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Title: **Deliverable 3.4 "Review of ENWL's load allocation tool"**

Synopsis: This report presents an assessment of ENWL's load allocation tool. This has been done for 12 LV networks by comparing the results of the tool and the monitoring data.

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Prepared For: Rita Shaw
Future Networks Engineer
Electricity North West Limited, UK

John Simpson
LCN Tier 1 Project Manager
Electricity North West Limited, UK

Dan Randles
Technology Development Manager
Electricity North West Limited, UK

Prepared By: Dr Tuba Gozel
The University of Manchester
Sackville Street, Manchester M13 9PL, UK

Revised By: Dr Luis(Nando) Ochoa
The University of Manchester
Sackville Street, Manchester M13 9PL, UK

Contacts: Dr Luis(Nando) Ochoa
+44 (0)161 306 4819
luis.ochoa@manchester.ac.uk

Executive Summary

This report corresponds to Deliverable 3.4 "Review of ENWL's load allocation tool" part of the Low Carbon Network Fund Tier 1 project "LV Network Solutions" run by Electricity North West Limited (ENWL).

The aim of the LV Network Solutions project is to provide ENWL with greater understanding of the characteristics, behaviour, and future needs of their low voltage networks. This will be based on the analysis of data gathered by appropriate monitoring schemes to be deployed on hundreds of LV feeders and substations, and the assessment of the corresponding computer-based network models in current and future scenarios.

In particular, this report assesses the accuracy of ENWL's load allocation tool. In order to do this, monitoring data at the busbar level and at the head of each feeder are compared with the corresponding results produced by the tool. This has been done for 5 LV networks and 29 feeders. This is a subset of 12 LV networks and 53 feeders that were initially considered but had to be filtered due to issues with MPANs and significant discrepancies with the monitoring data.

As a summary, it is important to highlight the following:
- The average monitored inductive power factor of the 12 LV networks was 0.99.
- Significant discrepancies (>90%) were found in 24 feeders with less than 10 MPANs and/or with significant capacitive behaviour.
- From the 29 feeders used in the comparison with the tool (against monitoring data), daily energy errors were in average 26%. This value decreased to 7% for the corresponding 5 LV networks (i.e., network analysis rather than per feeder analysis).
- When comparing with the Elexon-based profiles (against monitoring data), the feeder average daily energy error was 29%. This value decreased to 16% when assessing the LV networks.
- The tool produced apparent powers per feeder that were in average 18% higher or lower than the maximum or minimum values from the monitoring data (30 minutes), respectively. This value decreased to 2% for the corresponding 5 LV networks (i.e., network analysis rather than per feeder analysis).
- The tool produced apparent powers per LV network that were in average 18% larger than the monitoring data for more than half of the day (in average 15 hours). For the rest of the day, apparent powers were in average 9% smaller.
- For most feeders and LV networks, seasonality did not have a significant effect on the errors, i.e., the proportion of error continued to be around the same value across the year.

Based on the above, the most important conclusions are:
- The ENWL's load allocation tool is capable of producing a good approximation (7% error) of daily energy consumption when considering the aggregated MPANs in a given LV network.
- In terms of apparent power (for a given LV network), the tool results most of the time in much larger values (daily average of 18%) than those monitored. However, when considering the minimum and maximum monitoring values every 30 minutes, the tool's apparent powers were, in average, no further than 2%.
- One particular improvement that can be easily implemented is the adoption of a power factor much closer to unity.

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1 Introduction

As part of the transition towards a low carbon economy, Electricity North West Limited (ENWL), the Distribution Network Operator of the North West of England, is involved in different projects funded by the Low Carbon Network Fund. The University of Manchester is part of the Tier 1 project "LV Network Solutions".

The objective of this project is to provide ENWL with greater understanding of the characteristics, behaviour, and future needs of their LV networks. This will be based on the analysis of data gathered by appropriate monitoring schemes to be deployed on hundreds of LV feeders and substations, and the assessment of the corresponding computer-based network models in current and future scenarios.

This report assesses the accuracy of ENWL's load allocation tool. In order to do this, monitoring data at the busbar level and at the head of each feeder are compared with the corresponding results produced by the tool. This has been done for 5 LV networks and 29 feeders. This is a subset of 12 LV networks and 53 feeders that were initially considered but had to be filtered due to issues with MPANs and significant discrepancies with the monitoring data.

The main findings are listed below:
5 LV Networks
- From the comparison with the monitoring data, daily energy consumption errors were in average 7%.
- The average daily absolute errors of the apparent and active power were 16% and 19%, respectively.
- The tool produced apparent powers that were in average 2% higher or lower than the maximum or minimum values from the monitoring data (30 minutes), respectively.
- The tool produced apparent powers that were in average 18% larger than the monitoring data for more than half of the day (in average 15 hours). For the rest of the day, apparent powers were in average 9% smaller.

29 feeders
- From the comparison with the monitoring data, daily energy consumption errors were in average 26%.
- The average daily absolute errors of the apparent and active power were 38%.
- The tool produced apparent powers that were in average 18% higher or lower than the maximum or minimum values from the monitoring data, respectively.
- For 20 of the feeders analysed, the tool produced apparent powers that were in average 42% larger than the monitoring data for more than half of the day (in average 17 hours). For the rest of the day, apparent powers were in average 14% smaller.
- For 9 of the feeders analysed, the tool produced apparent powers that were in average 17% larger than the monitoring data for less than a quarter of the day (in average 2 hours). For the rest of the day, apparent powers were in average 41% smaller.

It is also important to highlight the following:
- The average monitored inductive power factor of the 12 LV networks was 0.99.
- Significant discrepancies (>90%) were found in 24 feeders with less than 10 MPANs and/or with significant capacitive behaviour.
- When comparing with the Elexon-based profiles, the feeder average daily energy error was 29%. This value decreased to 16% when assessing the LV networks.
- For most feeders and LV networks, seasonality did not have a significant effect on the errors, i.e., the proportion of error continues to be around the same value across the year.

2   Methodology to Assess ENWL's Load Allocation Tool

ENWL's load allocation tool is assessed by comparing the results produced by the tool with the corresponding monitoring data at the busbar level and at the head of the feeders. The methodology proposed here is applied to 12 LV networks and their 53 feeders.

To evaluate the tool, firstly, the monitoring data of 12 LV networks is processed to select only high quality data sets. MPAN type and number are obtained from GIS for each LV network. MPAN numbers adopted by ENWL's tool are then compared with those from the GIS data. Those feeders with discrepancies of more than two MPANs are not taken into consideration. Finally, the performance of the tool is evaluated using energy and power metrics against values from the monitoring data.

In this section, the specifications of the 12 LV networks and details of the proposed methodology are presented.

2.1   Specifications of LV Networks

The methodology proposed here is applied to 12 LV networks and their corresponding 53 feeders. The results produced by ENWL's load allocation tool are examined with the monitoring data of these LV networks (head of feeders and busbar level) for a number of days. The corresponding days have been selected based on the monitoring data quality. Only monitoring data with less than 1% missing values is taken in account.

Due to the quality of the data adopted, some LV networks have more available days to be analysed than others. For instance, the substation 450028 Whitebirk Drive with seven feeders has fifteen days' worth of data. On the other hand, the substation 455031 Holden with one feeder has more than fifty days. Table 1 shows the number of LV ways and days with data for each LV networks.

Table 1 Number of ways and days with data analysis for the 12 LV Networks

Plant Ref	Site Name	# LV Ways	# Days
212623	School St	4	16
232526	Pilkington Rd	4	16
331244	Prestbury	5	16
332670	Cedar Road	6	25
333008	Windermere Rd	5	17
333939	Shrigley Close	5	23
333944	Lyngard Close	4	21
337699	Welland Road	4	22
410428	Fulwood Barracks North	3	34
410699	West Park Avenue	6	23
450028	Whitebirk Drive	7	15
455031	Holden	1	56

The customer numbers of these LV networks range from 30 to 272. The customer and PV composition (in percentage) of each network is presented in Table 2. Four LV networks have domestic customers (PC1, PC2), five have domestic and small non-domestic customers (PC1-PC4), and the rest have mixed customers (PC0-PC8). Two LV networks have 1.5% PV penetration (in terms of number of customers). This information was obtained from the corresponding GIS data.

Table 2 MPAN Specifications of the 12 LV Networks

Plant Ref	Site Name	# MPANs	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	%PV
212623	School St	254	96.0 / 2.7 / 1.1 / 0.0 / 0.0 / 0.0	
232526	Pilkington Rd	272	88.2 / 6.2 / 4.7 / 0.3 / 0.3 / 0.0	
331244	Prestbury	140	85.7 / 6.4 / 6.4 / 0.7 / 0.0 / 0.7	
332670	Cedar Road	195	94.8 / 5.1 / 0.0 / 0.0 / 0.0 / 0.0	1.5
333008	Windermere Rd	135	95.5 / 4.4 / 0.0 / 0.0 / 0.0 / 0.0	1.4
333939	Shrigley Close	166	91.5 / 7.2 / 0.6 / 0.6 / 0.0 / 0.0	
333944	Lyngard Close	207	96.6 / 2.4 / 0.9 / 0.0 / 0.0 / 0.0	
337699	Welland Road	98	97.9 / 1.0 / 1.0 / 0.0 / 0.0 / 0.0	
410428	Fulwood Barracks North	71	100 / 0.0 / 0.0 / 0.0 / 0.0 / 0.0	
410699	West Park Avenue	129	93.0 / 6.9 / 0.0 / 0.0 / 0.0 / 0.0	
450028	Whitebirk Drive	212	87.6 / 1.9 / 8.4 / 0.0 / 1.2 / 0.6	
455031	Holden	30	76.6 / 13.3 / 3.3 / 6.6 / 0.0 / 0.0	

2.1 MPAN Analysis

After obtaining the MPAN information for the 12 LV networks and their corresponding 53 feeders, the total counts adopted by ENWL's tool are compared with those from the GIS data. Those LV networks and feeders with discrepancies of more than two MPANs are not taken into consideration. This section gives the details of this analysis.

From the 53 feeders, it was found that 41 feeders had no MPAN discrepancies between ENWL's tool and GIS data. However, 12 feeders did have mismatches in the total counts of MPANs.

The monitoring data was then used to double check the validity of the 41 feeders above. Based on daily energy consumption, 5 feeders were excluded. These 5 feeders had apparently no MPANs but consumption was recorded. In addition, 1 feeder was also excluded given that no consumption was recorded but apparently had customers.

From the 12 LV networks, it was found that 5 LV networks had no MPAN discrepancies among ENWL's tool and the GIS data. This was also checked with the monitoring data. However, 6 LV networks did have MPAN discrepancies between ENWL's tool and GIS data. In addition, one LV network had discrepancies with the monitoring data (one feeder with no MPAN consumed energy).

In conclusion, 35 feeders and 5 LV networks were considered to be correct in terms of MPAN count and the expected correlation with the monitoring data.

The breakdown of the analysis is given in Table 6 and Table 7 in the Appendix.

2.2 ENWL's Load Allocation Tool vs. Monitoring Data

For illustration purposes, feeder 277058964 of the 331244 substation Prestbury will be used for the comparison. MPAN specifications of feeder 277058964 are shown in Table 3. This feeder has 62 MPANs; most of them are PC1 customers, 2 and 1 are PC2 and PC3, respectively. ENWL's load allocation tool uses customer information different from the GIS data. In this particular case, according to the ENWL's tool source, this feeder has 63 MPANs.

Table 3 MPAN Specifications of feeder 277058964

FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0
277058964	16	63	62	95.1 / 3.2 / 1.6 / 0.0 / 0.0 / 0.0

The proposed methodology is applied to feeder 277058964 for sixteen days as seen in Table 3. This means that sixteen days match with the results produced by the tool and the corresponding monitoring data with 99% quality. However, the comparison in this section is illustrated for only one day.

The results produced by the tool from the 331244 substation Prestbury on the 14th January 2013 at the head of the feeder 277058964 are shown in Figure 1 (for the whole day). The three-phase active, reactive and apparent powers are presented. The sampling rate of these results is 30 minutes. The power factor for all results produced by the tool is 0.95.
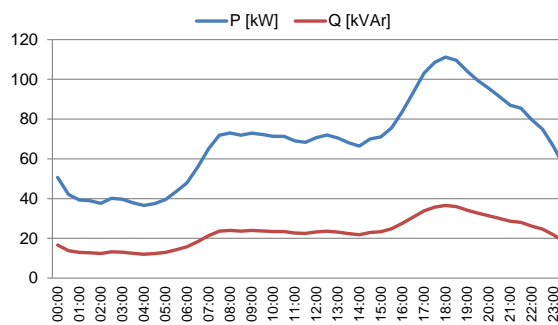

Figure 1 Results produced by the ENWL's tool for feeder 277058964

From the monitoring data of feeder 277058964 (14th January 2013), active and reactive powers for phases A, B and C are presented with minimum and maximum values in Figure 2. The sampling rate of the monitoring data is 10 minutes.
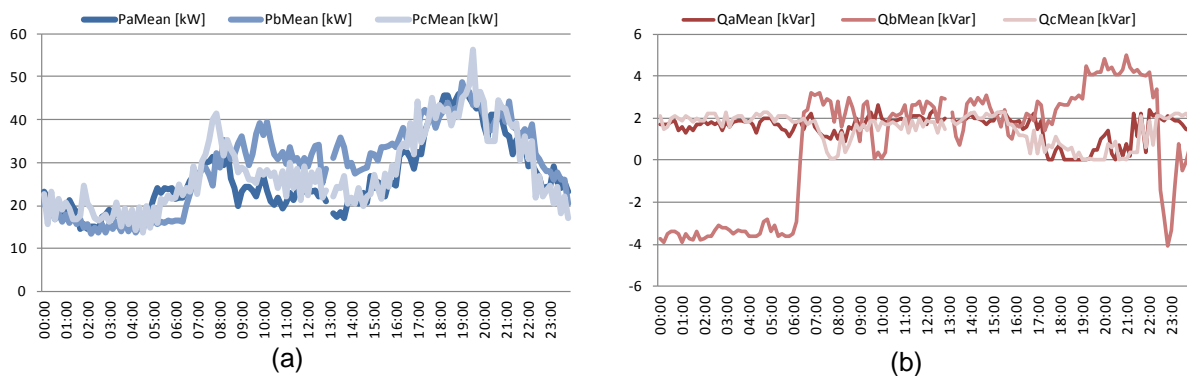

(a)   (b)

Figure 2 Monitoring data for feeder 277058964

In order to compare the results produced by the tool and the corresponding monitoring data, first it is needed to decrease the granularity of the latter. Then, three-phase active, reactive and apparent powers are calculated. Figure 3 shows the corresponding values throughout the day for both results produced by the ENWL's tool and the monitoring data. The pattern of the apparent powers show an overall match and the active powers are close to the lower monitoring values. However, for the reactive powers, significantly overestimates the values. Nonetheless, for review purposes, it is crucial to quantify this match for all sixteen days.
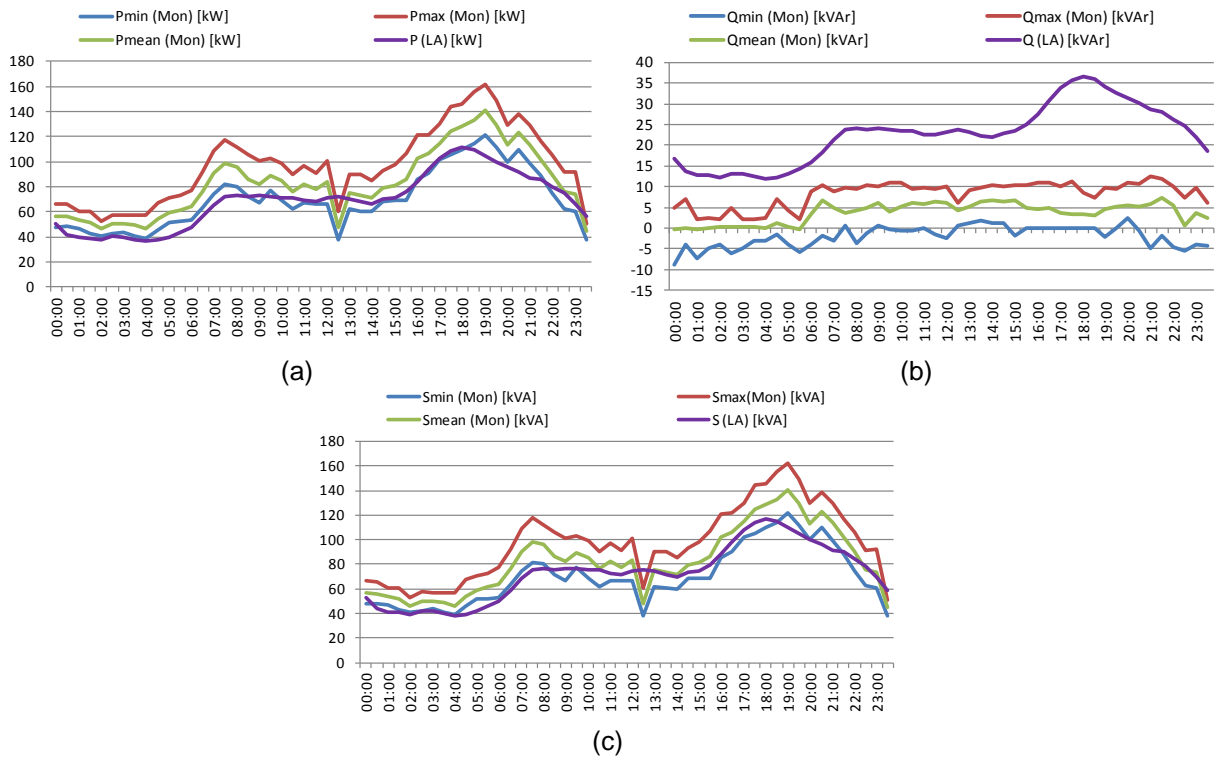
(a)

(b)

(c)

Figure 3 Results produced by the tool vs. Monitoring Data, feeder 277058964

To understand how far the results produced by the tool are from the monitoring data, the apparent power is examined with three parameters: mean, minimum and maximum values. First, the results are compared with the mean values of the monitoring data (Figure 4-a). Then, the results are examined with the minimum and maximum values of the monitoring data (Figure 4-b). The errors throughout a day are given in Figure 4-c and Figure 4-d, respectively. Note that the errors in the latter figure are calculated by considering the values outside the minimum and maximum monitoring data. It can be seen that the apparent power error reaches 60% with an average error of 15%. The average error considering the minimum and maximum monitoring data is 4% for this day.
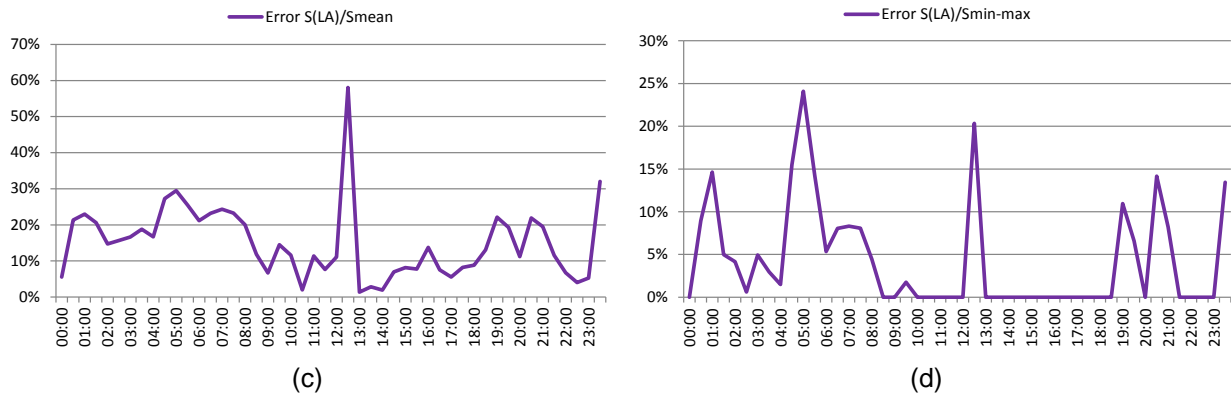

(a)

(b)
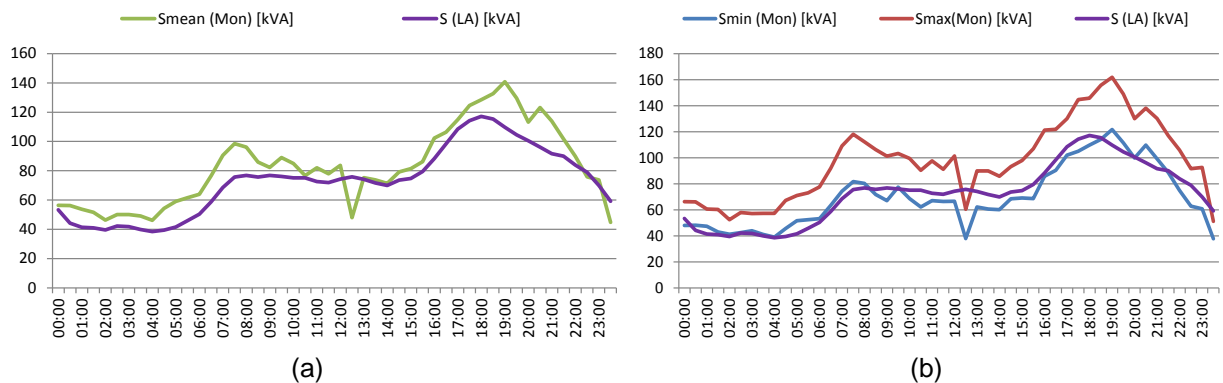
Figure 4 Error analysis of apparent power

2.3   Assessment Metrics

The proposed methodology compares the total energy consumptions throughout the day of a given feeder considering the results produced by the ENWL's tool, E(LA), the monitoring data, E(Mon), and also Elexon-based profiles, E(Elexon). Two comparison are carried out: one between the results produced by the tool and the monitoring data, Err E(LA), and another between the Elexon-based profiles and the monitoring data, Err E(Elexon). These comparisons help understanding the extent to which the ENWL's load allocation tool and the Elexon-based profiles match the monitoring data. In some cases, the comparison also highlights the potential discrepancies between the real number of customers connected to feeder or LV network and that used by ENWL.

The methodology considers the average daily absolute errors of the apparent and active powers, S(LA) and P(LA), as well as the apparent power error relative to the minimum or maximum monitoring data from the 30 minute period, S(LA)/Smin-max. In addition to these, other metrics are considered to: provide the frequency of the apparent power larger than the monitoring data, %Freq S(LA)>S(Mon), and to calculate the average error when the apparent power is larger, Error S(LA)>S(Mon), and smaller, Error S(LA)<S(Mon), than the monitoring data.

The proposed energy and power metrics are used to assess ENWL's load allocation tool per feeder and per LV network for all the corresponding available days. The power metrics are also used to assess the effects of seasonality (weekdays, winter, spring and summer).

