Evaluation of algorithm performance - 2014/15 gas year

Introduction

The annual gas year algorithm performance evaluation normally considers three sources of information as follows:

   i)   daily values of scaling factor (SF) and weather correction factor (WCF)

   ii)   reconciliation variance (RV) data for each EUC

   iii)   daily consumption data collected from the NDM sample

This note presents the result of the review in respect of NDM sample derived daily consumption data, with brief explanatory notes.

1.0 Scaling Factor (SF) and Weather Correction Factor (WCF)

This analysis was not completed for Gas Year 2014/15 as per the decision made at the Demand Estimation Sub Committee (DESC) meeting on 8th July 2015.

2.0 Reconciliation Variance (RV) analysis

This analysis was not completed for Gas Year 2014/15 as per the decision made at the Demand Estimation Sub Committee (DESC) meeting on 8th July 2015.

3.0 Analysis of NDM sample daily consumption data

3.1 Overview

The performance of the NDM profiling algorithms has been evaluated by comparing actual daily demands for supply points in the NDM sample with estimates of their daily demands (as per the NDM profiling formula) across the range of EUCs. This evaluation covers the period of the gas year 2014/15.

The performance of the algorithms has been evaluated on three bases:

   i)   As used   - gas year 2014/15 ALPs and DAFs, real system WCF and SF.

   ii)   Best estimate 14   - gas year 2014/15 ALPs, DAFs, estimated weather correction factor (EWCF) consistent with DAFs and SF = 1.

   iii) Best estimate 15   - as (ii) above but with ALPs, DAFs, EWCFs based on 2015/16 models adjusted to apply to pattern of days/holidays in 2014/15.

Tables showing the error ("actual-allocated") expressed as a percentage of full year demand, for the whole year and for winter and summer separately, for each of the three bases, are attached as Tables 3.1 to 3.9. Note that positive errors denote under allocation and negative errors denote over allocation by the algorithms.

It is worth noting at the outset that results for band 09 are unreliable and are disregarded in this assessment. Only supply points that are NDM and have passed data validation can be used to assess this band and therefore the band is represented by a very small number of supply points distributed in only some of the 13 LDZs.

Unusually high percentage errors were observed in band 08 for SE and SO LDZs over all three assessment bases (i.e. 'As Used', 'Best Estimate 14' and 'Best Estimate 15'). These assessments were made using a very small number of sample sites (5 and 8 respectively) and upon investigation, it was discovered that some of the sites appear to have a more weather sensitive profile than a typical band 08 profile.

Figures 3.1, 3.2 and 3.3 are bar charts showing a simple summary of the overall picture given by these three sets of tables. The overall error and apparent winter/summer bias for EUCs in each consumption band is shown averaged across all LDZs.

The bar chart in Figure 3.1 shows that for the "as used" analysis the percentage errors for all consumption bands over the 12 month period as a whole, are positive and lie within a range of 0.01% to 0.36%. The winter errors are negative with the exception of bands 01, 05 and 06 whereas the summer errors are positive in all bands except bands 05 and 06.

3.2 Analysis

The small positive errors over 12 months across all consumption bands indicate under allocation by the models. This under allocation in all consumption bands in the "as used" analysis is an indication of population AQs being higher than the NDM sample derived AQs. Moreover, since allocated consumption is a direct function of AQ, the extent of any AQ excess (in percentage terms) would broadly tend to be of the same order as that noted for this "as used" analysis. The full year errors in the "as used" analysis, across all applicable consumption bands for each LDZ (excluding WN LDZ for which there is no data for band 01) were also computed and are set out in Table 3.10. These errors range from -0.7% to +0.8% for the individual LDZs (and 0.2% overall across all LDZs excluding WN) suggesting an AQ excess of the same extent.

The "as used" analysis uses real (i.e. Gemini system) SFs that have taken population AQs into account (i.e. if population AQ was too high then this would have led to a decrease of the real SFs from the values that would have otherwise applied).

However, the AQs used in the analysis are not system AQs but are computed from sample data itself. These AQs based on the consumption data of the sample itself would be expected to be lower than the equivalent system AQs. Thus, the resultant "as used" allocations using the real SFs with sample derived AQs, end up being lower than they should be and this gives the positive errors shown in Figure 3.1.

The percentage changes in aggregate NDM AQs at the start of gas year 2015/16 as observed on the Gemini system indicated that a small reduction in aggregate NDM AQs had taken place for gas year 2015/16 in all 13 LDZs. The reduction was 1.8% overall across all LDZs and the changes ranged from a 0.2% reduction in SO LDZ to a 2.9% reduction in NO LDZ. Some of this change will be attributed to the effect of the new seasonal normal weather basis which came into effect on 1st October 2015.

The "best estimate" analysis is potentially more helpful in assessing the performance of the algorithms themselves, as opposed to the performance of the demand attribution process. For each "best estimate" analysis, a scaling factor of one is used and EWCF is applied instead of WCF. The EWCF is calculated directly from the models of aggregate NDM demand in the LDZ for the period in question, using the relevant aggregate NDM seasonal normal demands and weather sensitivities (the same values used originally to compute the EUC DAF profiles) along with the actual CWV. Use of the EWCF avoids bias which might be introduced in the WCF by any excess or deficiency in EUC AQs in the relevant LDZ, used to compute the sum across all EUCs of ALP weighted daily average demand [$\sum_{EUC} ALP * (AQ/365)$] for each day. (Note that EWCF = (WSENS/SND) * (CWV – SNCWV)).

The "best estimate 14" analysis is based on the algorithms for 2014/15, while the "best estimate 15" analysis is based on algorithms derived for 2015/16 and applied with appropriate adjustment for the pattern of days of the week and holidays in 2014/15.

On the evidence of the bar chart in Figure 3.2 ("best estimate 14"), there was very little overall error in the algorithms for any of the consumption bands over the whole of gas year 2014/15 (full year errors range between -0.07% and +0.40% for all bands). Overall consumption band winter period errors range from -1.34% to +2.19% and overall consumption band summer period errors range from -4.01% to 0.76%. Actual summer demands are lower and hence percentage errors can be somewhat greater in the summer. The signs of the winter and summer period errors suggest that for consumption bands 01, 02, 04, 05, 06 and 07 the profiles in 2014/15 were a little too flat, while for consumption bands 03 and 08 the profiles were a little too peaky. There are (of course) exceptions to this broad generalisation in some individual LDZs (see Tables 3.5 and 3.6)

The bar chart in Figure 3.3 ("best estimate 15") shows that the algorithms derived for 2015/16 would (if applied to gas year 2014/15) have resulted in a similar outcome for the majority of consumption bands overall. Whole year errors are very small overall for all the consumption bands, but for this "best estimate 15" case they range between -0.02% and +0.36%. Winter and summer period errors are slightly improved for bands 01, 02, 04, 05, 06 and 07. However, the winter and summer period errors are slightly worse for bands 03 and 08.

It must be borne in mind that the "best estimate" analyses are based on validated NDM sample data which is not necessarily representative of the population as a whole. Furthermore, this sample dataset suffers from small numbers of contributing meter/supply points at the higher consumption bands.

A selection of monthly charts is also presented: Figures 3.4 to 3.11 are monthly bar charts comparing actual and allocated demands, across all LDZs for consumption bands 01 to 08 respectively. These show for each month, actual demand, and allocated demand on the "as used", "best estimate 14" and "best estimate 15" bases.

In interpreting these monthly charts it is relevant to recall the weather conditions that prevailed during gas year 2014/15. Over the winter six month period, October 2014 was a mixed month with the first half of the

month being slightly colder than seasonal normal and the second half being substantially warmer, resulting in it being ranked 7th warmest in the last 50 years. Apart from on a few days, November 2014 was much warmer than normal resulting in the month being ranked 3rd warmest in the last 50 years. December 2014 was a mixed month with the beginning and end of the month being colder than normal and the middle of the month being notably warmer than normal. The month of January 2015 was fairly average overall, although the first half of the month was generally warmer than normal and the second half of the month was much colder than normal. February 2015 was also fairly average overall despite the first half of the month being much colder than normal and March 2015 was predominantly colder than normal on most days of the month. During the summer six month period, April 2015 was much warmer than normal (the 7th warmest in the last 50 years) and in contrast, May 2015 was predominantly colder than normal. The months of June and July 2015 were both fairly average overall (despite a few colder days) and the month of August 2015 was very close to normal throughout. September 2015 was consistently colder than normal on all but one day throughout the month, resulting in it ranking as the 9th coldest September in the last 50 years.

Consideration of these monthly bar charts focuses on the actual consumption compared to the allocations arising from the "best estimate" analyses, which better reflect the performance of the profiles themselves.

The monthly chart for band 01, in Figure 3.4, indicates winter under allocation (except in November 2014 which was predominantly warmer than normal). It also shows mostly small summer over allocation (most noticeably in April 2015 which was much warmer than normal) with the exception being in July & August 2015.

Table 3.11 shows the percentage errors (on the "best estimate 14" basis) for band 01 over the months of April, May and the rest of the summer months (June to September). For band 01 during April, over allocation occurred in all LDZs and during May, over allocation occurred in 8 LDZs. Over allocation was also observed in the majority of LDZs over the rest of the summer months (June to September) with the exception of EA, NT, SE, SO and SW LDZs.

Table 3.12 shows the percentage errors overall across all LDZs (on the "best estimate 14" basis) for each band (except band 09) over the months of April, May and the rest of the summer months (June to September). In this table, the errors are expressed as a percentage of the actual demand over the month or set of months. Over allocations occurred in bands 01, 02, 03 and 05 in April. In contrast, under allocation occurred in the majority of bands (02 to 05 and 07) in May. Over the rest of the summer period over allocations occurred in all but one band (03).

The monthly chart for band 02, in Figure 3.5, indicates winter over allocation in November, December and January and summer over allocation in April, August and September.

