P350: METHODOLOGY FOR LOAD PERIODS AND SAMPLE SETTLEMENT PERIODS - CONSULTATION

Target Audience	Transmission Company and BSC Parties
Date Published	15 May 2017
Deadline for Responses	**17:00 Wednesday 31 May 2017**
Summary	This paper details the proposed methodology for setting Load Periods and Sample Settlement Periods to be used in the derivation of Zonal Transmission Loss Factors, as required by Approved Modification P350 'Introduction of a seasonal Zonal Transmission Losses scheme'.

Responses to this consultation will be presented to the BSC Panel at its next meeting in June. The Panel will determine if a change needs to be made to the proposed methodology.

BSC Parties are invited to respond to this consultation using the consultation proforma available on the P350 Implementation page of the ELEXON website. Please return responses to P350Implementation@elexon.co.uk by 17:00 on Wednesday 31 May 2017. |

1. Introduction

1.1 Approved Modification P350 'Introduction of a seasonal Zonal Transmission Losses scheme' will introduce a Transmission Loss Factor (TLF) for each TLF Zone and BSC Season. The TLF Zones are aligned with the existing Grid Supply Point (GSP) Groups so transmission losses can be allocated on a geographical basis. The Competition and Markets Authority (CMA) is mandating, through secondary legislation and licence changes, an implementation date of 1 April 2018. This modification was approved by Ofgem on 24 March 2017.

1.2 The CMA stated P350 should be identical in its technical aspects to P229, except for the inclusion of a small number of additional solution elements that have emerged since P229 was progressed. These are:

- the treatment of Interconnectors and High Voltage Direct Current (HVDC) circuits that are internal to the Transmission System;
- National Grid's rights of 'step in'; and
- a new Transmission Loss Factor Adjustment value to neutralise the impact on certain strike price adjustments conducted outside the BSC by the Low Carbon Contracts Company for Contracts for Difference (CFD).

1.3 P350 requires that seasonal Zonal TLF values for each BSC Year (1 April to 31 March) are calculated in advance, using historic data from a 'Reference Year' (RY), running from 1 September to 31 August. Rather than using data for every half-hour Settlement Period in the RY, the P350 legal text (paragraph 7 of Annex T-2) requires the BSC Panel to identify representative Sample Settlement Periods (SSPs).

1.4 In order to do this, the BSC Panel must (after consultation with Transmission Company and other Parties) divide the RY into a number of different Load Periods (LPs), each "*representing (in the opinion of the Panel) typically different levels of load on the AC Transmission System, defined by time of day, day of week, season and such other factors as the Panel considers relevant*". The Panel must also specify a number of Sample Settlement Periods (SSPs) from each Load Period.

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1.5   These LPs and SSPs, when used to derive TLFs, will result in a representative annual average TLF for each zone. Note the RY will be divided in to BSC Seasons[1]

1.6   On the 11 May 2017, the Panel agreed the proposed methodology to be issued for consultation with the Transmission Company and BSC Parties, in accordance with the approved legal text for P350 (specifically Section T, Annex T-2, paragraph 7).

1.7   Parties' views will then be taken into account, and the LP and SSP methodology updated if required. It will then be presented to the BSC Panel for approval.

1.8   On or before the 31 August, ELEXON will notify the TLFA, the Transmission Company and Central Data Collection Agent (CDCA) of the LPs and SSPs for the Reference Year, and publish them on the BSC website.

2.   Data Analysis

2.1   It is not feasible to derive nodal TLFs for every SP, as metered data for every SP in the year would need to be input into the Load Flow Model (LFM). The LFM would then need to be run for each SP, or approximately 17,500 times. These outputs would then be used to produce a TLF per node and per SP, resulting in millions of pieces of data for analysis and manipulation to derive an annual average.

2.2   We suggest continuing to use the proposed LP and SSP methodology from previous related modifications (P82, P203 and P229). The analysis undertaken previously was refreshed to ensure it is still fit for purpose, and parties will be able to raise concerns as part of the consultation.

3.   Rationale for Proposed Load Periods

3.1   Using the previously stated methodology, data analysis was refreshed to determine the most appropriate way for dividing the RY (the period from 1 September 2016 to 31 August 2017) into LPs. As the data for 1 April to 30 August 2017 were not available, representative data from 1 April to 30 August 2016 was used in our analysis.

