

## Evaluation of Algorithm Performance - 2006/07 Gas Year

### Introduction

In accordance with customary practice, three sources of information have been examined in this review:

- 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 results of the review in respect of RV data and NDM sample derived daily consumption data, with brief explanatory notes.

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

This material was discussed at the meeting of DESC on 8<sup>th</sup> November 2007.

### 2.0 Reconciliation Variance (RV) analysis

#### 2.1 Overview

The object of this analysis is to assess the EUC profiles applied over the gas year through comparison of the allocated consumption and the available reconciliation data (RV data representing the 'actual' consumption). The RV data presented is based on the reconciliation variances that have been calculated for meter points in "B" EUCs. RVs for WAR band EUCs have not been included in the analysis.

The "raw" input data to this analysis is all RV data relating to the period in question (i.e. both standard and suppressed reconciliation).

Prior to analysis the data has been screened to remove RVs which are greater than 50% of either the actual or allocated consumption (i.e. both: allocated > 2 x actual and allocated < 0.5 x actual). This is to remove instances of potentially erroneous AQ or asset details. Additional checks have also been made to ensure removal of inappropriate or erroneous data (e.g. actual consumptions should be positive, very low AQs are filtered out). Over gas year 2006/07, this screening process reduced the available data set by an extent ranging from around 20% in March 2007 to around 47% in September 2007.

The remaining validated RV data is then used to establish, for each EUC, average profiles of actual and allocated demand. The generation of this average profile for an EUC involves taking each meter in turn and apportioning the total actual and allocated energy values evenly to all dates in the meter's reconciliation period. The ensuing aggregate values for each date are then divided by the number of contributing meters, and subsequently graphed against time.

The objective with this approach is not to establish a realistic profile resembling an ALP (annual load profile), but rather to highlight any seasonal patterns in the average reconciliation variance.

The RV profile that is thus derived for an EUC can be categorised according to two dimensions, its annual level and its peakiness (i.e. "peaky", "flat" or "ok"). The categorisation procedure is undertaken through the calculation of full year, winter and summer average errors between the allocated and actual and expressed as a percentage of the full year average actual figure.

The difference between the winter and summer errors is taken to reflect the peakiness of the profile, whereas the size of the full year error indicates whether the average AQ for the meters contributing to each EUC sample is too high or too low. The winter/summer differences have been classified as acceptable if the absolute difference is less than 5% (which is approximately equivalent to a one percentage point change in load factor).

It should be noted that, since gas year 2006/07 ended only a few months previously, RV data relating to meter points that are not monthly read has not fully flowed through to the analysis. Therefore, when this study is revised in spring 2008, the information relating to the lower consumption bands in the analysis will be further refined.

Graphs illustrating the profiles established from the RV data, for WM, SC, WN, EA, NE and SO LDZs in consumption bands 03, 04, 05, 06, 07 and 08 respectively, are attached as Figures 2.1, 2.3, 2.5, 2.7, 2.9 and 2.11.

Prior to classification, the deemed profile is scaled so that over the year as a whole the level of demand matches the actual level. Scaling allows comparison of the profile, and therefore analysis of the algorithm performance. Without scaling, the analysis would only highlight differences in demand levels, which are affected by other factors. Figures 2.0, 2.2, 2.4, 2.6, 2.8, 2.10 and 2.12 show each of the scaled profiles for the EUC and consumption band combinations stated above. Note that the uniform apportionment of each reconciliation variance quantity across all applicable days together with fluctuations in the numbers of contributing meters during the period mean that these RV profiles are not comparable to ALP profiles and therefore the various apparent "spikes" in these figures must be seen in this context.

## 2.2 Analysis

Table 2.1 shows the classification of the EUC profiles as regards their peakiness. Tables 2.2 and 2.3 show the percentage errors [(actual-allocated)/actual as a %] over the winter and summer periods respectively, on which the classification is based.

Where the average number of contributing meters across the full year or across the winter or summer six month periods was 2 or less no attempt has been made to derive a classification. Thus, no assessment has been possible for LDZs SC, WN and NT in consumption band 08B and for LDZs NO, NW, NE, EM, WN, WS, NT, SE, SO and SW in consumption band 09B.

Table 2.1 suggests that during 2006/07:

- For consumption bands 02B and 03B the profiles have in most cases been too peaky at the 5% level.
- In consumption band 02B the profiles for NO and EM LDZ have been good (i.e. within the  $\pm 5\%$  level)
- In consumption band 03B the profile for SW LDZ has been too peaky at the 10% level.
- Both these bands are the two most likely to contain non-monthly read meter points and therefore available RV data, at this point, is limited.
- The profiles for consumption band 04B appear in most cases to be either good (in 6 LDZs) or too peaky at the 5% level (also 6 LDZs). In one LDZ (WN, which has just 1% of the number of NDM supply points making up consumption band 04B nationally) the profile appears to be too peaky at the 10% level.
- The profiles for consumption band 05B appear in most cases to be either good (in 7 LDZs) or too peaky at the 5% level (5 LDZs). In one case (NW LDZ) the profile appears to be too peaky at the 10% level.
- The profiles for consumption bands 06B are also mostly good (10 of 13 LDZs) but there are also single occurrences of profiles that are too peaky at the 10% level (NW LDZ), too peaky at the 5% level (EA LDZ) and too flat at the 5% level (WN LDZ with just 28 supply points in the LDZ in this band).
- The profiles for consumption bands 07B are also a mixture of those that are good (7 LDZs) or too peaky at either the 5% level (2 LDZs) or the 10% level (4 LDZs).
- The profiles for consumption bands 08B are mostly too peaky at either the 5% level (4 LDZs) or the 10% level (2 LDZs). In two cases (EM and SW LDZs) the profiles were too flat at the 5% level. The profile in this band was good in SO LDZ, while an assessment of the profile could not be made for 3 LDZs (SC, WN and NT).
- Similarly, for consumption band 09B, assessment was only possible in 3 LDZs. Where data exists, this band features cases that are good or too flat at the 10% level.
- Considering individual LDZs, a notable number of LDZs show a preponderance of profiles which are too peaky - all bands in NW LDZ, 5 bands in WM, WS and EA LDZs and 4 bands in NE, WN, and SE LDZs. Overall there are no occurrences of profiles that are too flat in consumption bands 02B to 05B. Instances of profiles that are too flat are very rare in all bands - just three occurrences overall, one in each of bands 06B, 08B and 09B.

The winter and summer period fractional errors are shown in Tables 2.2 and 2.3. The profile assessments (e.g. the 5% and 10% levels) are based on the sum of the differences in the winter and summer errors - e.g. a winter error of -3% and a summer error of +3% for consumption band 02B in SC LDZ means an overall difference of 6% and the profile is too peaky at the 5% assessment level. Note here that the error is defined as "actual - allocated". So, a negative winter % error indicates a profile that is too peaky and a positive winter % error indicates a profile that is too flat (e.g. EM LDZ, consumption band 08B).

Table 2.4 shows the extent of the scaling that was applied in this RV analysis to the deemed demands in each EUC in order to match the annual demands. Most of the scaling applied is seen to be an uplift (>1). Interpreted simplistically, this might indicate a deficit in the level of AQ in these EUCs. In direct contrast, the WCF and SF strand of performance evaluation assessment which was presented to DESC in November 2007 suggested that aggregate NDM AQs overall were too high in gas year 2006/07.

However, this RV analysis does not actually reflect the overall population for a number of reasons. Most significantly, there is no reconciliation of consumption band 01B (which makes up around 73% of overall NDM load in AQ terms). Moreover, RV data validation results in a significant proportion of the raw data having to be discarded (thus the ensuing results for annual scaling do not necessarily represent the overall population). In addition, the results cover the recently concluded gas year pertaining to which all RV data in all consumption bands has not yet become available.

If the assumption is made that the RV results indicate correctly that non-domestic NDM EUC AQs were too low in 2006/07, since it also appears clear from the WCF and SF analysis that overall aggregate NDM AQs in gas year 2006/07 were too high, that would suggest that “domestic” (consumption band 01B) AQs are notably too high. The more plausible viewpoint is to discount the annual scaling from the RV analysis as being unrepresentative for the reasons stated.

The characteristics of individual consumption bands across all LDZs in aggregate can often be better than for individual LDZs. Bands 03B and 04B across all LDZs are shown as examples of this cumulative effect. Figure 2.13 and Figure 2.15 show the profiles established from the RV data, in consumption bands 03B and 04B respectively for all LDZs in aggregate. Figures 2.14 and 2.16 show the revised profiles after the application of scaling. On this basis, the scaled profiles for both consumption bands 03B and 04B appear overall to be within the winter/summer 5% error difference level: < 4.4% in band 03B and < 2.6% in band 04B. The corresponding error difference levels from the equivalent analysis of gas year 2005/06 undertaken a year ago in autumn 2006 were: < 2.8% for 03B and < 1.2% for 04B. When the analysis of gas year 2005/06 was repeated in spring 2007 (by which time more RV data pertaining to the analysis period had become available) the corresponding errors had declined further and were: < 2.3% and < 0.9% for bands 03B and 04B respectively.

### 3.0 Analysis of NDM sample daily consumption data

#### 3.1 Overview

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

- i) As used - 2006/07 ALPs and DAFs, real system WCF and SF
- ii) Best estimate 06 - 2006/07 ALPs and DAFs, EWCF, SF = 1
- iii) Best estimate 07 - as (ii) above but with 2007/08 ALPs and DAFs (equivalent)

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. The layout of these tables and the basis of the calculations are similar to that published on previous occasions (e.g. the June 2006 NDM report).

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 most consumption bands over the 12 month period as a whole are in the broad range 4 to 7% in most cases. Full year, winter and summer errors are positive for all consumption bands.