Figure 3.6 is the monthly chart for band 03, which shows small over allocation during the winter months of November, December and January but also shows mostly under allocation during the summer months, with the exception being in April & September 2015.

Figure 3.7 is the monthly chart for band 04, which shows the majority of the winter months having under allocation, which is also prevalent during the period from April to June over the summer months.

The monthly charts for bands 05 to 08 are in Figures 3.8 to 3.11. Overall, bands 05 and 06 show a small winter under allocation and a small summer over allocation but bands 07 and 08 show a small winter over allocation and a small summer under allocation (with exceptions for some months in some bands). For example, under allocation in bands 05 to 08 is evident for April 2015.

Additionally examples of monthly bar charts for individual EUCs, for some of the EUC bands (namely EM:E1402B, WM:E1403B, SC:E1404B, SO:E1405B, EA:E1406B, NW:E1407B and SW:E1408B) are shown in Figures 3.12 to 3.18 respectively. There is no consistent monthly pattern across all these examples, but in a majority of the examples February 2015 shows an under allocation and September 2015 an over allocation.

The final set of graphs (Figures 3.19 to 3.26) show actual demand and allocated demand on the "best estimate 14" and "best estimate 15" basis for each consumption band. In general, the allocated demand for both bases was close to the actual demand for each consumption band on most days. For band 01, the most notable exceptions occurred during the particularly cold days in late January and early February 2015 and the generally warmer period in mid April 2015. For the other bands 02 to 08, the most notable exceptions appear to be a general tendency for slight under allocation in the winter months and a slight over allocation in the summer months.

Table 3.1 – Oct 14 to Sep 15: Actual WCF and SF, ALPs and DAFs 'As Used'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	1.54%	0.43%	0.65%	-0.63%	0.54%	0.24%	-	0.82%	-0.36%	-1.74%	0.12%	-1.65%	1.31%	0.07%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	1.41%	0.24%	0.62%	-0.77%	0.63%	0.18%	0.17%	0.69%	-0.31%	-1.43%	0.10%	-1.41%	1.17%	0.00%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	1.32%	0.43%	1.16%	-0.52%	0.82%	1.78%	0.67%	1.72%	0.17%	-1.39%	0.08%	-1.02%	1.84%	0.37%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	1.41%	0.70%	0.57%	-0.54%	0.96%	0.56%	0.17%	1.20%	-0.09%	-1.25%	0.08%	-0.94%	1.47%	0.24%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	1.25%	0.52%	0.66%	-0.24%	0.69%	0.11%	0.33%	0.49%	-0.10%	-0.90%	0.07%	-1.08%	1.15%	0.26%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	0.81%	0.01%	0.36%	-0.07%	0.51%	0.00%	0.12%	0.48%	0.07%	-0.86%	0.08%	-0.86%	0.71%	0.14%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	0.70%	-0.01%	0.31%	0.05%	0.49%	-0.02%	0.05%	0.36%	0.12%	-0.50%	0.04%	-0.49%	0.70%	0.21%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	0.71%	-0.02%	0.29%	0.09%	0.50%	-0.01%	0.03%	0.30%	0.09%	-0.57%	0.10%	-0.28%	0.60%	0.18%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.2 – Oct 14 to Mar 15: Actual WCF and SF, ALPs and DAFs 'As Used'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	0.82%	0.93%	0.03%	-0.40%	-0.35%	0.27%	-	1.60%	-0.99%	-0.12%	1.11%	-2.99%	0.96%	0.01%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	-2.08%	-0.25%	-1.76%	-2.54%	-0.36%	-1.01%	-4.18%	-0.64%	0.03%	-5.54%	-0.17%	0.99%	1.52%	-1.04%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	0.20%	1.08%	-2.48%	-1.70%	-0.86%	-0.24%	-3.82%	-3.68%	0.73%	-1.46%	-1.16%	-1.77%	-2.14%	-0.91%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	0.17%	0.88%	-0.45%	-2.06%	-1.45%	0.80%	-3.92%	-0.60%	-0.94%	0.79%	0.07%	-3.27%	-0.44%	-0.51%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	0.43%	1.06%	0.18%	-0.19%	1.38%	0.36%	0.08%	3.28%	-1.81%	0.41%	0.60%	-0.60%	0.81%	0.39%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	1.07%	2.09%	2.25%	0.37%	2.17%	3.77%	-1.59%	-1.04%	2.73%	-0.82%	-0.66%	1.88%	3.77%	1.68%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	0.13%	-1.94%	1.92%	-1.09%	1.47%	0.82%	-8.58%	-7.14%	0.06%	4.00%	2.10%	1.26%	-7.78%	-0.15%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	6.91%	-6.97%	-0.89%	-5.95%	-1.32%	-3.43%	-13.03%	1.73%	-9.34%	-2.78%	12.27%	16.58%	-0.45%	-1.40%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.3 – Apr 15 to Sep 15: Actual WCF and SF, ALPs and DAFs 'As Used'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	3.26%	-0.93%	2.37%	-1.29%	3.26%	0.15%	-	-1.58%	1.52%	-6.66%	-3.00%	2.30%	2.41%	0.26%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	8.63%	1.42%	6.37%	3.86%	3.42%	3.44%	10.05%	4.40%	-1.26%	7.21%	0.74%	-8.17%	0.26%	2.62%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	3.66%	-1.13%	9.73%	2.59%	5.37%	7.43%	10.99%	16.66%	-1.44%	-1.22%	3.22%	1.11%	13.42%	3.63%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	3.95%	0.28%	2.81%	2.78%	6.56%	0.00%	8.32%	5.66%	1.97%	-5.97%	0.10%	4.71%	5.86%	1.95%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	2.72%	-0.52%	1.52%	-0.32%	-0.58%	-0.38%	0.78%	-5.30%	3.18%	-3.65%	-0.96%	-2.13%	1.79%	0.01%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	0.43%	-3.12%	-2.50%	-0.70%	-2.08%	-6.18%	2.48%	2.57%	-4.23%	-0.92%	1.40%	-6.45%	-4.25%	-2.29%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	1.45%	2.36%	-1.87%	1.46%	-0.77%	-1.13%	9.47%	9.58%	0.21%	-7.35%	-3.06%	-3.32%	10.89%	0.68%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	-8.35%	7.30%	1.72%	6.53%	2.63%	3.89%	12.55%	-1.60%	11.20%	2.43%	-26.7%	-37.9%	1.93%	2.12%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.4 – Oct 14 to Sep 15: EWCF, with SF=1: 2014/15 ALPs and DAFs 'Best Estimate 14'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	0.00%	0.00%	0.01%	0.25%	0.01%	0.01%	-	0.01%	0.01%	0.00%	0.01%	0.00%	0.00%	0.03%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	-0.06%	-0.13%	-0.18%	-0.15%	0.09%	-0.10%	-0.18%	-0.10%	-0.07%	-0.07%	-0.02%	-0.04%	-0.07%	-0.07%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	-0.07%	0.11%	1.08%	0.34%	0.38%	1.69%	1.08%	0.93%	0.39%	-0.02%	-0.04%	0.29%	0.62%	0.40%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	0.36%	0.35%	-0.16%	-0.07%	0.58%	0.36%	-0.16%	0.51%	0.07%	-0.02%	-0.02%	0.24%	0.43%	0.18%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	0.38%	0.29%	0.40%	0.24%	0.22%	-0.07%	0.40%	-0.06%	-0.02%	0.06%	-0.02%	-0.04%	0.28%	0.16%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	-0.03%	-0.08%	-0.11%	-0.04%	-0.05%	-0.08%	-0.11%	0.13%	-0.02%	0.00%	0.00%	-0.06%	-0.08%	-0.05%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	-0.03%	-0.04%	-0.05%	-0.03%	-0.04%	-0.04%	-0.05%	-0.03%	-0.01%	-0.01%	0.00%	-0.02%	-0.04%	-0.03%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	0.20%	-0.02%	-0.03%	-0.01%	-0.02%	-0.02%	-0.03%	-0.02%	-0.02%	-0.02%	0.01%	-0.01%	-0.02%	-0.01%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.5 – Oct 14 to Mar 15: EWCF, with SF=1: 2014/15 ALPs and DAFs 'Best Estimate 14'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	2.12%	1.29%	2.55%	2.56%	1.51%	1.32%	-	3.43%	0.10%	0.65%	0.47%	-0.39%	1.55%	1.40%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	-0.83%	0.14%	0.54%	0.47%	1.31%	-0.01%	-1.29%	1.23%	0.98%	-4.95%	-0.83%	3.22%	1.94%	0.14%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	1.34%	1.41%	-0.12%	1.22%	0.87%	0.84%	-0.88%	-1.54%	1.70%	-0.87%	-1.83%	0.70%	-1.57%	0.27%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	1.26%	1.26%	1.54%	0.50%	0.14%	1.62%	-1.38%	1.16%	-0.11%	1.33%	-0.53%	-0.96%	-0.06%	0.59%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	1.31%	1.35%	1.75%	1.87%	2.41%	0.99%	2.02%	4.52%	-1.13%	0.88%	0.04%	1.29%	0.97%	1.24%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	1.55%	2.23%	3.22%	1.55%	2.81%	4.08%	-0.37%	-0.29%	3.01%	-0.42%	-1.22%	3.42%	3.73%	2.22%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	0.44%	-1.89%	2.68%	-0.36%	1.74%	0.97%	-7.53%	-6.29%	0.23%	4.19%	1.63%	2.33%	-7.85%	0.22%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	7.08%	-6.94%	-0.23%	-5.33%	-1.13%	-3.34%	-12.1%	2.26%	-9.08%	-2.54%	11.86%	17.19%	-0.64%	-1.12%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.6 – Apr 15 to Sep 15: EWCF, with SF=1: 2014/15 ALPs and DAFs 'Best Estimate 14'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	-5.10%	-3.53%	-7.05%	-6.44%	-4.65%	-4.12%	-	-10.40%	-0.28%	-1.96%	-1.44%	1.15%	-4.92%	-4.00%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	1.53%	-0.78%	-1.93%	-1.77%	-3.38%	-0.33%	2.33%	-3.81%	-2.99%	10.20%	1.89%	-9.23%	-5.32%	-0.59%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	-3.03%	-3.00%	3.92%	-1.98%	-0.96%	4.08%	5.60%	7.76%	-3.37%	1.98%	4.47%	-0.85%	7.01%	0.74%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	-1.46%	-1.89%	-3.86%	-1.33%	1.60%	-2.66%	2.26%	-1.08%	0.53%	-3.12%	1.10%	3.14%	1.57%	-0.75%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	-1.30%	-1.74%	-2.04%	-2.91%	-3.86%	-2.12%	-2.54%	-9.55%	2.13%	-1.65%	-0.13%	-2.93%	-1.00%	-1.90%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	-2.35%	-3.55%	-5.14%	-2.36%	-4.51%	-6.91%	0.25%	0.70%	-4.91%	0.71%	2.15%	-7.16%	-6.26%	-3.64%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	-0.66%	2.23%	-3.77%	0.37%	-2.35%	-1.36%	8.11%	7.67%	-0.34%	-6.40%	-2.46%	-3.80%	9.35%	-0.36%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	-9.86%	7.27%	0.22%	5.65%	1.27%	3.77%	11.57%	-3.07%	10.66%	3.40%	-26.1%	-38.4%	0.75%	1.34%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.7 – Oct 14 to Sep 15: EWCF, with SF=1: 2015/16 ALPs and DAFs 'Best Estimate 15'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	-0.06%	0.12%	0.16%	0.28%	0.07%	0.14%	-	-0.01%	0.02%	0.02%	0.02%	0.03%	0.14%	0.08%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	-0.18%	-0.02%	0.03%	-0.06%	0.14%	0.05%	0.06%	-0.15%	-0.05%	-0.07%	-0.01%	-0.01%	-0.05%	-0.02%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	0.16%	0.21%	0.88%	0.22%	0.31%	1.40%	0.90%	1.10%	0.33%	-0.02%	-0.03%	0.25%	0.56%	0.37%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	0.58%	0.40%	0.19%	0.01%	0.47%	0.41%	0.21%	0.64%	0.07%	-0.03%	-0.01%	0.27%	0.46%	0.25%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	0.44%	0.34%	0.37%	0.20%	0.21%	-0.05%	0.39%	-0.03%	-0.01%	0.07%	-0.01%	-0.01%	0.28%	0.18%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	0.06%	-0.02%	0.04%	-0.03%	-0.01%	0.06%	0.05%	0.19%	-0.01%	0.00%	0.00%	-0.01%	0.01%	0.02%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	0.05%	0.00%	0.06%	-0.03%	-0.02%	-0.02%	0.06%	-0.04%	-0.01%	0.00%	0.01%	-0.06%	-0.04%	0.00%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	0.45%	0.01%	0.16%	0.01%	0.01%	0.05%	0.16%	0.00%	-0.02%	-0.02%	0.03%	-0.12%	0.06%	0.05%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.8 – Oct 14 to Mar 15: EWCF, with SF=1: 2015/16 ALPs and DAFs 'Best Estimate 15'