3.2   As before, the Initial Demand Out-turn (INDO) was chosen as being representative of the load on the Transmission System. INDO data has the added benefit of being published on BMRA and is available to both BSC Parties and any other interested parties. This was plotted for each SP in the data analysis period (see appendix 1, Graph 1.1 to 1.4), in order to determine whether any patterns of load were apparent.

3.3   On review of the results, a relatively simple trend became apparent. The load on the Transmission System can be divided into weekly periods, with incremental differences between each week. Furthermore, each week can be divided further into Business[2] and Non-Business Days (shown by a sharp decrease in INDO for weekends and Bank Holiday days). Hence we suggest selecting two LPs from each week, one for Business Days and one for Non-Business Days.

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[1] BSC Seasons are defined as: BSC Spring is 1 March to 31 May inclusive; BSC Summer is 1 June to 31 August inclusive; BSC Autumn is 1 September to 30 November inclusive; and BSC Winter is 1st December to 28th (or 29th, as the case may be) February inclusive, provided that the first relevant BSC Season shall be the period from the Go-live Date to the end of the next following BSC Season.

[2] Business Days are defined in the BSC as: 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 operating. In this instance they will be Electricity Forward Contract (EFA) days (23:00 to 23:00).

3.4 In a standard week, one LP would represent five Business Days and the second LP would represent two Non-Business Days. This is taken into account by paragraph 8.4 of Annex T-2 (which weights each Load Period in proportion to the number of Settlement Periods it contains).

3.5 This relatively simple approach would result in at least 104 LPs which reflect the differing loads on the Transmission System through the year. Note some years may have extra LPs if Bank Holidays occur mid-week and so are "islanded" from a weekend.

3.6 It is this proposed methodology for determining LPs that parties are asked to gives their views on through the consultation.

4. Rationale for Proposed Sample Settlement Periods

4.1 The LPs will be representative of how demand varies depending on time of year and day of the week, but will not be representative of variations in demand within a day (across the 48 periods).

4.2 Previous analysis plotted demand by SP, across each day for a sample month in each BSC season, to see how demand varies across the day. This analysis was refreshed for the current RY, and split into Business and Non-Business Days, with example graphs shown in appendix 2 (Graphs 2.1 to 2.8).

4.3 By splitting the day into a set of (equal) periods, each broadly representative of the load for that period, a representative SP can be chosen. This will ensure demand values used are not skewed towards peaks and troughs in load, and keep the number of SSPs to a manageable level. After analysing the data, dividing each day into six four hour blocks corresponding to Electricity Forward Agreement (EFA) Blocks[3] appears logical. To avoid doubt, on clock change days EFA Block 1 contains 3 hours (Spring) and 5 hours (Autumn).

4.4 Consideration was again given as to whether selecting multiple SPs for each EFA Block and LP would increase the representation of the SSPs. However this was discounted as the current proposed methodology is already representative of the load variations across each day, week and season.

4.5 The most representative SP from each LP and EFA Block was determined by averaging the INDO overall SPs in each EFA Block and LP, and identifying the SP with the INDO value closest to the average (see example in appendix 3). This provide six SSPs per LP (one SSP per EFA Block, with six EFA Blocks per LP), giving us at least 624 SSPs.

4.6 A comment was made at the BSC Panel meeting on 11 May that the Sample Settlement Periods selected by this methodology are not necessarily representative of all Settlement Periods in the EFA Block, because:

- The methodology chooses Settlement Periods with demands close to the average, and will therefore not include in the sample any 'outlier' Settlement Periods with extremely high or low values of demand; and

- The methodology selects Settlement Periods based only on total demand, (without regard to other factors, such as weather conditions or generation mix).

4.7 The first of these issues could potentially be addressed by including more Sample Settlement Periods in each EFA Block and/or selecting Sample Settlement Periods at random (so as to include a wider variety of Settlement Periods). We intend to investigate these options further, and report back to the BSC Panel meeting in June. However, the potential disadvantage of introducing such a change now is that it would introduce additional uncertainty into the 2018/19 TLF values (and would mean that they had been calculated on a different basis to the values presented to Ofgem in the P350 Modification Report).