To illustrate the methodology, daily energy consumptions and energy metrics of feeder 277058964 for each of the available sixteen days are given in Figure 5. The average values for this period are presented in Table 4. It can be clearly seen that the results produced by the ENWL's tool have an error of 13% relative to the monitoring data. This is much smaller than the error resulting from the Elexon-based profiles (in average 55%).
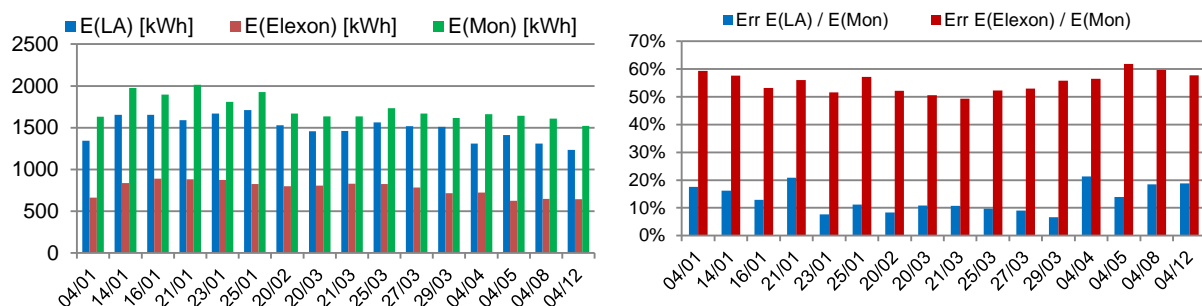

Figure 5 Daily energy consumptions and daily energy metrics of feeder 277058964

Table 4 Energy metrics of feeder 277058964

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)
All days	1495.548	773.1883	1727.28	13.38	55.25

The average daily absolute errors of the apparent and active power as well as that relative to the minimum or maximum monitoring values (30 minutes) for the feeder 277058964 are shown in Figure 6. The results produced by the ENWL's tool are outside the minimum and maximum monitoring values by 10% in average. The daily average absolute error of the apparent power ranges from 10% to 20%. These values increase slightly (around 2% more) for the active power.
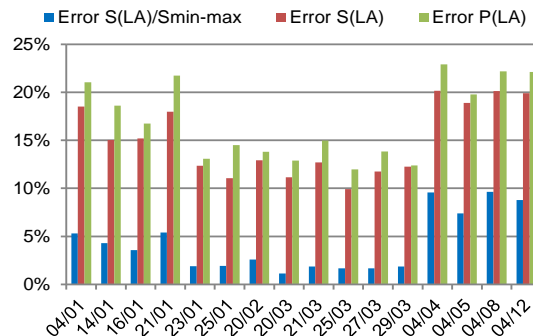

Figure 6 Daily apparent and active power metrics of feeder 277058964

Figure 7 shows the daily apparent power error metrics that quantify the how much larger or smaller the tool's values were from the monitoring data. The frequency for the former is also presented. According to the figure, when the results produced by the tool are larger this can exceed from 10% to 50% the monitoring values. When they are smaller, they can be 10% to 20% from the actual values. In average, larger results occur less than 10 hours per day.
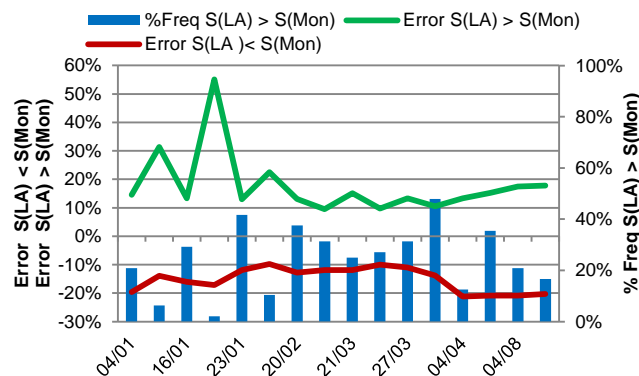

Figure 7 Daily apparent power error metrics of feeder 277058964

Table 5 gives the power metrics for all days, weekdays, winter, spring and summer. Apart from the summer days, there are no major differences among the metrics. When all days are considered, the results produced by the tool are in average around 4% outside the minimum or maximum monitoring values (30 minutes). The average daily absolute error of the apparent power is around 15%, only 2% below the active power error. The results produced by the ENWL's tool are during three quarters of the day smaller than the monitoring data by 15%. For a quarter of the day, they are larger by 18%.

Table 5 Power metrics of feeder 277058964

	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	4.28	15.00	17.04	-15.19	17.81	24.74
Weekdays	14	3.68	14.35	16.48	-14.38	18.01	24.26
Winter	8	4.21	15.37	17.71	-15.18	22.58	20.57
Spring	7	3.59	13.84	15.54	-14.39	12.40	30.06
Summer	1	9.62	20.12	22.17	-20.82	17.49	20.83

The above analysis is carried out for 12 LV networks. In addition, 35 feeders (with matching MPAN numbers between ENWL's tool and GIS) are also analysed. Both are presented in the second part of the Appendix.

3 LV Networks and Feeders: Analysis

Before the ENWL's load allocation tool can be assessed by comparing the proposed energy and power metrics calculated for the 35 feeders and the 5 LV networks, an initial check of the monitoring data is carried out to exclude those with potential issues.

It was found that one of the feeders had active powers of two phases always with negative values (no distributed generation was present according to the data). Other five feeders were found to have the daily energy consumption error above 90%. These 6 feeders were removed from the assessment.

The ENWL's load allocation tool is, therefore, assessed considering a total of 29 feeders and the 5 LV networks. The main findings are listed below:

5 LV networks
- From the comparison with the monitoring data, daily energy consumption errors were in average 7%.
- The average daily absolute errors of the apparent and active power were 16% and 19%, respectively.
- The tool produced apparent powers that were in average 2% higher or lower than the maximum or minimum values from the monitoring data (30 minutes), respectively.
- The tool produced apparent powers that were in average 18% larger than the monitoring data for more than half of the day (in average 15 hours). For the rest of the day, apparent powers were in average 9% smaller.

29 feeders
- From the comparison with the monitoring data, daily energy consumption errors were in average 26%.
- The average daily absolute errors of the apparent and active power were 38%.
- The tool produced apparent power that was in average 18% higher or lower than the maximum or minimum values from the monitoring data, respectively.
- For 20 of the feeders analysed, the tool produced apparent powers that are in average 42% larger than the monitoring data for more than half of the day (in average 17 hours). For the rest of the day, apparent powers were in average 14% smaller.
- For 9 of the feeders analysed, the tool produced apparent powers that were in average 17% larger than the monitoring data for less than a quarter of the day (in average 2 hours). For the rest of the day, apparent powers were in average 41% smaller.

It is also important to highlight the following:
- The average monitored inductive power factor of the 12 LV networks was 0.99.
- Significant discrepancies (>90%) were found in 24 feeders with less than 10 MPANs and/or with significant capacitive behaviour.
- When comparing with the Elexon-based profiles, the feeder average daily energy error was 29%. This value decreased to 16% when assessing the LV networks.
- For most feeders and LV networks, seasonality did not have a significant effect on the errors, i.e., the proportion of error continues to be around the same value across the year.

4 Conclusions

This report assessed the accuracy of ENWL's load allocation tool. In order to do this, monitoring data at the busbar level and at the head of each feeder were compared with the corresponding results produced by the tool. This has been done with energy and power metrics for 5 LV networks and 29 feeders. This is a subset of 12 LV networks and 53 feeders that were initially considered but had to be filtered due to issues with MPANs and significant discrepancies with the monitoring data.

As a summary, it is important to highlight the following:

- The average monitored inductive power factor of the 12 LV networks was 0.99.
- Significant discrepancies (>90%) were found in 24 feeders with less than 10 MPANs and/or with significant capacitive behaviour.
- From the 29 feeders used in the comparison with the tool (against monitoring data), daily energy errors were in average 26%. This value decreased to 7% for the corresponding 5 LV networks (i.e., network analysis rather than per feeder analysis).
- When comparing with the Elexon-based profiles (against monitoring data), the feeder average daily energy error was 29%. This value decreased to 16% when assessing the LV networks.
- The tool produced apparent powers per feeder that were in average 18% higher or lower than the maximum or minimum values from the monitoring data (30 minutes), respectively. This value decreased to 2% for the corresponding 5 LV networks (i.e., network analysis rather than per feeder analysis).
- The tool produced apparent powers per LV network that were in average 18% larger than the monitoring data for more than half of the day (in average 15 hours). For the rest of the day, apparent powers were in average 9% smaller.
- For most feeders and LV networks, seasonality did not have a significant effect on the errors, i.e., the proportion of error continued to be around the same value across the year.

Based on the above, the most important conclusions are:

- The ENWL's load allocation tool is capable of producing a good approximation (7% error) of daily energy consumption when considering the aggregated MPANs in a given LV network.
- In terms of apparent power (for a given LV network), the tool results most of the time in much larger values (daily average of 18%) than those monitored. However, when considering the minimum and maximum monitoring values every 30 minutes, the tool's apparent powers were, in average, no further than 2%.
- One particular improvement that can be easily implemented is the adoption of a power factor much closer to unity.

5 Appendix

This section consists of two parts. In the first part, the breakdown of the MPAN analysis is given for 12 LV networks and 53 feeders. The second part includes detailed analysis for each of the 12 LV networks and 35 feeders (same MPAN number in both the tool and GIS sources).

5.1 Breakdown of the MPAN Analysis

MPAN numbers adopted by ENWL's tool and from the GIS data are listed in Table 6 and Table 7 for the 12 LV networks and the 53 feeders, respectively. The LV networks and the feeders are shown with different colours. For example, the LV networks and the feeders used for the assessment are shown in blue. The explanation of the colours for Table 6 and Table 7 is as follows:

Colour Explanation for Table 6 and Table 7

	LV networks/feeders used for the assessment
	LV networks/feeders with MPAN discrepancies
	Feeders removed from the assessment
	Feeders with no MPAN information
	Feeder with no monitoring data
	Feeder with problematic monitoring data
Red	Mismatch in the MPAN count

Table 6 Results of MPAN analysis for 12 LV networks

Plant Ref	Site Name	# MPANs (ENWL LA)	# MPANs (GIS)
450028	Whitebirk Drive	212	212
332670	Cedar Road	197	195
331244	Prestbury	142	140
333008	Windermere Rd	135	135
455031	Holden	30	30
333939	Shrigley Close	212	166
410699	West Park Avenue	140	129
212623	School St	117	254
232526	Pilkington Rd	276	272
410428	Fulwood Barracks North	71	71
337699	Welland Road	163	98
333944	Lyngard Close	409	207

Table 7 Results of MPAN analysis for 53 feeders (Part 1)

Plant Ref	Site Name	FID	# MPANs (ENWL LA)	# MPANs (GIS)
333939	Shrigley Close	272040682	48	48
410699	West Park Avenue	145063163	30	30
332670	Cedar Road	263050494	40	40
333008	Windermere Rd	275033193	36	36
332670	Cedar Road	263050493	41	40
331244	Prestbury	277058902	41	41
331244	Prestbury	277058926	19	17
333944	Lyngard Close	271014800	49	49
337699	Welland Road	271014944	35	35
332670	Cedar Road	263068150	13	13
450028	Whitebirk Drive	113038448	31	31
333939	Shrigley Close	272040680	36	36
455031	Holden	39031026	30	30
331244	Prestbury	277058964	63	62
332670	Cedar Road	263050454	47	47
332670	Cedar Road	263050491	30	30
212623	School St	70066965	78	77
410699	West Park Avenue	145063162	14	14
332670	Cedar Road	263050453	26	25
333939	Shrigley Close	272040685	38	38
450028	Whitebirk Drive	113038450	41	41
212623	School St	70066983	39	39
333008	Windermere Rd	275033196	45	45
410699	West Park Avenue	145063164	24	24
333008	Windermere Rd	275033194	15	15
232526	Pilkington Rd	80033150	38	38
450028	Whitebirk Drive	113038447	36	36
410428	Fulwood Barracks North	142012016	46	46
410428	Fulwood Barracks North	142012020	25	25

Table 7 Results of MPAN analysis for 53 feeders (Part 2)

Plant Ref	Site Name	FID	# MPANs (ENWL LA)	# MPANs (GIS)
331244	Prestbury	277058946	4	5
450028	Whitebirk Drive	113038449	7	6
333008	Windermere Rd	275033195	26	26
333008	Windermere Rd	275033197	13	13
410699	West Park Avenue	145063161	18	18
232526	Pilkington Rd	80033146	31	0
450028	Whitebirk Drive	113038446	56	38
333944	Lyngard Close	271014801	74	43
450028	Whitebirk Drive	113038444	21	0
337699	Welland Road	271014950	41	23
410699	West Park Avenue	145063165	54	43
337699	Welland Road	271014945	87	40
333944	Lyngard Close	271014803	95	80
333944	Lyngard Close	271014804	191	35
232526	Pilkington Rd	80033178	150	177
333939	Shrigley Close	272040686	90	44
450028	Whitebirk Drive	113038445	10	2
212623	School St	70066993	0	138
212623	School St	70066980	0	0
333939	Shrigley Close	272040679	0	0
410428	Fulwood Barracks North	142012034	0	0
410699	West Park Avenue	145060931		0
232526	Pilkington Rd	80033182	57	57
331244	Prestbury	277058912	15	15

5.2 LV Network Analysis

5.2.1 212623 (School St) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
212623	Busbar	16	117	254	96.0 / 2.7 / 1.1 / 0 / 0 / 0	0

Daily energy consumptions
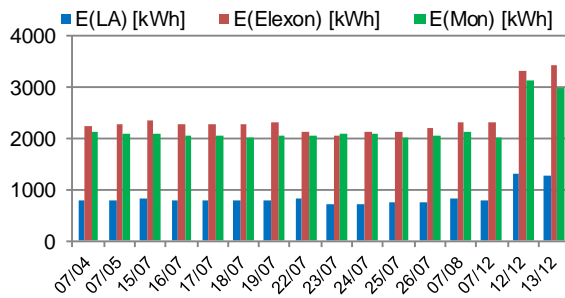
Daily energy consumption errors
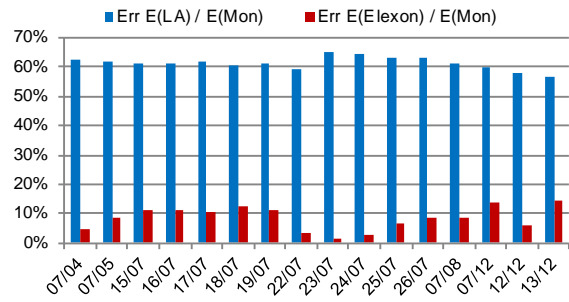
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	849.9041	2372.22574	2187.7771	61.36	8.55	0.987		0.00

Daily apparent & active power errors
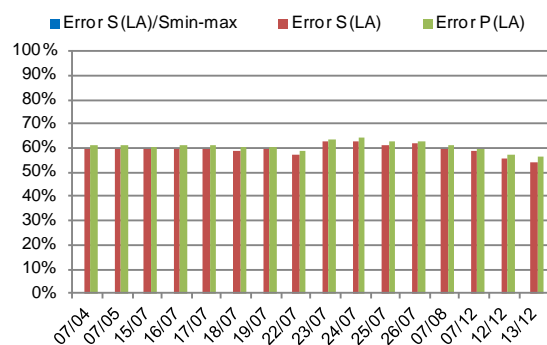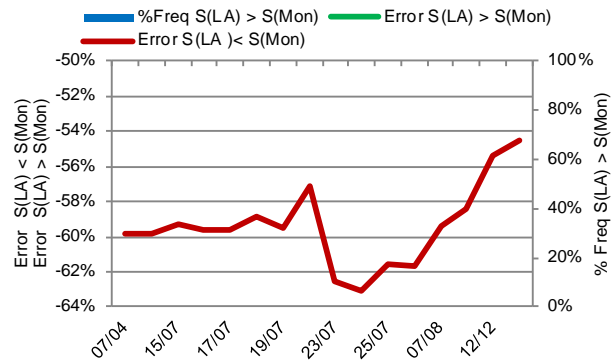
Daily apparent power errors

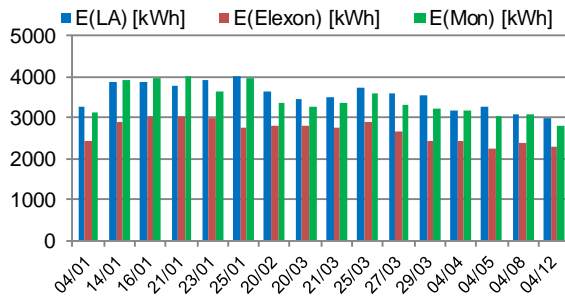|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16		59.40	60.90	-59.40		0.00
Weekdays	14		59.44	60.93	-59.44		0.00
Winter	3		56.12	58.02	-56.12		0.00
Spring	2		59.82	61.49	-59.82		0.00
Summer	11		60.21	61.58	-60.21		0.00

Comments:

- This LV network has **4** feeders and **254** mixed customers (137 less customers in ENWL's load allocation tool); the average of power factor is 0.**987** and always **inductive**.
- In terms of energy consumption, the results produced by the tool have an error of **61%** relative to the monitoring data and the error resulting from Elexon-based profiles are in average **8.5%.**
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.2   232526 (Pilkington Rd) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
232526	Busbar	16	276	272	88.2 / 6.2 / 4.7 / 0.3 / 0.3 / 0	0

Daily energy consumptions
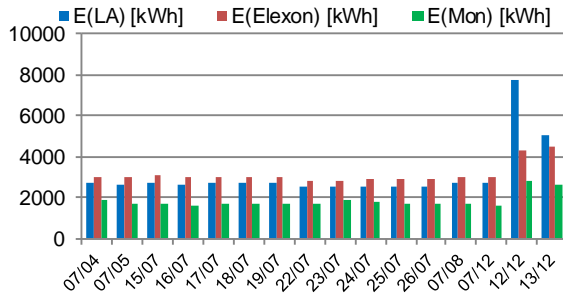
Daily energy consumption errors
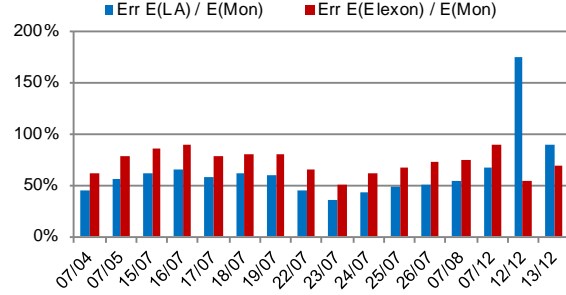
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	3089.769	3146.92005	1838.1096	63.47	72.33	0.979		0.00

Daily apparent & active power errors
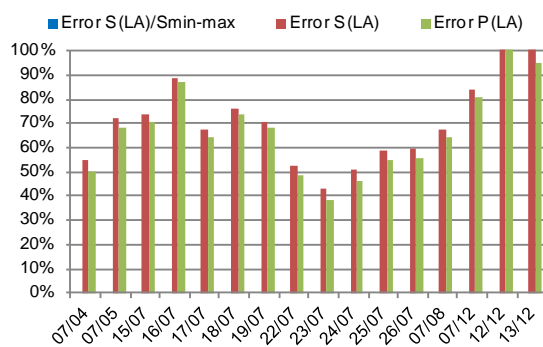
Daily apparent power errors
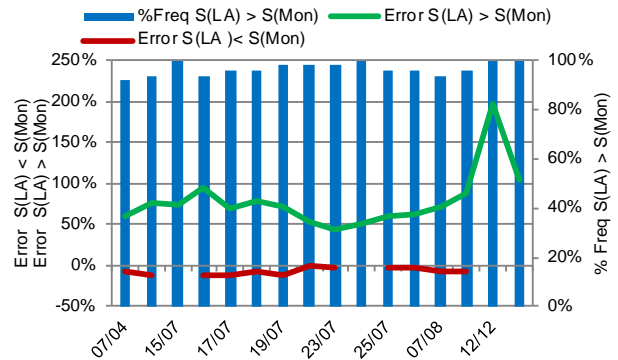
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16		76.31	71.85	-6.86	96.61	96.61
Weekdays	14		77.31	72.79	-6.68	97.02	97.02
Winter	3		128.08	119.74	-7.79	98.61	98.61
Spring	2		63.69	59.20	-9.64	92.71	92.71
Summer	11		64.48	61.09	-6.14	96.78	96.78

Comments:

- This LV network has **4** feeders and **272** mixed customers (4 more customers in ENWL's load allocation tool); the average of power factor is **0.98** and always inductive.
- In terms of energy consumption, the results produced by the tool have an error of **63%** relative to the monitoring data and the error resulting from Elexon-based profiles are in average **72%.**
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.3 331244 (Prestbury) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	Busbar	16	142	140	85.7 / 6.4 / 6.4 / 0.7 / 0 / 0.7	0

Daily energy consumptions

Daily energy consumption errors
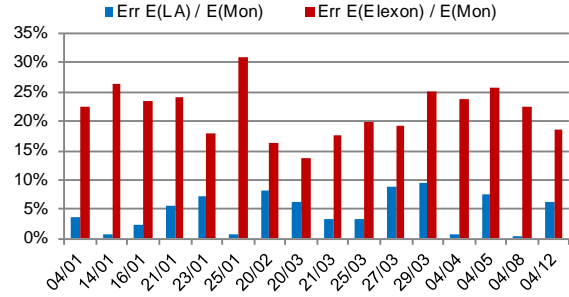
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	3532.873	2672.40998	3422.3573	4.66	21.74	0.994	1.000	4.04

Daily apparent & active power errors
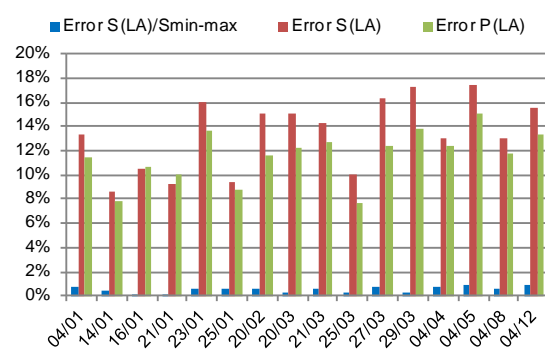
Daily apparent power errors
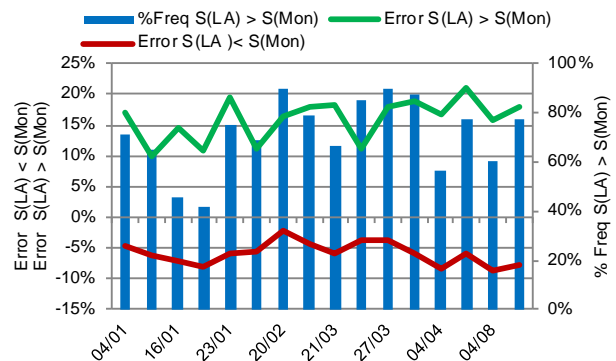
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	0.57	13.39	11.59	-5.88	15.92	70.96
Weekdays	14	0.53	13.13	11.32	-5.68	15.57	71.28
Winter	8	0.54	12.22	10.91	-5.94	14.66	66.67
Spring	7	0.59	14.78	12.33	-5.41	17.38	77.38
Summer	1	0.59	13.01	11.82	-8.74	15.81	60.42

Comments:
- This LV network has **5** feeders and **140** mixed customers; the average of inductive power factor is **0.994** and it behaves capacitive about an hour in a day.
- In terms of energy consumption, the results produced by the tool are **very close to** the monitoring data by **5%** errors in average**.** The results from Elexon-based profiles are far from the monitoring data by **22%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 0.6% in average. The average absolute error is around 13%.
- The results produced by the tool are **larger than** the monitoring data with around 16**%** errors for **more than half of a day**.