#### 3.2 Analysis

The consistently positive errors across all consumption bands indicate under allocation by the models. This under allocation in most consumption bands in the “as used” analysis, is a clear indication of population AQs being notably too high. Moreover, since allocated consumption is a direct function of AQ, the extent of the AQ excess (in percentage terms) would broadly tend to be of the same order as that noted for this “as used” analysis. Although not recorded in Table 3.1, the full year errors in the “as used” analysis, for each LDZ across all applicable consumption bands (band 09B is not represented in every LDZ) were also computed and they range from 3 to 7% suggesting an AQ excess of the same extent (except for WN LDZ where the error is -3%, indicating an AQ deficit; the WCF and SF analysis also indicated an AQ deficit in WN LDZ).

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, this giving the consistently positive errors shown in Figure 3.1.

The analysis of WCF and SF patterns over gas year 2006/07, presented at the DESC meeting on 8<sup>th</sup> November 2007, also indicated that population NDM AQs were too high during this period, in all LDZs, except WN. The WCF and SF analysis suggested that this AQ excess during gas year 2006/07 was in the range 2 to 4% for LDZs: SC, NW, WS and SO, and in the range 5 to 8% for LDZs: NO, NE, EM, WM, EA, NT, SE and SW.

It is noteworthy that both the WCF and SF analysis and the “as used” analysis suggest closely similar ranges of AQ excess (excepting WN LDZ, the overall percentage errors in the “as used” analysis for each LDZ range from 3% to 7%: SC LDZ is just over 3%, NW, WS and SO are in the range 4-5% and the other LDZs are in the range 6-7%).

The revised NDM supply point AQs, instituted at the start of gas year 2007/08, also showed a reduction from those applicable in the previous gas year. The percentage changes in aggregate NDM AQs at the start of gas year 2007/08 as observed from the Gemini system showed reduction of 4% overall across all LDZs and these reductions range from 3.1% in WS LDZ to 4.8% in SW LDZ.

The analysis of WCF and SF patterns over gas year 2006/07, presented at the DESC meeting on 8<sup>th</sup> November 2007, also provided evidence of WCF bias (i.e. lower WCF) due to overstated aggregate NDM SNDs during gas year 2006/07 (note that WCF bias was observed to a lesser extent in 2006/07 than in 2005/06). In respect of the more weather sensitive consumption bands, for which the DAF\*WCF term would have been more strongly depressed, the under allocation shown in the “as used” analysis may be believed to be also due to this WCF bias. However, the system SFs used in the “as used” analysis have already taken in to account the WCF bias, causing SFs to be greater than they would otherwise have been (and acting counter to the depressive effect on system SFs of NDM AQs having been too high). Therefore, the observed under allocation may be ascribed solely to NDM AQs having been too high.

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 along with the actual CWV. Use of the EWCF avoids bias which might be introduced in the WCF by aggregate NDM SND error. WCF bias was lower in 2006/07 than it had been in 2005/06 due to the reduced levels of aggregate NDM SND that were applied in 2006/07 (relative to 2005/06).

The “best estimate 06” analysis is based on the algorithms for 2006/07, while the “best estimate 07” analysis is based on algorithms derived for 2007/08 and applied with appropriate adjustment to 2006/07.

On the evidence of the bar chart in Figure 3.2 (“best estimate 06”), there was little overall error in the algorithms for any of the consumption bands over gas year 2006/07 as a whole. Disregarding the sparsely represented band 09B (only 5 NDM supply points in 4 of 13 LDZs), overall consumption band winter period errors are of the order of +3.2% or less and overall consumption band summer period errors are of the order of -6% or less. Actual summer demands are lower and hence percentage errors tend to be greater in the summer. For most bands the signs of the winter and summer period errors suggest that the profiles in 2006/07 were a little too flat. Band 07B is an exception, showing a negative (-0.8%) winter period error and a positive (0.7%) summer period error, indicating that the profiles in this band overall may have been very slightly 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 07”) shows that the algorithms derived for 2007/08 would (if applied to gas year 2006/07) have resulted in very similar outcomes for each overall consumption band considered. Whole year errors are very small overall for all the consumption bands (bands 01B and 04B are very slightly worse: e.g. 0.13% -v- 0.11% for band 01B) and the other bands are very slightly better.

Winter period errors are however better (with “best estimate 07”) in all bands except 05B and 06B, and a similar picture applies to the summer period errors (band 02B very nearly the same and the rest better except

for bands 05B and 06B). So, the profiles derived for 2007/08 when appropriately adjusted and applied to 2007/08 appear on the whole to do better over the winter and summer periods.

Overall across each consumption band (band 07B excepted), both the “best estimate” analyses suggest under allocation (positive errors) in the winter and corresponding over allocation (negative errors) in the summer.

The reconciliation variance analysis in broad terms mostly indicated over allocation in the winter and corresponding under allocation in the summer.

The two analyses are, however, based on different data sets, neither of which is necessarily representative of the population as a whole. The RV analysis cannot assess consumption band 01B and is based on a validated sub-set of available reconciliation data relating to gas year 2006/07. Moreover, not all RV data pertaining to the period has been received at the time of this analysis (i.e. RVs resulting from non-monthly meter reads have not all come in). On the other hand, the “best estimate” analyses are based on validated NDM sample data. Moreover, both analyses suffer 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 01B to 08B respectively. These show for each month, actual demand, and allocated demand on the “as used”, “best estimate 06” and “best estimate 07” bases.

In interpreting these monthly charts it is relevant to recall the weather conditions that prevailed during gas year 2006/07. Overall nationally and for each individual LDZ, the winter six month period (October 2006 to March 2007) was the warmest ever. In the winter period the months of November, December and January saw extended periods of above seasonal normal weather. In the summer six month period, April 2007 was exceptionally warm, but thereafter the summer was not exceptionally warm, and was notable mainly for the spells of extreme wet weather in June and July.

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.

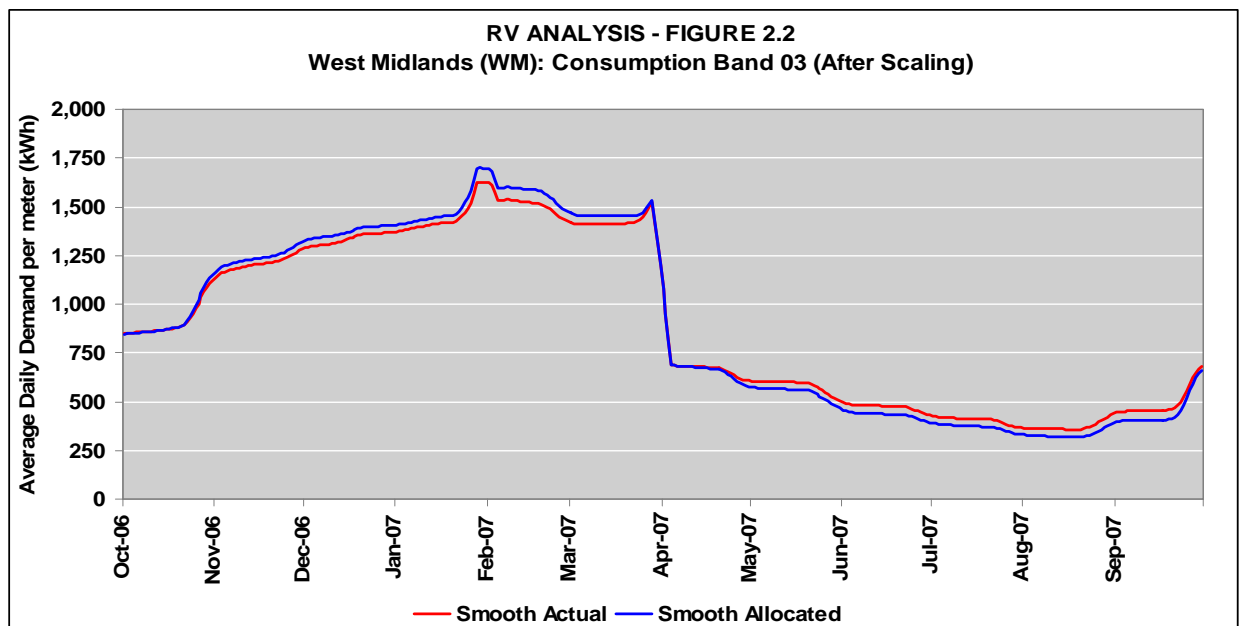
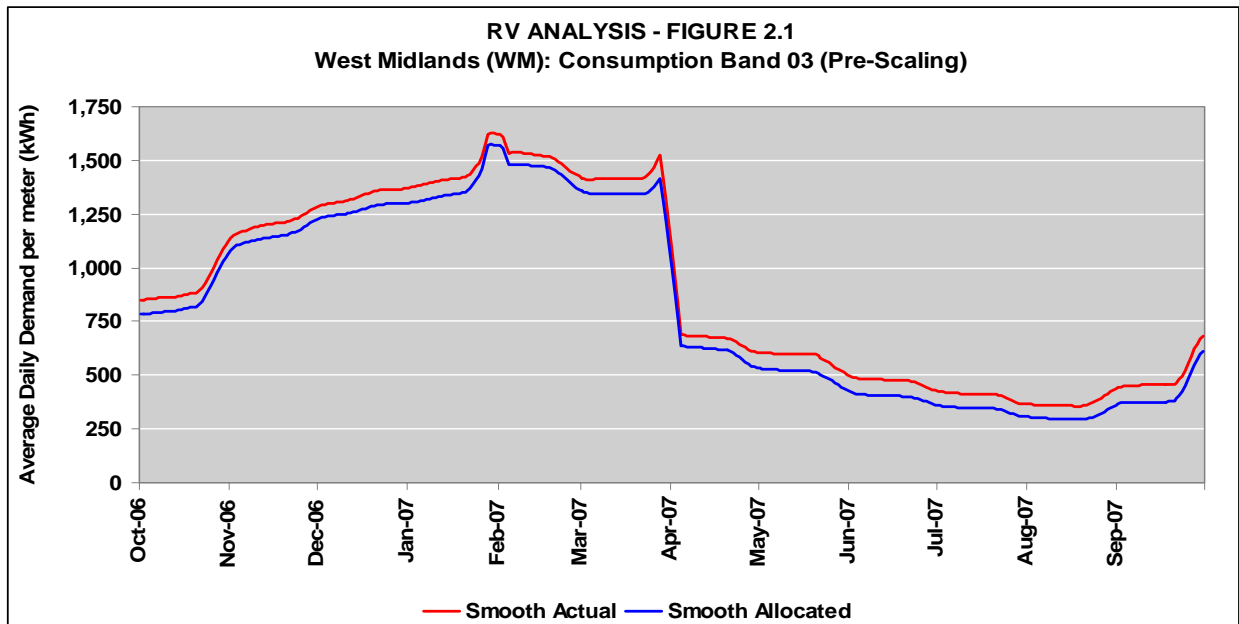
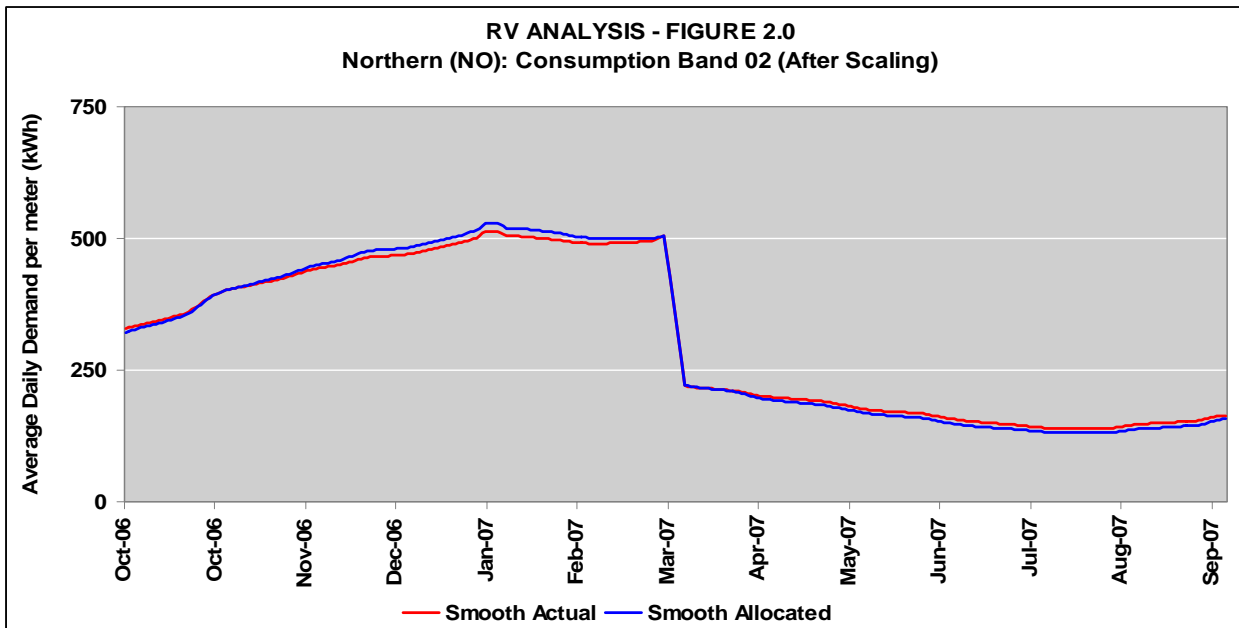
The monthly charts for bands 01B, 02B, 03B and 04B in Figures 3.4 to 3.7 reveal clear under allocation in the months of November and January in particular, and this was also the case in December for band 01B and in March in bands 02B, 03B and 04B. These four bands also show clear over allocation in the months of April and May (but less so in April for band 04B).