Analysis of daily percentage error: Statistic is total errors as percentage of full period

EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	2.24%	1.19%	1.95%	1.72%	0.51%	0.52%	-	3.25%	-0.55%	0.02%	-0.25%	-1.24%	0.70%	0.80%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	-0.75%	0.07%	0.06%	-0.41%	0.46%	-0.74%	-1.78%	1.02%	0.39%	-5.52%	-1.42%	2.55%	1.10%	-0.43%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	1.77%	1.37%	-0.89%	0.29%	-0.05%	-0.08%	-1.65%	-1.84%	1.10%	-1.41%	-2.48%	-0.12%	-2.62%	-0.33%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	1.65%	1.20%	1.33%	-0.16%	-0.65%	1.06%	-1.59%	1.03%	-0.62%	0.85%	-1.05%	-1.61%	-0.80%	0.18%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	1.56%	1.35%	1.41%	1.36%	1.99%	0.48%	1.68%	4.57%	-1.55%	0.50%	-0.38%	0.79%	0.42%	0.94%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	1.82%	2.26%	3.17%	1.29%	2.55%	3.92%	-0.42%	-0.19%	2.78%	-0.75%	-1.61%	3.08%	3.42%	2.06%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	0.69%	-1.86%	2.64%	-0.54%	1.60%	0.78%	-7.58%	-6.21%	0.04%	4.02%	1.40%	2.04%	-8.25%	0.10%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	7.44%	-6.91%	-0.17%	-5.46%	-1.23%	-3.45%	-12.1%	2.37%	-9.32%	-2.75%	11.67%	16.96%	-0.83%	-1.19%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

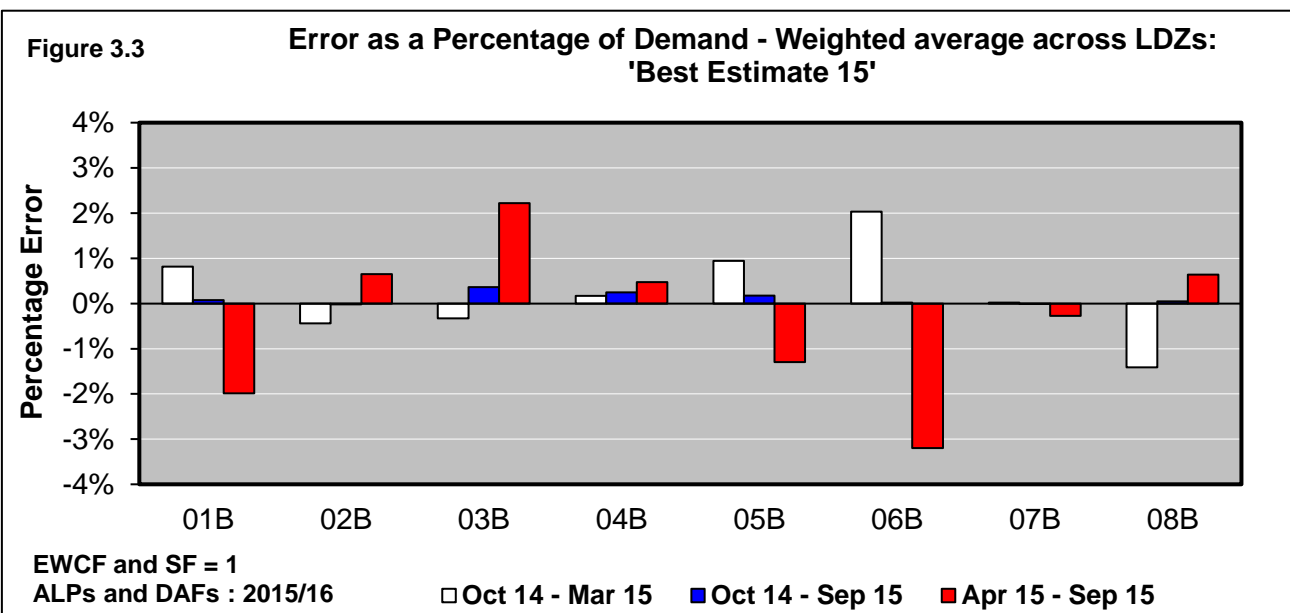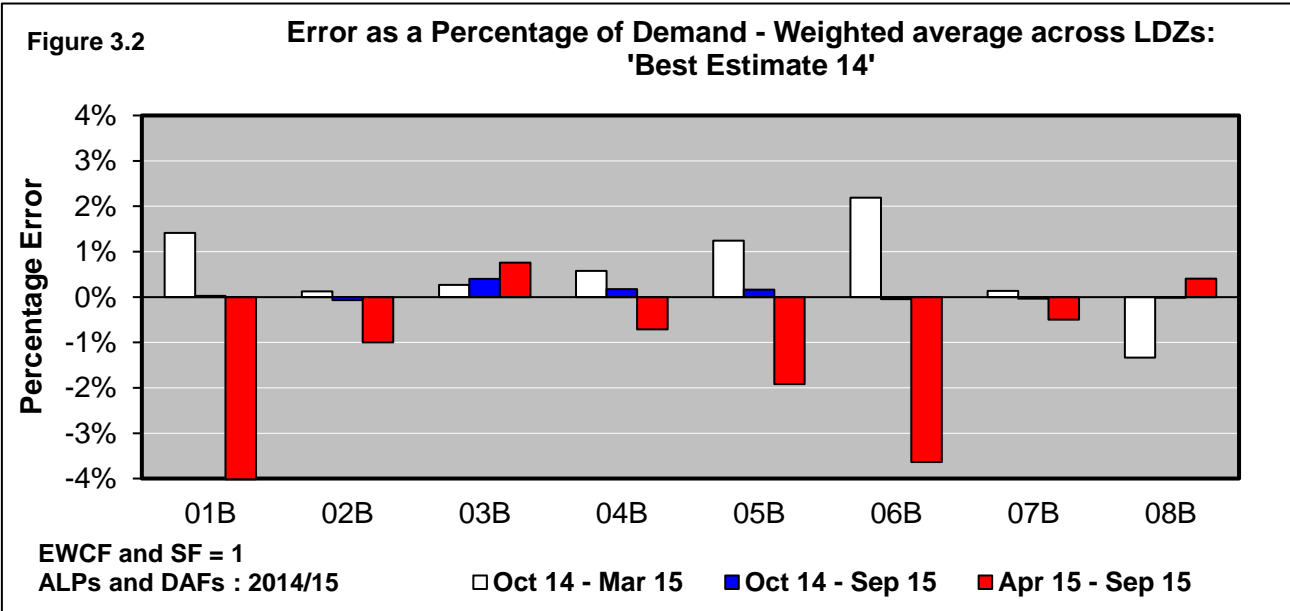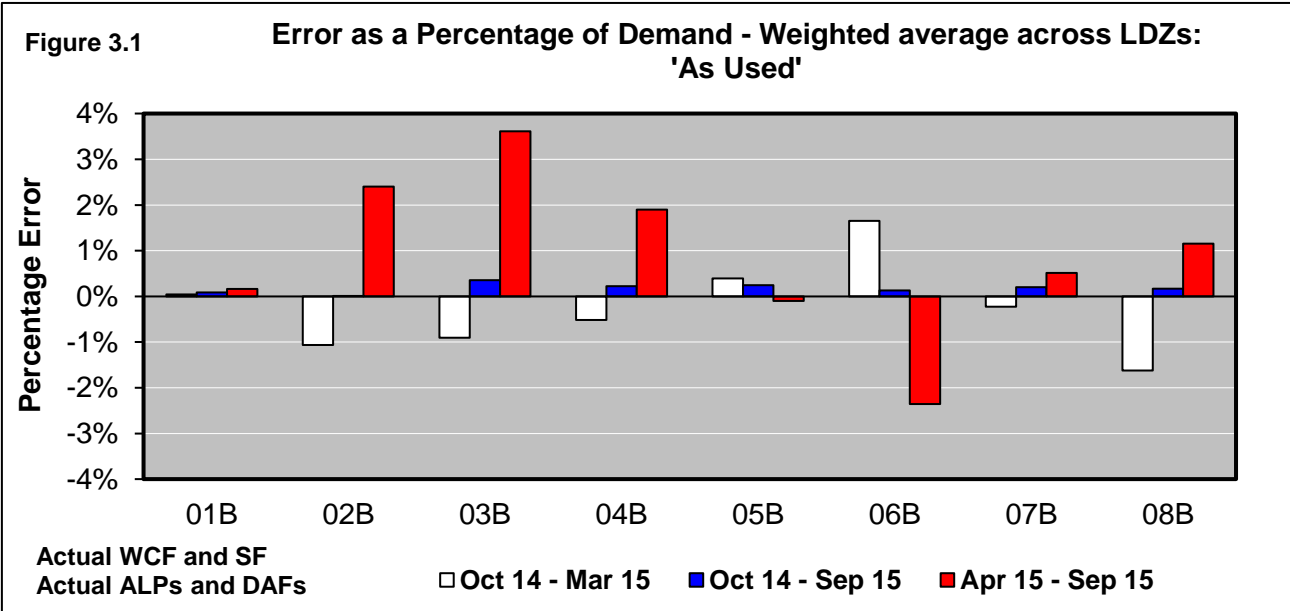**Table 3.9 – Apr 15 to Sep 15: EWCF, with SF=1: 2015/16 ALPs and DAFs 'Best Estimate 15'**

