EVALUATION OF ALGORITHM PERFORMANCE – 2006/07 GAS YEAR
SCALING FACTOR AND WEATHER CORRECTION FACTOR

1.0 Background

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

- Daily values of scaling factor (SF) and weather correction factor (WCF)
- Reconciliation variance data for each EUC
- Daily consumption data collected from the NDM sample

The material presented here refers only to SF and WCF data. The other strands of this evaluation will be available for consideration at a subsequent DESC meeting.

The SF and WCF-EWCF graphs this year range over two whole gas years 2005/06 and 2006/07. These graphs are presented in their now standard form for each LDZ, in Figures 1 to 13 of this note. Tables of average values of the SF and WCF-EWCF, for gas years 2005/06 and 2006/07, along with the improvement or degradation in these averages between the two gas years, are presented in Tables 1 to 6. It should also be noted that SF and WCF values have been obtained for the period 1st to 10th October 2007 (the start of the new gas year 2007/08) and appended to the graphs of the previous two completed gas years.

Additionally, the root mean square deviation (RMS) of SF from 1 has also been computed for each discrete month during the previous gas years 2005/06 and 2006/07, and the respective figures can be found in Tables 7 and 8. The differences in these RMS values between the two gas years are presented in Table 9. These figures provide a very useful additional measure of the variability of SFs about one (the ideal value).

2.0 Overall Results

These various graphs and tables indicate the following notable points:

- Examination of Tables 1, 2 and 3 indicates that for nearly all LDZs (WN LDZ being the only clear exception), average values of SF for gas year 06/07 generally (i.e. across weekdays, most weekend days and for the winter and summer periods as a whole) appear to be further away from the ideal value of one than over equivalent periods of the previous gas year, 05/06.

- In all LDZs (except WN LDZ), weekday (Monday to Thursday), Friday, Saturday, Sunday, overall winter and overall summer SF values are less than one in gas year 2006/07.

- The RMS deviation of SF from the ideal value of one provides a measure of the variability of SFs. Tables 7, 8 and 9 indicate that, for a majority of LDZs in each individual month (except July and September), the variability of SFs was more marked in gas year 2006/07, than during the previous gas year.

  Exceptions (i.e. reduced variability) occur in WN LDZ in every month, SC LDZ in July and August, SO LDZ during November to March, NW LDZ during December to February and in July, NE, NT and SW LDZs during June to September, NE and EA LDZs in December and January, EM LDZ in December, July and September, and EA and SE LDZs in September.

- For gas year 2006/07, examination of the average weekday and weekend day values of WCF-EWCF and their differences in Tables 4, 5 and 6 indicates that WCF bias, as measured by the deviation of WCF from EWCF, appears to be markedly improved for nearly all days of the week, compared to that over the equivalent days of the previous gas year (2005/06). Weekday (Monday to Thursday) WCF bias is a little worse in only 3 LDZs (i.e. NO, NW and NE) and has clearly improved in 10 LDZs. Weekend WCF bias over Friday, Saturday and Sunday days has improved in most instances, with the only exceptions being NO LDZ on Saturday and Sunday (both worse). However, for the winter taken as a whole, LDZs: SC, NO, NW, NE and EM show worse WCF bias figures as does the summer taken as a whole in NW LDZ.

  Over the whole of gas year 2005/06, WCF bias was consistently negative over all days of the week. This was because aggregate NDM seasonal normal demand (SND) specified for 2005/06 was too high.

  During gas year 2006/07 WCF bias was still negative in most cases over all days of the week (exceptions were WN LDZ for all days, SC LDZ for Fridays and Saturdays and NT LDZ for Sundays).

However, the bias is, in general, notably less negative than was the case in 2005/06. The levels of aggregate NDM seasonal normal demand (SND) specified for gas year 2006/07 were lower than those applied to 2005/06. Thus, the improvement in WCF bias may be attributed to the reduced levels of aggregate NDM SND adopted for 2006/07. However, since WCF bias is still consistently negative, it appears that aggregate NDM SND in 2006/07 was still too high for most LDZs.

Tables 10 and 11 provide monthly values of weather corrected aggregate NDM demand as a percentage of aggregate NDM SND, for gas year 2005/06 and for gas year 2006/07 respectively.

- A consistently negative WCF bias would tend to drive the corresponding SF to a higher value than it would otherwise have. In addition to this, SF values over gas year were consistently below one in all LDZs (except WN LDZ). *In the absence of WCF bias, SF values would have been even lower than they were during gas year 2006/07.* Consequently, it would appear that in nearly all LDZs (WN LDZ excepted) the prevailing level of aggregate NDM AQ is too high. An assessment of the excess in NDM AQ levels in each LDZ is made later in this document.
- Over the first 10 days of October 2007, it has been warmer than average across the country. Average SF values over these 10 days are mixed: In 4 LDZs they appear to be greater than one, while in 3 other LDZs the values are close to but lower than one. In the remaining 6 LDZs they are clearly lower than one.

3.0 Commentary

It is customary in this note on WCF and SF values to identify and provide a commentary on any unusual occurrences of SF and WCF-EWCF values, in the most recent gas year (2006/07). In part, these instances (up to May 2007) have previously been reported in Appendix 13 of the NDM report published on 27th June 2007. They are all included here for completeness:

- Part or all of the week prior to the start of the Christmas holiday period saw a period of notably colder weather in most LDZs while the Christmas holiday period itself was markedly mild - as was most of the winter 2006/07.

  The cold conditions prior to the holiday period saw strong NDM demand, in some instances greater than prevailing weather conditions would ordinarily have caused. This led to positive WCF bias in some LDZs (notably NO, EA, NT, SE and SO) on some of the days leading up to the holiday period. However, there was no consequential SF effect because higher (or lower) actual aggregate NDM demand acts directly on SF and indirectly via WCF but the effects are in opposite directions.

  During the Christmas holiday period itself (which extends in to the first few days of January) there were examples of SF volatility (and WCF volatility) across many LDZs. These instances may largely be attributed to the values of the holiday factors for the affected days in either the EUC demand models or the aggregate NDM demand models. Holiday factor inaccuracies impact the SF on a day in different directions, depending on whether they arise from the EUC demand models or from the aggregate NDM demand model.