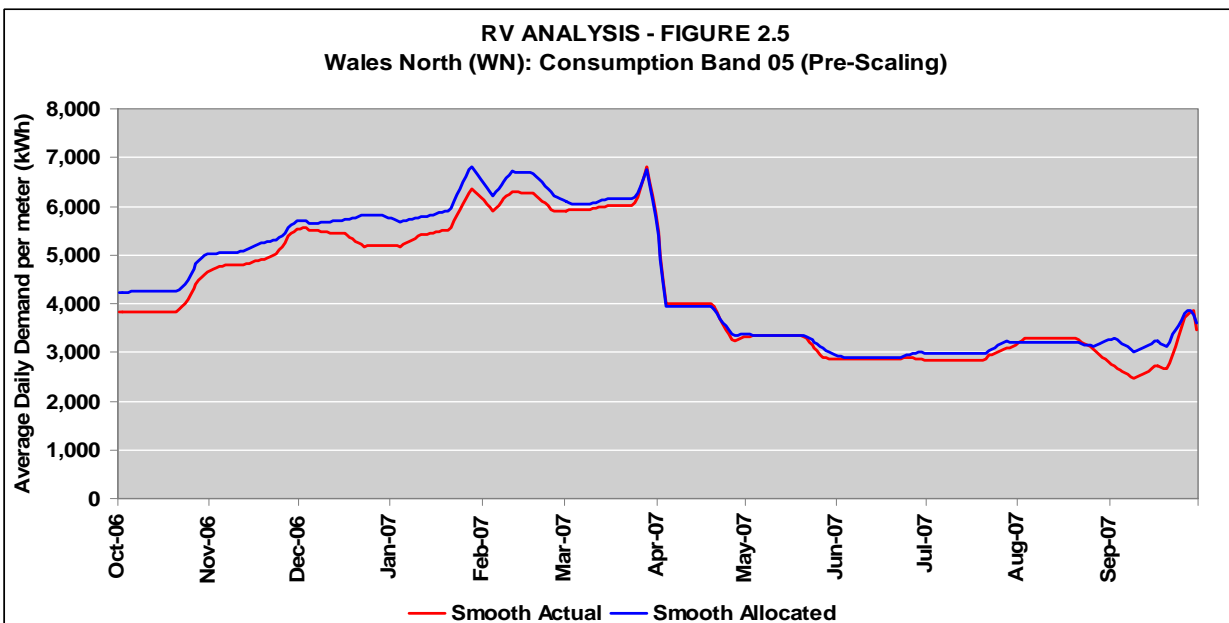
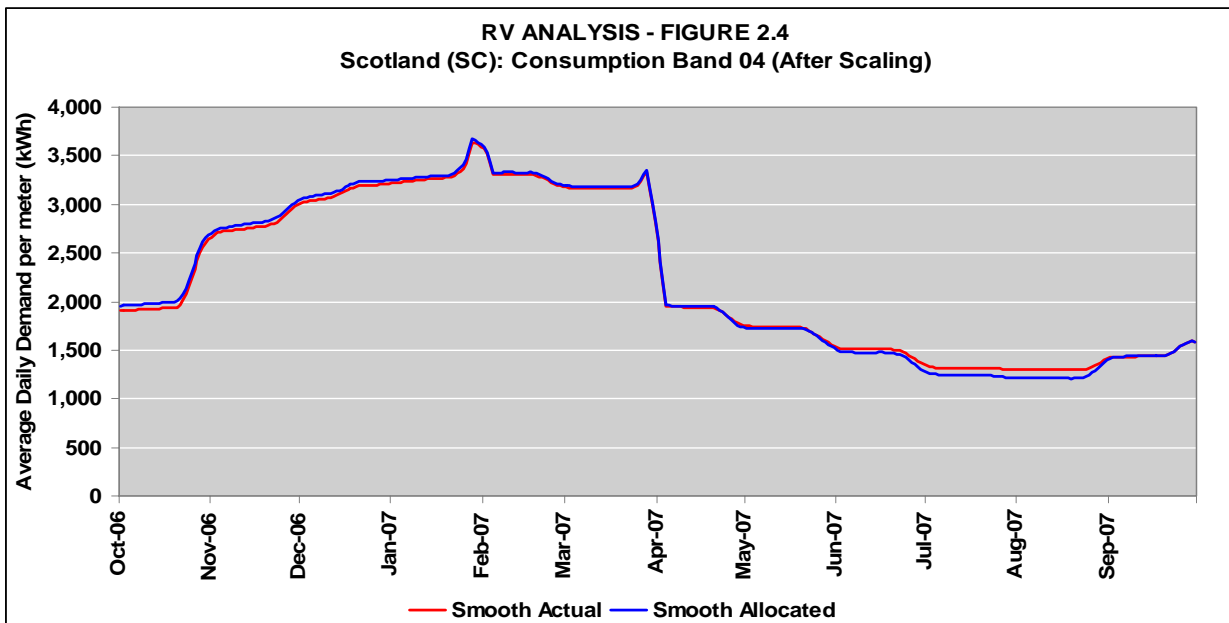
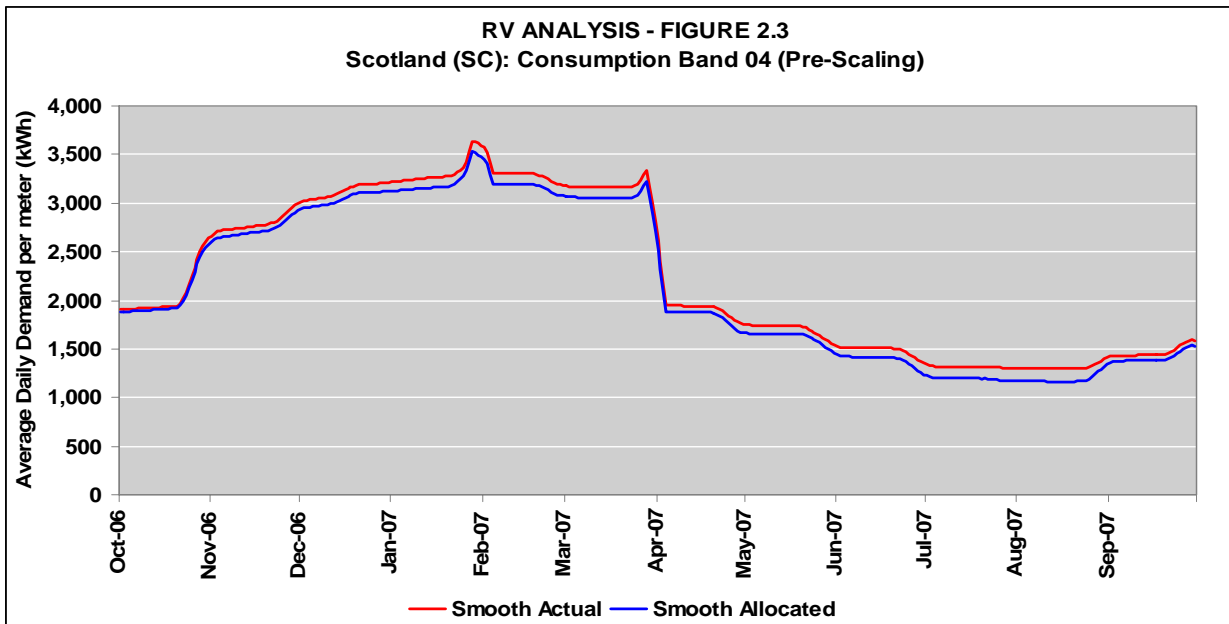
Bands 05B and 06B (Figures 3.8 and 3.9) show under allocations in November, January and March, in particular, with over allocations in October, May and September.