Analysis of daily percentage error: Statistic is total errors as percentage of full period

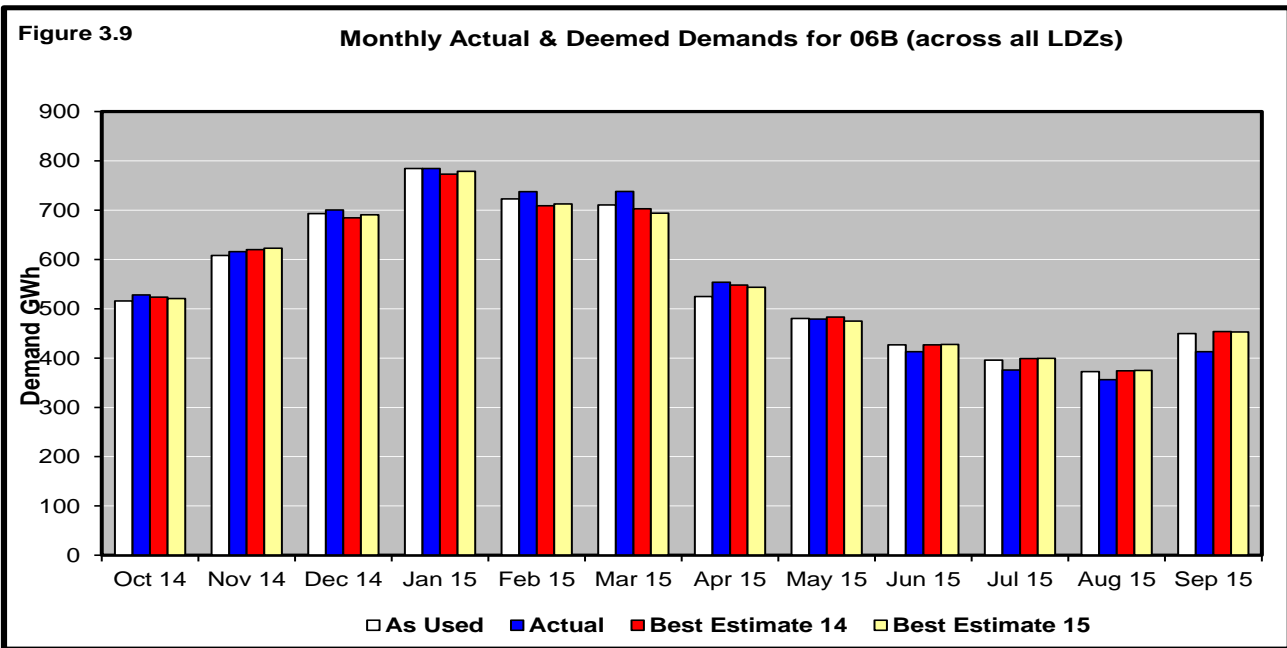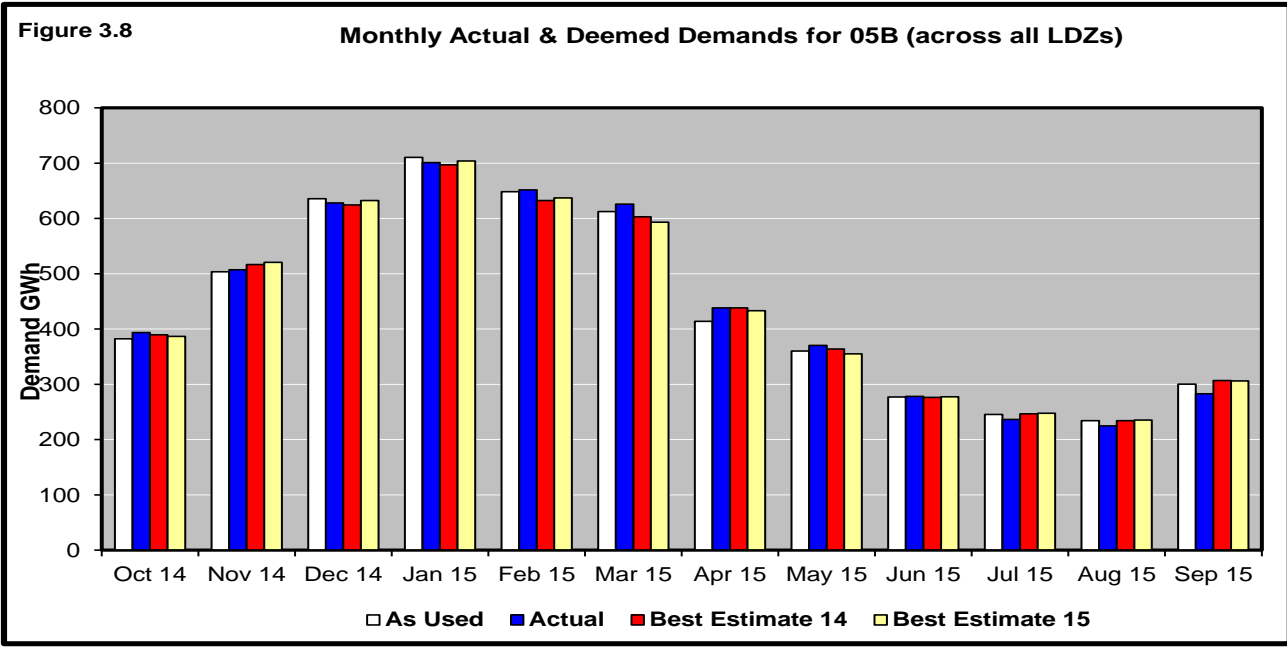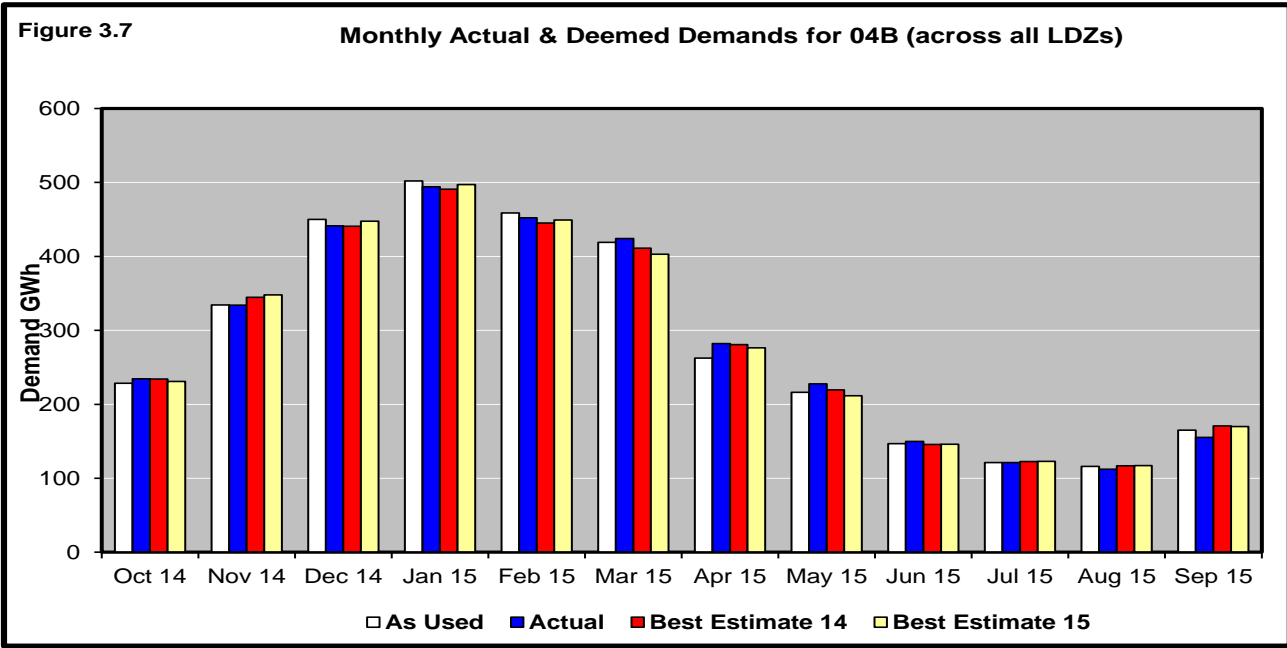| EUC	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	ALL
01B	-5.61%	-2.83%	-4.82%	-3.89%	-1.31%	-1.05%	-	-9.89%	1.74%	0.00%	0.90%	3.75%	-1.62%	-2.05%
Num S.pts	222	222	222	241	233	233	-	222	252	234	216	235	230	2762
02B	1.00%	-0.25%	-0.04%	0.87%	-0.76%	2.22%	4.24%	-3.41%	-1.29%	11.41%	3.35%	-7.21%	-3.08%	1.02%
Num S.pts	111	102	154	113	160	135	3	80	186	185	165	142	133	1669
03B	-3.22%	-2.56%	5.05%	0.05%	1.28%	5.56%	6.77%	9.22%	-1.87%	3.25%	6.15%	1.30%	9.82%	2.15%
Num S.pts	154	103	139	106	153	120	9	16	171	170	191	137	86	1555
04B	-1.60%	-1.53%	-2.30%	0.39%	3.08%	-1.16%	3.81%	-0.33%	1.75%	-2.04%	2.24%	4.84%	3.37%	0.41%
Num S.pts	282	129	261	182	224	241	20	47	243	284	279	213	116	2521
05B	-1.55%	-1.58%	-1.50%	-2.04%	-3.09%	-1.08%	-1.95%	-9.58%	2.96%	-0.84%	0.68%	-1.75%	0.02%	-1.29%
Num S.pts	232	84	153	84	158	167	19	37	84	176	133	109	72	1508
06B	-2.54%	-3.46%	-4.69%	-1.93%	-4.00%	-6.27%	0.71%	0.71%	-4.53%	1.26%	2.86%	-6.30%	-5.54%	-3.22%
Num S.pts	79	38	81	68	77	85	6	24	56	63	41	43	53	714
07B	-0.79%	2.27%	-3.46%	0.59%	-2.12%	-1.07%	8.40%	7.55%	-0.07%	-6.12%	-2.09%	-3.45%	9.83%	-0.14%
Num S.pts	29	24	45	38	57	33	8	10	20	19	18	17	24	342
08B	-9.76%	7.31%	0.56%	5.83%	1.47%	4.04%	11.87%	-3.17%	10.93%	3.69%	-25.7%	-38.3%	1.17%	1.58%
Num S.pts	7	12	35	14	41	32	4	11	15	19	5	8	14	217