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[3] EFA Block 1 is 23:00 to 03:00, EFA Block 2 is 3:00 to 07:00, EFA Block 3 is 07:00 to 11:00, EFA Block 4 is 11:00 to 15:00, EFA Block 5 is 15:00 to 19:00, and EFA Block 6 is 19:00 to 23:00

4.8   It is this proposed methodology for determining SSPs that parties are asked to gives their views on through the consultation.

5.   Next steps

5.1   Following the end of the consultation period, the P350 project team will consider all responses on their merits and the methodology updated if required. A second paper will then be presented to the BSC Panel in June to request approval of the methodology. We will include all consultation responses, and our actions in respect to them.

5.2   As the actual LPs and SSPs should be based on the most up-to-date data we have, we intend to use INDO data up to and including 30 June 2017 (1 July to 31 August 2016 demand data will be used to complete the RY) when calculating the actual LPs and SSPs. The chosen LPs and SSPs will be detailed in papers for the ISG (July 2017), and BSC Panel (August 2017), before being submitted on or before 31 August 2017.

5.3   You are invited to respond to this consultation using the consultation proforma. Please return responses to P350Implementation@elexon.co.uk by 17:00 on Wednesday 31 May 2017.

Appendices

Appendix 1 – INDO by Season (Graphs 1.1 to 1.4)

Appendix 2 – Initial Demand Out-turn INDO, by Settlement Period and Day, for first month of each Season (Graphs 2.1 to 2.8)

Appendix 3 – Worked example of how Settlement Period defined per EFA block and Load Period

For more information, please contact:

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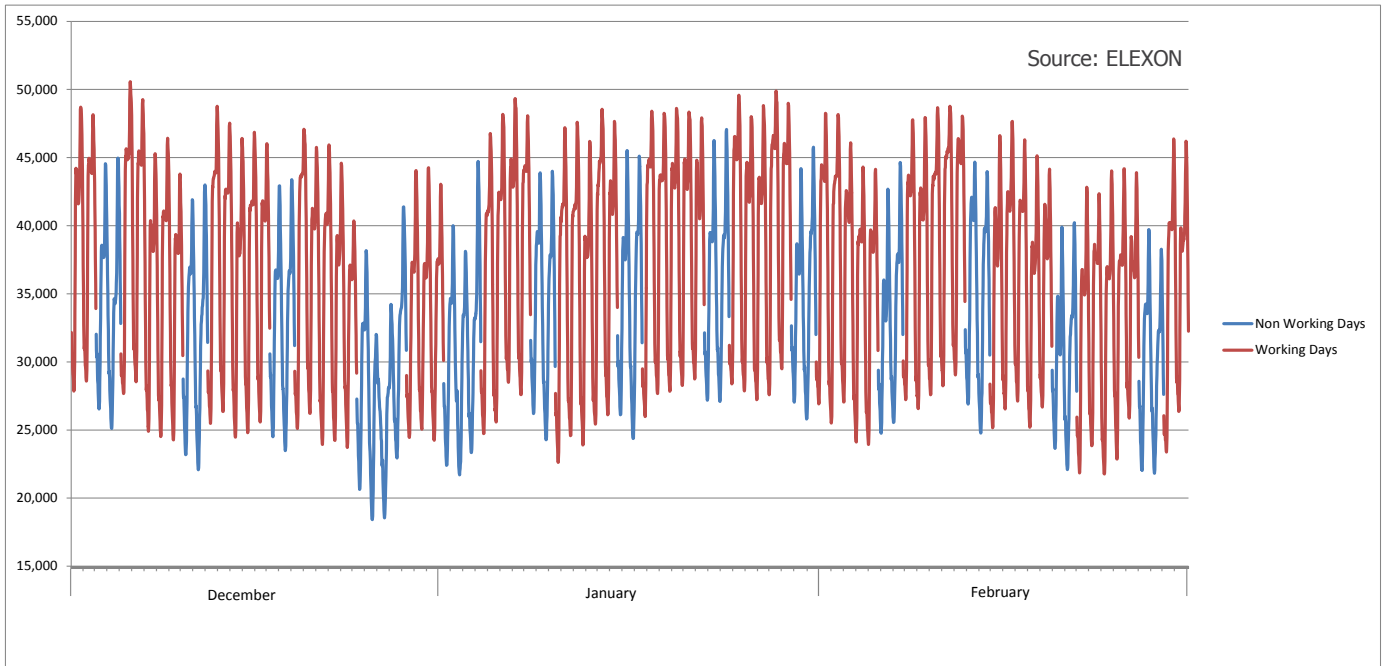
P350Implementation@elexon.co.uk

020 7380 4172

Appendix 1 - Initial Demand Out-turn (INDO) by Season.