5.2.4 332670 (Cedar Road) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	Busbar	25	197	195	94.8 / 5.1 / 0 / 0 / 0 / 0	1.5

Daily energy consumptions
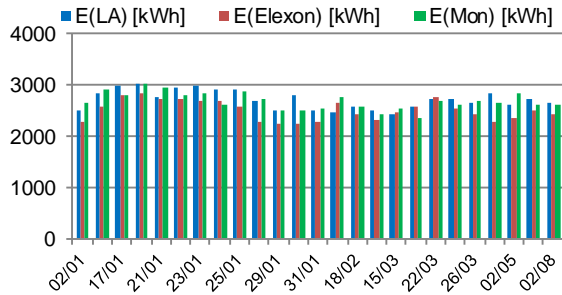
Daily energy consumption errors
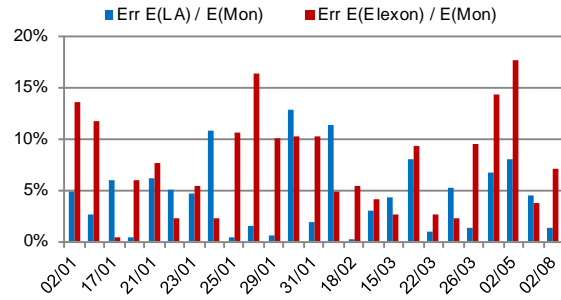
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	2705.411	2501.4569	2678.234	4.50	7.62	0.988		0.00

Daily apparent & active power errors
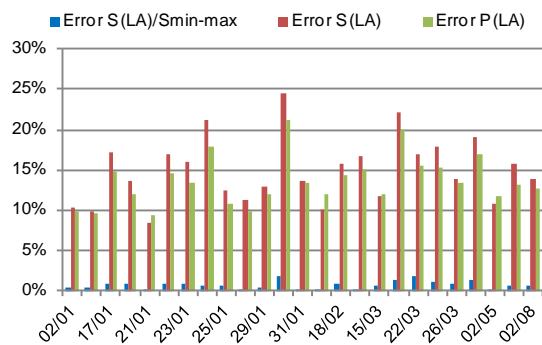
Daily apparent power errors
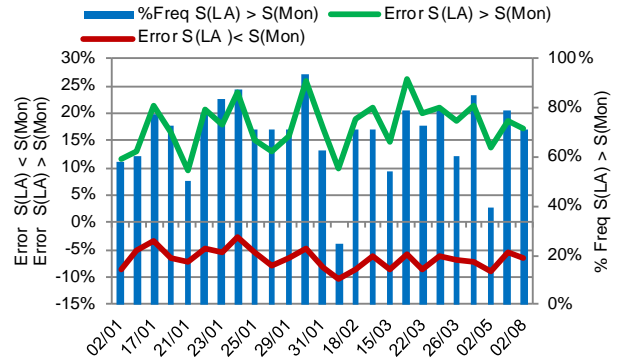
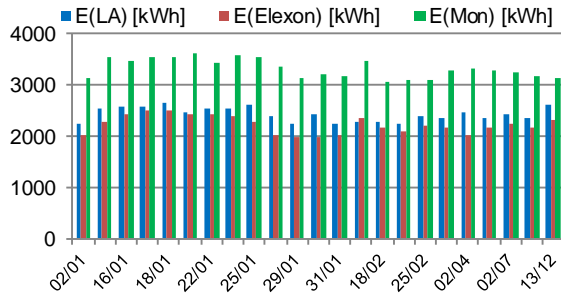|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	0.77	14.94	13.64	-6.59	17.67	68.92
Weekdays	25	0.77	14.94	13.64	-6.59	17.67	68.92
Winter	15	0.66	14.29	13.01	-6.33	16.62	68.75
Spring	8	1.01	16.17	15.00	-7.25	19.60	67.71
Summer	2	0.65	14.85	12.92	-5.84	17.78	75.00

Comments:

- This LV network has **6** feeders and **195** domestic customers with **1.5 % PV** systems; the average of power factor is **0.986** and always inductive.
- In terms of energy consumption, the results produced by the tool are **very close to** the monitoring data by **5%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 1% in average. The average absolute error is around 15%.
- The results produced by the tool are **larger than** the monitoring data with around **18%** errors for **more than half of a day**.
- The PV effect is not clearly seen with this analysis.

5.2.5 333008 (Windermere Rd) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	Busbar	17	135	135	95.5 / 4.4 / 0 / 0 / 0 / 0	1.4

Daily energy consumptions
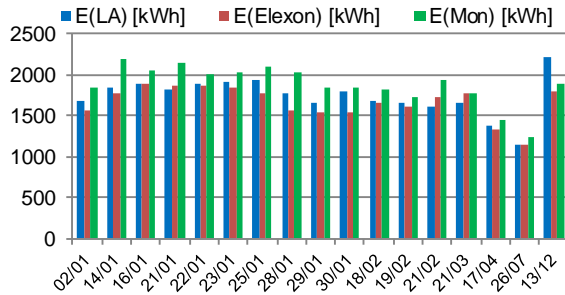
Daily energy consumption errors
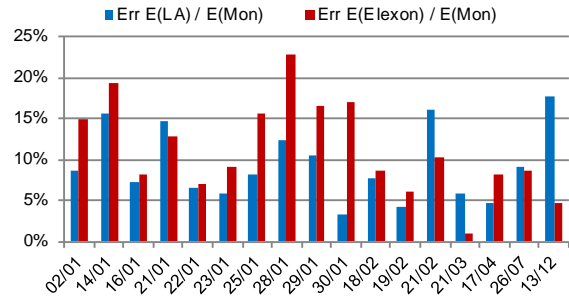
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	1733.851	1659.94418	1873.2029	9.34	11.21	0.986		0.00

Daily apparent & active power errors
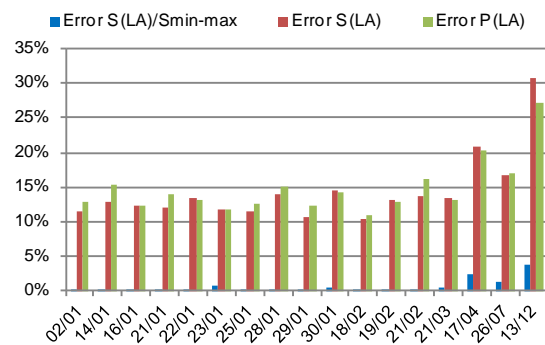
Daily apparent power errors
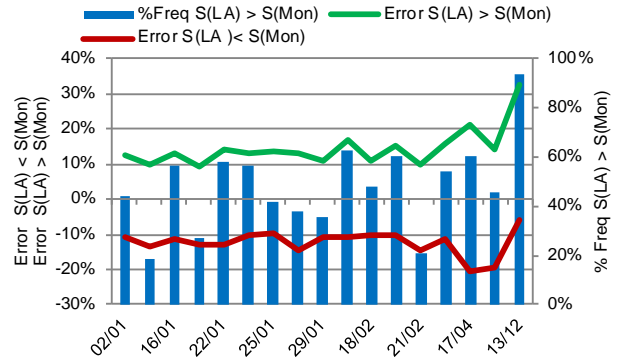
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	17	0.75	14.37	14.79	-12.38	14.39	48.28
Weekdays	17	0.75	14.37	14.79	-12.38	14.39	48.28
Winter	14	0.60	13.80	14.36	-11.39	13.87	47.17
Spring	2	1.48	17.13	16.68	-15.85	18.19	57.29
Summer	1	1.35	16.85	17.05	-19.29	13.98	45.83

Comments:

- This LV network has **5** feeders and **135** domestic customers with **1.4 % PV** systems; the average of power factor is **0.986** and always inductive.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data by **9%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 1% in average. The average absolute error is around 14%.
- The results produced by the tool are **smaller than** the monitoring data with around **12%** errors for **nearly half time**.
- The PV effect is not clearly seen with this analysis.

5.2.6   333939 (Shrigley Close) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333939	Busbar	23	212	166	91.5 / 7.2 / 0.6 / 0.6 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors
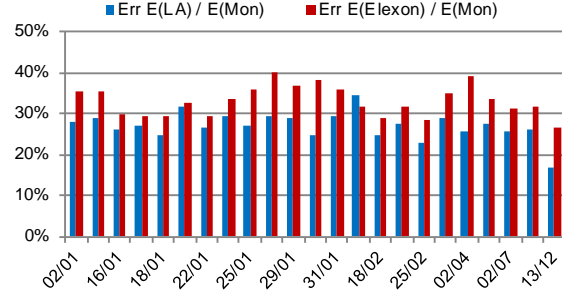
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	2421.13	2223.48083	3319.9145	27.00	33.02	0.990		0.00

Daily apparent & active power errors
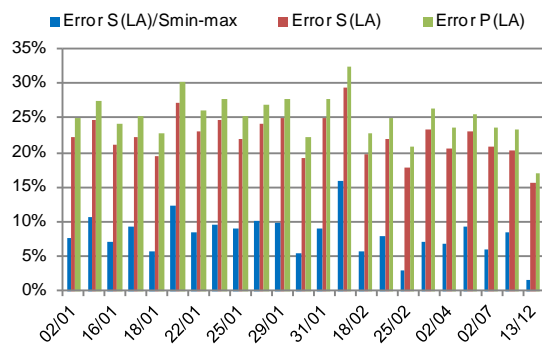
Daily apparent power errors
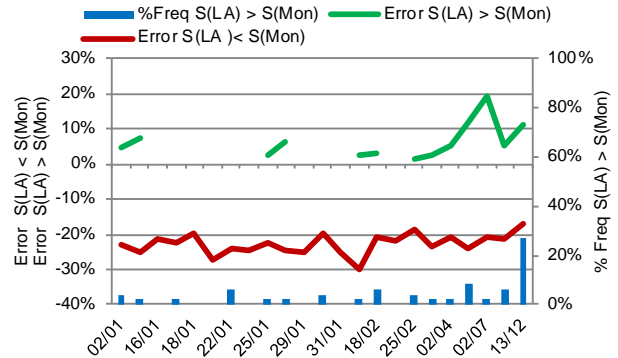
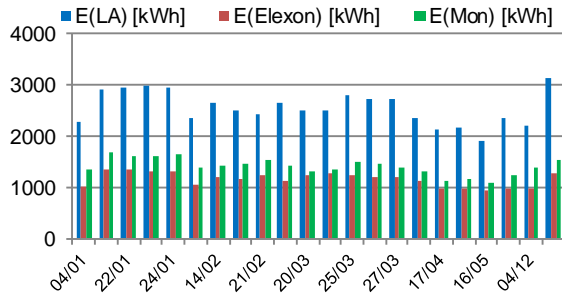|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	8.13	22.30	25.18	-22.75	6.93	3.62
Weekdays	22	8.07	22.27	25.16	-22.70	6.60	3.41
Winter	19	8.23	22.53	25.41	-22.95	5.82	3.40
Spring	1	6.81	20.71	23.72	-21.04	5.12	2.08
Summer	3	7.94	21.38	24.18	-22.07	11.98	5.56

Comments:
- This LV network has **5** feeders and **166** customers (46 more customers in ENWL's load allocation tool); the average of power factor is **0.99** and always inductive.
- In terms of energy consumption, the results produced by the tool have an error of **27%** relative to the monitoring data and the error resulting from Elexon-based profiles are in average **33%.**
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 8% in average. The average absolute error is around 25%.
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.7 333944 (Lyngard Close) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333944	Busbar	21	409	207	96.6 / 2.4 / 0.9 / 0 / 0 / 0	0

Daily energy consumptions
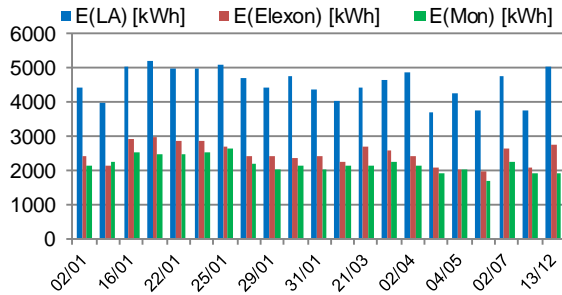
Daily energy consumption errors
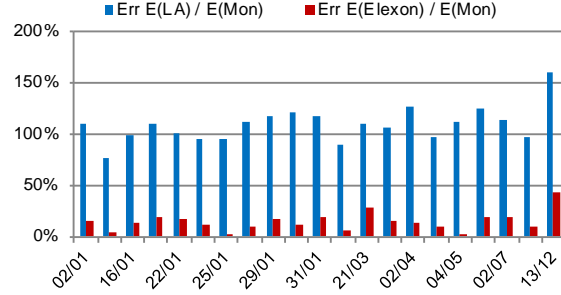
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	4523.518	2474.07983	2172.2397	109.03	14.56	0.990		0.00

Daily apparent & active power errors
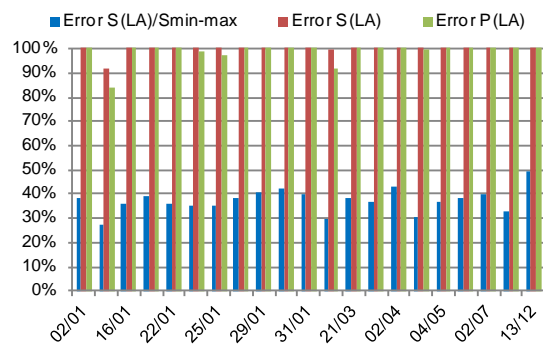
Daily apparent power errors
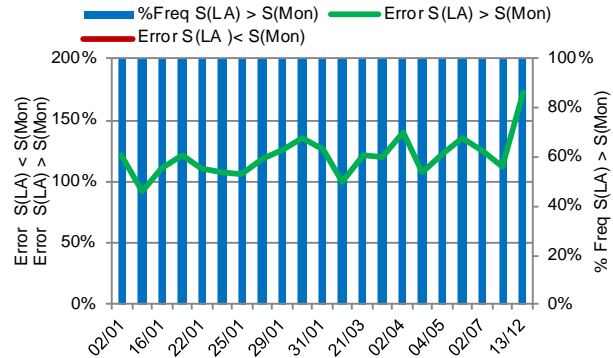
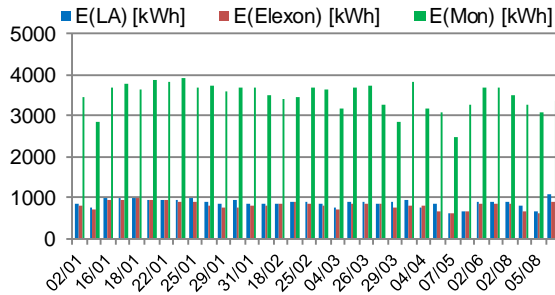|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	21	37.42	120.50	111.60		120.50	100.00
Weekdays	20	37.44	120.41	111.52		120.41	100.00
Winter	14	37.28	118.50	109.64		118.50	100.00
Spring	6	37.34	124.55	115.60		124.55	100.00
Summer	1	39.86	124.19	115.01		124.19	100.00

Comments:

- This LV network has **4** feeders and **207** customers (202 more customers in ENWL's load allocation tool); the average of power factor is **0.99** and always inductive.
- In terms of energy consumption, the results produced by the tool are **quite far** from the monitoring data at by **109%** errors in average. The results from Elexon-based profiles are **more close** to the monitoring data by **15%** errors in average.
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.8   337699 (Welland Road) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
337699	Busbar	22	163	98	97.9 / 1.0 / 1.0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors
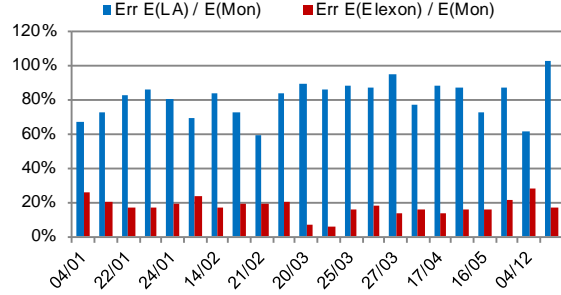
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	2545.359	1157.58181	1407.7803	80.86	17.67	0.986		0.00

Daily apparent & active power errors
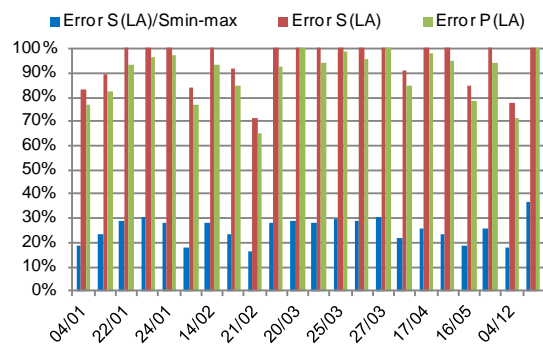
Daily apparent power errors
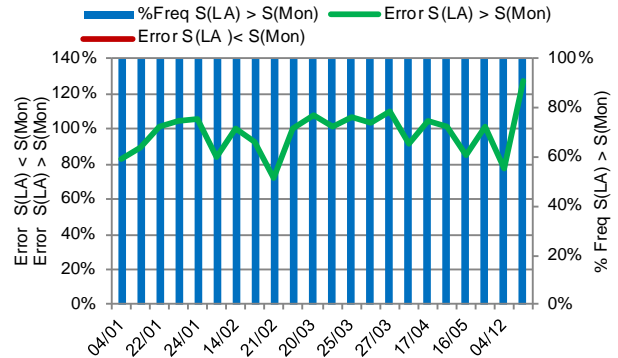
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	22	25.56	97.64	90.47		97.64	100.00
Weekdays	21	25.54	97.46	90.30		97.46	100.00
Winter	11	24.67	94.19	86.95		94.19	100.00
Spring	10	26.49	101.06	93.99		101.06	100.00
Summer	1	26.10	101.35	94.09		101.35	100.00

Comments:

- This LV network has **6** feeders and **98** customers (65 more customers in ENWL's load allocation tool); the average of power factor is **0.986** and always inductive.
- In terms of energy consumption, the results produced by the tool are **quite far** from the monitoring data by **80%** errors in average. The results from Elexon-based profiles are **more close** to the monitoring data by **18%** errors in average.
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.9   410428 (Fulwood Barracks North) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410428	Busbar	34	71	71	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors
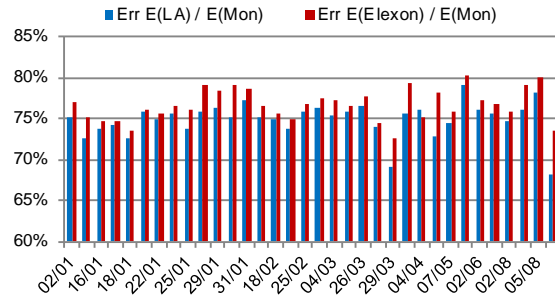
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	869.0058	810.344981	3468.2525	74.89	76.61	0.990		0.00

Daily apparent & active power errors
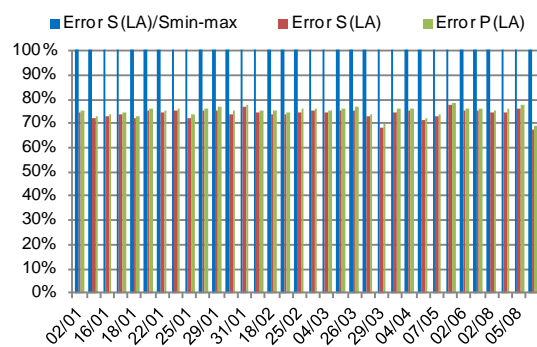
Daily apparent power errors
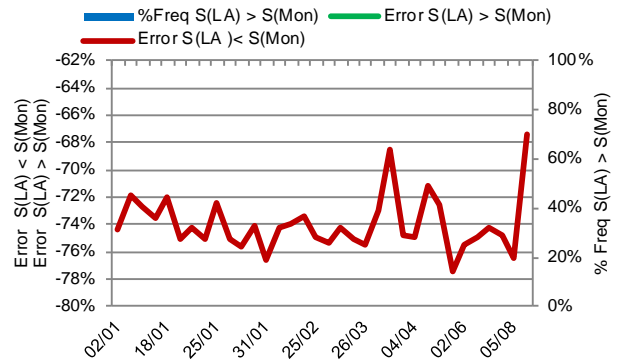
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	34	269.44	73.97	75.04	-73.97		0.00
Weekdays	31	269.13	73.99	75.06	-73.99		0.00
Winter	19	268.01	73.79	74.86	-73.79		0.00
Spring	10	263.92	73.72	74.81	-73.72		0.00
Summer	5	285.86	75.16	76.17	-75.16		0.00

Comments:

- This LV network has **3** feeders. The two feeders have **71** domestic unrestricted customers. The third, however, has no MPAN information but monitoring data.
- In terms of energy consumption, the results produced by the tool are **far** from the monitoring data by **75%** errors in average.
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.10 410699 (West Park Avenue) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410699	Busbar	23	140	129	93.0 / 6.9 / 0 / 0 / 0 / 0	0

Daily energy consumptions
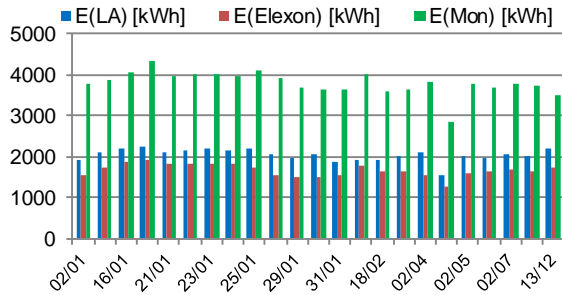
Daily energy consumption errors
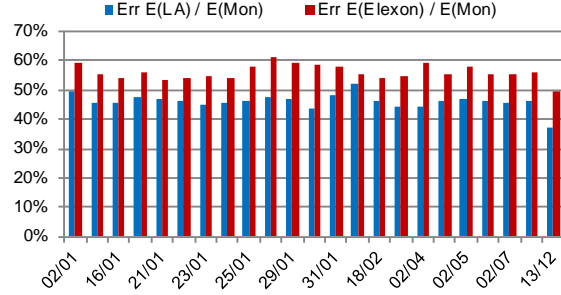
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	2041.047	1665.7573	3792.7986	46.13	56.06	0.995		0.00

Daily apparent & active power errors
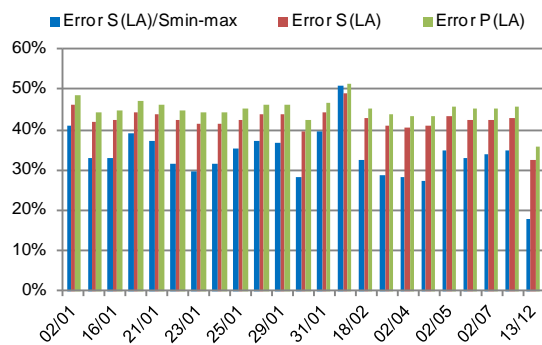
Daily apparent power errors
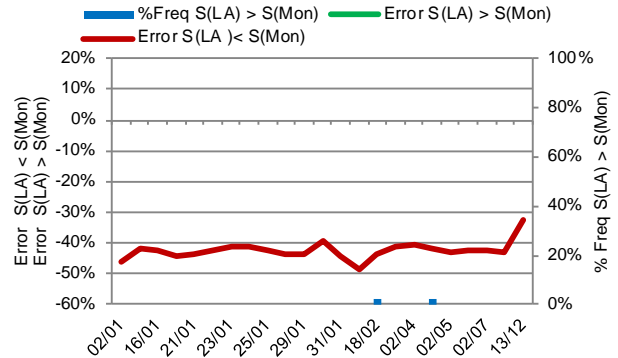
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	33.70	42.37	44.98	-42.43	9.51	0.18
Weekdays	22	33.73	42.36	44.97	-42.42	9.51	0.19
Winter	16	34.61	42.58	45.19	-42.63	2.76	0.13
Spring	4	29.80	41.39	43.95	-41.52	16.26	0.52
Summer	3	34.01	42.57	45.20	-42.57		0.00

Comments:
- This LV network has **6** feeders and **129** domestic customers (11 more customers in ENWL's load allocation tool); the average of power factor is **0.995** and always inductive.
- In terms of energy consumption, the results produced by the tool are **smaller** than the monitoring data by 46% errors in average and the error resulting from Elexon-based profiles are in average **56%.**
- Due to MPAN discrepancies, this LV network is not taken into consideration in the assessment of ENWL's load allocation tool.
- This analysis shows that ENWL's load allocation tool needs to check MPAN information of this network.