Table 3.10 - Aggregate NDM AQs 2014/15		
LDZ	**Estimated AQ Excess (+) or Deficit (-) ('as used' analysis full year errors)**	**Observed AQ Changes in Gemini at start of gas year 2015/16**
SC	0.8%	-2.3%
NO	0.1%	-2.9%
NW	0.4%	-2.8%
NE	-0.1%	-1.5%
EM	0.6%	-0.6%
WM	0.1%	-1.3%
WN	-	-
WS	0.4%	-1.4%
EA	0.04%	-2.3%
NT	-0.7%	-1.8%
SE	0.1%	-2.1%
SO	-0.1%	-0.2%
SW	0.8%	-2.2%
Overall	0.2%	-1.8%

Table 3.11 - Apr 15 - Sep 15: EWCF, with SF=1: 2014/15 ALPs and DAFs 'Best Estimate 14'
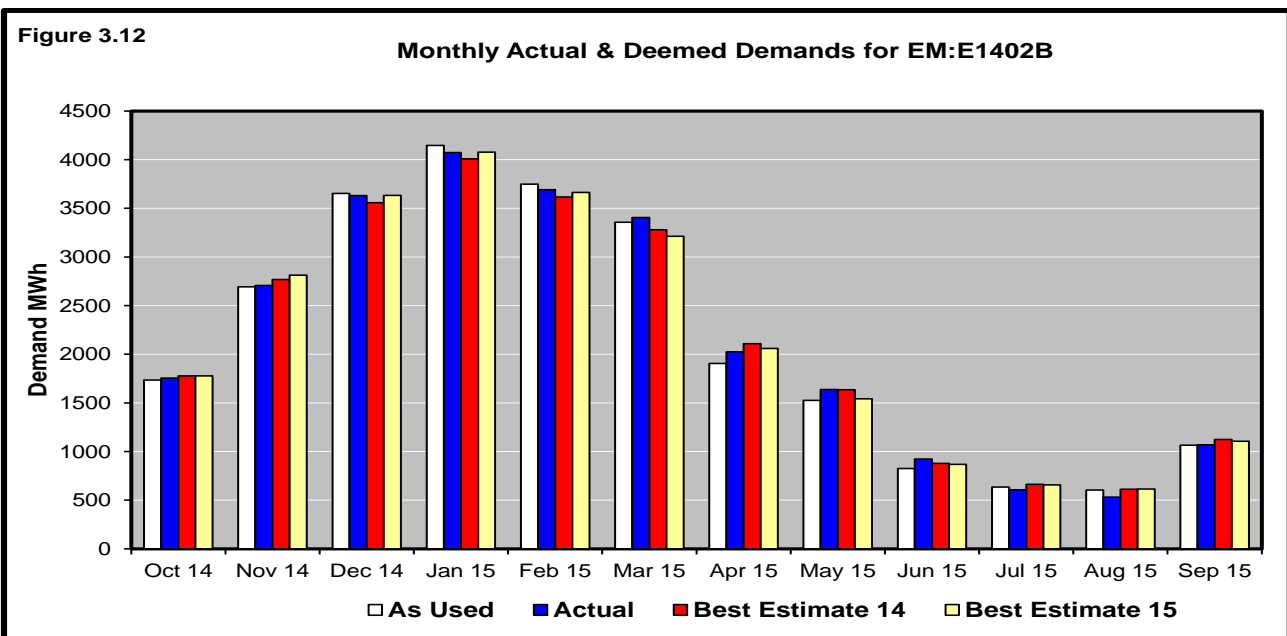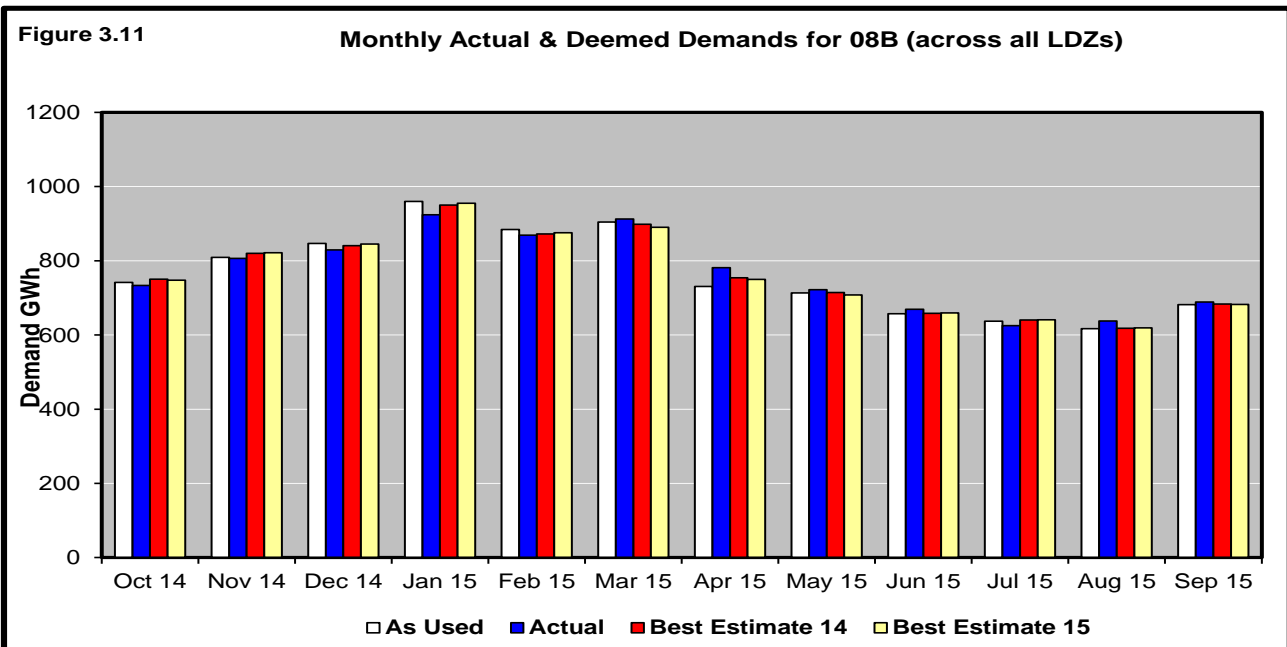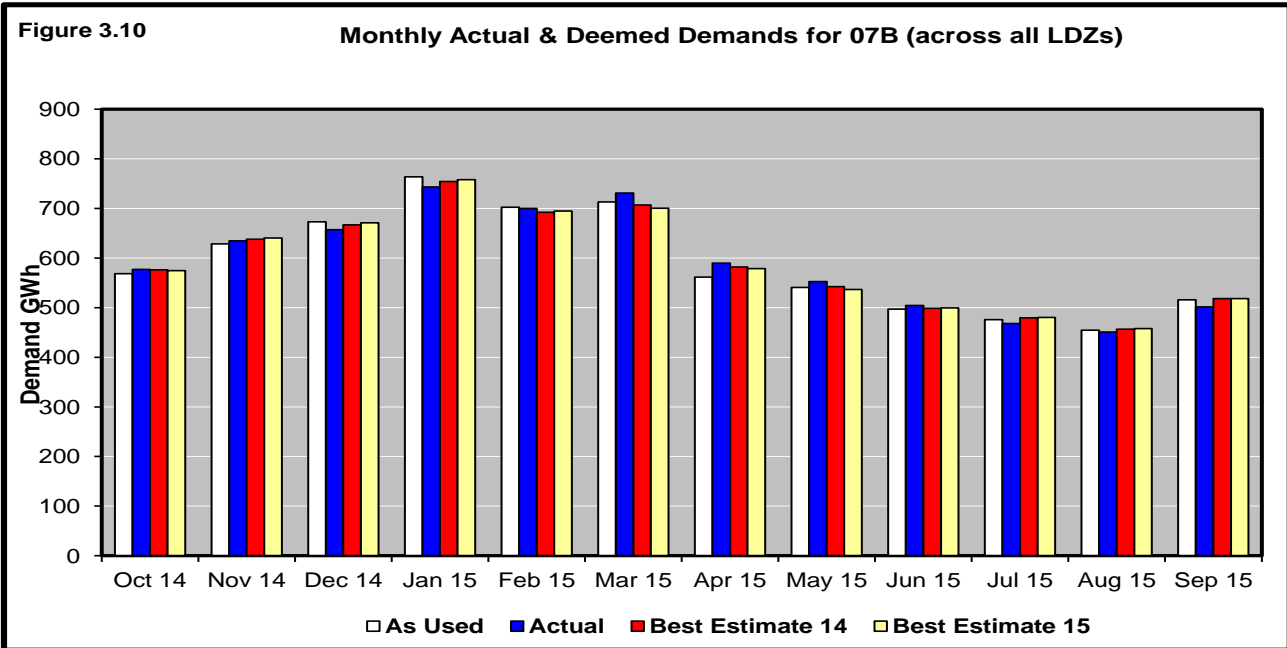
Analysis of Daily Percentage Error: Statistic is Total Errors as Percentage of Actual Demand in Specified Period