  For example if on a particular day in the holiday period, the EUC and aggregate NDM holiday factors did not reduce both EUC and aggregate NDM demand sufficiently, the EUC demand models would yield ALPs that were too high leading to a depressive effect on SFs to compensate for this, while the high aggregate NDM SND on the day would give a WCF that was biased too low leading in turn to an inflationary effect on the SF to compensate for the WCF bias. Thus, the net effect on the SF on any given day in the holiday period would depend on the balance between these two opposing influences.
- In EM, WM and WS LDZs on 2nd January 2007 there were positive spikes in WCF-EWCF (without corresponding noteworthy perturbations in the SF values). In each of these LDZs NDM demand was unusually high on this day - higher than the prevailing (near seasonal normal) weather conditions would ordinarily have indicated. The SF does not show much perturbation because aggregate NDM demand goes into the computation of both WCF and of SF. When aggregate NDM demand is too high WCF becomes too great which leads to a lower SF. However, the inflated aggregate NDM demand directly acts to increase SF. The two effects are in opposition, once again resulting in very little change to SF from its level on adjacent days.
- Two days later, on 4th January 2007 in WS LDZ, there was a sharp downward spike in SF (down to 0.77). On this day WCF-EWCF was very close to zero (i.e. no WCF bias). Aggregate NDM and

aggregate DM demands also showed no unusual characteristics. The reason for this SF anomaly was that on 4th January the aggregate AQ used for demand attribution for the 01B consumption band was greater by ~35% than that on the day before (and the day after). This appears to have been a data error in the Gemini system. Since the AQ for the 01B consumption band was extremely high (an increase of about 5.5 TWh) demand attribution (without the SF) yielded a very high value of computed total aggregate NDM demand and the SF had to take on a markedly lower value to scale this down to the measured aggregate NDM demand.

- In WM LDZ on 11th February 2007 there was a negative spike in WCF-EWCF (without a corresponding noteworthy perturbation in SF). NDM demand was unusually low on this day - lower than the prevailing (mild) weather conditions would normally have indicated. The SF does not show much perturbation because aggregate NDM demand goes into the computation of both WCF and of SF. When aggregate NDM demand is too low WCF becomes too small which leads to a higher SF. However, the deflated aggregate NDM demand directly acts to decrease SF. The two effects are in opposition, yet again resulting in very little change to SF from its level on adjacent days.

- April 2007 was the warmest April month in gas industry weather records going back to 1928. NDM demand fell away sharply during this month and WCF and SF values were impacted by these exceptional circumstances. Table A13.12 shows that for April 2007, weather corrected aggregate NDM demand as a percentage of aggregate NDM seasonal normal demand was markedly depressed below the ideal 100% level in most LDZs. When aggregate NDM demand is too low WCF becomes too low which tends to force SF to be higher. However, the reduced aggregate NDM demand also directly acts to decrease SF. The two effects are in opposition and may in many instances broadly balance out resulting in no discernible impact on the SF. However, markedly depressed aggregate NDM demand levels in April 2007 meant that the direct depressive effect on SF was predominant in most LDZs, causing reductions in the SF in all LDZs except SC, NO and WS. LDZs EM, EA, NT and SO showed particularly strong reductions in SF while LDZs NW, NE, WM, WN, SE and SW also showed reductions in SF.

- In a number of LDZs, spikes in SF may be seen during one or both of the two bank holiday Mondays during May 2007. In SC, NE, EM, WN and SW LDZs both bank holidays show SF spikes, while in EA and NT LDZs the spike only appears to be present for the end of May bank holiday. In many of these LDZs (e.g. NE, EM, EA, NT and SW) the spike at the end of May bank holiday is additionally caught up in the marked scaling factor volatility observed generally during late May 2007. Any additional increase in SF on the May bank holidays, over and above any increase due to other factors occurring at the same time, is probably attributable to the holiday factors applied to these days in the EUC demand models and in the demand models for aggregate NDM demand in the affected LDZs. The SF spikes are consistent with too much holiday demand reduction applied in the EUC demand models or insufficient holiday demand reduction applied in the aggregate NDM demand models (or both).

- The SF was notably volatile in many LDZs during late May 2007 (generally over the period 22nd to 31st May). In weather terms, across the country there was exceptionally warm weather in the days (i.e. 22nd to 25th May) leading up to the end of May bank holiday weekend. Saturday, 26th May was generally near seasonal normal or a little warmer. From Sunday onwards the weather turned very sharply colder with the bank holiday being one of the coldest ever end of May bank holidays across the country. This colder weather persisted in most LDZs for the rest of the month of May.

  Five LDZs: NE, EM, EA, NT and SW, show notable SF volatility during this period. In all of these LDZs the underlying demand model for the 01B consumption band (used to derive ALPs and DAFs for 2006/07) has summer reductions. The 01B consumption band makes up between 69% and 74% of total NDM load (on an AQ basis) in these LDZs. However, the summer reduction period only comes in to effect from the Sunday of the end of May bank holiday weekend.

  If weather on any day in the summer six-month period is significantly different from seasonal normal for that time of year, the ALP value that is applied on that day to EUCs with summer reductions may not be appropriate for the prevailing weather. Thus, the (AQ*ALP/365) terms in the demand attribution formula (see Appendix 8) may be too low or too high and the scaling factor then has to change abnormally to compensate.

  The days before the bank holiday weekend were outside the period during which summer reductions (and hence reduced ALPs) applied in the demand model for the 01B consumption band. The exceptionally warmer than seasonal normal weather during these days meant that the applicable (AQ*ALP/365) terms were too high for the prevailing conditions, causing SFs to generally drop sharply to compensate.

From the Sunday onwards, the summer reduction period came into effect and hence reduced ALPs did now apply (to the 01B consumption band). However, much colder weather, from the Sunday of the weekend onwards to the end of May, and especially on the bitterly cold (for the time of year) bank holiday Monday itself, meant that on these days the applicable (AQ*ALP/365) terms were far too low, causing SFs to increase sharply to compensate.

- Many days in the mid-summer months of 2007 (June and July) were exceptionally wet throughout Britain. The month of June was the wettest ever and significant flooding occurred over at least two distinct periods in the month: 15th to 16th June and 25th to 27th June. Less extreme but still unsettled conditions occurred in July. Weather conditions in these months did not match the extreme hot weather experienced a year previously in 2006.

  In June and July, in a number of LDZs there were instances of individual days when sharply positive WCF-EWCF values occurred due to aggregate NDM demand higher than would ordinarily be expected based on the weather that prevailed on each of those days. The impact on SF was usually minimal because higher than expected NDM demand had a direct inflationary effect on SF while the same high aggregate NDM demand caused a positive WCF bias which had a deflationary effect on SF.

  There were also a few instances of individual days when sharply negative WCF-EWCF values occurred due to aggregate NDM demand lower than would ordinarily be expected based on the weather that prevailed on each of those days. The impact on SF was usually minimal because lower than expected aggregate NDM demand had a direct deflationary effect on SF while the same low NDM demand caused a negative WCF bias which had a inflationary effect on SF.

  These, atypical aggregate NDM demands may have been due to the unprecedented conditions that prevailed. Instances of positive or negative WCF spikes may be observed: in SC LDZ on 16th & 25th June and 21st July; in NO LDZ on 15th & 25th June; in NW LDZ on 25th & 27th June; in NE LDZ on 15th & 25th June; in EM LDZ on 27th June; in WM LDZ on 20th July; in WN LDZ on 25th June and 20th July; and in WS LDZ on 5th July.