5.2.11 450028 (Whitebirk Drive) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
450028	Busbar	15	212	212	87.6 / 1.9 / 8.4 / 0 / 1.2 / 0.6	0

Daily energy consumptions
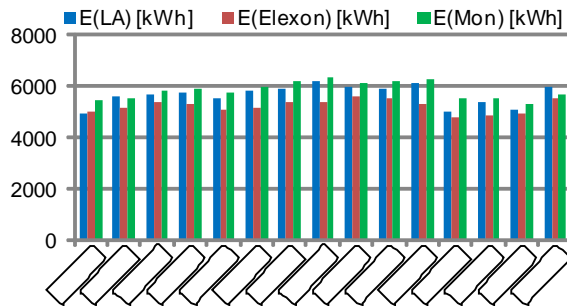
Daily energy consumption errors
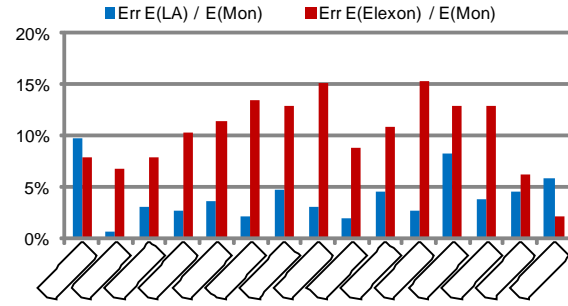
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	5665.56	5242.86803	5849.2233	4.02	10.25	0.980		0.00

Daily apparent & active power errors
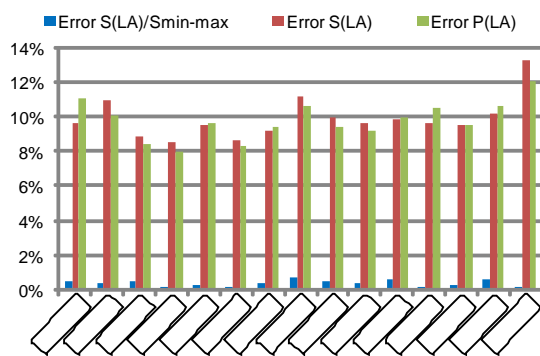
Daily apparent power errors
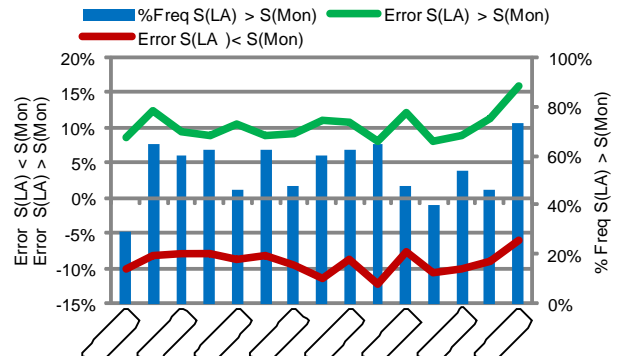
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	15	0.37	9.89	9.79	-9.09	10.27	54.72
Weekdays	14	0.36	9.87	9.73	-9.09	10.19	55.36
Winter	5	0.32	10.24	9.92	-8.00	11.09	57.92
Spring	9	0.37	9.66	9.62	-9.69	9.69	53.94
Summer	1	0.62	10.15	10.65	-9.08	11.43	45.83

Comments:

- This LV network has **7** feeders and **212** mixed customers; the average of power factor is **0.98** and always inductive.
- In terms of energy consumption, the results produced by the tool are very close to the monitoring data by **4%** errors in average. The results from Elexon-based profiles are far from the monitoring data by **10%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 0.4% in average. The average absolute error is around 10%.
- The results produced by the tool are **larger than** the monitoring data with around **10%** errors for a bit more than half of a day.

5.2.12 455031 (Holden) LV Network

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
455031	Busbar	56	30	30	76.6 / 13.3 / 3.3 / 6.6 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	761.1208	506.777235	731.45625	11.53	30.28	0.989		0.00

Daily apparent & active power errors

Daily apparent power errors

	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	56	6.50	26.63	47.05	-12.03	31.91	67.34
Weekdays	53	6.71	27.11	48.68	-11.95	32.39	68.36
Winter	29	6.53	27.08	24.67	-9.61	30.09	73.28
Spring	23	6.87	27.27	80.23	-15.14	35.52	60.60
Summer	4	4.24	19.68	18.48	-11.11	24.25	63.02

Comments:

- This LV network has **1** feeder and **30** domestic and small non-domestic customers; the average of power factor is **0.99** and always inductive.
- In terms of energy consumption, the results produced by the tool are close to the monitoring data by **12%** errors in average. The results from Elexon-based profiles are far from the monitoring data by **30%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 7% in average. The average absolute error is around 27%.
- The results produced by the tool are **larger than** the monitoring data with around **30%** error by nearly three quarters of the day.

5.3 Feeder Analysis

5.3.1 212623 (School St) - Feeder 70066965

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
212623	70066965	16	78	77	97.4 / 1.2 / 1.2 / 0 / 0 / 0	0

**Daily energy consumptions**
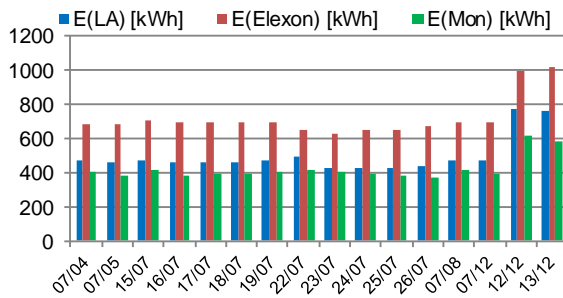
Daily energy consumption errors
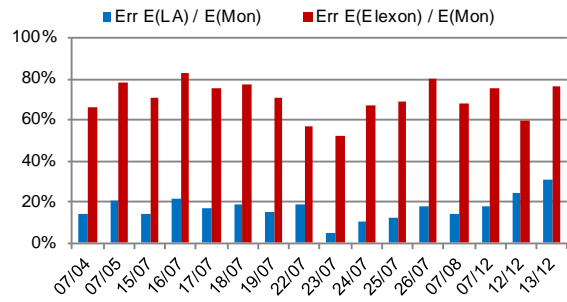
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	496.2716	717.879978	422.44112	16.92	70.27	0.969		0.00

Daily apparent & active power errors
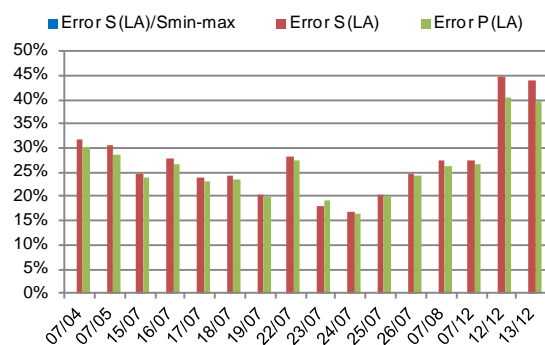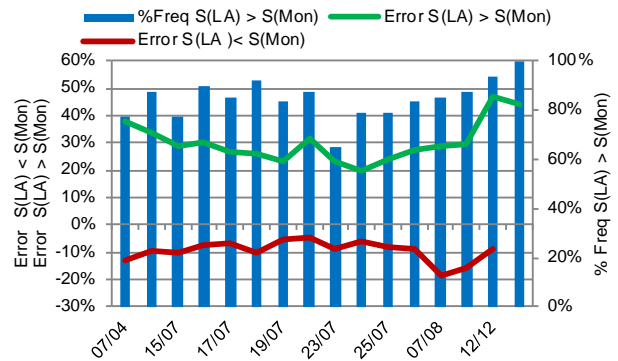
Daily apparent power errors

	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16		27.25	26.06	-9.44	30.13	84.51
Weekdays	14		26.89	25.70	-8.69	29.65	84.82
Winter	3		38.69	35.57	-12.55	40.03	93.75
Spring	2		31.29	29.49	-10.99	35.67	82.29
Summer	11		23.39	22.85	-8.59	26.41	82.39

**Comments:**
- This feeder has domestic and small non-domestic customers; the average of power factor is **0.97** inductive always.
- In terms of energy consumption, the results produced by the tool are bigger than the monitoring data by **17%** errors in average and the error resulting from Elexon-based profiles are **70%** in average.
- In terms of apparent power, the average absolute error is around 27%.
- The results produced by the tool are **larger than** the monitoring data with around 30**%** errors most of the day.

5.3.2   212623 (School St) - Feeder 70066983

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
212623	70066983	16	39	39	92.3 / 7.6 / 0 / 0 / 0 / 0	0

Daily energy consumptions
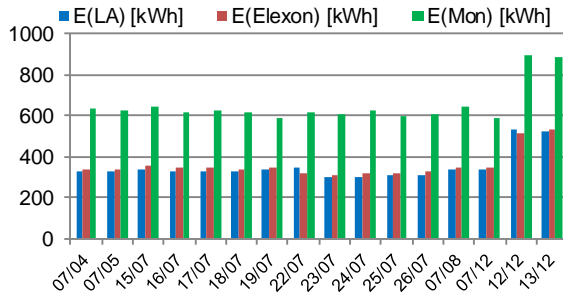
Daily energy consumption errors
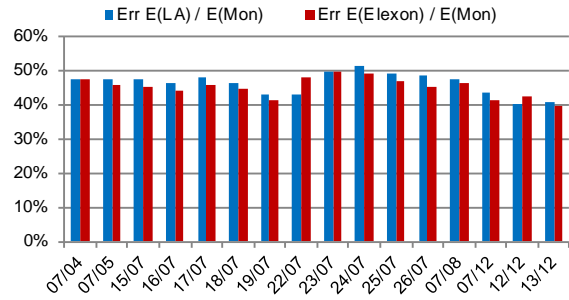
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	351.1957	357.383815	650.25686	46.28	45.23	0.987		0.00

Daily apparent & active power errors
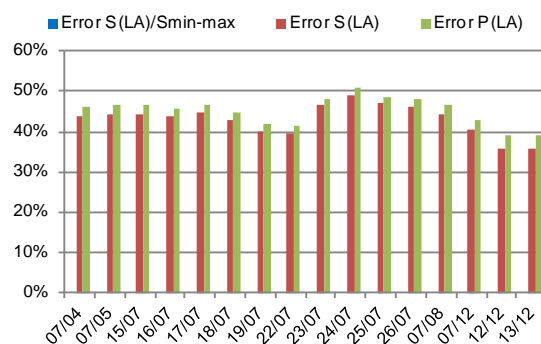
Daily apparent power errors
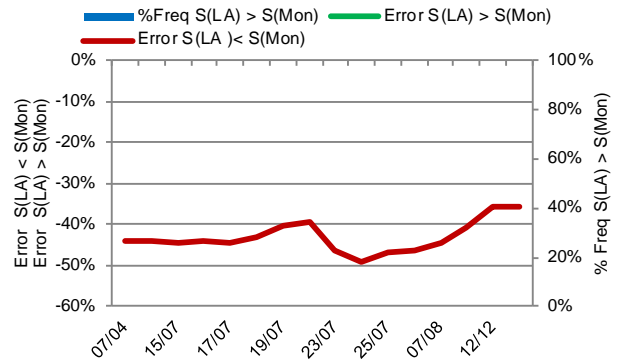
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16		43.06	45.17	-43.06		0.00
Weekdays	14		43.18	45.27	-43.18		0.00
Winter	3		37.44	40.21	-37.44		0.00
Spring	2		44.00	46.32	-44.00		0.00
Summer	11		44.42	46.32	-44.42		0.00

Comments:

- This feeder has domestic, small non-domestic customers and a **PC0** customer; the average of power factor is **0.987** inductive always.
- In terms of energy consumption, the results produced by the tool are **smaller** than the monitoring data by **46%** error in average.
- In terms of apparent power, the average error is around **43%**.
- The results produced by the tool are **smaller than** the monitoring data for all the time.

5.3.3 232526 (Pilkington Rd) - Feeder 80033150

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
232526	80033150	16	38	38	86.8 / 13.1 / 0 / 0 / 0 / 0	0

Daily energy consumptions
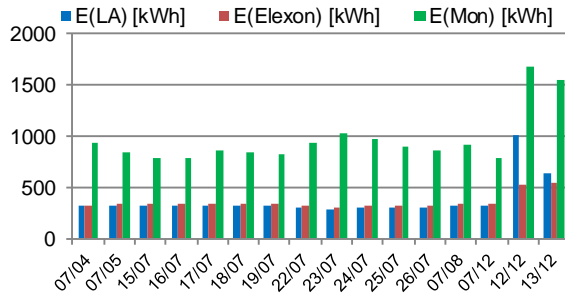
Daily energy consumption errors
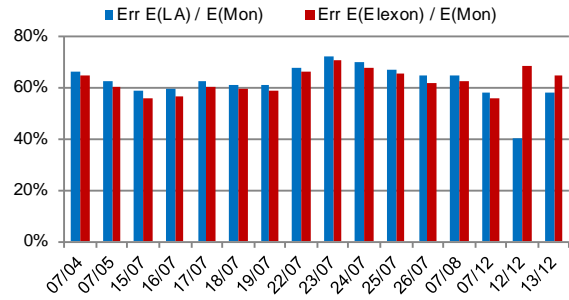
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	375.6649	355.501738	966.44507	62.16	62.52	0.983		0.00

Daily apparent & active power errors
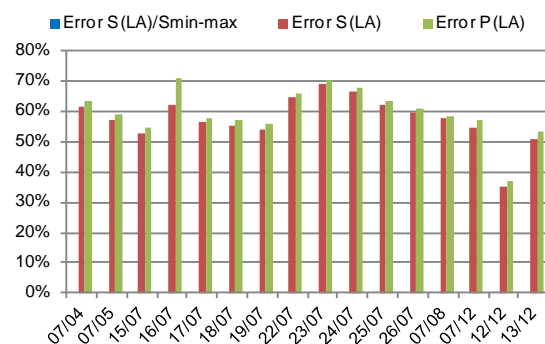
Daily apparent power errors
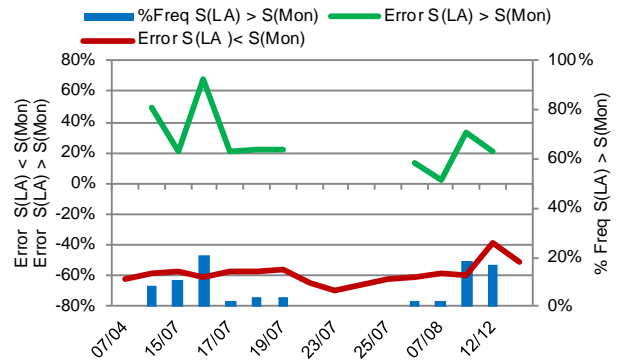
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16		57.48	59.58	-58.52	27.03	5.60
Weekdays	14		57.41	59.51	-58.27	26.29	5.06
Winter	3		46.89	49.11	-49.49	27.00	11.81
Spring	2		59.30	61.12	-59.68	48.76	4.17
Summer	11		60.03	62.15	-60.77	23.93	4.17

### Comments:

- This feeder has domestic customers; the average of power factor is **0.98** and always inductive.
- In terms of energy consumption, the results produced by the tool are **smaller** than the monitoring data by **62%** errors in average.
- In terms of apparent power, the average error is around **57%.**
- The results produced by the tool are **smaller than** the monitoring data most of the time.

5.3.4   331244 (Prestbury) - Feeder 277058902

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	277058902	16	41	41	92.6 / 4.8 / 0 / 2.4 / 0 / 0	0

Daily energy consumptions
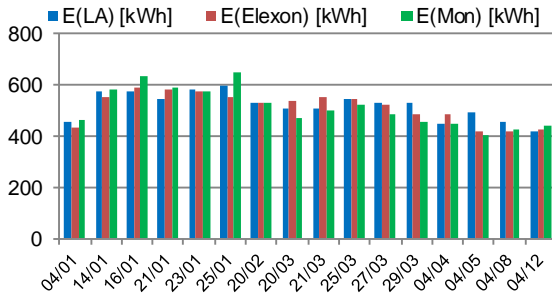
Daily energy consumption errors
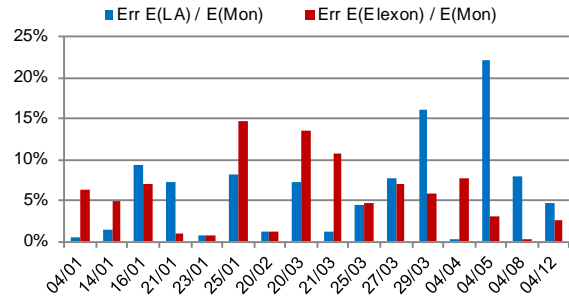
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	516.7287	512.05675	509.93542	6.26	5.71	0.997		0.00

Daily apparent & active power errors
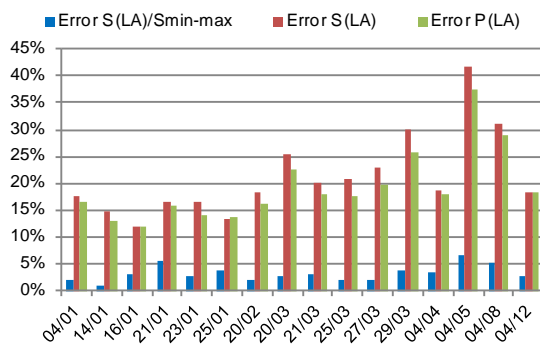
Daily apparent power errors
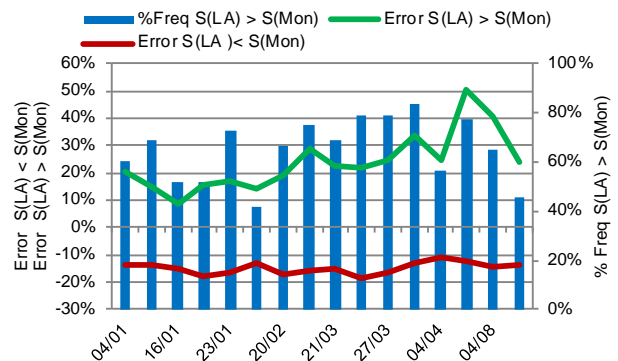
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	3.27	21.15	19.24	-14.72	23.76	65.23
Weekdays	14	2.90	18.97	17.24	-14.92	20.67	64.43
Winter	8	2.91	15.92	15.01	-14.92	16.74	57.55
Spring	7	3.41	25.68	22.69	-14.54	29.40	74.11
Summer	1	5.20	31.23	28.82	-14.38	40.46	64.58

Comments:

- This feeder has domestic, small non-domestic customers; the average of power factor is **0.997** inductive always.
- In terms of energy consumption, the results produced by the tool are **very close to** the monitoring data by **6%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 3% in average. The average absolute error is around 21%.
- The results produced by the tool are **larger** than the monitoring data more than the half of the day.

5.3.5   331244 (Prestbury) - Feeder 277058912

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	277058912	16	15	15	73.3 / 6.6 / 20 / 0 / 0 / 0	0

### Daily energy consumptions
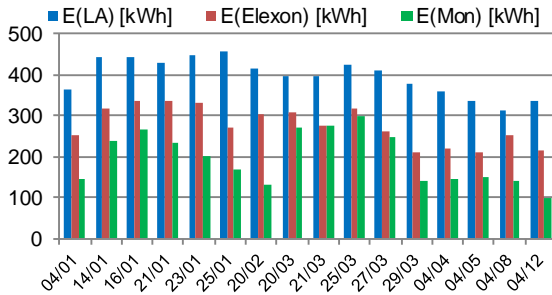
Daily energy consumption errors
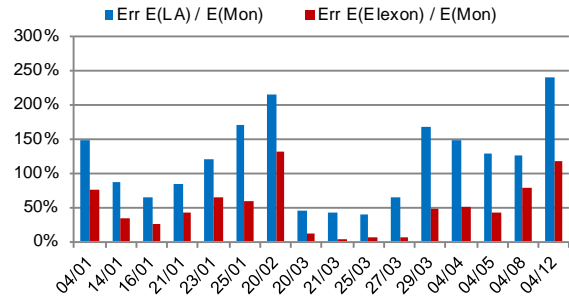
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	396.1146	275.35221	197.05938	118.39	49.57	0.500	0.750	31.25

Daily apparent & active power errors
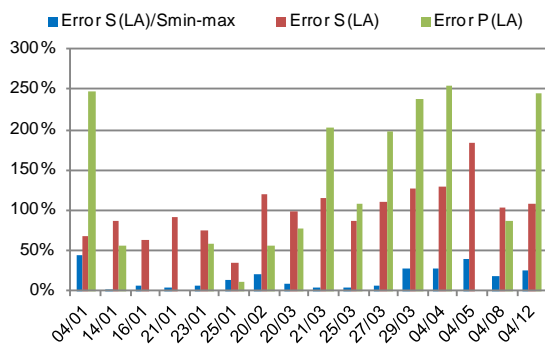
Daily apparent power errors
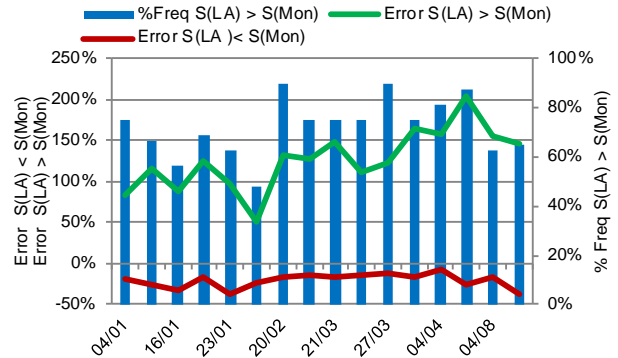
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	16.42	100.24	141.74	-20.59	127.10	72.01
Weekdays	14	14.62	94.11	146.25	-20.45	119.51	71.58
Winter	8	15.51	80.85	112.69	-25.72	104.95	66.41
Spring	7	17.15	121.88	179.80	-15.23	148.32	79.76
Summer	1	18.61	103.84	87.70	-17.16	155.85	62.50

Comments:

- This feeder has domestic and small non-domestic customers; the average of inductive power factor is **0.5** and capacitive power factor is 0.75.
- Due to the extraordinary power factor, the monitoring data files of this feeder were dissected. **It is found that Pa, Pb have negative values every time stamps**.
- This feeder is removed from the assessment of ENWL's load allocation tool.
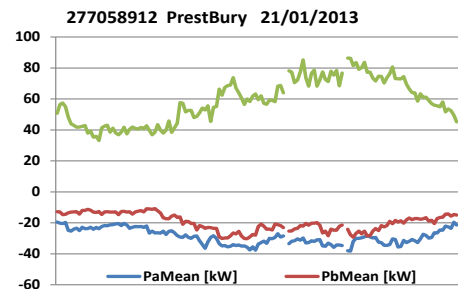
5.3.6   331244 (Prestbury) - Feeder 277058926

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	277058926	16	19	17	47.0 / 17.6 / 29.4 / 0 / 0 / 5.8	0

**Daily energy consumptions**
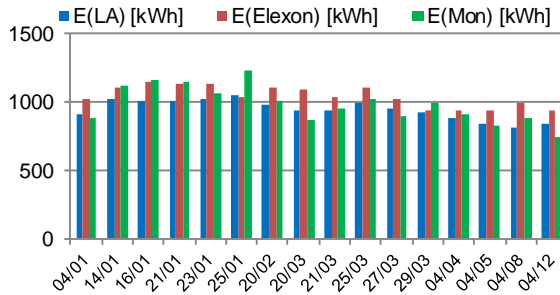
Daily energy consumption errors
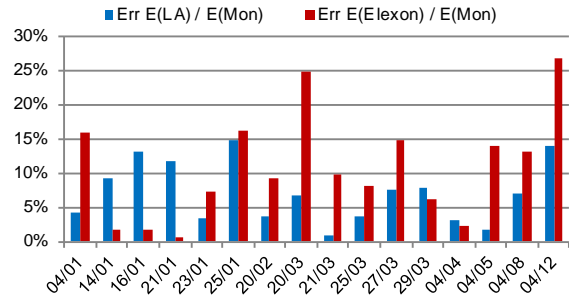
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	942.8995	1040.60774	979.175	7.06	10.78	0.998		0.00

Daily apparent & active power errors
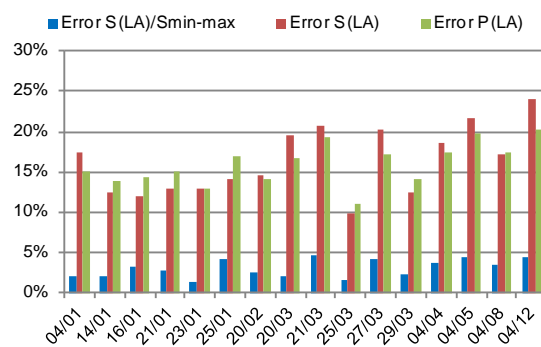
Daily apparent power errors
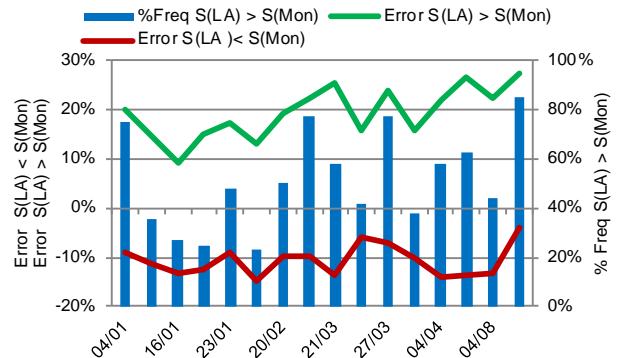
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	3.08	16.31	15.97	-10.68	19.38	51.56
Weekdays	14	2.95	15.87	15.60	-10.30	18.66	51.34
Winter	8	2.85	15.10	15.33	-10.42	16.98	46.09
Spring	7	3.28	17.57	16.50	-10.63	21.71	58.93
Summer	1	3.56	17.16	17.42	-13.13	22.34	43.75

Comments:

- This feeder has domestic, small non-domestic customers and a **PC0** customer; the average of power factor is **0.998** inductive always.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data by **7%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 3% in average. The average absolute error is around 16%.
- The results produced by the tool are **larger** than the monitoring data for half of the day.