Graph 1.1 – INDO for September to November
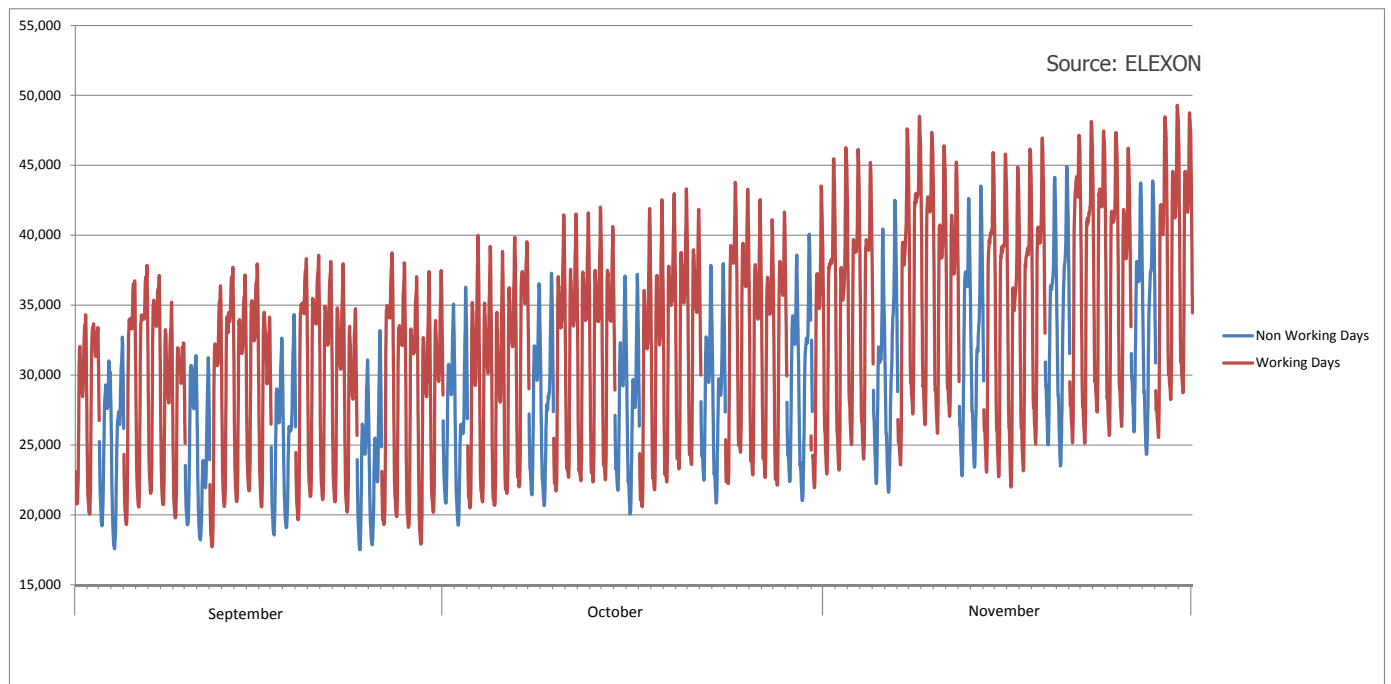
Graph 1.2 – INDO for December to February