- The period 19th to 22nd August was also one during which unsettled conditions prevailed nationally, with widespread rain occurring during some of the days in this period in most parts of Britain. On one or more days during this period in many LDZs there were instances of sharp positive WCF spikes. These were generally cases of days colder than seasonal normal on which aggregate NDM demand was higher than expected. LDZs: NW, WM, WN and WS on 19th August; SW LDZ on 20th August; LDZs: NO, NE, EM and WM on 21st August; and LDZs: EA, NT and SE on 22nd August, exhibited these characteristics. In addition in SC LDZ on 21st August aggregate NDM demand was higher than expected for that relatively warm day, which followed a colder than normal week long spell of weather immediately previously.

- SC LDZ also showed a modest scaling factor spike on 27th August on the English bank holiday, suggesting the effect of an inappropriate holiday factor. The necessity to use grouped LDZ data (especially at higher consumption ranges) means that the set of potential holidays applied in the underlying EUC demand modelling are always the union of Scottish and English holidays.

- A period of colder than average weather affected all LDZs at the end of September (from 25th or 26th to 30th September). This resulted in positive WCF values, but negative WCF bias (negative WCF-EWCF) due to SND error. In effect, for most LDZs (SC and NO excepted), the WCF values were not a large as they should have been. Consequently, during this late September period, the negatively biased WCF led by an upturn in SF from the previously observed general level of SF in each affected LDZ.

4.0 Assessment

As a broad generalisation, scaling factor deviations from one (offsets from one and also day to day volatility) are related to the closeness of correspondence (or otherwise) between aggregate NDM seasonal normal demand on the day and the AQ weighted ALP on the day (in other words the (AQ*ALP/365) term in the NDM demand attribution formula summed across all EUCs in the LDZ). The ratio of aggregate NDM SND to AQ weighted ALP is broadly inversely related to the deviation of SF from the ideal value of one. However, the effect is more pronounced in summer than in winter, and moreover, the summer is also affected by warm weather cut-off and reduction effects in some EUC models.

Scaling factor volatility may be seen in a number of LDZs in the summer in both 2005/06 and 2006/07. Warm weather cut-offs in EUC demand models give rise to summer scaling factor volatility by a mechanism involving the DAF parameter. If weather on a day in summer is significantly different from normal for that time of year, the DAF value that is applied on that day to EUCs with cut-offs may not be appropriate for the prevailing weather. Thus overall the (1 + WCF*DAF) terms in the demand attribution formula may be either too low or too high and the scaling factor has to change abnormally to compensate.

There are indications that EUC demand models with summer reductions also give rise to summer scaling factor volatility. Here, the mechanism involves the ALP parameter. If weather on a day in summer is significantly different from normal for that time of year, the ALP value that is applied on that day to EUCs with summer reductions may not be appropriate for the prevailing weather. Thus, overall the (AQ*ALP/365) terms in the demand attribution formula may be too low and the scaling factor has to change abnormally to compensate. In LDZs where such an effect occurs an offset in SF values (a “plateau-like” effect) may be observed in the summer months corresponding to all or part of the range of dates across which summer reductions apply in the underlying EUC demand models (for those LDZs). In summer 2007 this effect may be seen in LDZs NT and SW (the same effect occurred in summer 2006 in these LDZs and in SE LDZ).

An examination of the average monthly value of WCF-EWCF and weather corrected aggregate NDM demand as a percentage of aggregate NDM SND allows an approximate assessment to be made of the “equilibrium level” of SF in each LDZ; that is to say the likely level of SF if any WCF bias is discounted. This assessment is an approximate one and is based on identifying a period (of a month’s duration in this instance) over which WCF bias was small (at or near zero) and weather corrected aggregate NDM demand was close to (~100% of) aggregate NDM seasonal normal demand over the period, then identifying the average value of SF that applied to the period and adjusting this SF for any residual WCF bias that applied in the period.

This coincidence of conditions cannot always be identified in a LDZ and in those circumstances it is not possible to assess the “equilibrium level” of SF. A further complication is that weather corrected aggregate NDM demand as a percentage of aggregate NDM seasonal normal demand would be biased lower (than the target 100%) if aggregate NDM SND is too high, as appears to have been the case for gas year 2006/07 (albeit to a lesser extent than gas year 2005/06). Consequently, assessment of “equilibrium levels” of SF based on the SF patterns over winter 2006/07, is not entirely reliable.

If an “equilibrium level” of SF can be identified in a LDZ, it may then provide an approximate indication of the prevailing level of aggregate NDM AQ in the LDZ - for example an “equilibrium level” of SF above one suggests that aggregate NDM AQ is less than it should be and an “equilibrium level” of SF below one indicates that aggregate NDM AQ is greater than it should be.

Subject to the previously stated caveat about aggregate NDM SND, the assessment has been undertaken for the gas year 2006/07, concentrating in particular on the most recent winter period (October 2006 to March 2007). The resultant “equilibrium levels” of SF (where they can be assessed) were presented in Table A13.13 of the NDM report published in the spring (on 27th June 2007). This table is reproduced here as Table 12.

The table also includes, for comparison, WCF bias (i.e. WCF-EWCF) and SF values for the winter period of gas year 2006/07 for all days and for Monday to Thursday weekdays. The inferences that may be drawn about the impact of WCF bias and the prevailing level of aggregate NDM AQs from a comparison of these values in each LDZ are also presented in Table 12.

For gas year 2006/07, “equilibrium levels” of SF were determined for all LDZs. Both the “equilibrium levels” of SF and the WCF bias assessments set out in Table 12 suggest that aggregate NDM AQ in every LDZ (except WN LDZ) is notably too high.

The “equilibrium” SF based assessment tends to suggest a lower excess in aggregate NDM AQ levels (in each LDZ) than the WCF bias assessment. This is consistent with the impact of aggregate NDM SND (still too high in 2006/07) on the procedure for identifying the “equilibrium level” of SF (i.e. the ensuing “equilibrium levels” of SF tend to be greater than they should be (implying a lesser aggregate NDM AQ excess).

In WN LDZ, which is smaller in overall load size than adjacent LDZs, the prevailing level of NDM AQ appears to be too low. The principal cause of the NDM AQ deficiency in this LDZ has been known for some time to be due to supply points incorrectly assigned to adjacent LDZs. However, this deficiency in aggregate NDM AQ in WN LDZ does appear to have improved (lessened) in gas year 2006/07 in comparison with gas year 2005/06.

For all other LDZs, aggregate NDM AQs appear to be too high. On the basis of the assessment set out in Table 12, of the impact of WCF bias on SF over the winter period of gas year 2006/07, this AQ excess is 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.

Table 13 shows the percentage changes in aggregate NDM AQs at the start of gas year 2007/08 as observed on the Gemini system. It is clear that a significant reduction in aggregate NDM AQs have taken place for gas year 2007/08. The reduction is 4% overall across all LDZs and the reductions range from 3.1% in WS LDZ to 4.8% in SW LDZ. The reductions observed in SC, NW, WS and SO are closely in line with the predicted AQ excess of 2-4% in these LDZs. The AQ reductions in LDZs: NO, NE, EM, WM, EA, NT, SE and SW are less than the predicted AQ excess of 5-8% in these LDZs. So, it may be that in these LDZs there is still an excess in NDM AQ in aggregate.