5.3.7   331244 (Prestbury) - Feeder 277058946

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	277058946	16	4	5	80 / 20 / 0 / 0 / 0 / 0	0

Daily energy consumptions
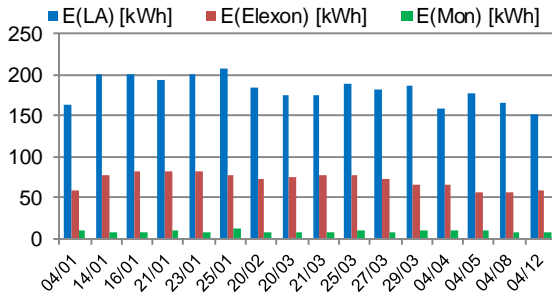
Daily energy consumption errors
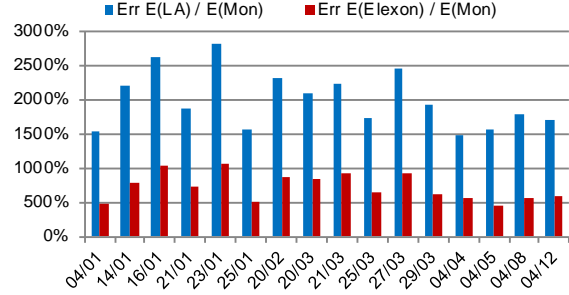
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	181.5827	71.2049759	8.9052083	1993.63	725.81	0.631	0.989	0.91

Daily apparent & active power errors
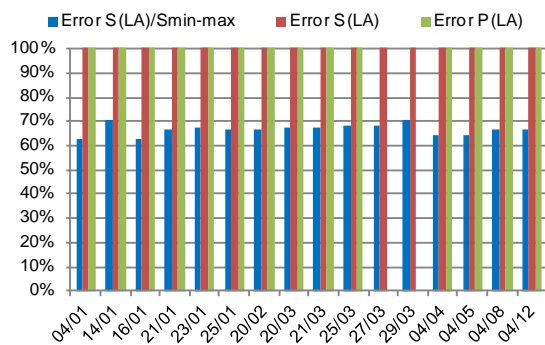
Daily apparent power errors
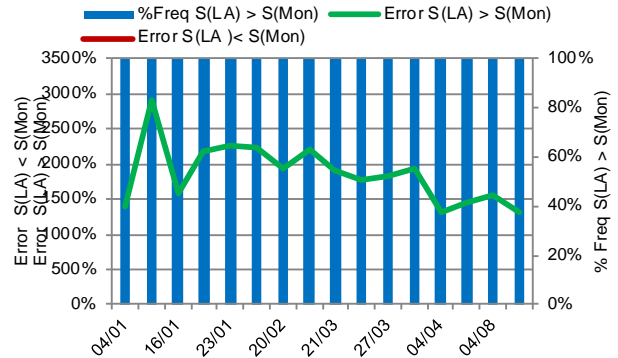
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	66.78	1860.30	3196.21		1860.30	100.00
Weekdays	14	66.96	1911.70	3277.74		1911.70	100.00
Winter	8	66.41	1974.83	3070.92		1974.83	100.00
Spring	7	67.22	1774.72	3529.75		1774.72	100.00
Summer	1	66.73	1543.22	2530.87		1543.22	100.00

Comments:

- This feeder has **only 5** domestic customers; the average of **inductive** power factor is **0.63** and it behaves capacitive for 13 minutes in a day.
- In terms of energy consumption, the results produced by the tool are **quite far** from the monitoring data by more than **100%** errors.
- Due to the energy errors more than 90%, this feeder (with less than 10 MPANs) is removed from the assessment of ENWL's load allocation tool.

5.3.8   331244 (Prestbury) - Feeder 277058964

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
331244	277058964	16	63	62	95.1 / 3.2 / 1.6 / 0 / 0 / 0	0

Daily energy consumptions
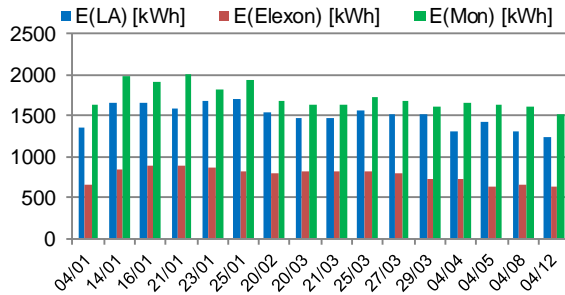
Daily energy consumption errors
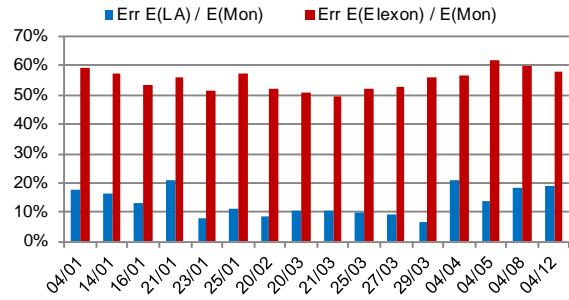
	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	1495.548	773.188298	1727.2823	13.38	55.25	0.997	1.000	0.78

Daily apparent & active power errors

Daily apparent power errors

	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	16	4.28	15.00	17.04	-15.19	17.81	24.74
Weekdays	14	3.68	14.35	16.48	-14.38	18.01	24.26
Winter	8	4.21	15.37	17.71	-15.18	22.58	20.57
Spring	7	3.59	13.84	15.54	-14.39	12.40	30.06
Summer	1	9.62	20.12	22.17	-20.82	17.49	20.83

Comments:

- This feeder has most domestic customers and one small non-domestic customer; the average of inductive power factor is 0.997 and it behaves capacitive 11 minutes in a day.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data at the rate of **13%**.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 4% in average. The average absolute error is around 15%.
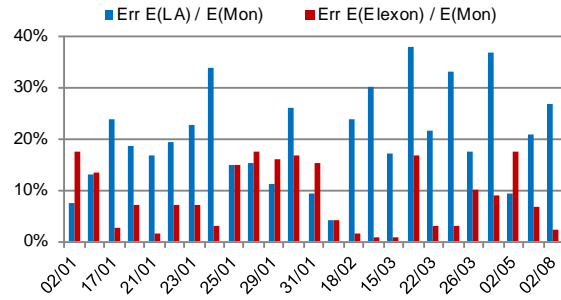- The results produced by the tool are **larger** than the monitoring data for a quarter of the day.

5.3.9   332670 (Cedar Road) - Feeder 263050453

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263050453	25	26	25	88 / 12 / 0 / 0 / 0 / 0	4

Daily energy consumptions
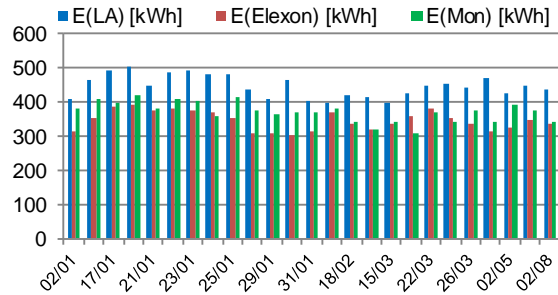
Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	444.9639	345.214565	370.66867	20.45	8.65	0.992		0.00

Daily apparent & active power errors
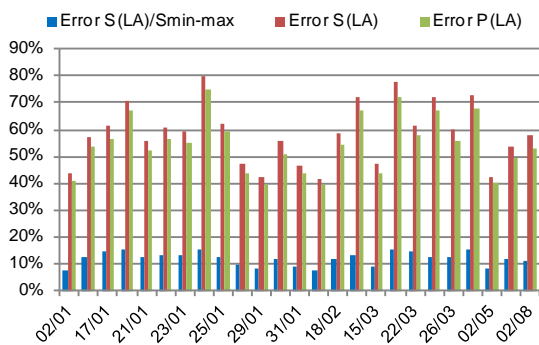
Daily apparent power errors
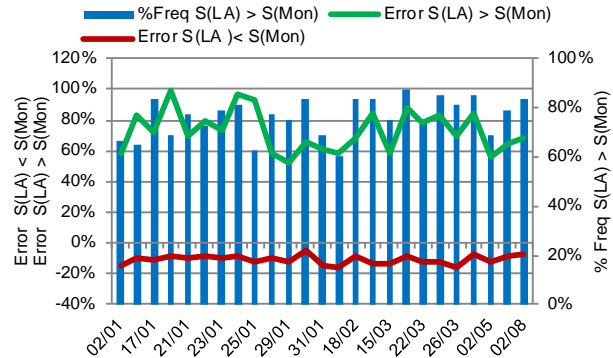
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	12.07	58.47	54.52	-10.83	72.90	76.33
Weekdays	25	12.07	58.47	54.52	-10.83	72.90	76.33
Winter	15	11.76	56.26	52.57	-10.65	72.54	73.61
Spring	8	12.78	63.34	59.02	-11.94	75.17	80.21
Summer	2	11.58	55.59	51.05	-7.69	66.58	81.25

Comments:

- This feeder has domestic customers and PV systems at the rate of 4%; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are **larger** than the monitoring data by **20%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 12% in average. The average absolute error is around 60%.
- The results produced by the tool are **larger** than the monitoring data for three quarters of the day.
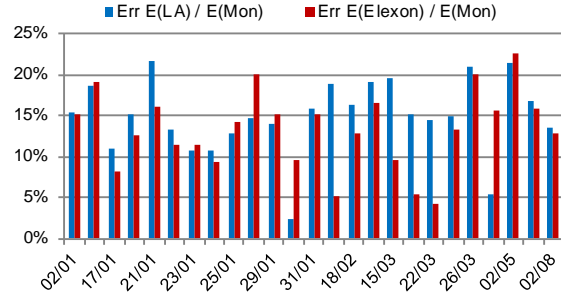- The PV effect is not clearly seen with this analysis.

5.3.10 332670 (Cedar Road) - Feeder 263050454

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263050454	25	47	47	100 / 0 / 0 / 0 / 0 / 0	2.1

Daily energy consumptions
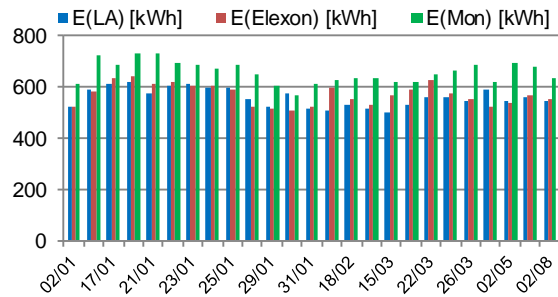
Daily energy consumption errors

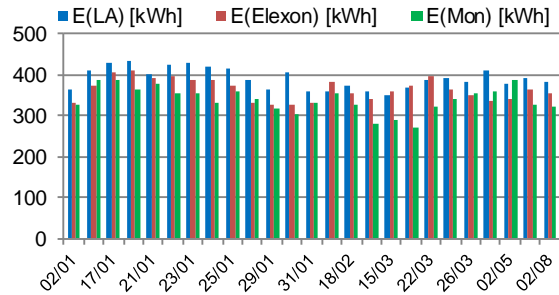|	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	558.4505	568.521128	656.024	14.92	13.25	0.988		0.00

Daily apparent & active power errors
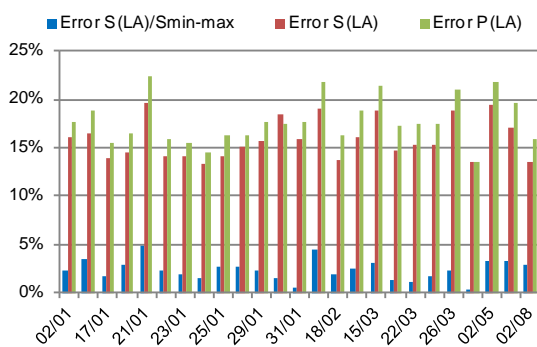
Daily apparent power errors
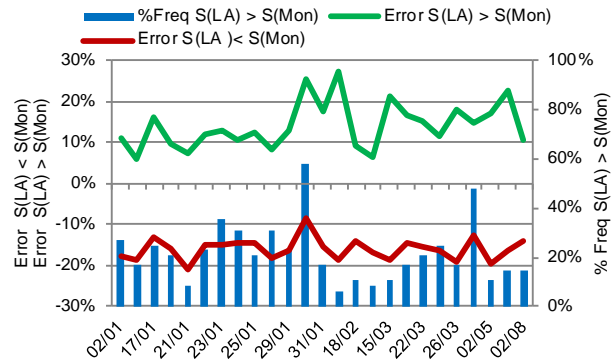
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	2.39	15.88	17.75	-16.00	14.10	21.58
Weekdays	25	2.39	15.88	17.75	-16.00	14.10	21.58
Winter	15	2.50	15.60	17.32	-15.76	13.24	23.61
Spring	8	2.01	16.55	18.57	-16.66	15.11	19.53
Summer	2	3.07	15.33	17.70	-15.12	16.56	14.58

Comments:

- This feeder has only domestic unrestricted customers and PV systems at the rate of **2.1%**; the average of power factor is 0.997 and always inductive.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data at the rate of **13%**.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 4% in average. The average absolute error is around 15%.
- The results produced by the tool are **larger** than the monitoring data about a quarter of the day.
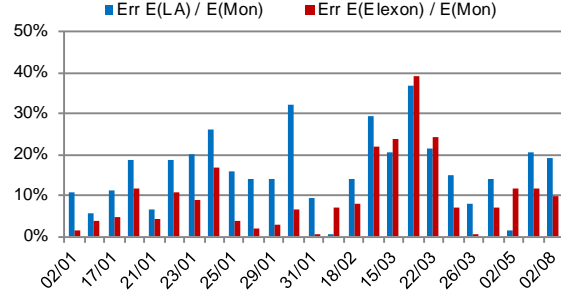- The PV effect is not clearly seen with this analysis.

5.3.11 332670 (Cedar Road) - Feeder 263050491

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263050491	25	30	30	100 / 0 / 0 / 0 / 0 / 0	3.3

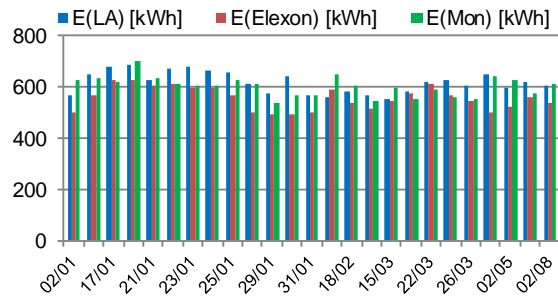**Daily energy consumptions**

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	390.417	362.885826	338.202	16.20	10.04	0.990	1.000	0.25

Daily apparent & active power errors
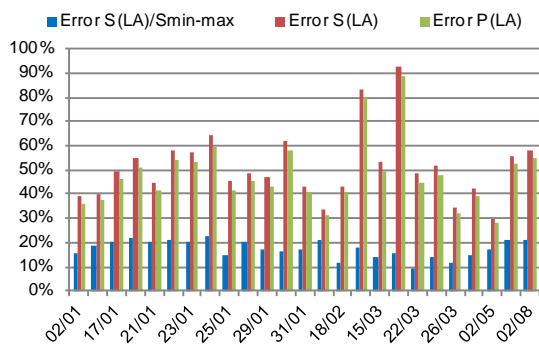
Daily apparent power errors
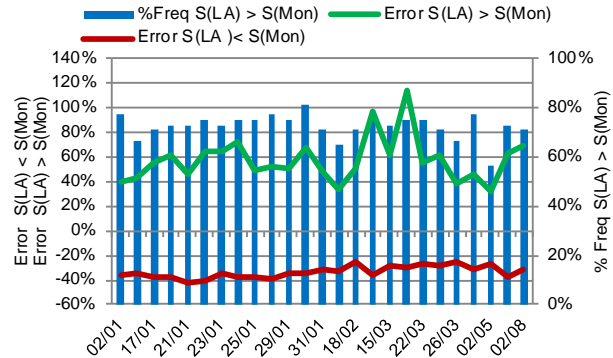
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	17.51	51.20	47.89	-33.56	57.44	72.50
Weekdays	25	17.51	51.20	47.89	-33.56	57.44	72.50
Winter	15	18.68	48.73	45.34	-35.83	53.21	73.19
Spring	8	14.39	54.36	51.26	-29.23	63.15	71.35
Summer	2	21.13	57.08	53.61	-33.81	66.29	71.88

Comments:

- This feeder has only domestic unrestricted customers and PV systems at the rate of **3.3%**; the average of inductive power factor is 0.99 and it behaves capacitive a few minutes in a day.
- In terms of energy consumption, the results produced by the tool are **larger** than the monitoring data by **16%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 18% in average. The average absolute error is around 51%.
- The results produced by the tool are **larger** than the monitoring data for three quarters of the day.
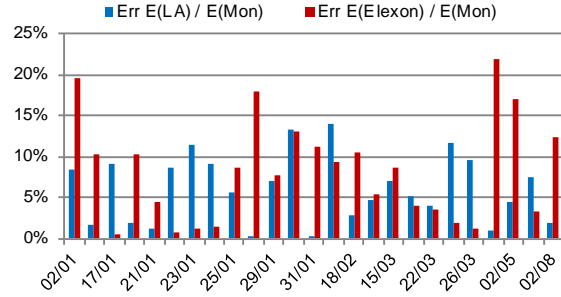- The PV effect is not clearly seen with this analysis.

5.3.12 332670 (Cedar Road) - Feeder 263050493

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263050493	25	41	40	87.5 / 12.5 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	615.9272	555.197284	600.88467	6.07	8.23	0.979		0.00

Daily apparent & active power errors
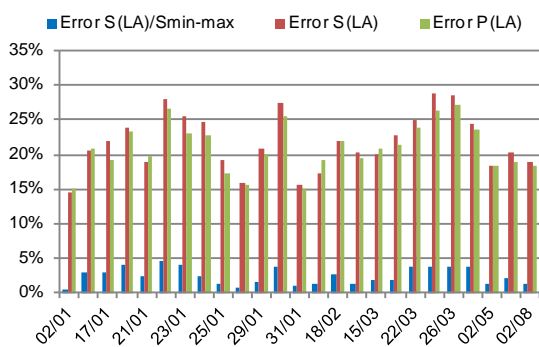
Daily apparent power errors
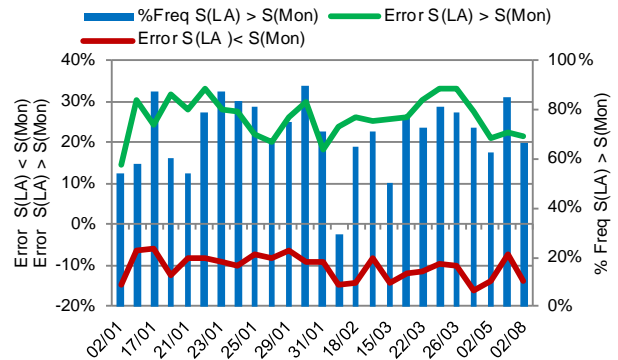
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	2.48	21.77	20.96	-10.37	25.99	70.42
Weekdays	25	2.48	21.77	20.96	-10.37	25.99	70.42
Winter	15	2.44	21.12	20.37	-9.55	25.56	69.44
Spring	8	2.73	23.54	22.65	-11.89	27.81	70.83
Summer	2	1.73	19.61	18.64	-10.50	22.00	76.04

Comments:

- This feeder has domestic customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are **very close to** the monitoring data by **6%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 2.5% in average. The average absolute error is around 21%.
- The results produced by the tool are **larger** than the monitoring data more than the half of the day.
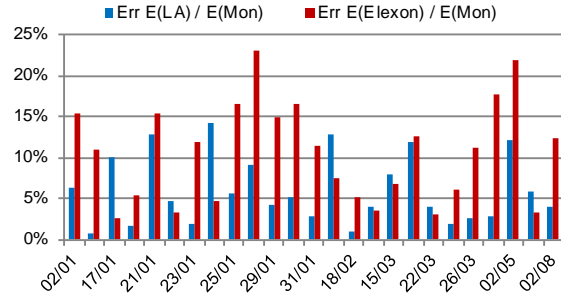
5.3.13 332670 (Cedar Road) - Feeder 263050494

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263050494	25	40	40	97.5 / 2.5 / 0 / 0 / 0 / 0	0

Daily energy consumptions
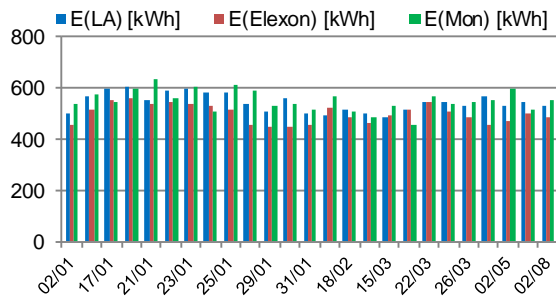
Daily energy consumption errors

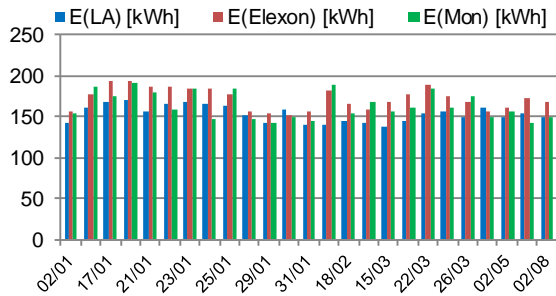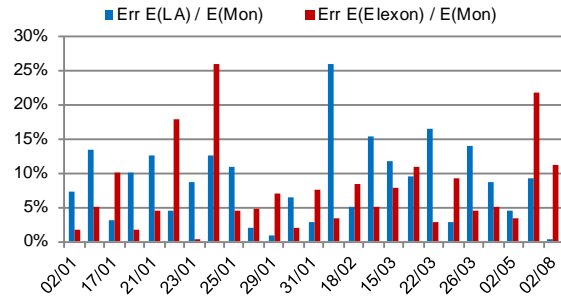|	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	542.3415	498.117671	549.42067	6.02	10.55	0.983		0.00

Daily apparent & active power errors
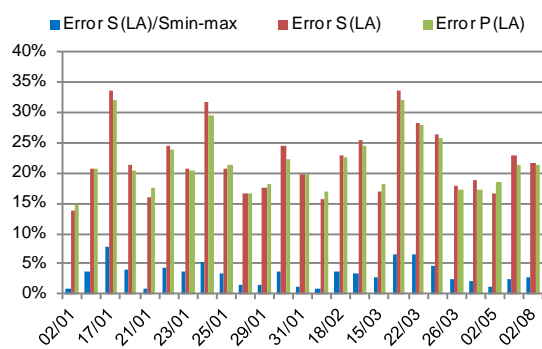
Daily apparent power errors
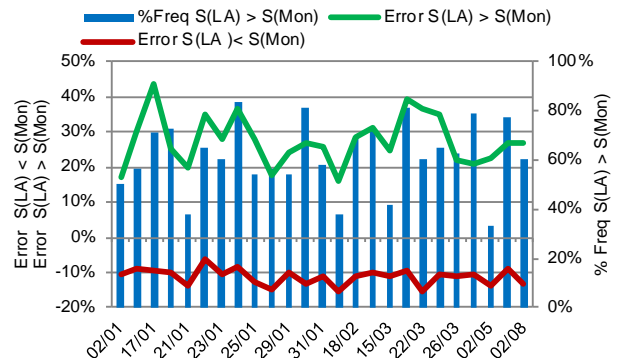
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	3.29	21.93	21.66	-11.21	27.48	61.58
Weekdays	25	3.29	21.93	21.66	-11.21	27.48	61.58
Winter	15	3.14	21.34	21.16	-11.04	26.74	60.42
Spring	8	3.73	22.98	22.68	-11.58	28.99	61.98
Summer	2	2.62	22.18	21.34	-11.03	26.97	68.75

Comments:
- This feeder has domestic customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data by **6%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 3.3% in average. The average absolute error is around 22%.
- The results produced by the tool are **larger** than the monitoring data more than the half of the day.