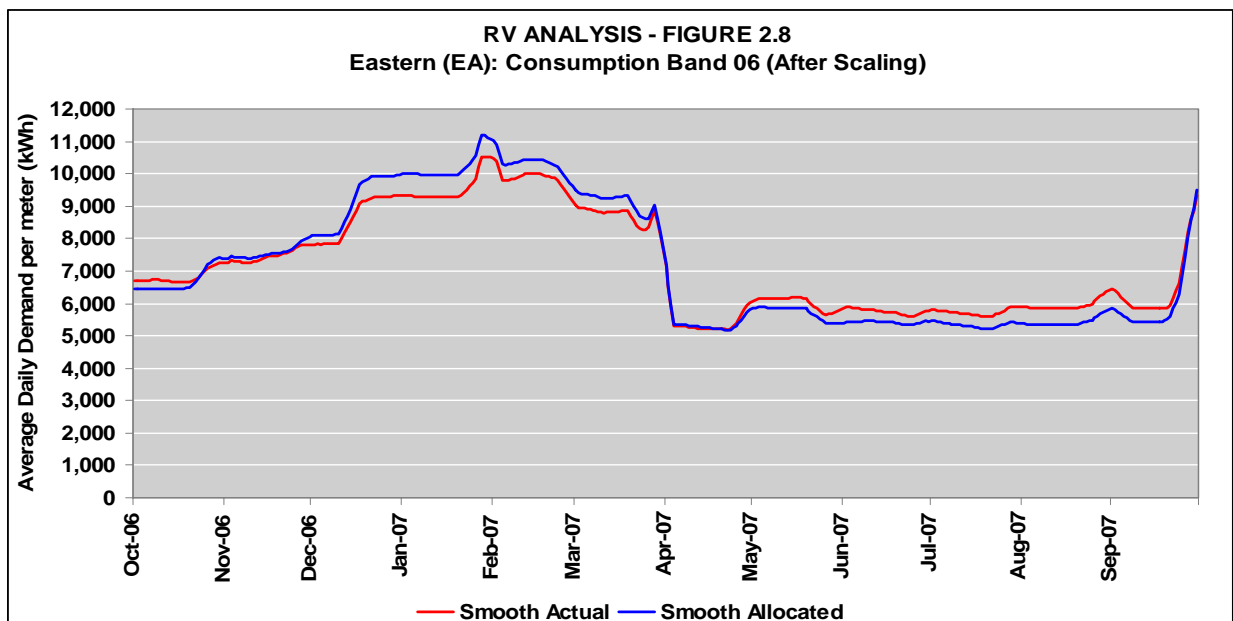
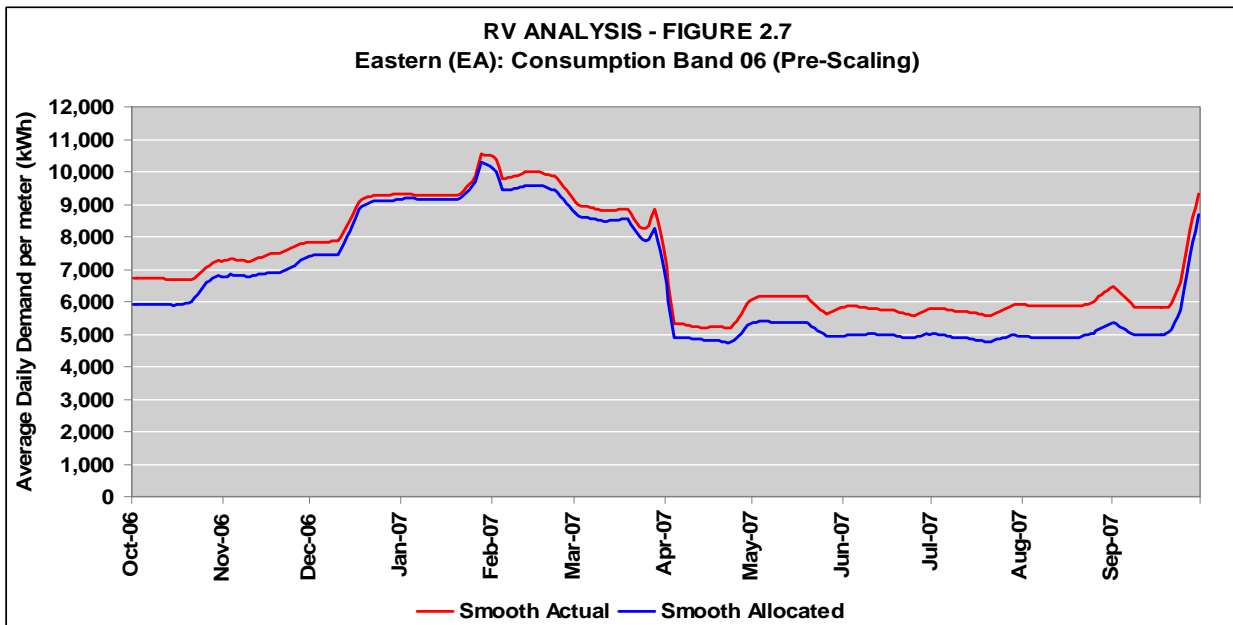
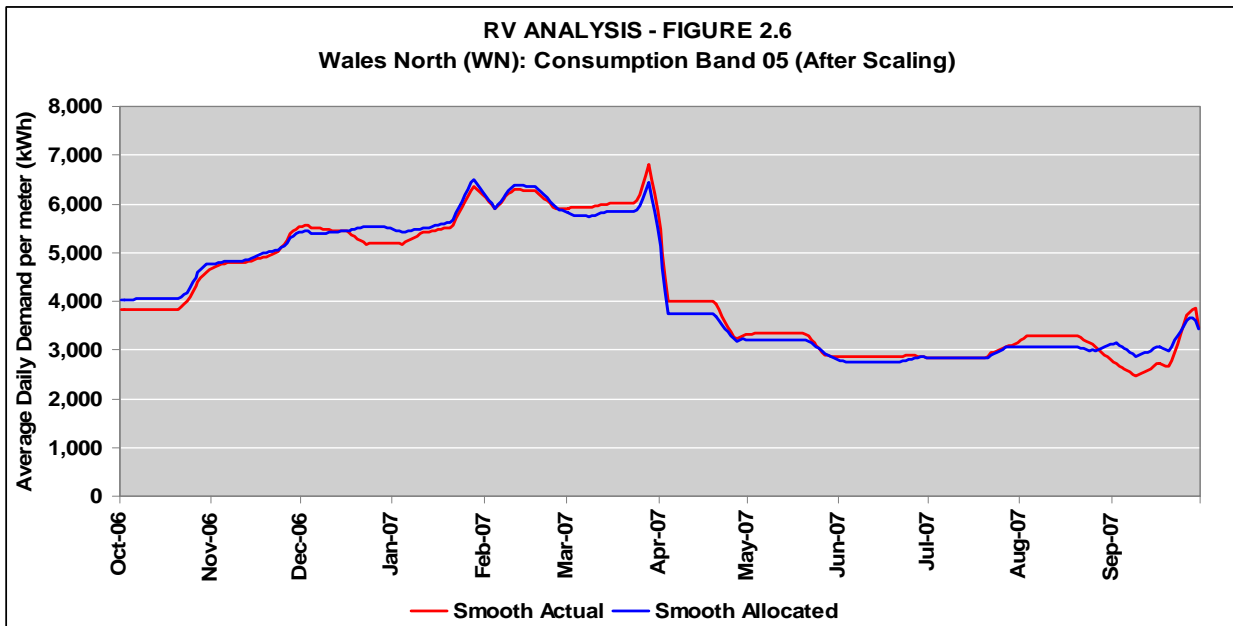
Band 07B (Figure 3.10) is atypical with clear under allocation in November and July and some over allocation evident in December.

Band 08B (Figure 3.11) shows under allocation in October, November, January and March, with over allocation through the summer period months of May to September.