Figure 1

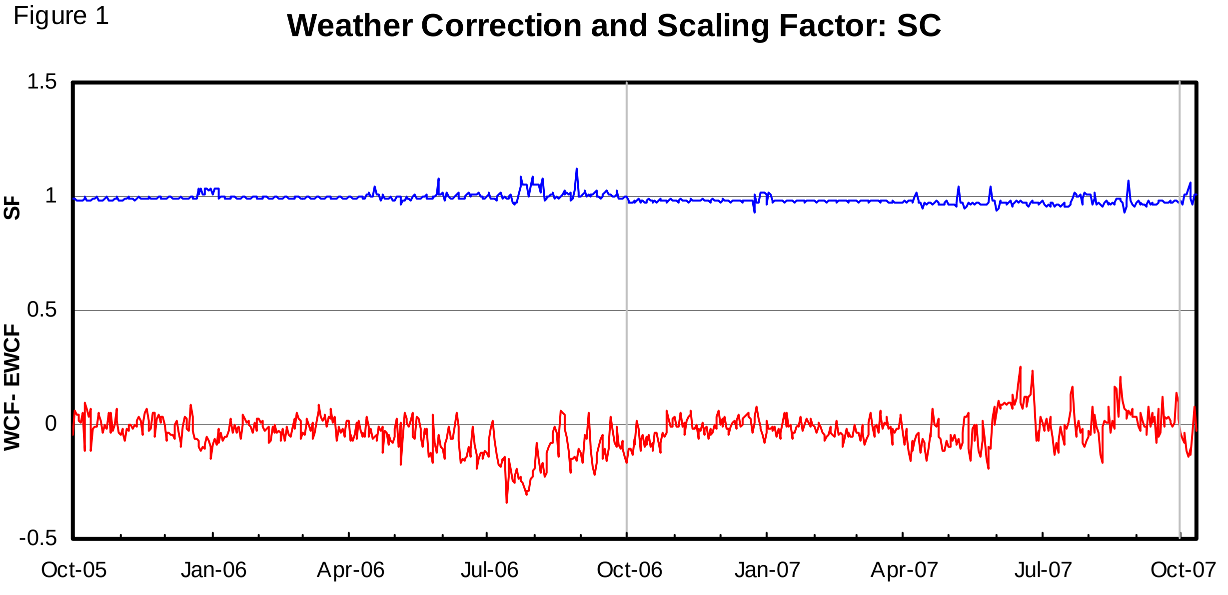


Figure 2

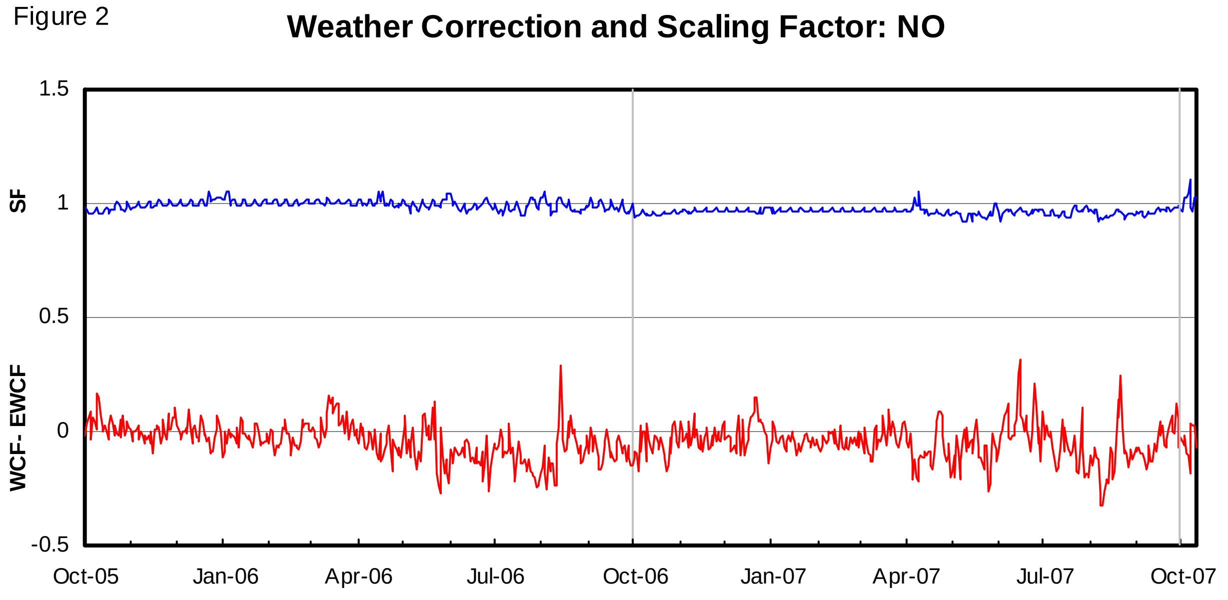


Figure 3

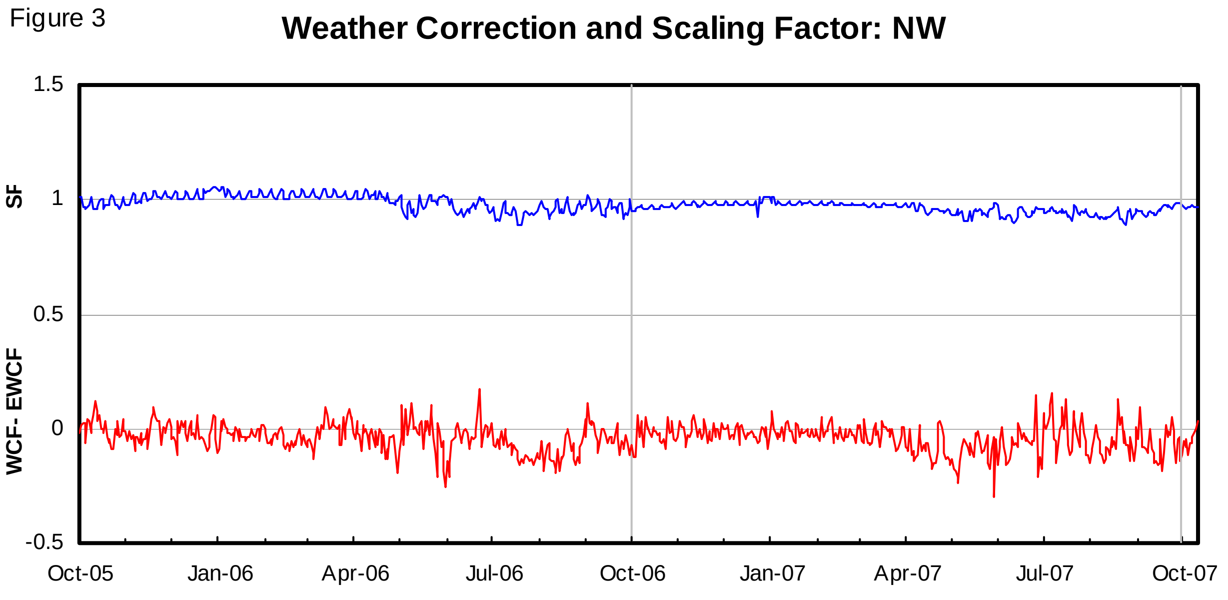


Figure 4