Graph 1.3 – INDO for March to May
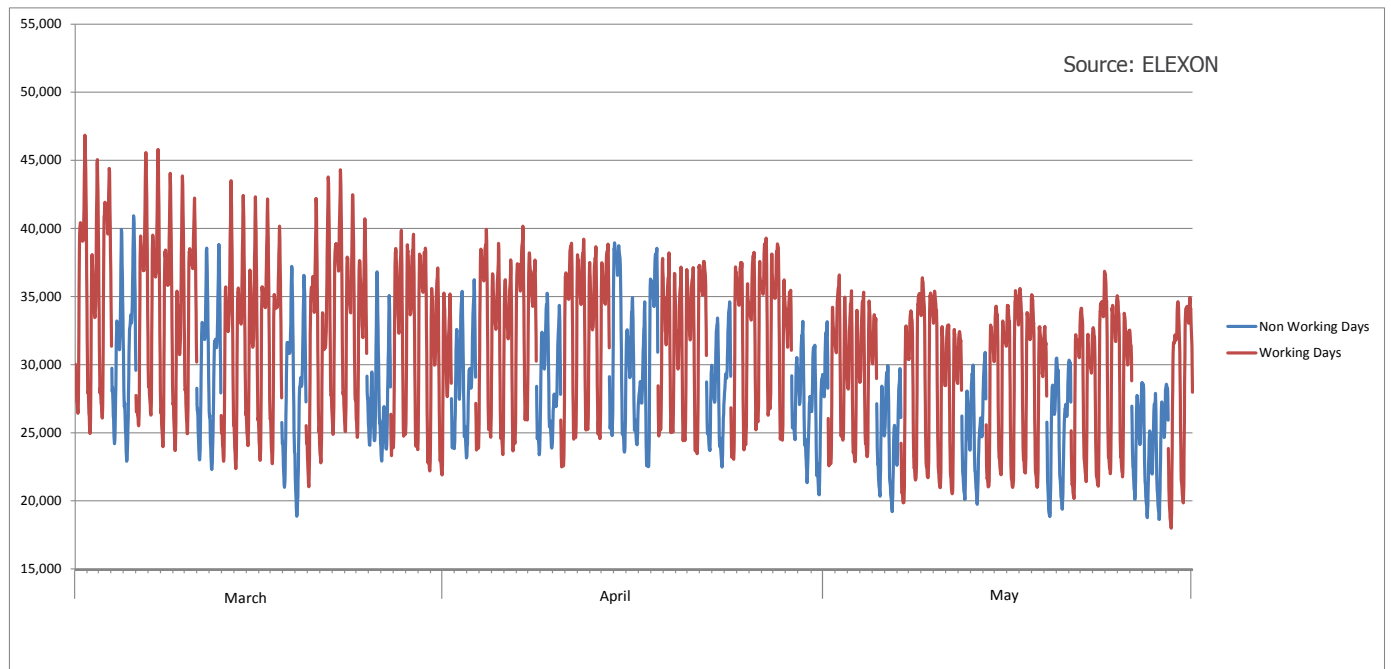
Graph 1.4 – INDO for June to August

Appendix 2 – Initial Demand Out-turn (INDO), by SP and Day, for first month of each Season