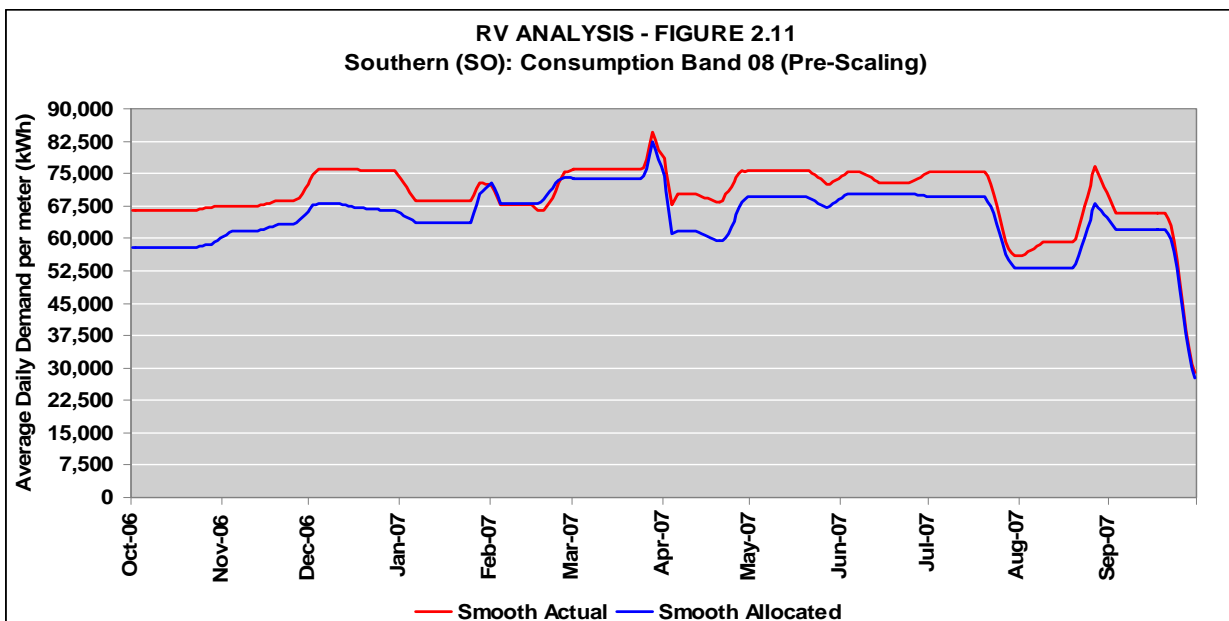
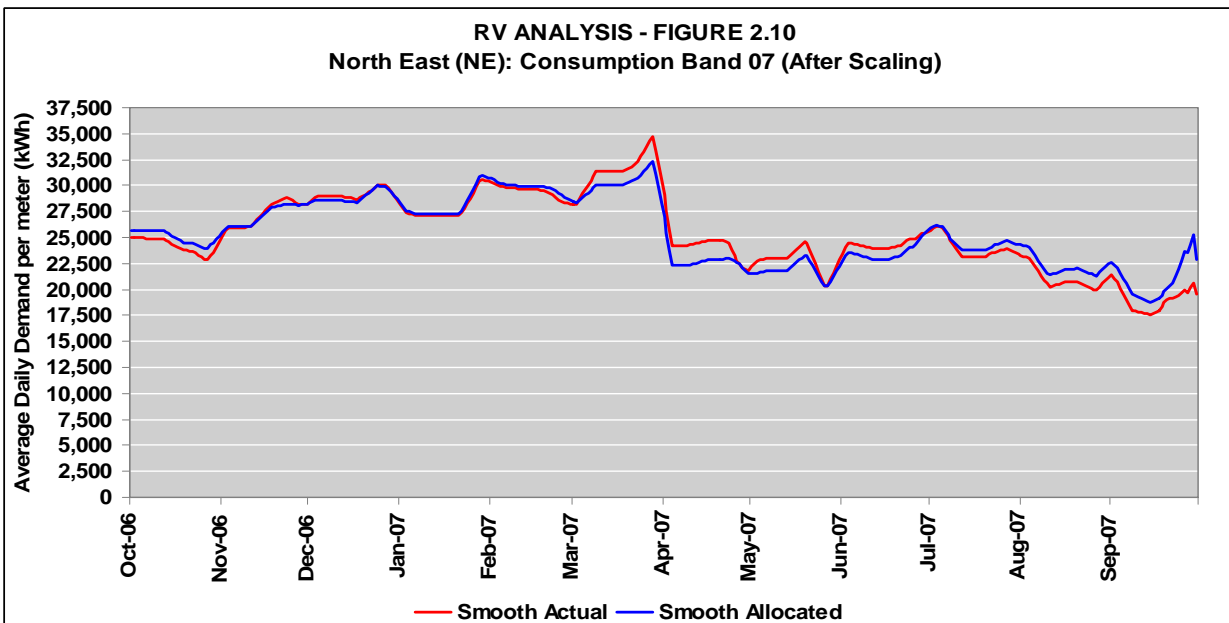
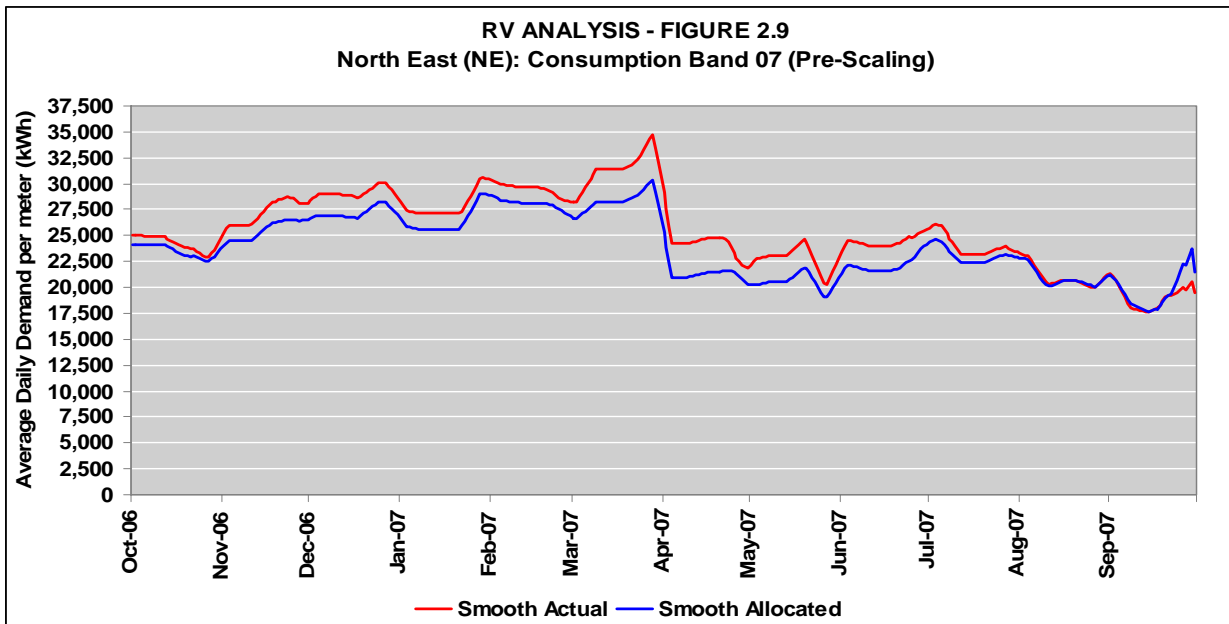
Additionally examples of monthly bar charts for individual EUCs, for each of the first four EUC bands (namely EA:E0601B, SC:E0602B, NE:E0603B and SW:E0604B) are shown in Figures 3.12 to 3.15 respectively. Some of these examples also show notable under allocation in winter period months (e.g. November, January and March) and over allocations in April and/or May.