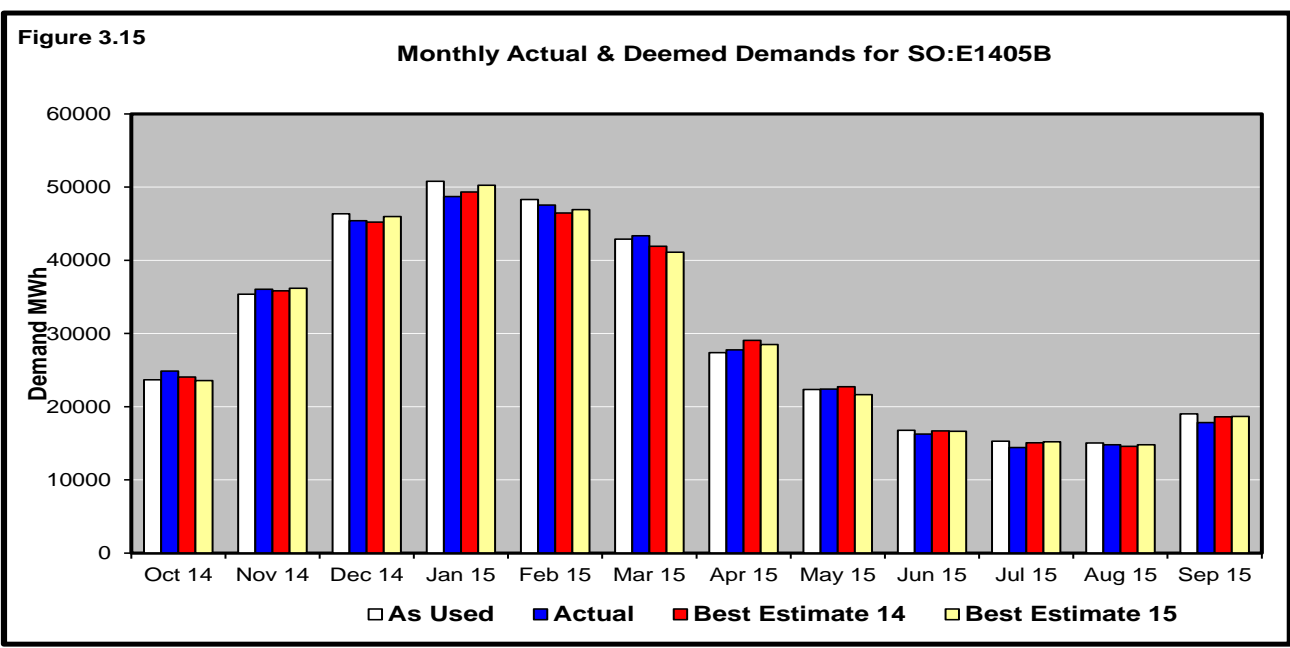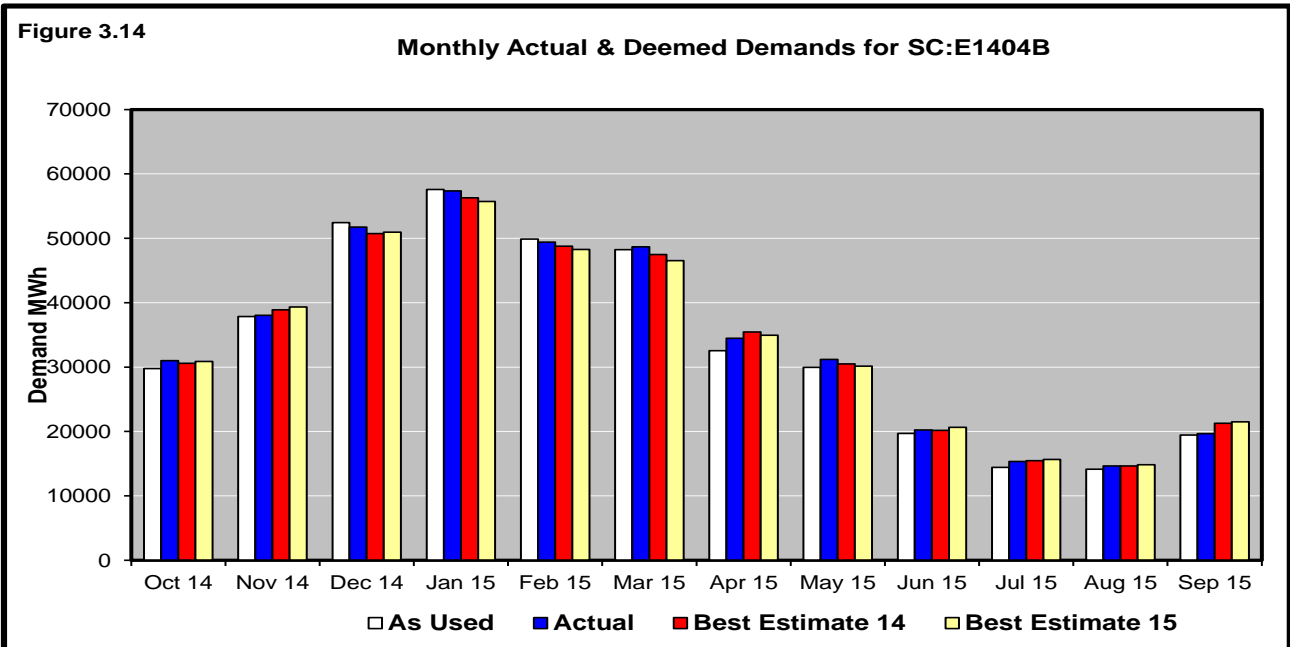| Band 01B	Apr 15	May 15	Jun 15 - Sep 15
SC	-2.3%	0.2%	-3.0%
NO	-2.4%	0.1%	-1.2%
NW	-3.2%	0.8%	-4.7%
NE	-3.5%	-0.1%	-2.9%
EM	-3.2%	-0.5%	-0.9%
WM	-3.6%	-0.1%	-0.5%
WN	-	-	-
WS	-5.1%	-1.3%	-3.9%
EA	-1.4%	-0.6%	1.7%
NT	-2.4%	-1.7%	2.1%
SE	-2.1%	-1.3%	2.0%
SO	-2.5%	0.4%	3.3%
SW	-3.8%	-1.4%	0.3%

Table 3.12 - Apr 15 - Sep 15: EWCF, with SF=1: 2014/15 ALPs and DAFs 'Best Estimate 14'

Analysis of Daily Percentage Error: Statistic is Total Errors as Percentage of Actual Demand in Specified Period