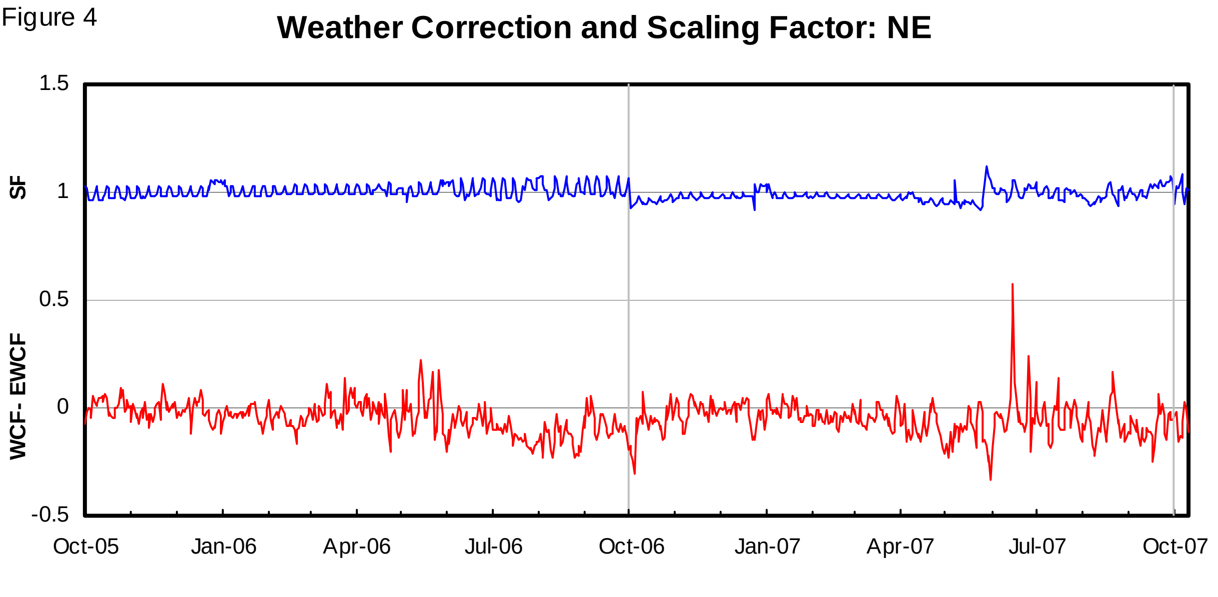
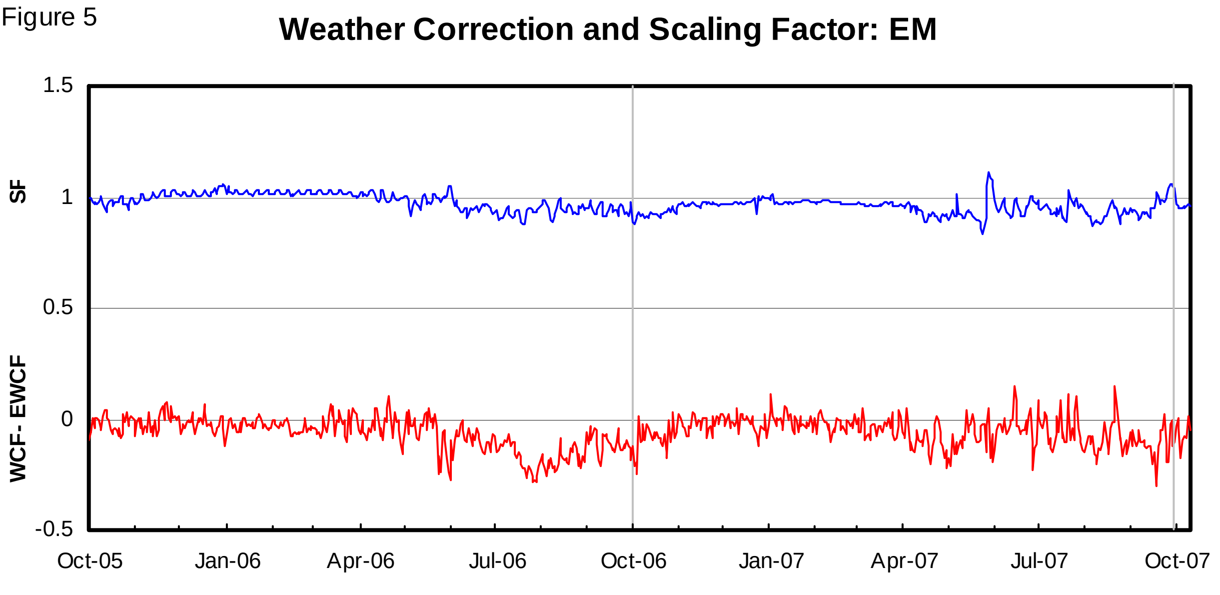


Figure 5



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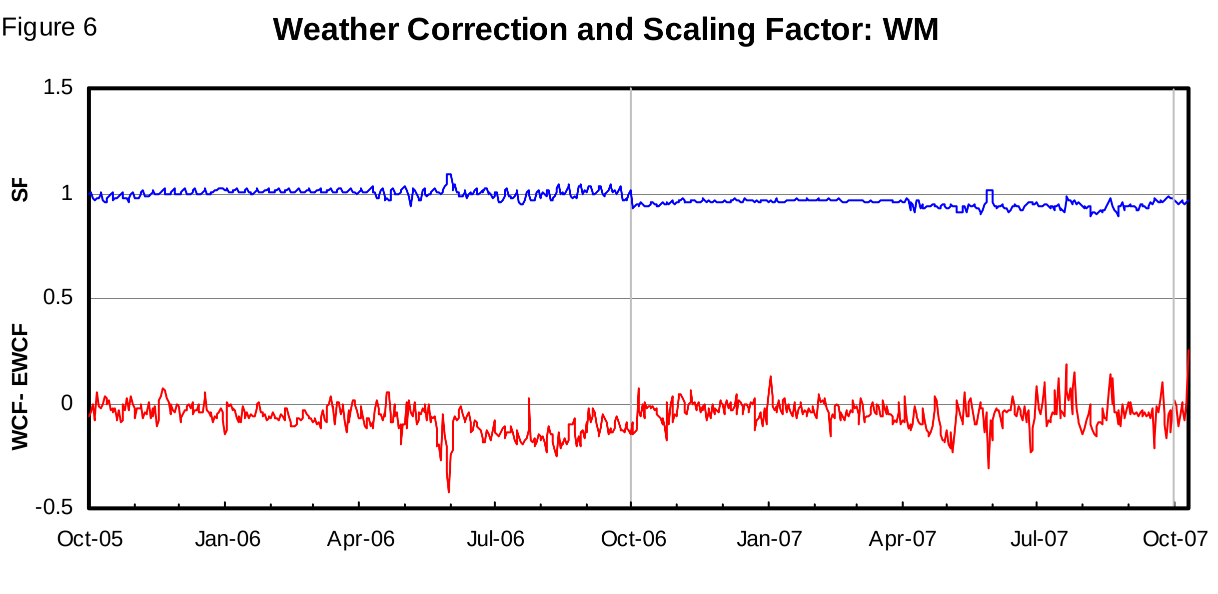