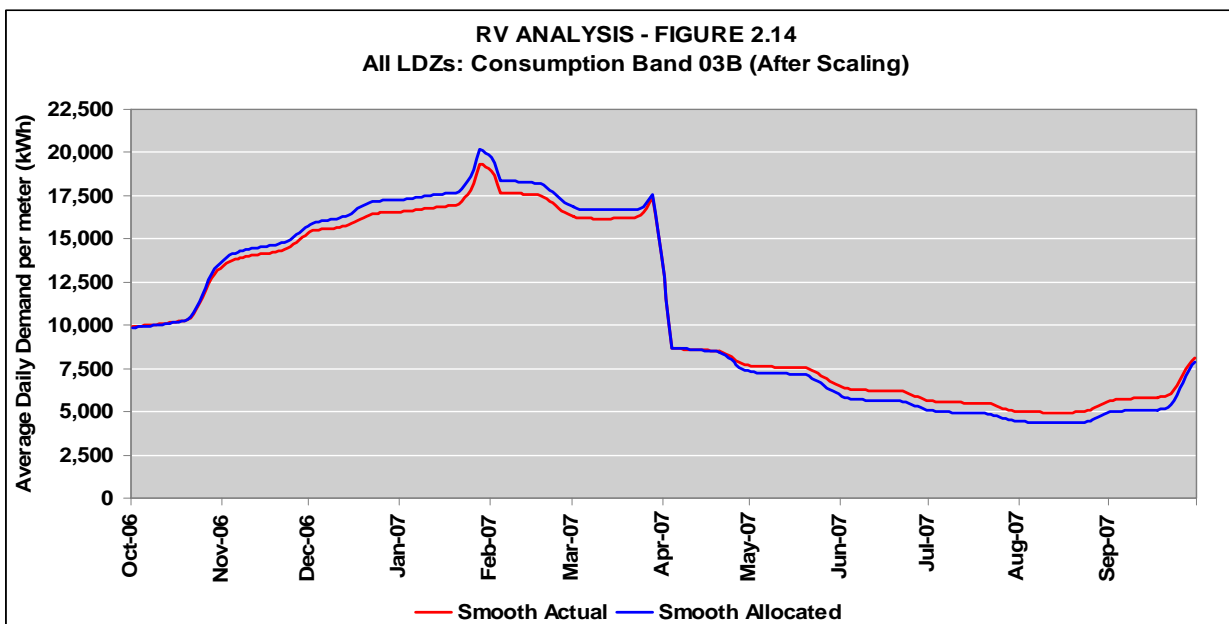
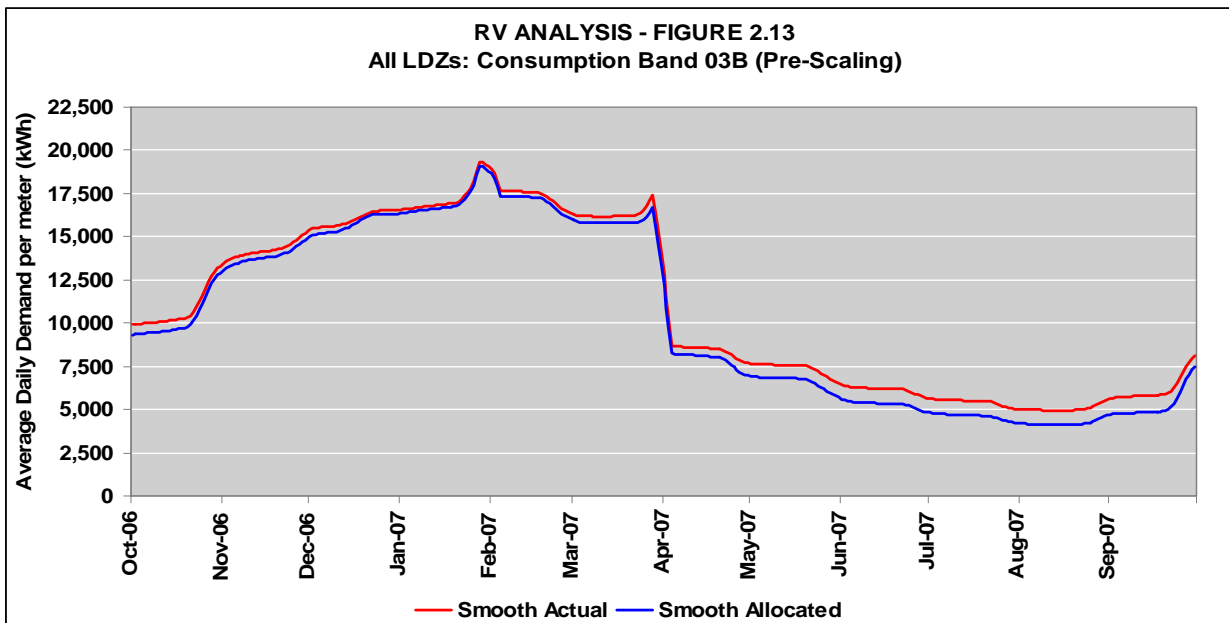
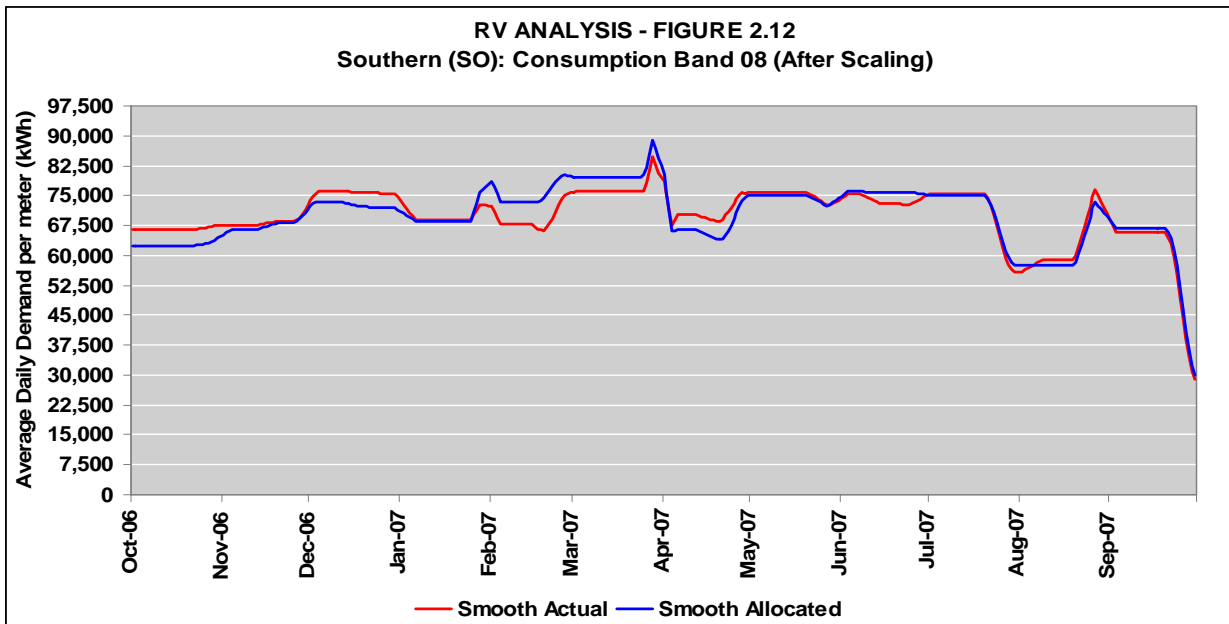


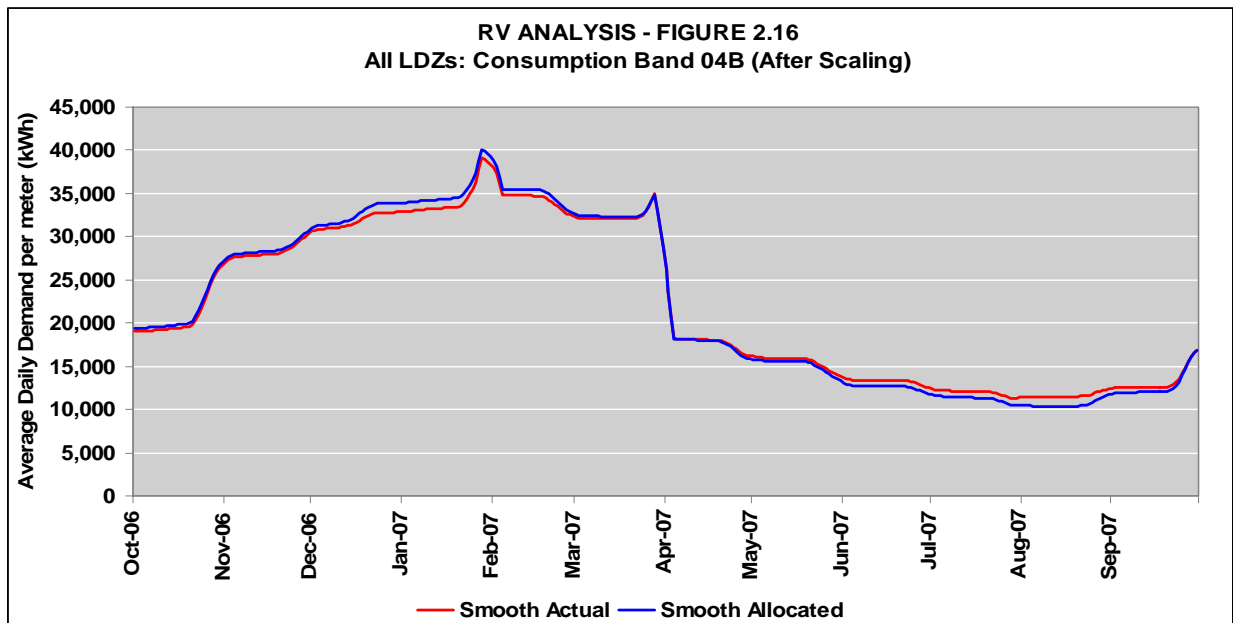
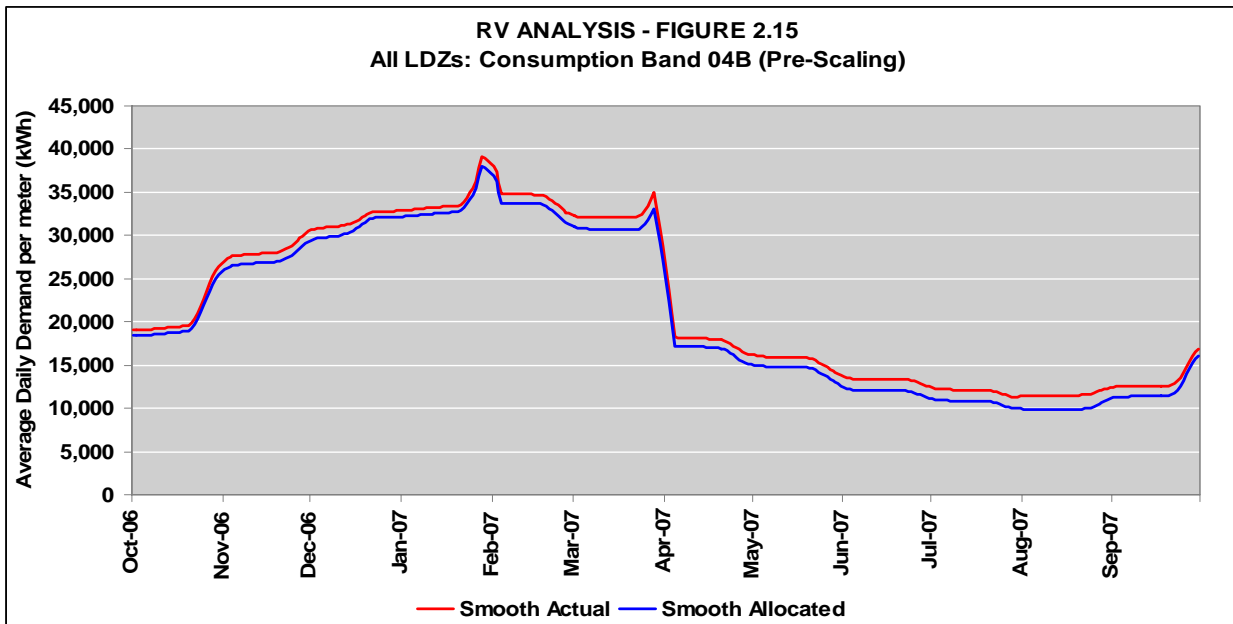












**Table 2.1 – RV Categorisations: Profile (Gas Year 2006/07)**

Based on average errors (after scaling) over the period as a percentage of average actual over the full year