5.3.14 332670 (Cedar Road) - Feeder 263068150

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
332670	263068150	25	13	13	92.3 / 7.6 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

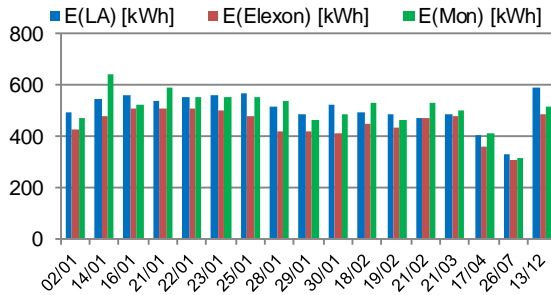|	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	153.3117	171.520428	163.034	8.79	7.48	0.985		0.00

Daily apparent & active power errors
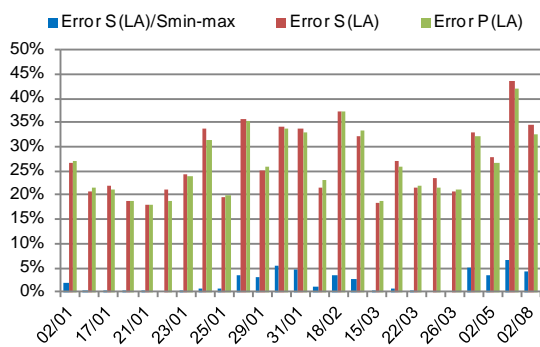
Daily apparent power errors
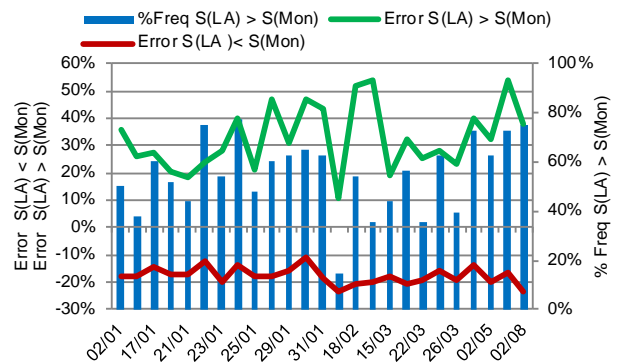
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	25	1.98	27.00	26.64	-17.67	32.72	54.92
Weekdays	25	1.98	27.00	26.64	-17.67	32.72	54.92
Winter	15	1.75	26.18	25.96	-17.01	31.44	54.44
Spring	8	1.57	25.51	25.24	-18.32	31.81	51.04
Summer	2	5.33	39.09	37.31	-20.05	45.96	73.96

Comments:

- This feeder has domestic customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data by **9%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 2% in average. The average absolute error is around 27%.
- The results produced by the tool are **larger** than the monitoring data about half of the day.
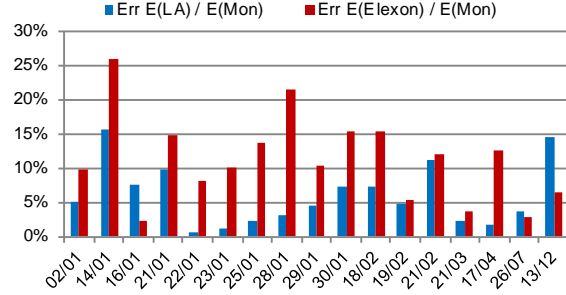
5.3.15 333008 (Windermere Rd) - Feeder 275033193

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	275033193	17	36	36	94.4 / 5.5 / 0 / 0 / 0 / 0	0

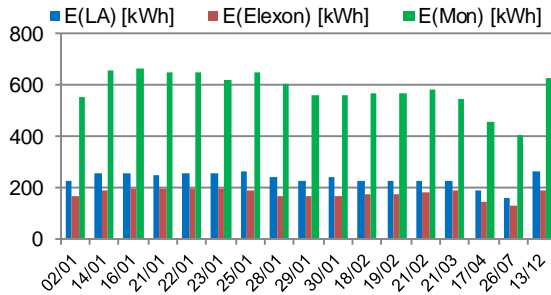**Daily energy consumptions**

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	504.5172	447.88153	507.16078	6.07	11.18	0.987		0.00

Daily apparent & active power errors
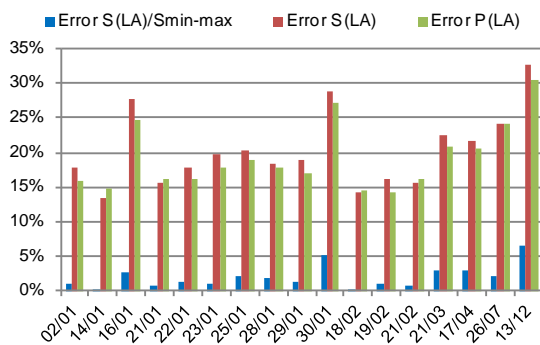
Daily apparent power errors
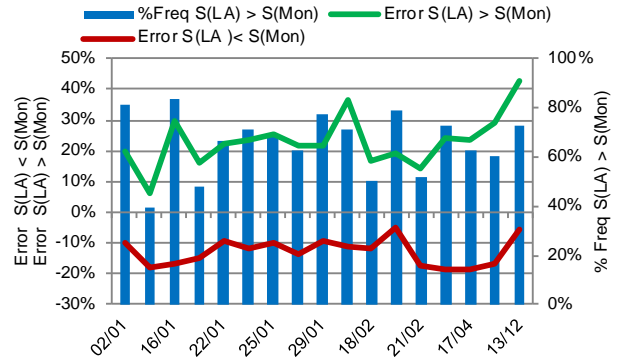
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	17	2.03	20.35	19.27	-12.84	22.99	65.81
Weekdays	17	2.03	20.35	19.27	-12.84	22.99	65.81
Winter	14	1.88	19.83	18.71	-11.76	22.43	65.92
Spring	2	3.00	22.06	20.73	-18.50	23.72	67.71
Summer	1	2.15	24.28	24.27	-16.62	29.30	60.42

Comments:

- This feeder has domestic customers; the average of power factor is 0.987 and always inductive.
- In terms of energy consumption, the results produced by the tool are **very close to** the monitoring data by **6%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 2% in average. The average absolute error is around 21%.
- The results produced by the tool are **larger** than the monitoring data more than half of the day.
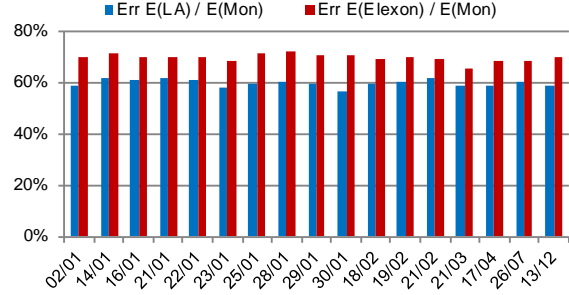
5.3.16 333008 (Windermere Rd) - Feeder 275033194

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	275033194	17	15	15	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

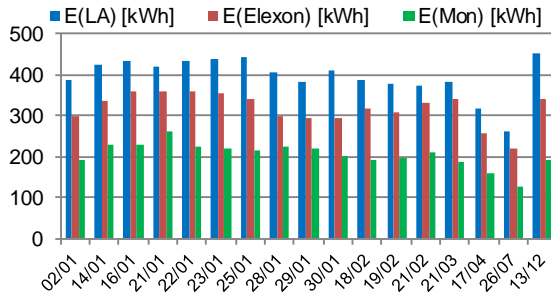|	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	233.3128	175.721997	582.09412	59.86	69.74	0.985		0.00

Daily apparent & active power errors
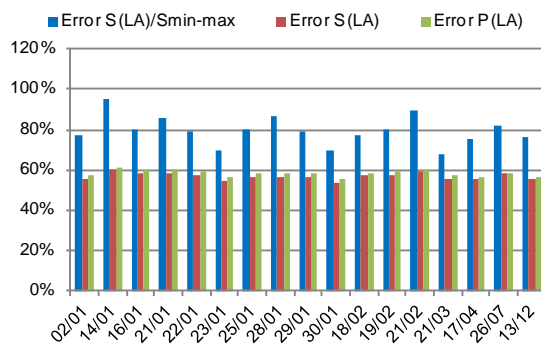
Daily apparent power errors
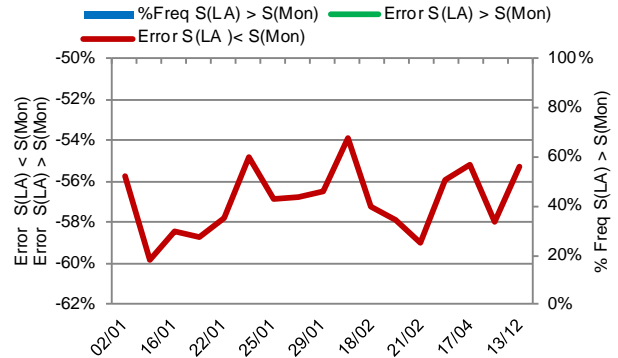
	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	17	79.36	56.92	58.41	-56.92	#VALUE!	0.00
Weekdays	17	79.36	56.92	58.41	-56.92	#VALUE!	0.00
Winter	14	80.32	57.04	58.58	-57.04	#VALUE!	0.00
Spring	2	71.32	55.58	57.06	-55.58	#VALUE!	0.00
Summer	1	81.96	58.00	58.68	-58.00	#VALUE!	0.00

Comments:

- This feeder has only **15** domestic unrestricted customers; the average of power factor is 0.985 and always inductive.
- In terms of energy consumption, the results produced by the tool are **quite smaller** than the monitoring data by **60%** errors in average.
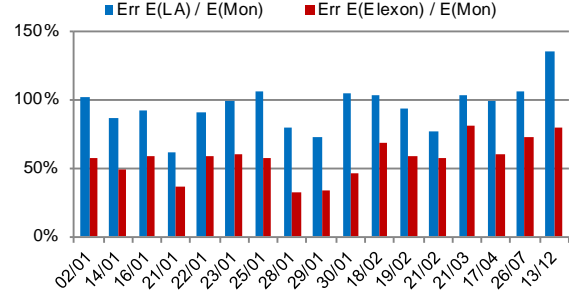
5.3.17 333008 (Windermere Rd) - Feeder 275033195

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	275033195	17	26	26	96.1 / 3.8 / 0 / 0 / 0 / 0	3.8

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	394.6019	317.659163	203.97745	94.82	56.94	0.992	0.998	6.50

Daily apparent & active power errors
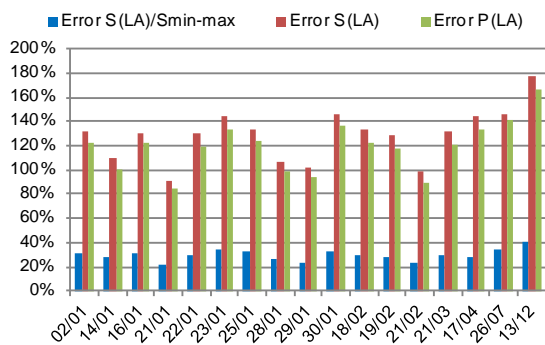
Daily apparent power errors
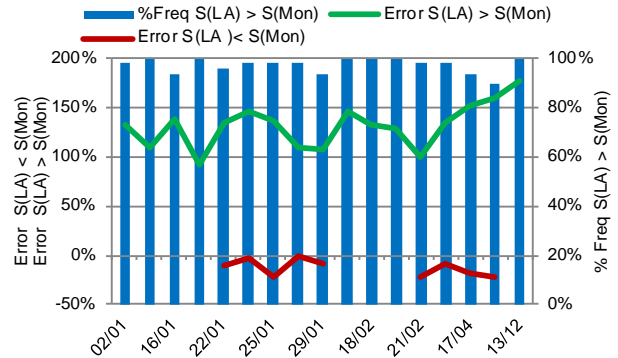
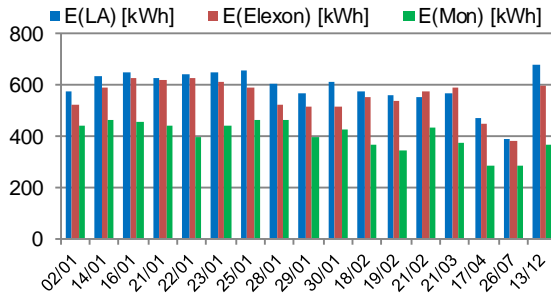|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	17	29.79	128.45	119.17	-14.72	131.74	97.30
Weekdays	17	29.79	128.45	119.17	-14.72	131.74	97.30
Winter	14	29.55	125.85	116.45	-14.01	128.04	98.07
Spring	2	29.27	137.79	127.57	-13.54	143.27	95.83
Summer	1	34.26	146.05	140.48	-22.77	160.39	89.58

Comments:

- This feeder has **26** domestic customers and **PV** systems at the rate of **3.8%;** the average of inductive power factor is 0.99 and it behaves capacitive one and half an hour in a day.
- In terms of energy consumption, the results produced by the tool are **quite larger** than the monitoring data by **95%** errors in average.
- The PV effect is not clearly seen with this analysis.
- Due to the energy errors more than 90%, this feeder is removed from the assessment of ENWL's load allocation tool.
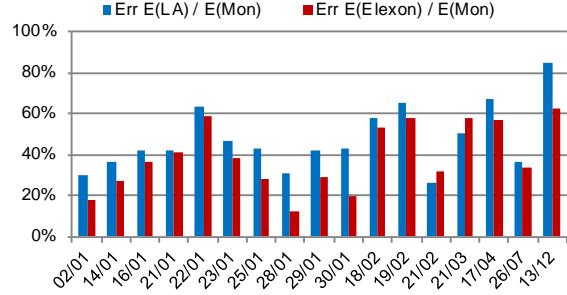
5.3.18 333008 (Windermere Rd) - Feeder 275033196

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	275033196	17	45	45	95.5 / 4.4 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	587.8389	553.314728	401.92059	47.43	39.01	0.981		0.00

Daily apparent & active power errors
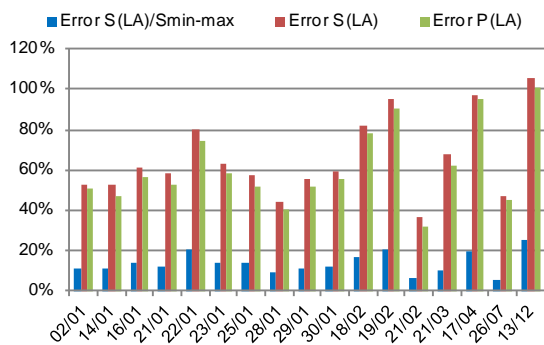
Daily apparent power errors
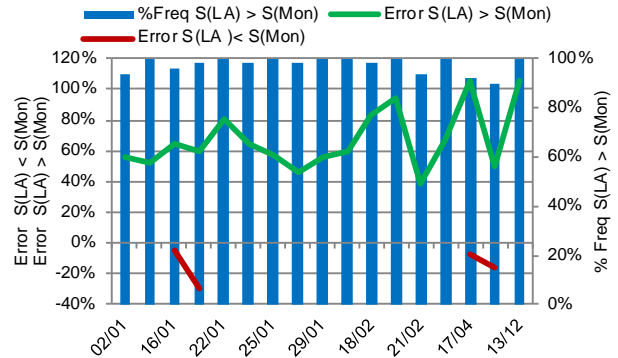
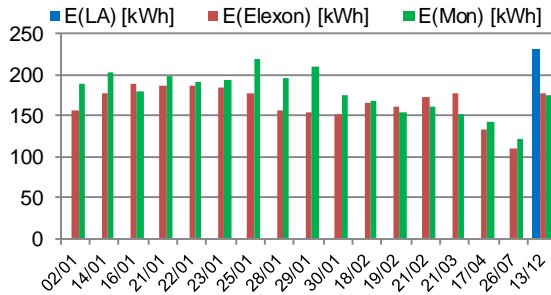|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	17	13.84	65.66	61.33	-9.36	67.07	97.43
Weekdays	17	13.84	65.66	61.33	-9.36	67.07	97.43
Winter	14	14.29	64.67	59.99	-8.76	65.55	98.21
Spring	2	14.86	82.04	78.79	-7.23	86.11	95.83
Summer	1	5.41	46.70	45.04	-15.69	50.30	89.58

Comments:

- This feeder has **45** domestic customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are larger than to the monitoring data by **47%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 14% in average. The average absolute error is around 66**%.**
- The results produced by the tool are above the monitoring data nearly whole time.
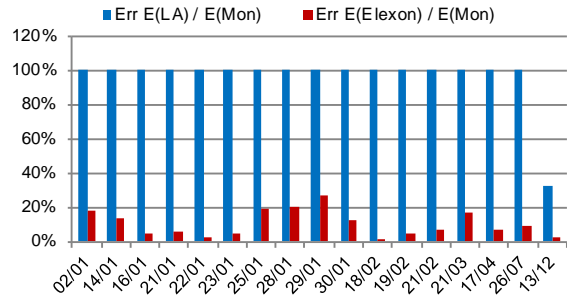
5.3.19 333008 (Windermere Rd) - Feeder 275033197

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333008	275033197	17	13	13	92.3 / 7.6 / 0 / 0 / 0 / 0	7.6

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	13.57988	165.366766	178.05	96.06	10.34	0.974		0.00

Daily apparent & active power errors
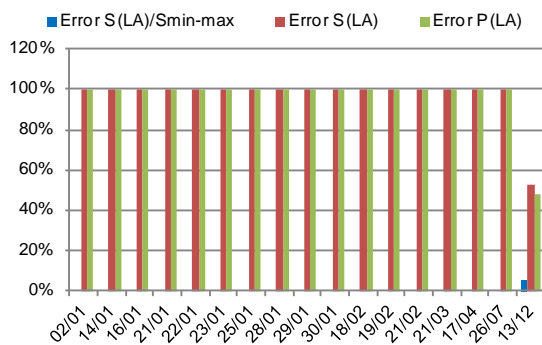
Daily apparent power errors
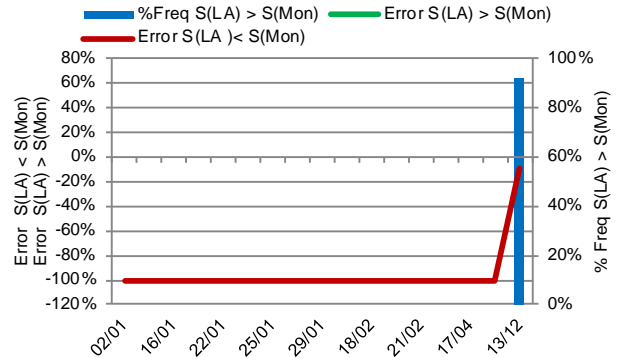
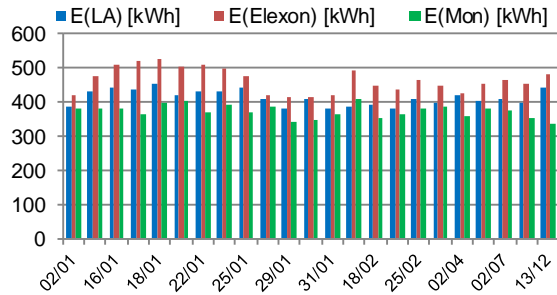|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	1 \ (17)	5.85	97.19	96.96	-94.63	56.25	5.39
Weekdays	1 \ (17)	5.85	97.19	96.96	-94.63	56.25	5.39
Winter	1 \ (14)	5.85	96.59	96.30	-93.48	56.25	6.55
Spring	0 \ (2)						
Summer	0 \ (1)						

Comments:

- The results produced by the tool have power values for **only one** of 17 days and the average energy errors is 96%.
- Due to the energy errors more than 90%, this feeder is removed from the assessment of ENWL's load allocation tool.
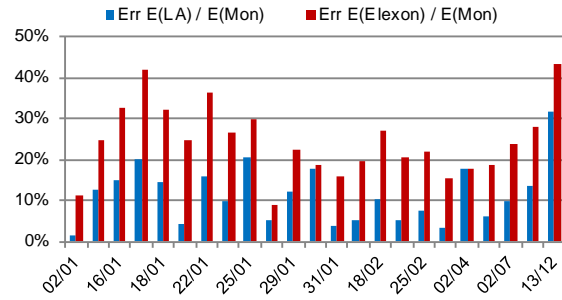
5.3.20 333939 (Shrigley Close) - Feeder 272040680

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333939	272040680	23	36	36	94.4 / 5.5 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	412.4925	463.176979	372.39565	11.49	24.48	0.984		0.00

Daily apparent & active power errors
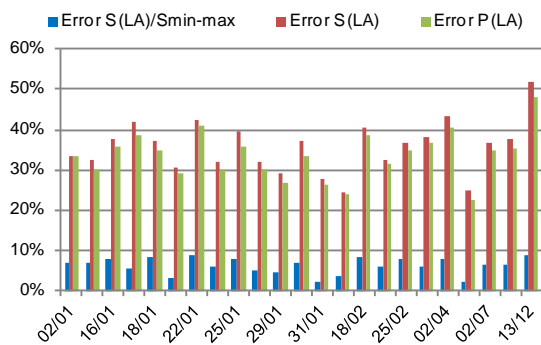
Daily apparent power errors
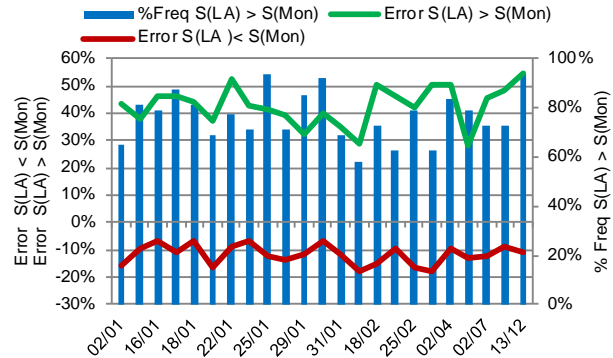
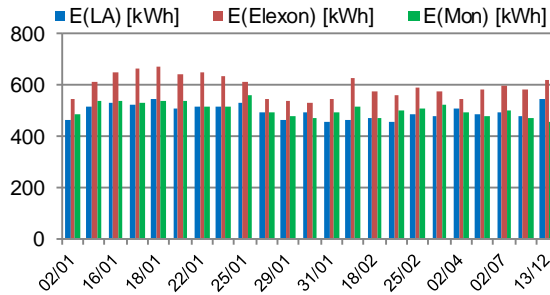|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	6.39	35.68	33.53	-11.67	42.72	76.45
Weekdays	22	6.57	36.16	34.02	-11.61	43.38	76.33
Winter	19	6.48	35.69	33.58	-11.83	42.65	76.32
Spring	1	7.91	43.28	40.27	-9.46	50.05	83.33
Summer	3	5.31	33.11	30.95	-11.41	40.74	75.00

Comments:

- This feeder has domestic customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are close to the monitoring data by **11%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 6% in average. The average absolute error is around 36%.
- The results produced by the tool are larger than the monitoring data around the rate of 43% error for three quarters of the day and smaller by 12% for a quarter of the day.
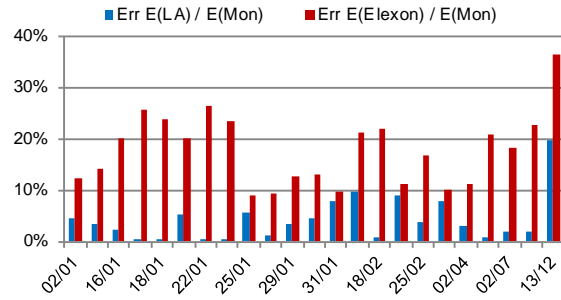
5.3.21 333939 (Shrigley Close) - Feeder 272040682

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333939	272040682	23	48	48	97.9 / 2.0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	495.4559	593.940286	504.20072	4.31	17.86	0.981		0.00