Figure 7

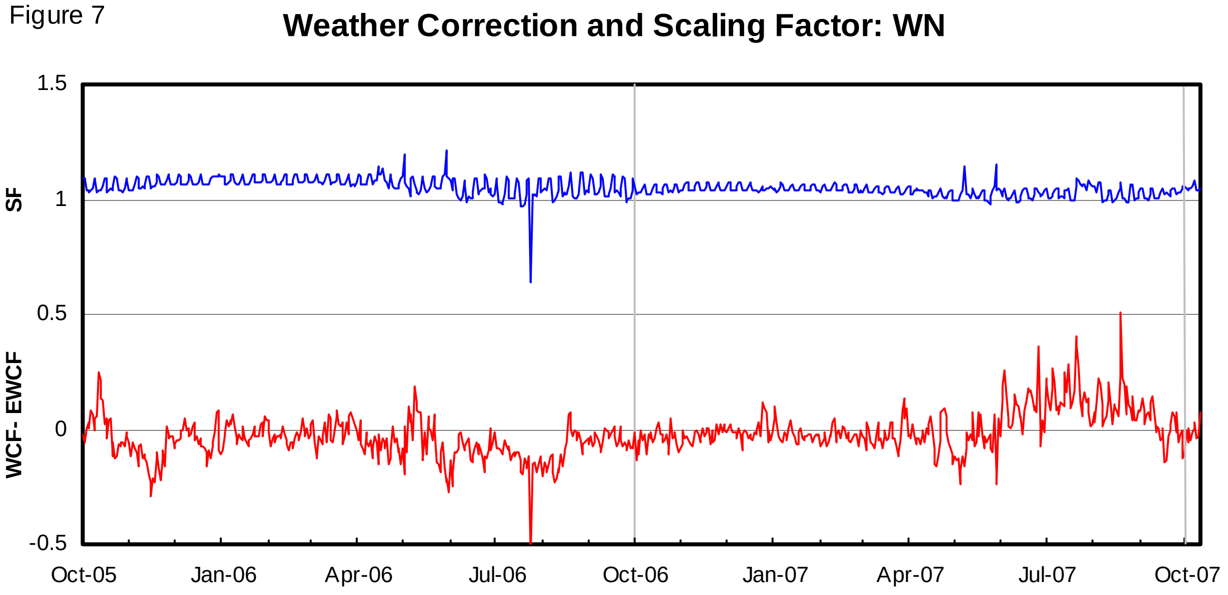


Figure 8

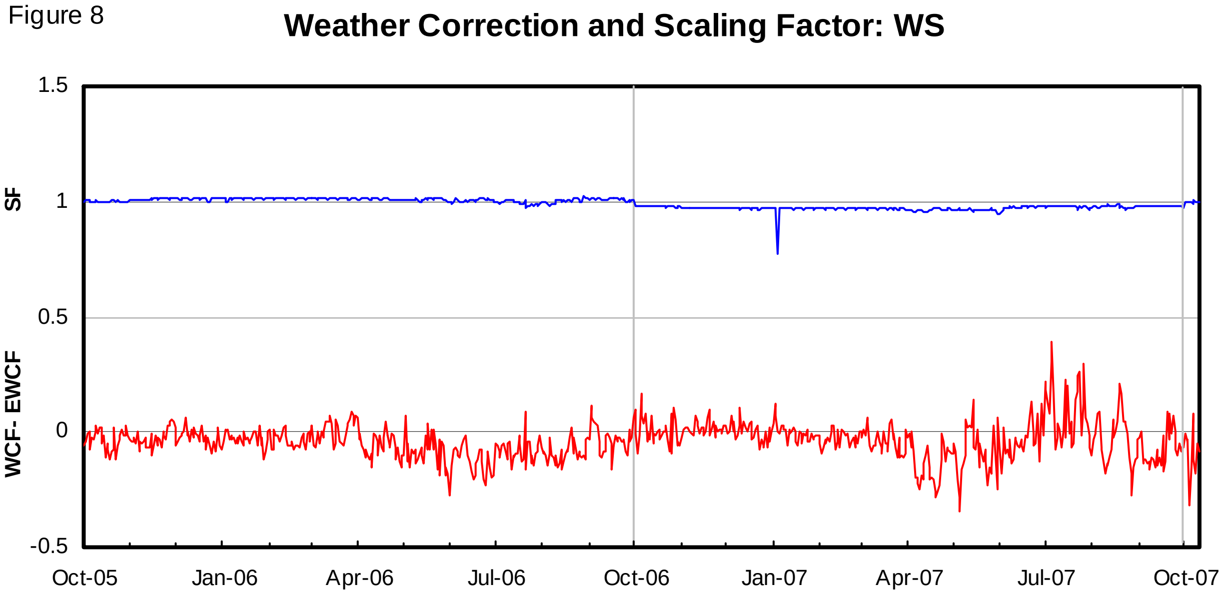


Figure 9

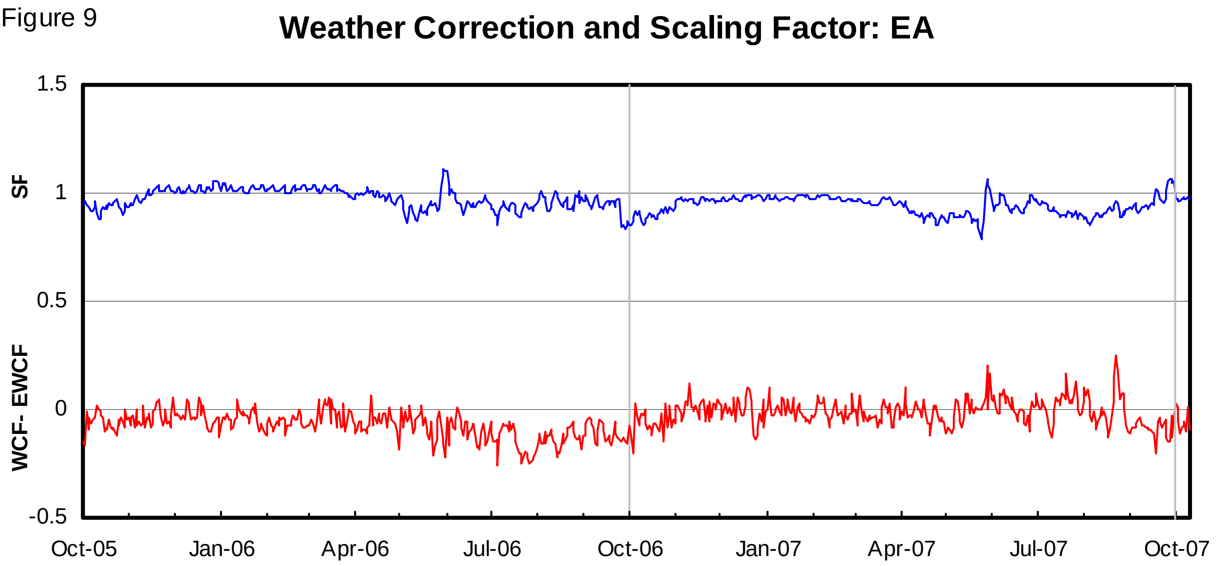


Figure 10

Weather Correction and Scaling Factor: NT

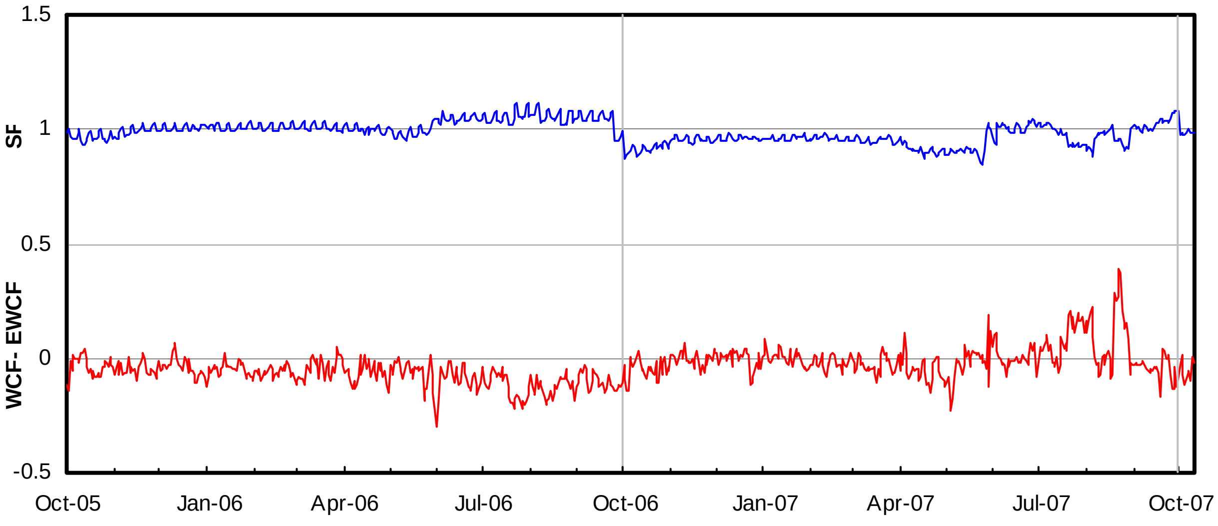


Figure 11

Weather Correction and Scaling Factor: SE

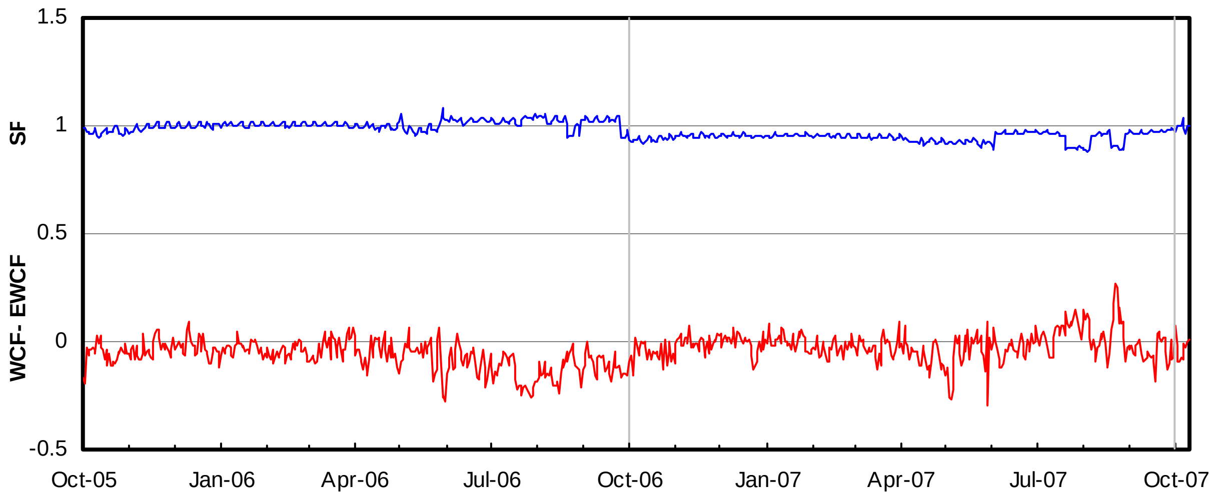


Figure 12

Weather Correction and Scaling Factor: SO

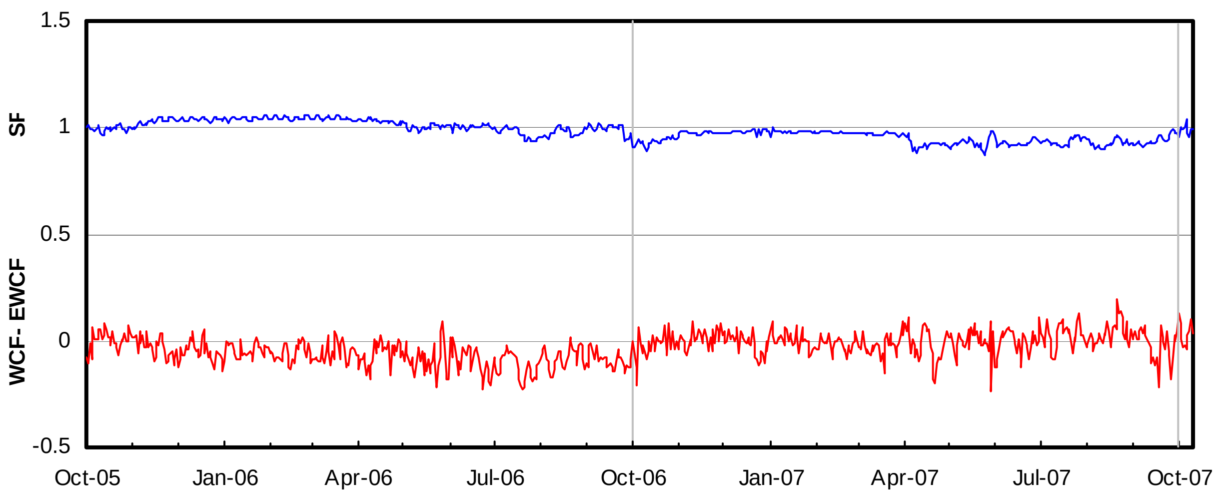
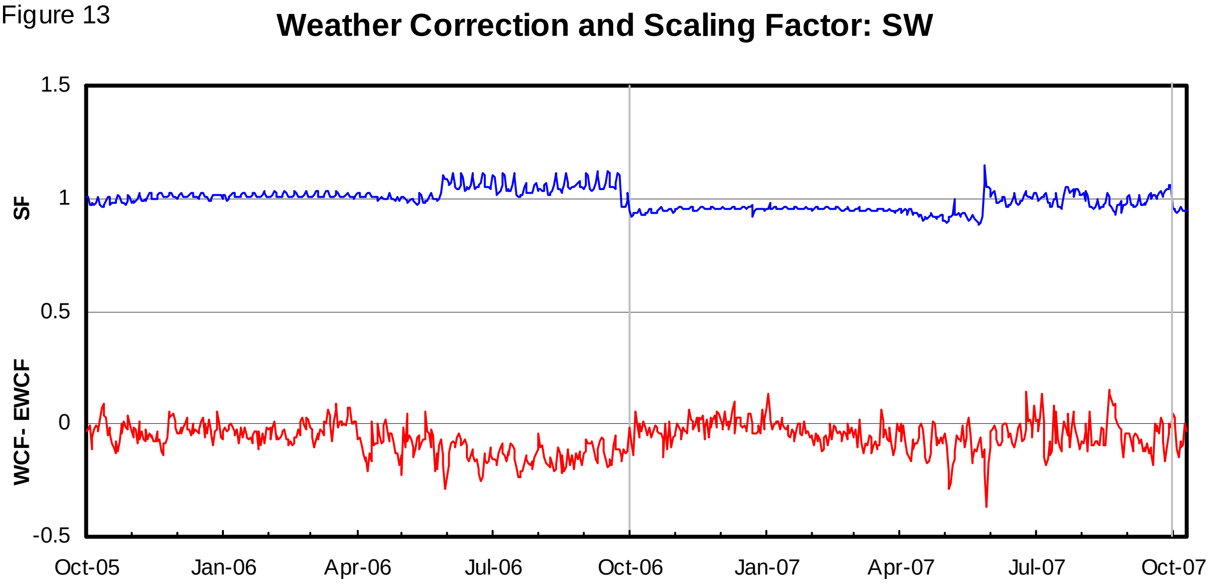


Figure 13


Weather Correction and Scaling Factor: SW
1.5
1
0.5
0
-0.5
SF
WCF- EWCF
Oct-05
Jan-06
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Jul-06
Oct-06
Jan-07
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Jul-07
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Table 1: Average Values of SF Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.998	0.998	1.002	1.011	0.996	1.006
NO	0.989	0.997	1.009	1.005	0.999	0.992
NW	0.981	0.992	1.013	1.011	1.013	0.970
NE	0.991	1.005	1.041	1.032	1.000	1.012
EM	0.977	0.986	1.000	1.000	1.011	0.960
WM	0.995	0.999	1.014	1.023	1.003	1.001
WN	1.046	1.059	1.102	1.098	1.076	1.051