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	↑	~	↑	↑	~	↑	↑	↑	↑	↑	↑	↑	↑
03	B	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
04	B	~	~	↑	~	~	↑	↑	↑	~	~	↑	↑	↑
05	B	↑	↑	↑	↑	~	~	~	~	↑	↑	~	~	~
06	B	~	~	↑	~	~	~	↓	~	↑	~	~	~	~
07	B	~	↑	↑	~	↑	↑	↑	↑	~	~	~	~	~
08	B		↑	↑	↑	↓	↑		↑		↓	↑	~	↓
09	B	~					~			↓				

<u>5% Level</u>	↑	Too Peaky	↓	Too Flat	<u>10% Level</u>	↑	Too Peaky	↓	Too Flat
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**Table 2.2 – RV Categorisations: Winter (Gas Year 2006/07)**

Based on average errors (after scaling) over the period as a percentage of average actual over the full year

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	-0.03	-0.02	-0.03	-0.04	-0.02	-0.03	-0.04	-0.03	-0.03	-0.03	-0.03	-0.03	-0.05
03	B	-0.04	-0.05	-0.05	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.04	-0.04	-0.05	-0.06
04	B	-0.01	-0.02	-0.03	-0.02	-0.02	-0.03	-0.05	-0.03	-0.02	-0.02	-0.03	-0.03	-0.03
05	B	-0.03	-0.03	-0.05	-0.04	-0.01	-0.01	-0.01	0.01	-0.03	-0.03	-0.02	-0.01	-0.01
06	B	-0.02	0.00	-0.06	0.00	-0.02	0.00	0.03	-0.01	-0.05	-0.01	-0.01	-0.02	-0.02
07	B	-0.02	-0.06	-0.06	0.00	-0.05	-0.04	-0.09	-0.11	0.01	0.01	0.00	-0.01	-0.02
08	B		-0.06	-0.04	-0.03	0.03	-0.04		-0.02		0.12	-0.03	0.00	0.04
09	B	0.01					0.00			0.07				

**Table 2.3 – RV Categorisations: Summer (Gas Year 2006/07)**

Statistics are average errors (after scaling) over the period as a fraction of average actual over the full year

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	0.03	0.02	0.03	0.04	0.02	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.05
03	B	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.05	0.06
04	B	0.01	0.02	0.03	0.02	0.02	0.03	0.05	0.03	0.02	0.02	0.03	0.03	0.03
05	B	0.03	0.03	0.05	0.04	0.01	0.01	0.01	-0.01	0.03	0.03	0.02	0.01	0.01
06	B	0.02	0.00	0.06	0.00	0.02	0.00	-0.03	0.01	0.05	0.01	0.01	0.02	0.02
07	B	0.02	0.06	0.06	0.00	0.05	0.03	0.09	0.11	-0.01	-0.01	0.00	0.01	0.02
08	B		0.06	0.04	0.03	-0.03	0.04		0.04		-0.12	0.09	0.00	-0.04
09	B	-0.01					0.00			-0.07				

**Table 2.4 – RV Categorisations: Annual Scaling (Gas Year 2006/07)**

Statistics are total actual over the full year divided by the total allocated over the full year

EUC	Band	SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW
02	B	1.03	1.05	1.03	1.04	1.04	1.04	0.98	1.04	1.04	1.04	1.04	1.04	1.05
03	B	1.04	1.06	1.05	1.06	1.07	1.08	1.00	1.05	1.07	1.07	1.06	1.06	1.06
04	B	1.04	1.06	1.05	1.06	1.07	1.08	1.01	1.04	1.06	1.06	1.08	1.07	1.06
05	B	1.03	1.07	1.05	1.05	1.07	1.05	0.95	1.07	1.06	1.05	1.06	1.06	1.07
06	B	1.07	0.98	1.04	1.04	1.05	1.03	1.04	1.07	1.09	1.06	1.05	1.05	1.08
07	B	0.97	1.15	0.93	1.06	1.08	1.05	0.73	0.96	1.04	1.04	1.06	1.03	1.04
08	B		1.11	1.02	0.99	1.03	1.14		0.96		1.08	0.94	1.08	1.14
09	B	0.98					1.02			1.06				

**Table 3.1 – Oct 06 to Sep 07: 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	3.70%	7.84%	6.83%	6.84%	8.29%	8.74%	-	6.06%	6.02%	6.18%	7.49%	4.38%	8.81%	6.71%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	3.76%	8.24%	6.90%	7.92%	8.58%	9.03%	-2.27%	6.48%	6.05%	6.15%	7.56%	4.47%	9.14%	7.04%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	3.81%	7.79%	6.73%	7.38%	8.33%	8.97%	-2.33%	6.03%	6.07%	6.19%	7.62%	4.91%	8.82%	6.74%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	3.53%	7.58%	6.60%	6.43%	8.07%	8.34%	-2.66%	5.83%	6.12%	6.15%	7.42%	4.87%	7.82%	6.43%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	3.41%	6.95%	6.10%	5.77%	7.23%	7.83%	-2.77%	5.18%	6.07%	5.87%	7.14%	4.88%	6.96%	5.97%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	3.14%	6.32%	5.51%	4.68%	6.59%	6.87%	-2.86%	4.41%	5.89%	5.38%	6.67%	4.90%	6.16%	5.46%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	2.92%	5.49%	5.26%	3.95%	6.17%	6.38%	-2.99%	4.59%	5.89%	4.97%	6.26%	4.88%	6.30%	5.20%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	2.68%	4.83%	4.72%	3.28%	5.69%	5.92%	-3.27%	3.82%	5.90%	4.69%	5.92%	4.86%	5.09%	4.76%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	2.60%	4.65%	-	-	5.43%	5.68%	-	-	-	-	-	-	-	4.19%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.2 – Oct 06 to Mar 07: 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	4.23%	9.10%	5.73%	7.25%	7.36%	8.75%	-	5.48%	5.55%	7.15%	8.04%	4.83%	9.09%	6.84%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	1.84%	6.63%	4.40%	8.21%	8.73%	8.03%	-4.56%	3.70%	4.85%	11.25%	9.21%	3.82%	4.57%	6.41%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179

03B	5.56%	5.40%	7.39%	7.12%	10.27%	9.93%	6.79%	5.45%	5.46%	7.27%	7.52%	5.95%	10.78%	7.36%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	5.80%	7.66%	7.10%	8.19%	9.13%	9.29%	-4.71%	9.17%	7.10%	7.87%	8.84%	5.64%	8.76%	7.66%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	5.03%	6.62%	5.71%	6.20%	7.38%	6.63%	-0.32%	5.28%	5.07%	6.63%	7.55%	5.93%	8.31%	6.26%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	5.63%	5.64%	5.71%	6.48%	8.60%	6.82%	0.10%	7.12%	3.72%	5.57%	6.45%	6.64%	8.29%	6.27%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	0.21%	13.63%	1.29%	-0.28%	2.14%	8.09%	-19.95%	4.07%	6.27%	2.23%	7.57%	5.69%	1.34%	3.64%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	6.61%	3.70%	8.57%	-0.84%	9.67%	9.23%	-12.31%	-4.99%	10.65%	13.90%	9.37%	14.79%	7.76%	7.00%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	-10.43%	20.63%	-	-	-2.70%	2.95%	-	-	-	-	-	-	-	0.01%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.3 – Apr 07 to Sep 07: 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	2.38%	4.37%	9.78%	5.66%	10.88%	8.72%	-	7.69%	7.38%	3.29%	5.84%	3.00%	7.91%	6.32%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	8.03%	12.57%	13.35%	6.91%	8.07%	12.26%	3.10%	14.78%	9.19%	-8.32%	2.91%	6.12%	22.08%	8.67%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	-0.54%	13.34%	4.96%	8.14%	2.40%	5.98%	-33.23%	7.64%	7.66%	3.35%	7.91%	1.94%	2.12%	4.80%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	-1.44%	7.38%	5.39%	2.03%	5.17%	5.87%	1.51%	-4.15%	3.54%	1.85%	3.68%	2.80%	5.51%	3.28%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	0.19%	7.60%	6.88%	4.89%	6.92%	10.30%	-7.62%	4.96%	8.23%	4.30%	6.23%	2.43%	4.30%	5.39%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	-1.17%	7.47%	5.19%	1.61%	3.11%	6.96%	-7.79%	-0.28%	9.57%	5.05%	7.04%	1.26%	2.60%	4.02%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	6.52%	-9.47%	10.63%	9.34%	11.49%	3.78%	14.30%	5.46%	5.30%	8.68%	4.24%	3.45%	13.41%	6.91%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	-2.70%	6.19%	-0.68%	7.98%	-0.02%	1.29%	6.08%	13.39%	-1.22%	-10.00%	1.11%	-12.57%	1.48%	1.02%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	14.68%	-25.71%	-	-	13.75%	8.78%	-	-	-	-	-	-	-	5.24%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.4 – Oct 06 to Sep 07: EWCF, with SF=1: 2006/07 ALPs and DAFs ‘Best Estimate 06’**

*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	0.01%	0.01%	0.01%	0.20%	0.22%	0.01%	-	0.00%	0.28%	0.25%	0.01%	0.00%	0.24%	0.10%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	-0.01%	-0.06%	0.18%	-0.18%	0.22%	0.50%	0.18%	0.03%	0.32%	0.43%	0.45%	0.02%	0.01%	0.18%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	0.14%	0.02%	0.22%	0.23%	0.19%	0.27%	0.22%	0.25%	0.35%	0.37%	0.41%	0.54%	0.39%	0.29%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	0.00%	0.23%	0.02%	0.00%	-0.03%	0.04%	0.02%	0.22%	0.40%	0.44%	0.46%	0.47%	0.26%	0.22%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	0.01%	0.02%	0.03%	0.02%	0.01%	0.09%	0.03%	0.08%	0.31%	0.39%	0.36%	0.41%	0.07%	0.16%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	0.01%	0.05%	0.04%	0.12%	0.05%	0.10%	0.04%	0.14%	0.07%	0.17%	0.27%	0.35%	0.07%	0.11%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	0.01%	0.06%	0.03%	0.05%	0.05%	0.07%	0.03%	0.09%	0.04%	0.04%	0.05%	0.25%	0.08%	0.07%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	0.02%	0.04%	0.03%	0.02%	0.02%	0.03%	0.03%	0.06%	0.02%	0.03%	0.02%	0.04%	0.03%	0.03%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	0.01%	0.03%	-	-	0.02%	0.02%	-	-	-	-	-	-	-	0.02%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.5 – Oct 06 to Mar 07: EWCF, with SF=1: 2006/07 ALPs and DAFs ‘Best Estimate 06’**