Graph 2.1 - September Non-Business Days
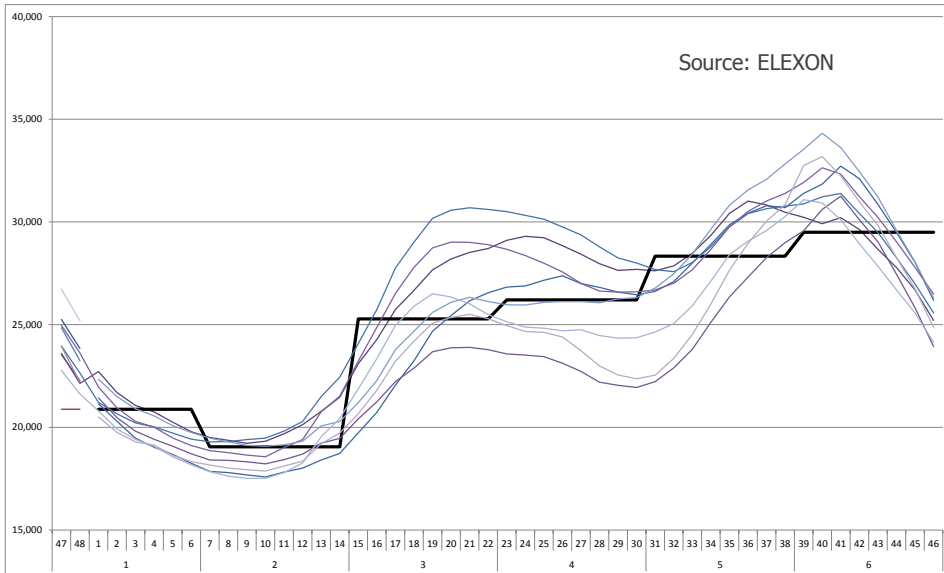
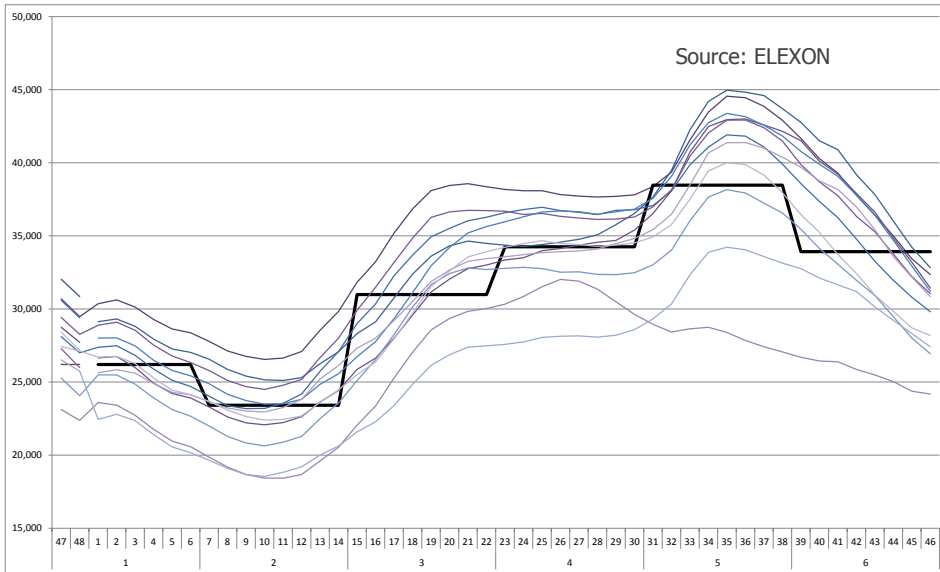