Daily apparent & active power errors
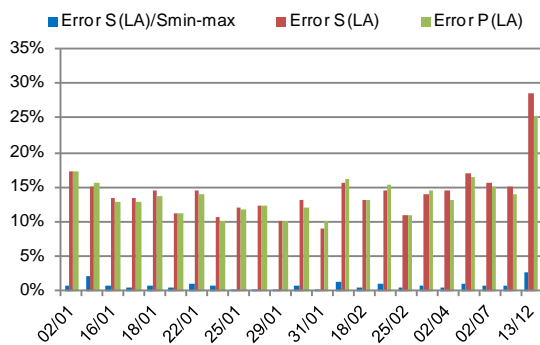
Daily apparent power errors
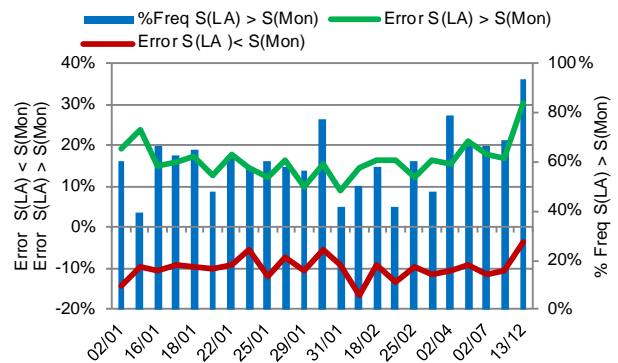
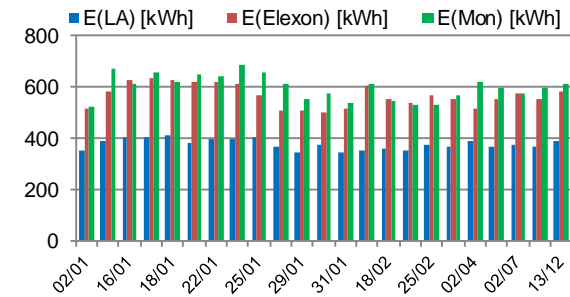|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	0.83	14.18	13.87	-9.80	16.37	60.42
Weekdays	22	0.82	14.06	13.74	-9.84	16.17	60.13
Winter	19	0.83	13.91	13.69	-9.70	16.08	58.33
Spring	1	0.52	14.47	13.22	-10.54	15.50	79.17
Summer	3	0.94	15.80	15.22	-10.20	18.54	67.36

Comments:

- This feeder has **48** domestic customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are very close to the monitoring data by **4%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 1% in average. The average absolute error is around 14%.
- The results produced by the tool are larger than the monitoring data with around 16% errors for more than half of the day.
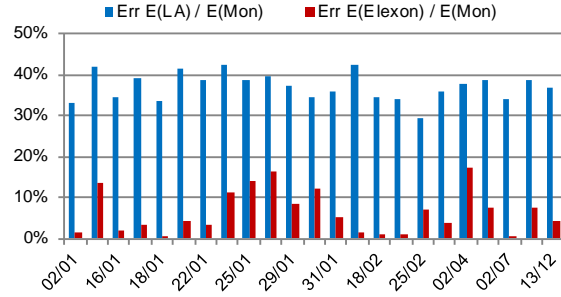
5.3.22 333939 (Shrigley Close) - Feeder 272040685

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333939	272040685	23	38	38	84.2 / 10.5 / 2.6 / 2.6 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	375.0709	564.02721	597.75	37.05	6.42	0.994		0.00

Daily apparent & active power errors
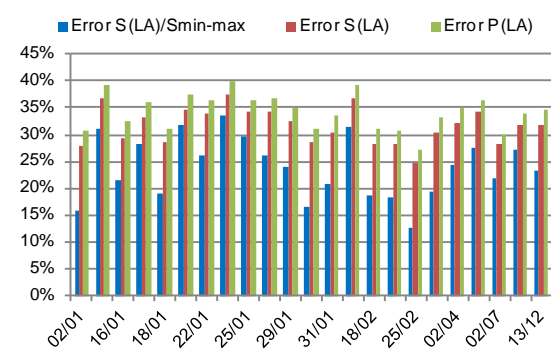
Daily apparent power errors
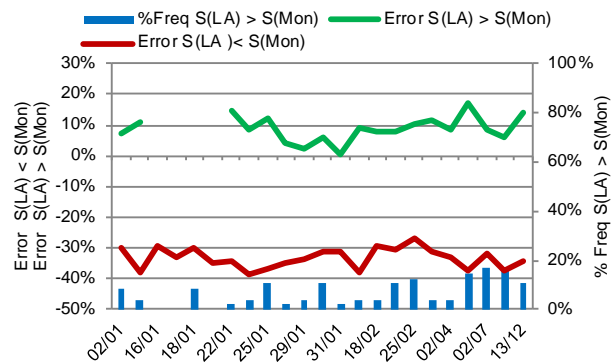
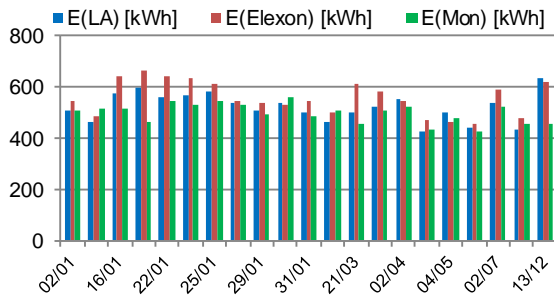|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	23.88	31.65	34.22	-33.23	8.94	6.70
Weekdays	22	23.71	31.53	34.13	-33.06	8.50	6.34
Winter	19	23.58	31.66	34.31	-32.89	8.63	5.37
Spring	1	24.34	32.18	35.06	-33.21	8.62	4.17
Summer	3	25.57	31.42	33.39	-35.40	10.69	15.97

Comments:

- This feeder has domestic and small non-domestic customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are smaller than the monitoring data by **37%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 24% in average. The average absolute error is around 32%.
- The results produced by the tool are **smaller** than the monitoring data with around 9% errors for most of the day.
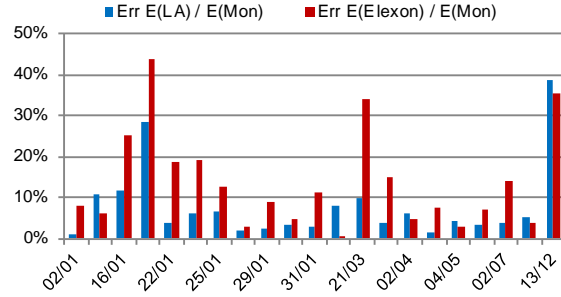
5.3.23 333944 (Lyngard Close) - Feeder 271014800

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
333944	271014800	21	49	49	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	520.856	556.229226	496.72937	7.82	13.64	0.990		0.00

Daily apparent & active power errors
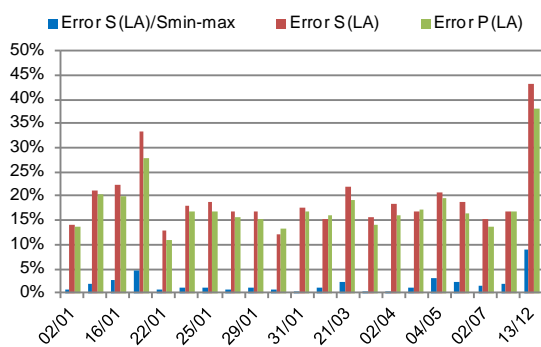
Daily apparent power errors
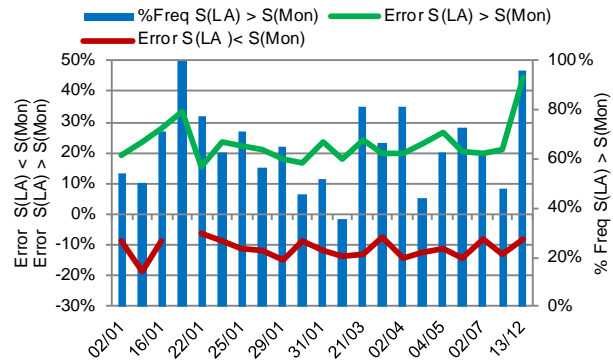
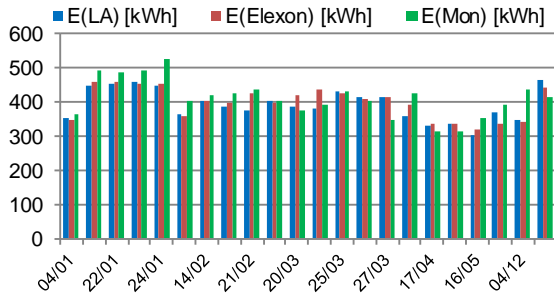|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	21	1.91	19.43	17.90	-11.26	22.83	64.48
Weekdays	20	1.85	19.36	17.82	-11.25	22.66	64.58
Winter	14	2.04	20.00	18.53	-11.10	23.34	63.10
Spring	6	1.66	18.78	17.10	-12.13	22.18	68.06
Summer	1	1.67	15.32	13.87	-8.11	19.64	62.50

Comments:

- This feeder has only **49** domestic unrestricted customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are very close to the monitoring data by **8%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 2% in average. The average absolute error is around 19%.
- The results produced by the tool are larger than the monitoring data with around 65% errors for more than half of the day.
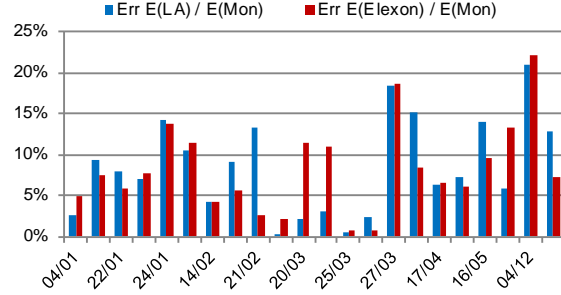
5.3.24 337699 (Welland Road) - Feeder 271014944

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
337699	271014944	22	35	35	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	391.4398	397.205026	410.86288	8.53	8.26	0.991	1.000	0.47

Daily apparent & active power errors
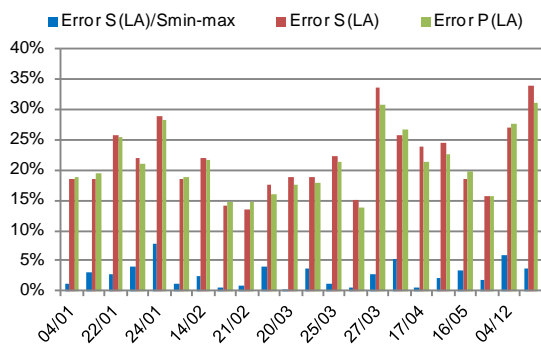
Daily apparent power errors
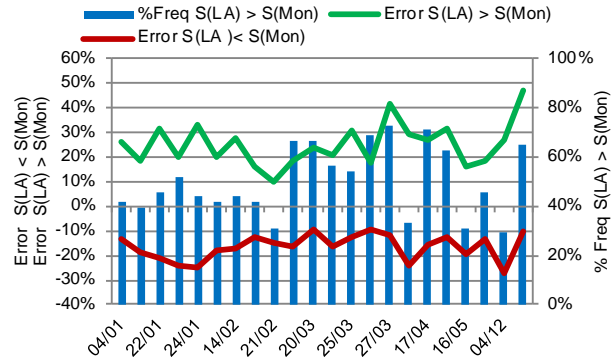
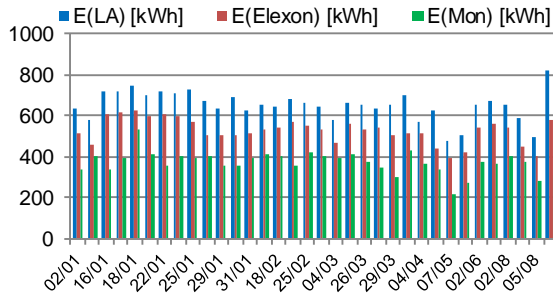|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	22	2.72	21.70	21.10	-16.55	25.09	50.19
Weekdays	21	2.77	21.99	21.37	-16.70	25.41	50.40
Winter	11	3.09	22.07	21.96	-18.42	25.13	43.18
Spring	10	2.42	21.91	20.72	-14.81	25.71	58.33
Summer	1	1.72	15.62	15.54	-13.30	18.35	45.83

Comments:

- This feeder has only domestic unrestricted customers; the average of inductive power factor is 0.99 and it behaves capacitive about an hour in a day.
- In terms of energy consumption, the results produced by the tool are **close to** the monitoring data by **9%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 3% in average. The average absolute error is around 22%.
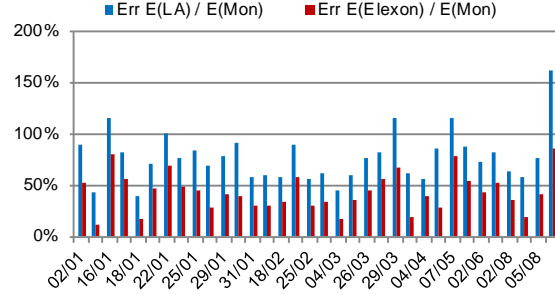- The results produced by the tool are **larger** than the monitoring data half of the day.

5.3.25 410428 (Fulwood Barracks North) - Feeder 142012016

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410428	142012016	34	46	46	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	648.6933	525.012241	370.95882	77.31	43.27	0.975		0.00

Daily apparent & active power errors
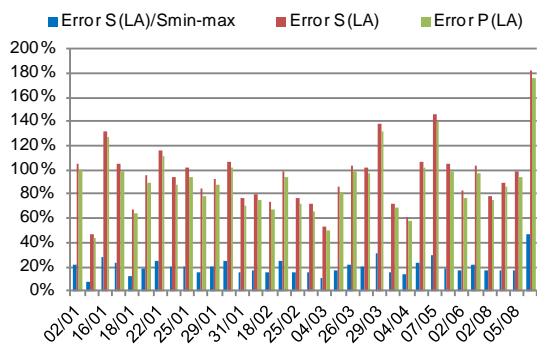
Daily apparent power errors
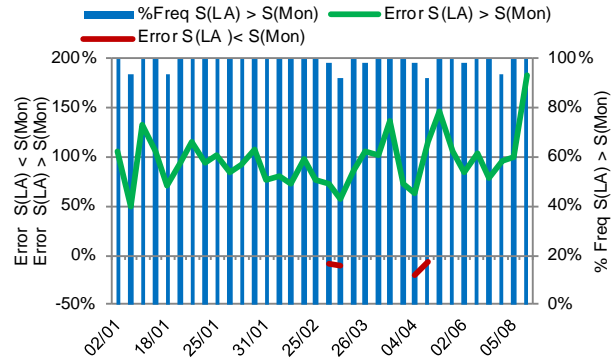
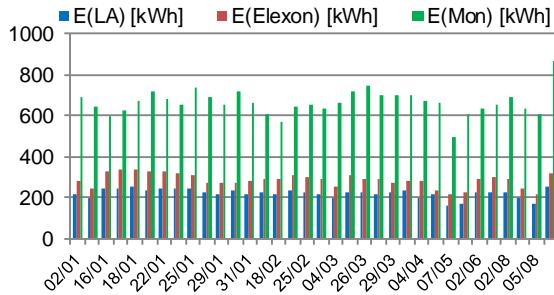|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	34	20.10	95.03	90.03	-8.42	95.95	98.71
Weekdays	31	20.20	95.23	90.17	-10.76	95.70	99.13
Winter	19	20.61	95.01	89.77	-9.50	95.41	99.23
Spring	10	20.04	97.28	92.59	-10.47	98.88	97.92
Summer	5	18.29	90.65	85.88	-2.71	92.14	98.33

Comments:

- This feeder has only **46** domestic unrestricted customers; the average of power factor is 0.98 and always inductive.
- In terms of energy consumption, the results produced by the tool are bigger than the monitoring data by **77%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 20% in average. The average absolute error is around 95%.
- The results produced by the tool are **larger** than the monitoring data with around **96%** errors almost all day.
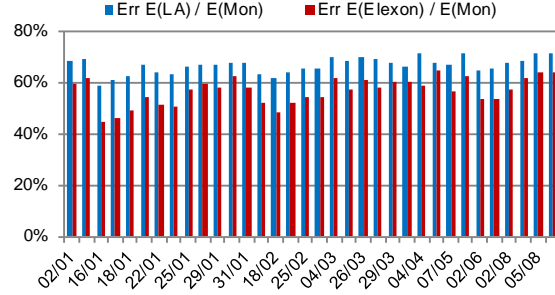
5.3.26 410428 (Fulwood Barracks North) - Feeder 142012020

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410428	142012020	34	25	25	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	220.3126	285.33274	663.64167	66.70	56.83	0.995	0.999	1.10

Daily apparent & active power errors
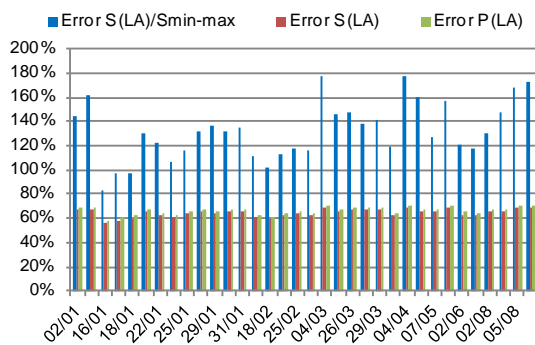
Daily apparent power errors
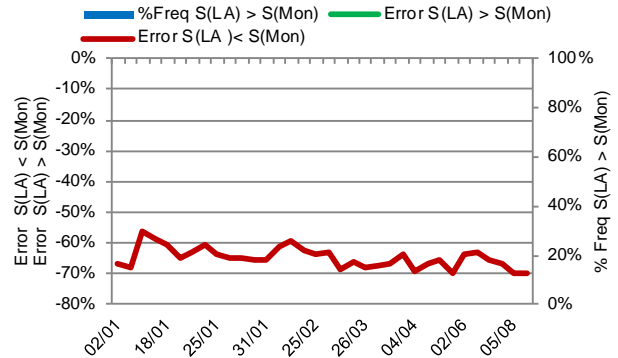
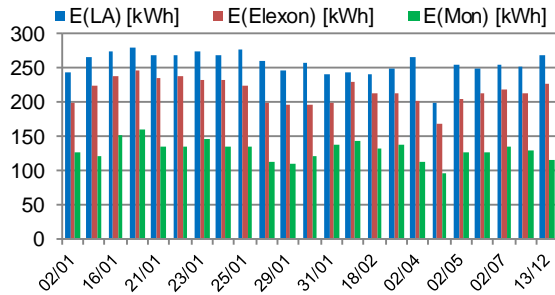|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	34	132.49	64.75	66.33	-64.75	#VALUE!	0.00
Weekdays	31	131.49	64.68	66.26	-64.68	#VALUE!	0.00
Winter	19	122.55	63.27	64.92	-63.27	#VALUE!	0.00
Spring	10	149.25	67.13	68.60	-67.13	#VALUE!	0.00
Summer	5	136.77	65.65	67.17	-65.65	#VALUE!	0.00

Comments:

- This feeder has only domestic unrestricted customers; the average of inductive power factor is 0.99 and it behaves capacitive about 14 minutes in a day.
- In terms of energy consumption, the results produced by the tool are **smaller** than the monitoring data by 67% errors in average.
- The results produced by the tool are **smaller** than the monitoring data **all the time**.
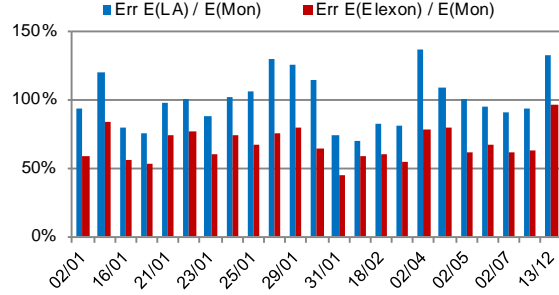
5.3.27 410699 (West Park Avenue) - Feeder 145063161

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410699	145063161	23	18	18	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	256.2	215.115795	129.17464	99.98	67.40		0.815	100.00

Daily apparent & active power errors
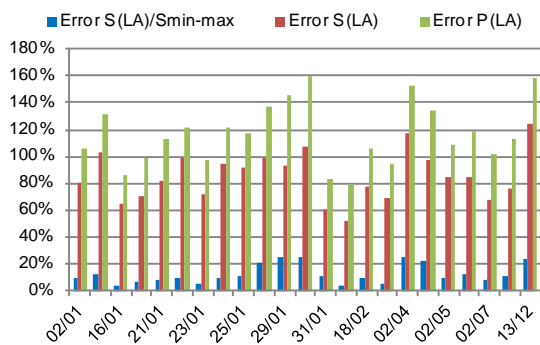
Daily apparent power errors
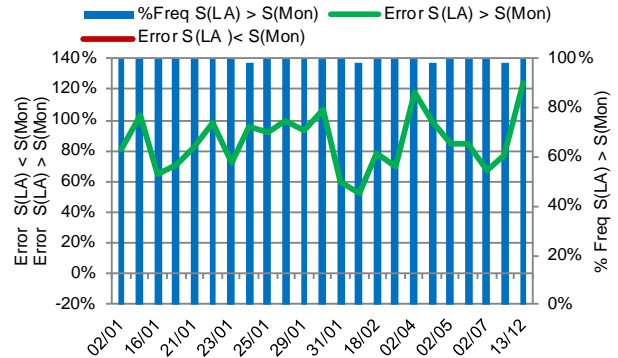
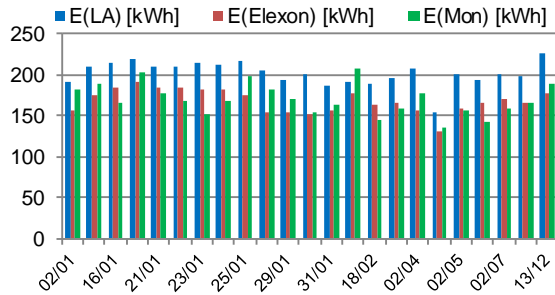|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	12.65	85.62	116.86	-7.60	85.89	99.64
Weekdays	22	12.68	85.68	116.77	-7.60	85.96	99.62
Winter	16	12.29	85.79	116.42	-5.98	85.97	99.74
Spring	4	15.82	92.28	123.05	-6.58	92.76	99.48
Summer	3	10.33	75.85	110.91	-11.86	76.31	99.31

Comments:

- This feeder has only 18 domestic unrestricted customers; the average of power factor is **0.81** and **always capacitive**.
- In terms of energy consumption, the results produced by the tool are larger than the monitoring data by **100%** errors in average.
- Due to the energy errors more than 90%, this feeder is removed from the assessment of ENWL's load allocation tool.
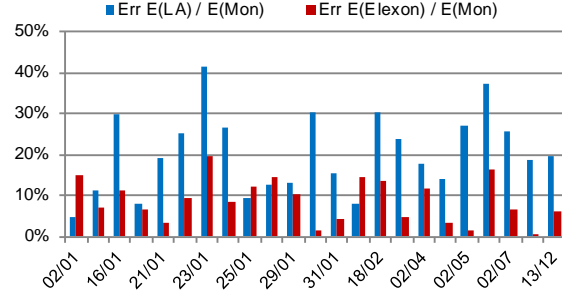
5.3.28 410699 (West Park Avenue) - Feeder 145063162

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410699	145063162	23	14	14	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	201.392	167.312285	169.55145	20.39	8.83	0.992	0.997	5.07

Daily apparent & active power errors
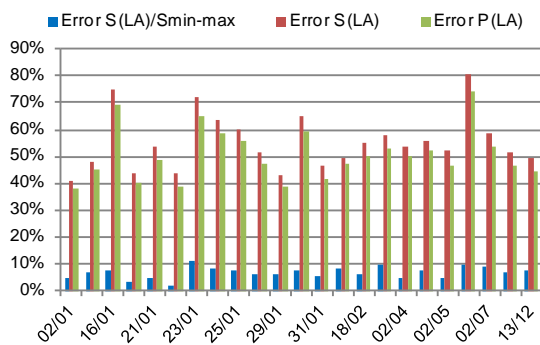
Daily apparent power errors
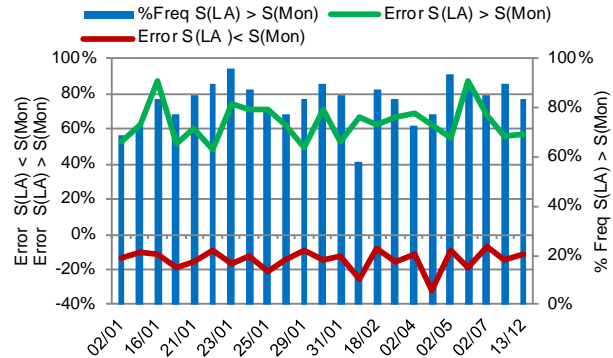
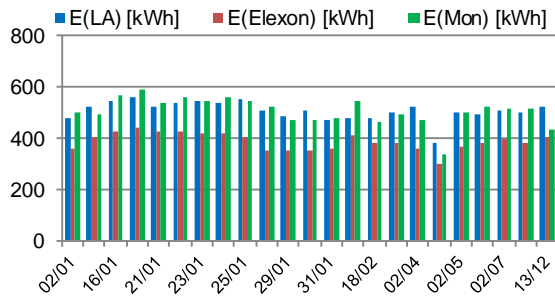|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	6.93	55.22	50.53	-14.58	63.55	82.43
Weekdays	22	6.79	54.07	49.45	-14.40	62.45	82.10
Winter	16	6.63	53.76	49.18	-14.13	62.36	81.51
Spring	4	6.80	54.92	50.38	-17.45	63.35	81.77
Summer	3	8.70	63.37	57.93	-13.14	70.15	88.19