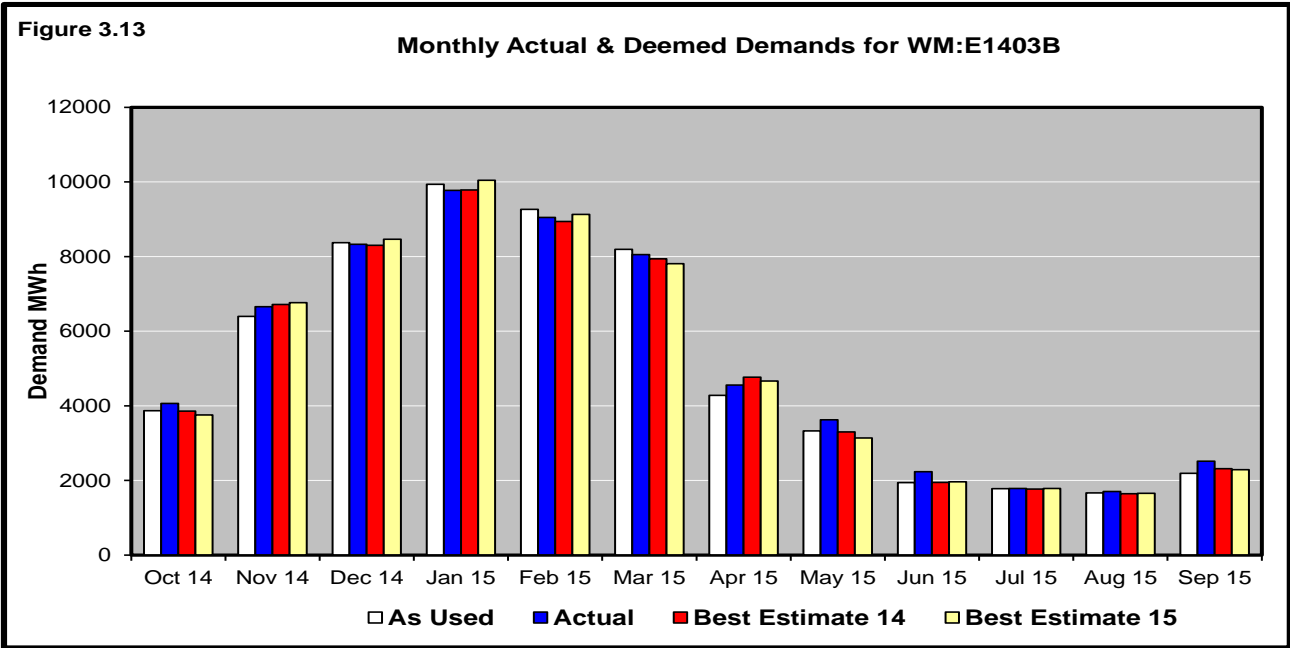| All LDZs	Apr 15	May 15	Jun 15 - Sep 15
01B	-10.3%	-2.1%	-1.3%
02B	-2.7%	3.3%	-2.3%
03B	-2.3%	3.2%	1.3%
04B	0.5%	3.5%	-3.2%
05B	-0.1%	1.7%	-4.0%
06B	1.0%	-0.9%	-6.3%
07B	1.2%	1.6%	-1.8%
08B	2.0%	-0.3%	-0.4%
09B	-	-	-

Figure 3.1

Error as a Percentage of Demand - Weighted average across LDZs: 'As Used'

Actual WCF and SF
Actual ALPs and DAFs

□ Oct 14 - Mar 15   ■ Oct 14 - Sep 15   ■ Apr 15 - Sep 15

Figure 3.2

Error as a Percentage of Demand - Weighted average across LDZs: 'Best Estimate 14'

EWCF and SF = 1
ALPs and DAFs : 2014/15

□ Oct 14 - Mar 15   ■ Oct 14 - Sep 15   ■ Apr 15 - Sep 15

Figure 3.3

Error as a Percentage of Demand - Weighted average across LDZs: 'Best Estimate 15'

EWCF and SF = 1
ALPs and DAFs : 2015/16

□ Oct 14 - Mar 15   ■ Oct 14 - Sep 15   ■ Apr 15 - Sep 15

Figure 3.4

Monthly Actual & Deemed Demands for 01B (across all LDZs)

Figure 3.5

Monthly Actual & Deemed Demands for 02B (across all LDZs)

Figure 3.6

Monthly Actual & Deemed Demands for 03B (across all LDZs)

Figure 3.7 Monthly Actual & Deemed Demands for 04B (across all LDZs)

Figure 3.8 Monthly Actual & Deemed Demands for 05B (across all LDZs)

Figure 3.9 Monthly Actual & Deemed Demands for 06B (across all LDZs)

Figure 3.10

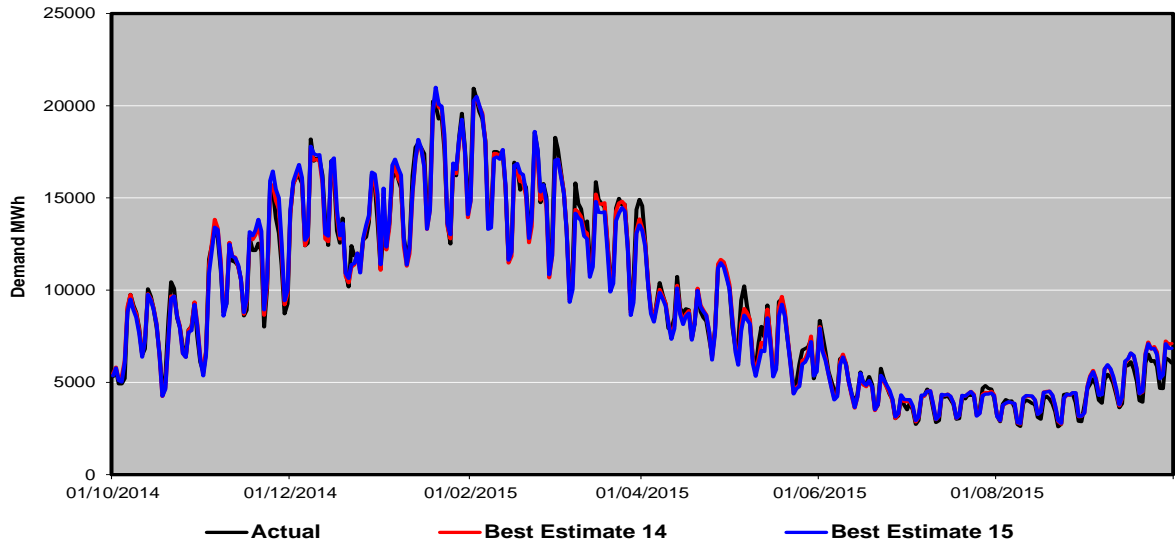Monthly Actual & Deemed Demands for 07B (across all LDZs)

Figure 3.11

Monthly Actual & Deemed Demands for 08B (across all LDZs)

Figure 3.12

Monthly Actual & Deemed Demands for EM:E1402B

Figure 3.13

Monthly Actual & Deemed Demands for WM:E1403B

Figure 3.14

Monthly Actual & Deemed Demands for SC:E1404B

Figure 3.15

Monthly Actual & Deemed Demands for SO:E1405B

Figure 3.16

Monthly Actual & Deemed Demands for EA:E1406B

Figure 3.17

Monthly Actual & Deemed Demands for NW:E1407B

Figure 3.18

Monthly Actual & Deemed Demands for SW:E1408B

xoserve

Figure 3.19

Daily Actual and Deemed Demands for 01B (across all LDZs)
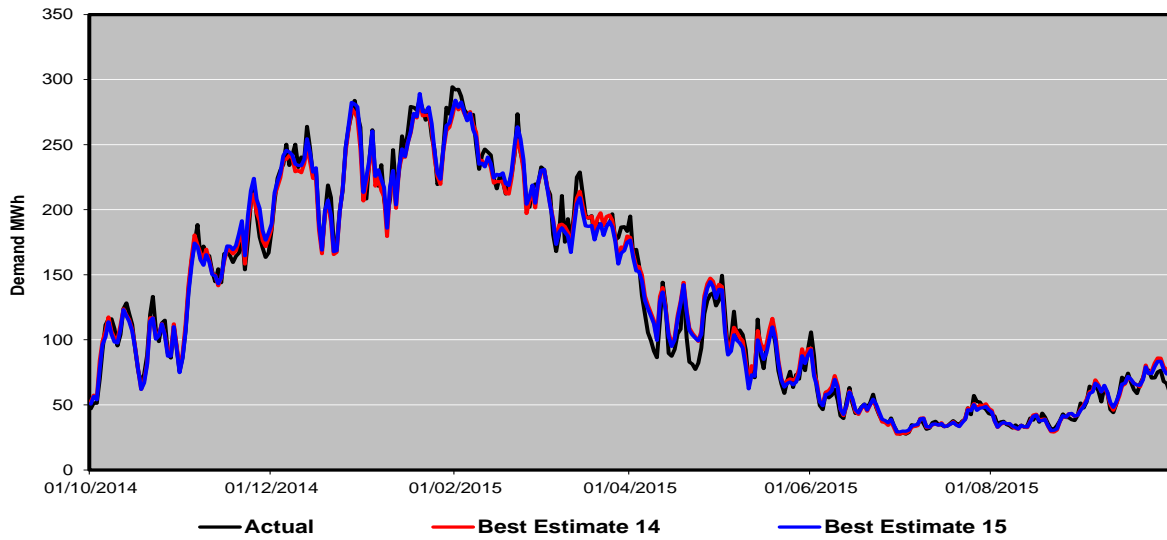
Figure 3.20