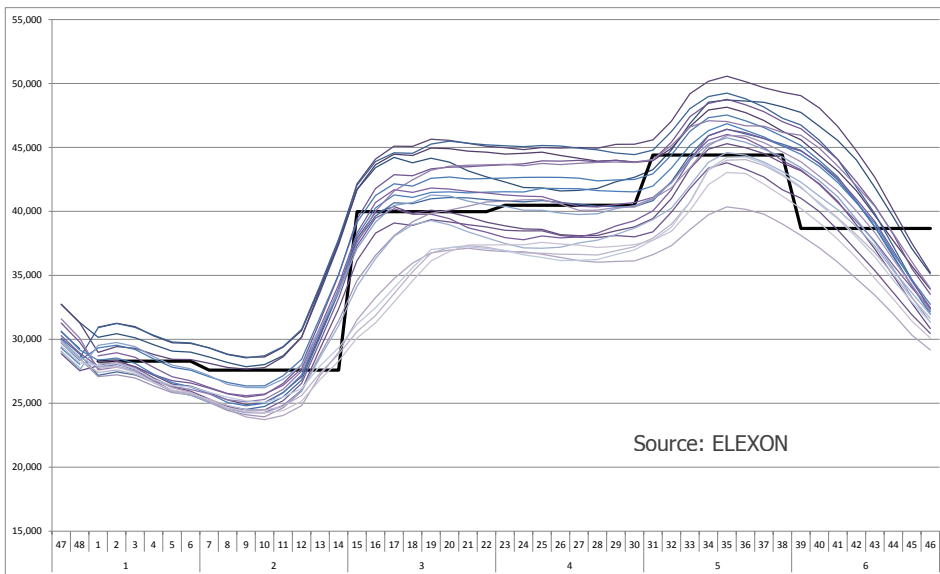Graph 2.2 - September Business Days
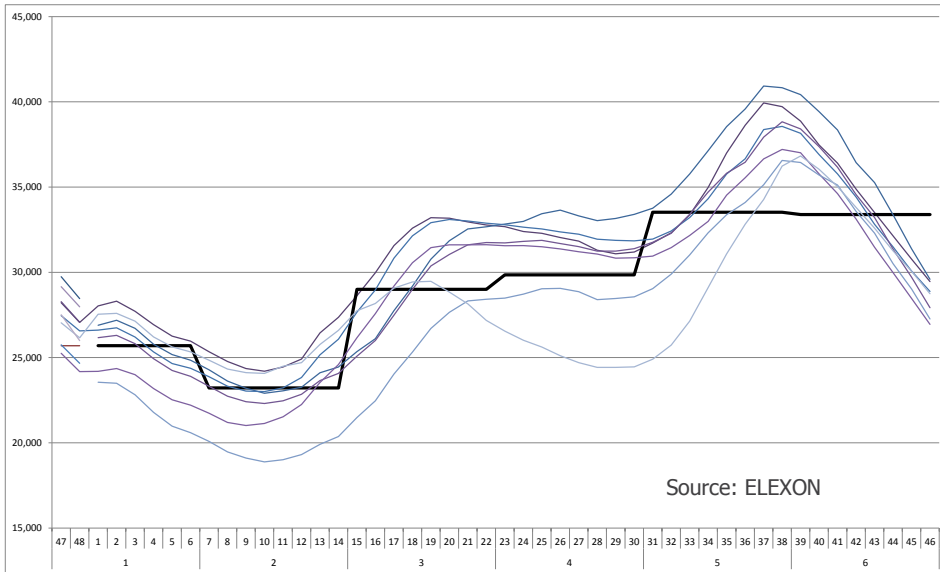
Graph 2.3 - December Non-Business Days