Comments:

- This feeder has only **14** domestic unrestricted customers; the average of inductive power factor is 0.99 and it behaves capacitive about one hour in a day
- In terms of energy consumption, the results produced by the tool are larger than the monitoring data by **20%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 7% in average. The average absolute error is around 55%.
- The results produced by the tool are **larger** than the monitoring data **most of the day**.
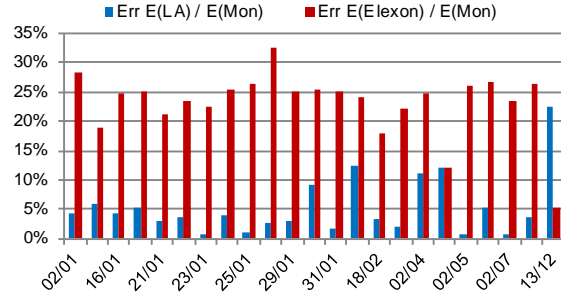
5.3.29 410699 (West Park Avenue) - Feeder 145063163

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410699	145063163	23	30	30	93.3 / 6.6 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	506.3935	386.102793	504.77826	5.34	23.18	0.994		0.00

Daily apparent & active power errors
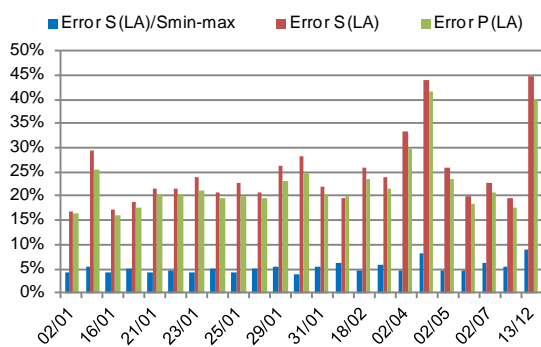
Daily apparent power errors
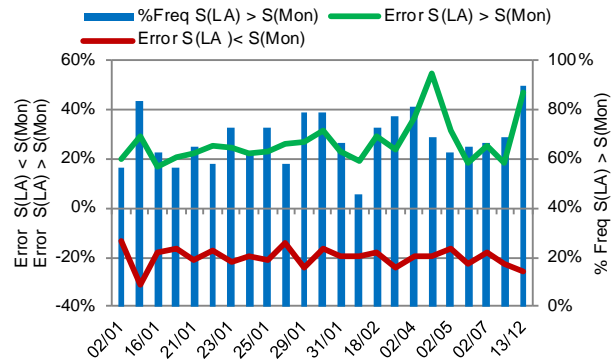
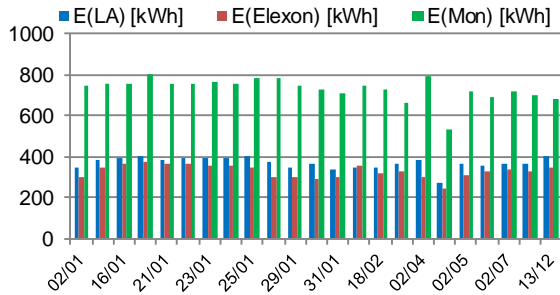|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	5.28	24.78	22.70	-19.94	26.71	68.30
Weekdays	22	5.32	25.00	22.90	-19.81	27.09	68.47
Winter	16	5.13	23.80	21.79	-19.79	25.36	67.58
Spring	4	5.77	31.73	29.18	-19.74	36.74	72.40
Summer	3	5.48	20.71	18.96	-21.01	20.57	66.67

Comments:

- This feeder has only domestic customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are **very close** to the monitoring data by **5%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 5% in average. The average absolute error is around 25%.
- The results produced by the tool are **larger** than the monitoring data for almost three quarters of the day.
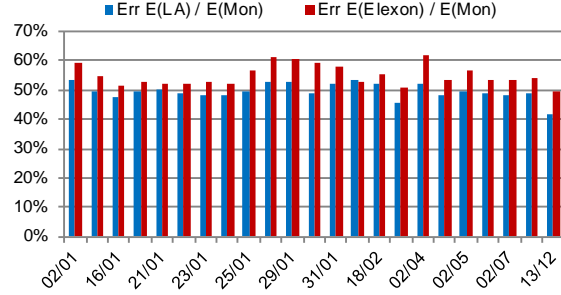
5.3.30 410699 (West Park Avenue) - Feeder 145063164

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
410699	145063164	23	24	24	87.5 / 12.5 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	367.0418	328.185762	729.25942	49.60	54.93	0.990		0.00

Daily apparent & active power errors
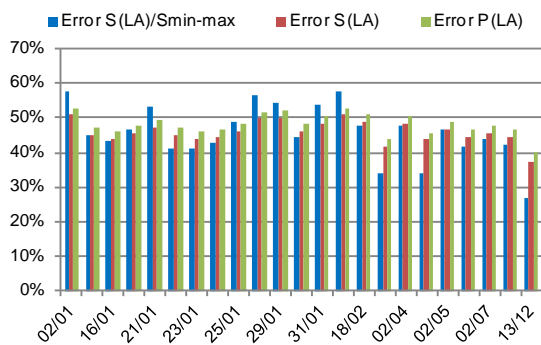
Daily apparent power errors
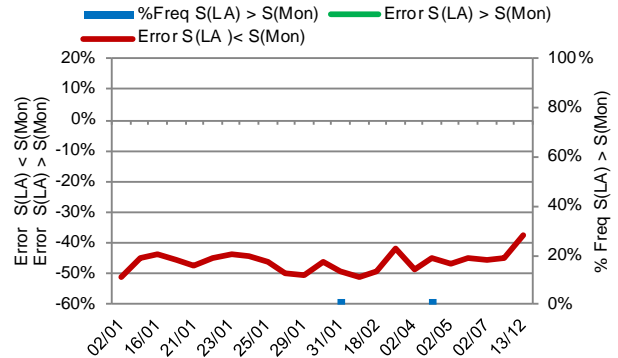
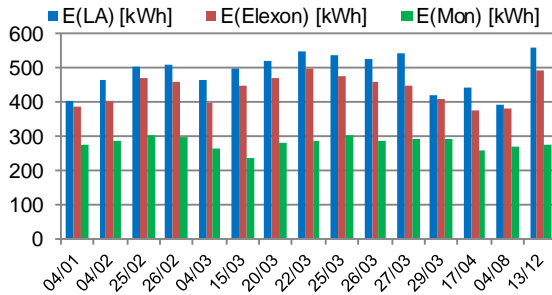|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	23	45.77	46.06	48.22	-46.12	15.26	0.18
Weekdays	22	45.96	46.13	48.29	-46.19	15.26	0.19
Winter	16	47.65	46.51	48.69	-46.55	15.27	0.13
Spring	4	40.54	45.12	47.22	-45.27	15.24	0.52
Summer	3	42.74	44.98	47.09	-44.98	#VALUE!	0.00

Comments:
- This feeder has only domestic customers with three PC2 customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are **smaller** than the monitoring data by **50%** errors in average.
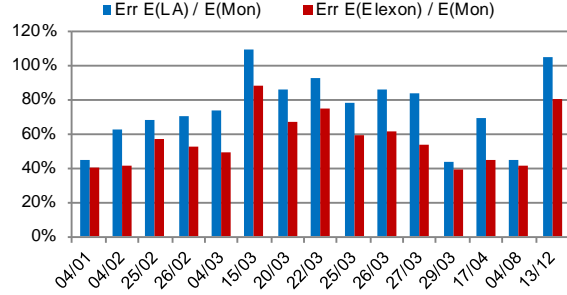- The results produced by the tool are **smaller** than the monitoring data nearly all day.

5.3.31 450028 (Whitebirk Drive) - Feeder 113038447

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
450028	113038447	15	36	36	97.2 / 0 / 2.7 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	487.4692	437.048366	279.62889	74.67	56.57	0.991	1.000	0.56

Daily apparent & active power errors
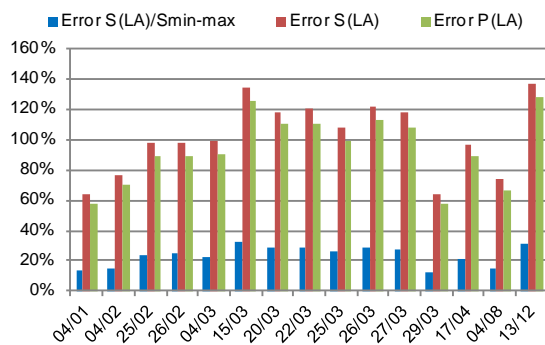
Daily apparent power errors
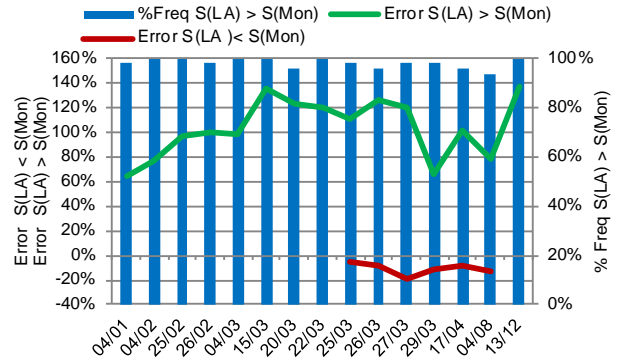
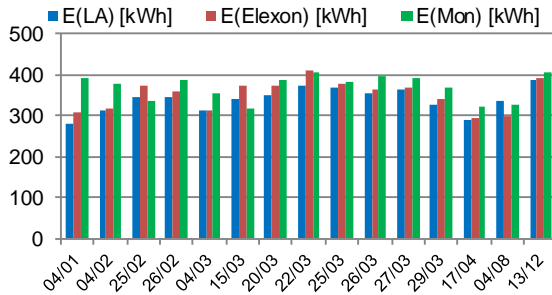|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	15	23.63	101.76	93.77	-8.86	103.52	98.06
Weekdays	14	24.23	103.78	95.68	-8.28	105.37	98.36
Winter	5	21.81	94.61	86.79	-4.85	95.26	99.17
Spring	9	25.58	108.87	100.62	-9.42	110.99	97.92
Summer	1	15.28	73.52	66.98	-13.49	77.52	93.75

Comments:

- This feeder has mostly domestic customers and one non-domestic; the average of inductive power factor is 0.99 and it behaves capacitive eight minutes in a day.
- In terms of energy consumption, the results produced by the tool are **larger** than the monitoring data by **75%** errors in average.
- The results produced by the tool are **larger** than the monitoring data most of the day.
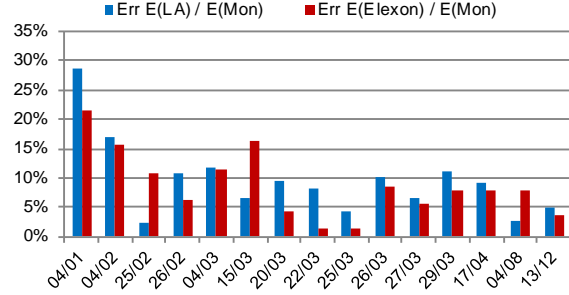
5.3.32 450028 (Whitebirk Drive) - Feeder 113038448

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
450028	113038448	15	31	31	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	338.0025	349.925242	368.95333	9.61	8.75	0.994	1.000	0.14

Daily apparent & active power errors
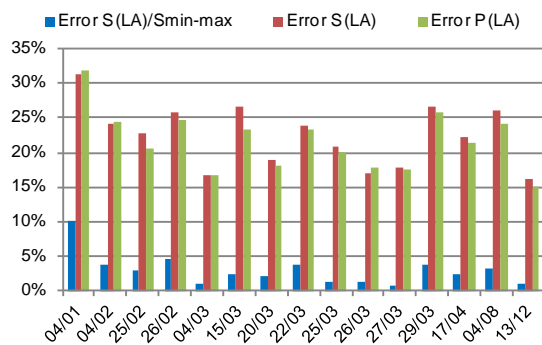
Daily apparent power errors
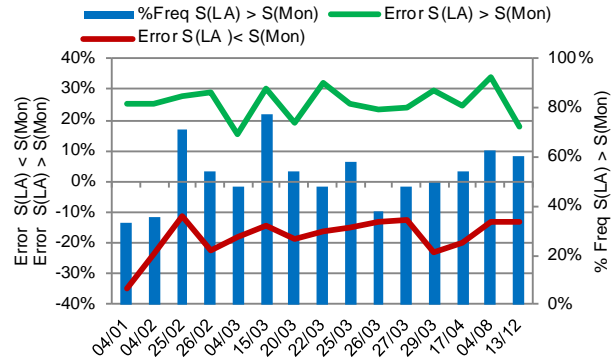
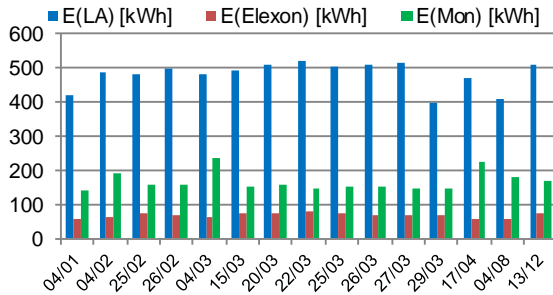|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	15	3.02	22.47	21.67	-17.90	25.48	52.78
Weekdays	14	3.01	22.22	21.49	-18.24	24.89	52.08
Winter	5	4.59	24.11	23.37	-20.99	24.97	50.83
Spring	9	2.13	21.17	20.44	-16.72	24.85	52.78
Summer	1	3.16	25.97	24.26	-13.07	33.71	62.50

Comments:

- This feeder has only domestic customers; the average of inductive power factor is 0.99, it behaves capacitive two minutes in a day.
- In terms of energy consumption, the results produced by the tool are **close** to monitoring data by **10%** errors in average.
- In terms of apparent power, the average error is about the rate of 25%. The error of minimum maximum border is below the rate of 5%.
- The results produced by the tool are **larger** than the monitoring data for about half of the day.
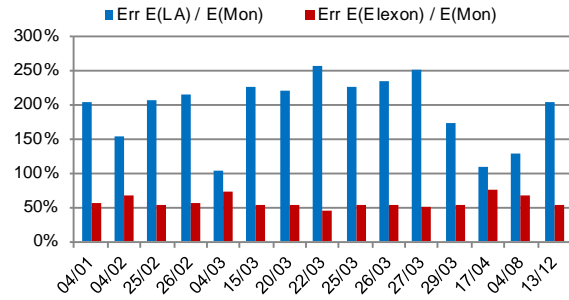
5.3.33 450028 (Whitebirk Drive) - Feeder 113038449

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
450028	113038449	15	7	6	100 / 0 / 0 / 0 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	479.729	67.7274662	166.79222	194.52	58.09	0.989	0.985	40.00

Daily apparent & active power errors
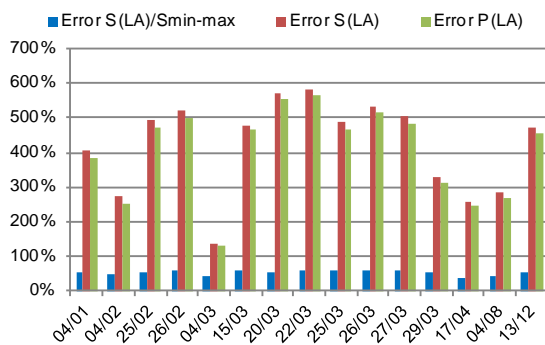
Daily apparent power errors
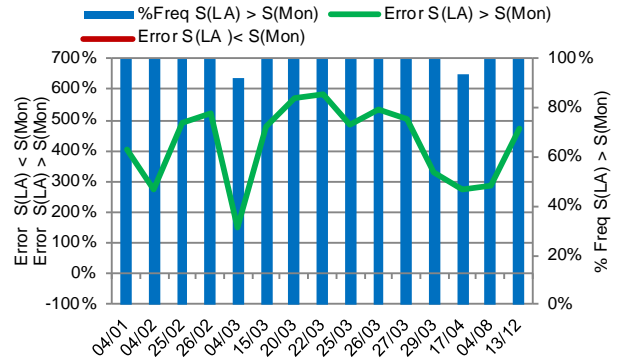
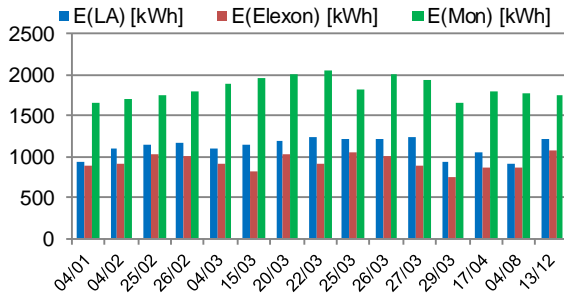|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	15	54.14	421.40	404.59	-2.23	423.35	99.03
Weekdays	14	54.75	431.23	414.34	-2.23	433.32	98.96
Winter	5	55.18	432.19	412.31	#VALUE!	432.19	100.00
Spring	9	54.51	430.70	415.47	-2.23	433.95	98.38
Summer	1	45.61	283.78	268.05	#VALUE!	283.78	100.00

Comments:

- This feeder has **less than 10** domestic customers; the average of inductive and capacitive power factor is 0.99 and it behaves capacitive about less than half day.
- Even the results produced by the tool are quite **larger** than the monitoring data by **195%** errors in average.
- Due to the energy errors more than 90%, this feeder (with less than 10 MPANs) is removed from the assessment of ENWL's load allocation tool.
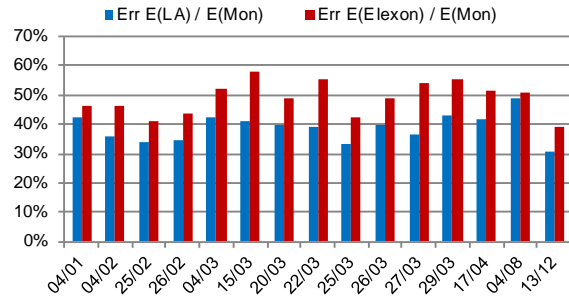
5.3.34 450028 (Whitebirk Drive) - Feeder 113038450

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
450028	113038450	15	41	41	80.4 / 4.8 / 12.1 / 0 / 2.4 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	1118.854	932.031488	1833.9256	38.98	49.01	0.985		0.00

Daily apparent & active power errors
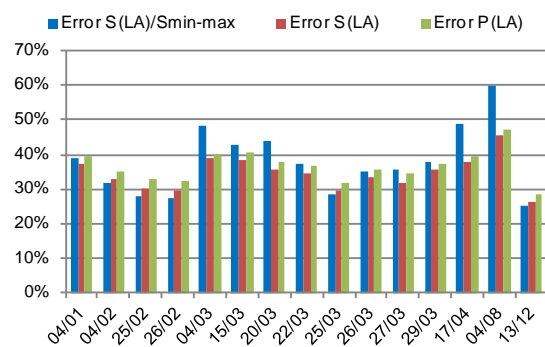
Daily apparent power errors
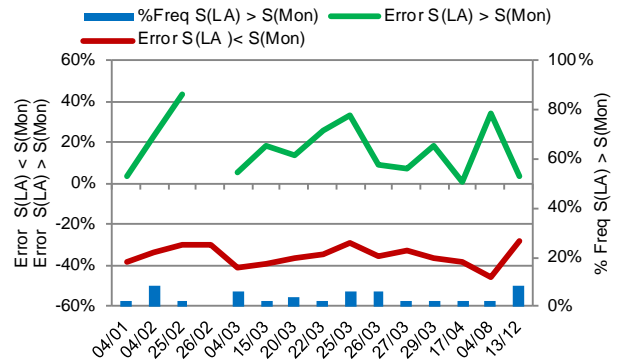
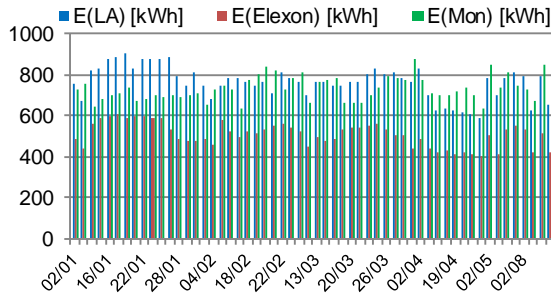|	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	15	38.03	34.54	36.60	-35.24	17.18	3.75
Weekdays	14	36.47	33.73	35.85	-34.47	15.90	3.87
Winter	5	30.41	31.27	33.67	-31.95	18.58	4.17
Spring	9	39.83	35.10	37.06	-35.87	14.71	3.70
Summer	1	59.86	45.77	47.14	-46.03	33.83	2.08

Comments:

- This feeder has domestic and non-domestic customers; the average of power factor is 0.98 and always inductive.
- The results produced by the tool are **smaller** than the monitoring data based on energy consumption and apparent power with around **40%**.
- In terms of apparent power, the average error is about the rate of 35%. The error of minimum maximum border is below the rate of 38%.
- The results produced by the tool are **smaller** than the monitoring data **most of time**.
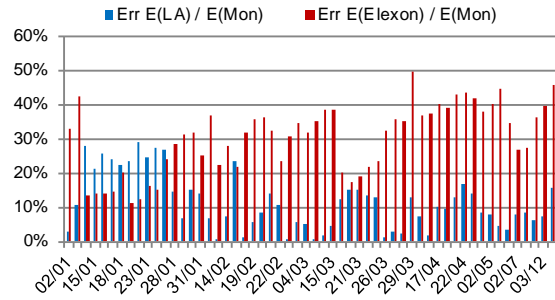
5.3.35 455031 (Holden) - Feeder 39031026

Plant Ref No	FID	# Days	# MPANs (ENWL LA)	# MPANs (GIS)	%PC1/%PC2/%PC3/%PC4/%PC5-8/%PC0	% PV
455031	39031026	56	30	30	76.6 / 13.3 / 3.3 / 6.6 / 0 / 0	0

Daily energy consumptions

Daily energy consumption errors

	E(LA) [kWh]	E(Elex) [kWh]	E(Mon) [kWh]	%Err E(LA)	%Err E(Elexon)	pf_ind	pf_cap	%freq pf_cap
All days	761.1208	506.777235	731.45625	11.53	30.28	0.989		0.00

Daily apparent & active power errors

Daily apparent power errors

	# Days	%BandError S(LA)	%Error S(LA)	%Error P(LA)	%Error S(LA)<S(Mon)	%Error S(LA)>S(Mon)	%Freq S(LA)>S(Mon)
All days	56	6.50	26.63	47.05	-12.03	31.91	67.34
Weekdays	53	6.71	27.11	48.68	-11.95	32.39	68.36
Winter	29	6.53	27.08	24.67	-9.61	30.09	73.28
Spring	23	6.87	27.27	80.23	-15.14	35.52	60.60
Summer	4	4.24	19.68	18.48	-11.11	24.25	63.02

Comments:

- This feeder has domestic and small non-domestic customers; the average of power factor is 0.99 and always inductive.
- In terms of energy consumption, the results produced by the tool are **close** to monitoring data by **12%** errors in average.
- In terms of apparent power, the results produced by the tool are outside the minimum and maximum monitoring values by 7% in average. The average absolute error is around 27%.
- The results produced by the tool are **larger** than the monitoring data with 32% errors for three quarters of the day.