WS	1.009	1.007	1.004	1.008	1.010	1.005
EA	0.971	0.973	0.984	0.994	1.000	0.953
NT	1.003	1.012	1.032	1.041	0.998	1.030
SE	0.998	1.004	1.018	1.019	0.998	1.011
SO	1.010	1.019	1.020	1.024	1.032	0.997
SW	1.012	1.022	1.044	1.045	1.007	1.038
AVG	0.998	1.006	1.022	1.024	1.011	1.002

Table 2: Average Values of SF Gas Year 2006/07

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.979	0.969	0.977	0.986	0.982	0.975
NO	0.960	0.966	0.973	0.963	0.966	0.960
NW	0.958	0.963	0.968	0.963	0.977	0.944
NE	0.977	0.985	0.998	0.988	0.978	0.988
EM	0.953	0.957	0.955	0.955	0.965	0.943
WM	0.949	0.948	0.958	0.954	0.961	0.941
WN	1.025	1.040	1.057	1.058	1.046	1.027
WS	0.972	0.974	0.973	0.970	0.971	0.973
EA	0.940	0.939	0.945	0.944	0.959	0.923
NT	0.954	0.957	0.968	0.966	0.951	0.965
SE	0.944	0.944	0.956	0.951	0.950	0.943
SO	0.951	0.948	0.950	0.949	0.970	0.931
SW	0.958	0.960	0.974	0.979	0.952	0.976
AVG	0.963	0.965	0.973	0.971	0.971	0.961

Table 3: Difference Between Average Values of SF in Gas Year 2005/06 and 2006/07

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.019	-0.029	-0.021	-0.003	-0.014	-0.019
NO	-0.029	-0.031	-0.018	-0.032	-0.033	-0.032