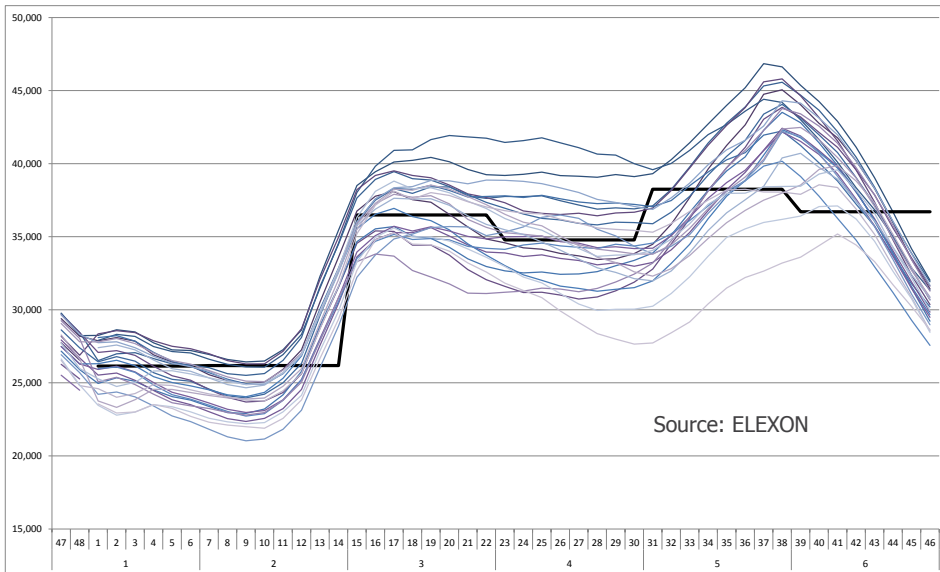Graph 2.4 - December Business Days

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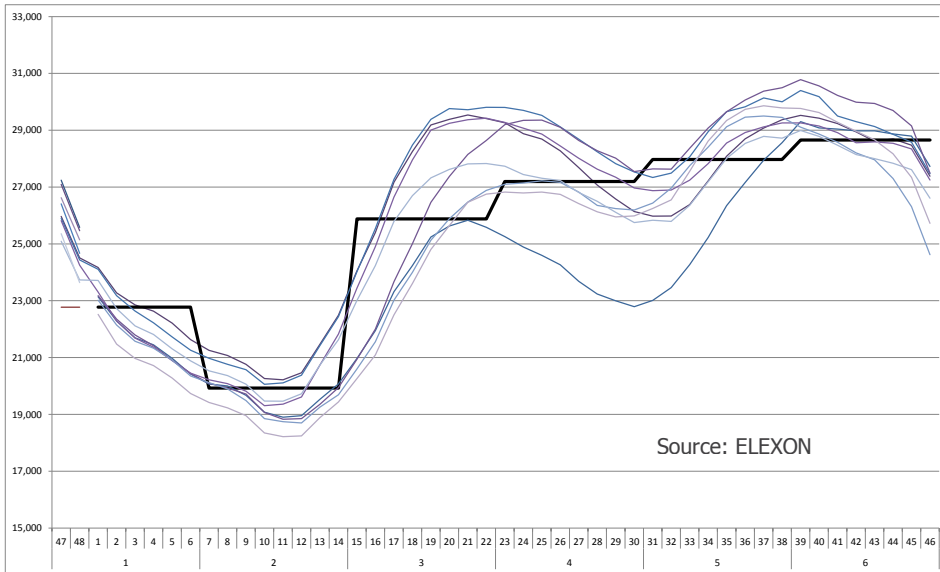
Graph 2.5 - March Non-Business Days
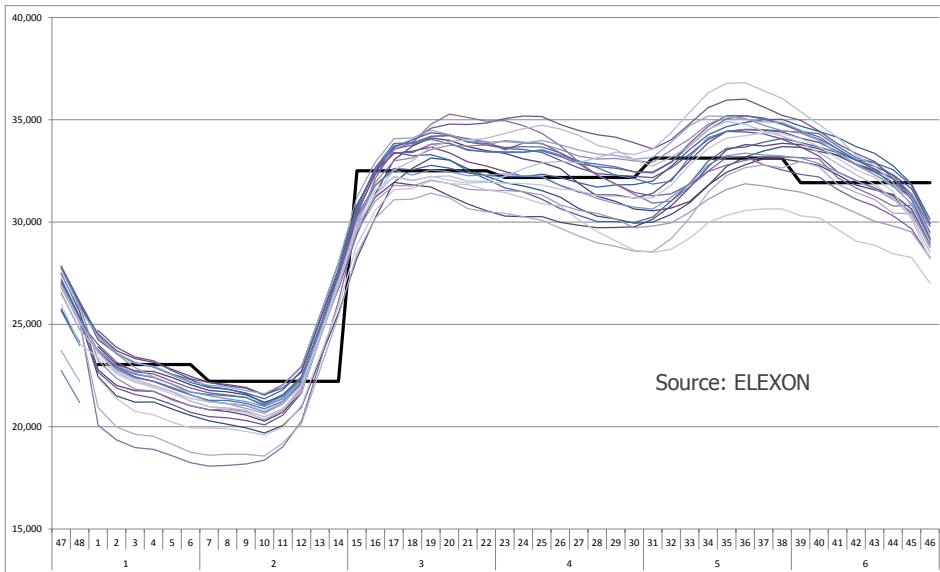

Source: ELEXON

Graph 2.6 - March Business Days

Source: ELEXON

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Graph 2.7 - June Non-Business Days

Source: ELEXON

Graph 2.8 - June Business Days

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Appendix 3 – Worked example of how SSPs defined per EFA Block and LP

The following example aims to show how a particular SSP is chosen for a particular EFA Block and LP, so as to be representation of load on the Transmission System.

Using a randomly picked LP (the weekend of 3 – 4 September 2016), the data is sorted into EFA Blocks. The average INDO for each EFA Block is derived by summing all values in the EFA Block, and dividing by the number of values. The SP with the closest INDO value to the average for this EFA Block is then chosen as the representative SSP for this EFA Block/LP:

Date	Settlement Period	EFA Block	INDO (MW)	Average INDO (MW)	Absolute Difference
02/09/2016	47	1	25250	21121	4129
02/09/2016	48	1	23836	21121	2715
03/09/2016	1	1	22714	21121	1593
03/09/2016	2	1	21688	21121	567
03/09/2016	3	1	21066	21121	55
03/09/2016	4	1	20747	21121	374
03/09/2016	5	1	20251	21121	870
03/09/2016	6	1	19784	21121	1337
03/09/2016	47	1	23595	21121	2474
03/09/2016	48	1	22142	21121	1021
04/09/2016	**1**	**1**	21145	**21121**	24
04/09/2016	2	1	20295	21121	826
04/09/2016	3	1	19464	21121	1657
04/09/2016	4	1	19031	21121	2090
04/09/2016	5	1	18684	21121	2437
04/09/2016	6	1	18249	21121	2872

Therefore SP 1, from 4 September 2016, would be one of the SSP used in calculating the Zonal TLFs for this BSC Season.

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