*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	0.74%	2.81%	1.57%	1.97%	1.49%	1.78%	-	1.56%	1.02%	1.23%	1.48%	1.49%	1.69%	1.57%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	-1.83%	-0.24%	0.05%	2.10%	2.70%	1.06%	-2.72%	-0.51%	0.34%	5.71%	2.96%	0.50%	-3.57%	0.87%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	2.19%	-1.23%	3.30%	1.27%	4.41%	2.99%	8.58%	1.50%	0.98%	1.41%	1.08%	2.73%	3.42%	2.12%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	2.49%	1.40%	3.00%	2.87%	3.31%	2.64%	-2.71%	5.41%	2.72%	2.14%	2.68%	2.42%	1.72%	2.58%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	1.82%	0.59%	1.84%	1.12%	1.94%	0.17%	1.95%	1.53%	0.64%	0.95%	1.41%	2.76%	1.53%	1.35%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	2.69%	-0.02%	2.19%	2.06%	3.67%	1.16%	2.78%	3.68%	-0.73%	-0.07%	0.52%	3.53%	1.95%	1.71%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	-2.64%	8.99%	-2.20%	-4.49%	-2.81%	2.91%	-16.45%	0.45%	2.00%	-3.51%	1.83%	2.59%	-5.55%	-0.79%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	4.25%	-0.80%	5.75%	-4.55%	5.45%	4.51%	-8.38%	-8.62%	6.64%	9.00%	4.01%	12.05%	2.04%	3.15%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	-13.11%	17.06%	-	-	-7.27%	-1.86%	-	-	-	-	-	-	-	-3.66%

Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5
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**Table 3.6 – Apr 07 to Sep 07: EWCF, with SF=1: 2006/07 ALPs and DAFs ‘Best Estimate 06’**

*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	-1.79%	-7.69%	-4.17%	-4.75%	-3.31%	-5.16%	-	-4.42%	-1.82%	-2.66%	-4.41%	-4.56%	-4.48%	-4.10%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	4.03%	0.44%	0.51%	-8.12%	-7.72%	-1.32%	6.97%	1.63%	0.26%	14.52%	-6.62%	-1.18%	10.13%	-2.08%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	-4.96%	2.92%	-8.11%	-2.78%	-	-8.21%	-	-3.21%	-1.32%	-2.35%	-1.47%	-5.77%	-	-5.10%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	-5.44%	-2.77%	-7.28%	-7.17%	-9.08%	-6.75%	5.56%	-	-5.78%	-3.81%	-5.34%	-4.79%	-3.32%	-5.90%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	-3.56%	-1.11%	-3.52%	-2.25%	-3.81%	-0.08%	-3.76%	-2.88%	-0.40%	-0.79%	-1.97%	-5.10%	-2.79%	-2.32%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	-4.64%	0.17%	-3.50%	-3.19%	-6.23%	-1.62%	-4.53%	-5.96%	1.43%	0.60%	-0.16%	-6.30%	-3.07%	-2.68%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	3.52%	-	3.04%	5.82%	3.83%	-4.24%	16.83%	-0.52%	-3.01%	4.85%	-2.71%	-3.88%	8.17%	0.69%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	-5.76%	1.04%	-8.01%	5.23%	-7.76%	-6.22%	8.72%	9.49%	-9.89%	-	-5.53%	-	-2.69%	-4.99%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	12.19%	-	-	-	7.48%	2.16%	-	-	-	-	-	-	-	0.34%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.7 – Oct 06 to Sep 07: EWCF, with SF=1: 2007/08 ALPs and DAFs ‘Best Estimate 07’**

*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	0.01%	0.02%	0.19%	0.29%	0.29%	0.26%	-	0.01%	0.28%	0.00%	0.00%	0.00%	0.30%	0.13%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	-0.01%	-0.05%	-0.01%	-0.08%	0.03%	0.30%	-0.01%	0.08%	0.09%	0.28%	0.28%	0.30%	0.07%	0.11%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	-0.01%	0.15%	0.22%	0.25%	0.24%	0.23%	0.22%	0.30%	0.24%	0.29%	0.30%	0.37%	0.18%	0.23%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	0.00%	0.28%	0.02%	0.21%	0.21%	0.29%	0.02%	0.21%	0.28%	0.32%	0.35%	0.43%	0.22%	0.23%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	0.00%	0.03%	0.04%	0.03%	0.02%	0.10%	0.04%	0.08%	0.09%	0.28%	0.27%	0.38%	0.07%	0.12%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	0.01%	0.04%	0.04%	0.01%	0.05%	0.10%	0.04%	0.14%	0.08%	0.02%	0.22%	0.36%	0.07%	0.08%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	0.00%	0.07%	0.02%	0.04%	0.04%	0.06%	0.02%	0.09%	0.05%	0.04%	0.05%	0.28%	0.09%	0.07%



Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	0.02%	0.04%	0.03%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.05%	0.03%	0.03%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	0.01%	0.02%	-	-	0.01%	0.02%	-	-	-	-	-	-	-	0.01%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.8 – Oct 06 to Mar 07: EWCF, with SF=1: 2007/08 ALPs and DAFs ‘Best Estimate 07’**

*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	1.21%	2.62%	1.08%	2.01%	0.83%	1.46%	-	1.27%	-0.09%	0.74%	0.51%	1.23%	1.49%	1.20%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	-1.16%	-0.53%	0.03%	2.38%	2.83%	1.76%	-2.74%	0.00%	-1.24%	4.67%	1.64%	0.51%	-2.28%	0.77%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	2.92%	-1.22%	2.21%	1.10%	3.24%	0.84%	7.55%	1.67%	0.33%	0.99%	0.90%	1.66%	3.13%	1.61%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	2.29%	1.41%	2.79%	2.53%	2.21%	1.35%	-2.93%	4.35%	2.44%	1.53%	1.53%	2.77%	1.56%	2.07%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	1.88%	0.57%	2.24%	1.32%	2.39%	0.37%	2.35%	1.90%	0.27%	0.65%	0.98%	2.55%	1.49%	1.38%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839
06B	2.44%	1.18%	2.80%	2.36%	3.40%	1.89%	3.39%	3.43%	-0.77%	0.40%	0.42%	3.19%	2.26%	1.95%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	-1.43%	9.13%	-1.81%	-3.87%	-2.21%	3.43%	-16.00%	1.19%	1.64%	-3.96%	1.38%	3.17%	-4.68%	-0.30%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	4.58%	-0.53%	5.95%	-3.65%	6.25%	5.28%	-8.14%	-10.06%	5.29%	7.65%	2.55%	11.00%	0.95%	3.14%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	-12.78%	17.24%	-	-	-7.09%	-1.72%	-	-	-	-	-	-	-	-3.43%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

**Table 3.9 – Apr 07 to Sep 07: EWCF, with SF=1: 2007/08 ALPs and DAFs ‘Best Estimate 07’**

*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	-2.93%	-7.12%	-2.21%	-4.55%	-1.22%	-3.26%	-	-3.56%	1.32%	-2.19%	-1.56%	-3.77%	-3.60%	-2.90%
Num S.pts	242	236	205	234	205	214	-	235	242	207	233	234	213	2700
02B	2.53%	1.24%	-0.12%	-8.66%	-8.95%	-4.43%	6.39%	0.34%	3.57%	-12.17%	-3.59%	-0.22%	6.72%	-2.09%
Num S.pts	86	105	113	89	98	98	8	69	96	115	115	84	103	1179
03B	-7.29%	3.34%	-5.16%	-2.21%	-8.91%	-1.65%	-24.61%	-3.51%	0.02%	-1.53%	-1.40%	-3.35%	-9.95%	-3.81%
Num S.pts	112	75	123	85	133	64	12	71	116	130	161	93	85	1260
04B	-5.03%	-2.63%	-6.75%	-5.57%	-5.21%	-2.48%	6.03%	-12.17%	-5.47%	-2.69%	-2.76%	-5.87%	-3.05%	-4.50%
Num S.pts	352	249	343	255	316	285	44	148	319	392	416	270	228	3617
05B	-3.71%	-1.03%	-4.29%	-2.62%	-4.68%	-0.46%	-4.54%	-3.61%	-0.31%	-0.48%	-1.31%	-4.70%	-2.71%	-2.45%
Num S.pts	305	172	314	195	232	311	41	101	193	353	233	217	172	2839

06B	-4.21%	-1.87%	-4.49%	-4.01%	-5.76%	-2.85%	-5.54%	-5.55%	1.52%	-0.64%	-0.13%	-5.57%	-3.59%	-3.15%
Num S.pts	95	78	127	82	112	113	19	47	73	110	81	72	69	1078
07B	1.91%	-16.56%	2.49%	5.03%	3.02%	-5.04%	16.36%	-1.73%	-2.43%	5.47%	-2.01%	-4.79%	6.93%	0.01%
Num S.pts	30	21	29	42	53	48	4	17	27	13	9	29	30	352
08B	-6.21%	0.73%	-8.30%	4.20%	-8.92%	-7.32%	8.48%	11.00%	-7.85%	-12.12%	-3.49%	-19.18%	-1.22%	-4.95%
Num S.pts	11	14	27	14	30	32	5	11	8	8	14	9	10	193
09B	11.87%	-32.68%	-	-	7.28%	1.99%	-	-	-	-	-	-	-	0.07%
Num S.pts	2	1	-	-	1	1	-	-	-	-	-	-	-	5