Daily Actual and Deemed Demands for 02B (across all LDZs)
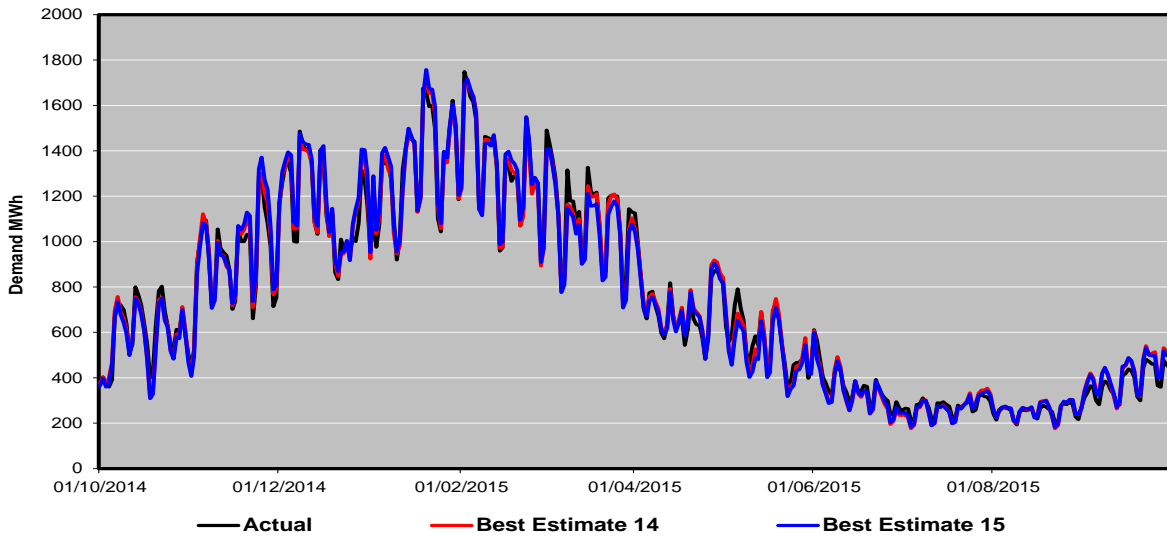
Figure 3.21

Daily Actual and Deemed Demands for 03B (across all LDZs)
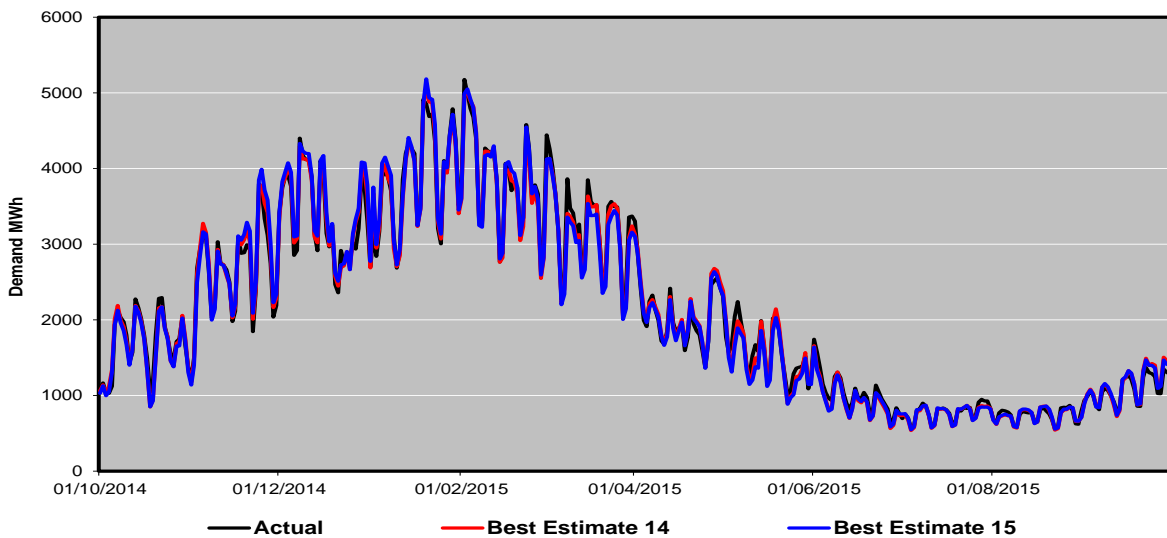
Figure 3.22

Daily Actual and Deemed Demands for 04B (across all LDZs)

Figure 3.23

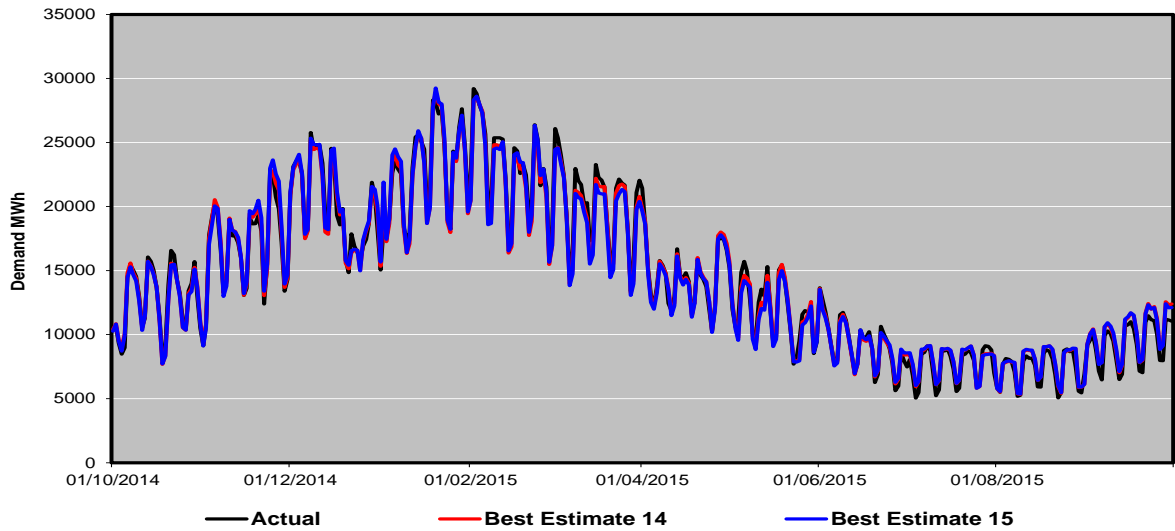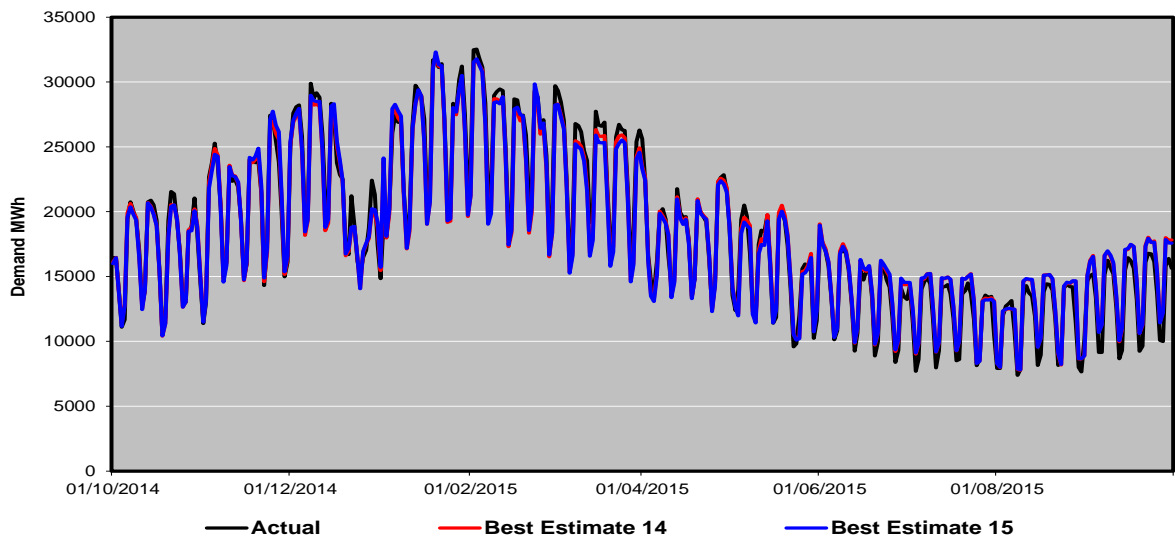**Daily Actual and Deemed Demands for 05B (across all LDZs)**

Figure 3.24

Daily Actual and Deemed Demands for 06B (across all LDZs)

Figure 3.25

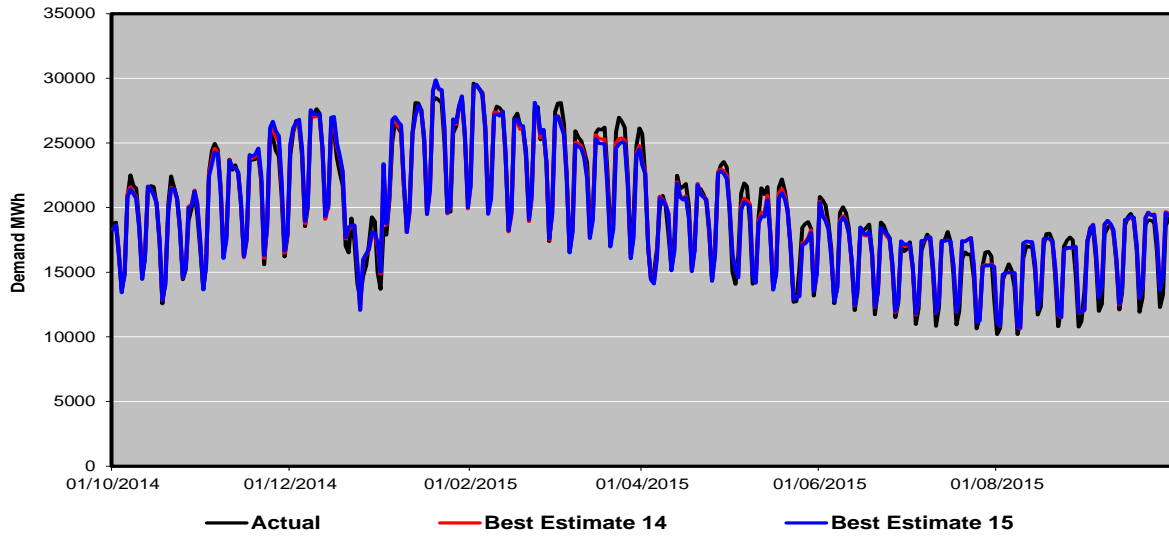**Daily Actual and Deemed Demands for 07B (across all LDZs)**

Figure 3.26

Daily Actual and Deemed Demands for 08B (across all LDZs)