NW	-0.023	-0.029	-0.019	-0.026	-0.010	-0.026
NE	-0.014	-0.010	0.039	0.020	-0.022	0.000
EM	-0.024	-0.029	-0.045	-0.045	-0.024	-0.017
WM	-0.046	-0.051	-0.028	-0.023	-0.036	-0.058

WN	0.021	0.019	0.045	0.040	0.030	0.024
WS	-0.019	-0.019	-0.023	-0.022	-0.019	-0.022
EA	-0.031	-0.034	-0.039	-0.050	-0.041	-0.030
NT	-0.043	-0.031	0.000	0.007	-0.047	-0.005
SE	-0.054	-0.052	-0.026	-0.030	-0.048	-0.046
SO	-0.039	-0.033	-0.030	-0.027	0.002	-0.066
SW	-0.030	-0.018	0.018	0.024	-0.041	0.014

Table 4: Average Values of WCF – EWCF Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.052	-0.063	-0.056	-0.050	-0.012	-0.096
NO	-0.042	-0.048	-0.043	-0.033	0.002	-0.086
NW	-0.032	-0.046	-0.051	-0.038	-0.017	-0.058
NE	-0.044	-0.043	-0.053	-0.049	-0.019	-0.073
EM	-0.061	-0.072	-0.077	-0.067	-0.022	-0.109
WM	-0.077	-0.085	-0.084	-0.075	-0.041	-0.116
WN	-0.057	-0.054	-0.064	-0.055	-0.033	-0.081
WS	-0.051	-0.059	-0.054	-0.039	-0.023	-0.079
EA	-0.073	-0.078	-0.075	-0.076	-0.043	-0.105
NT	-0.073	-0.073	-0.061	-0.069	-0.045	-0.096
SE	-0.073	-0.067	-0.060	-0.064	-0.036	-0.102
SO	-0.069	-0.069	-0.052	-0.052	-0.039	-0.089
SW	-0.078	-0.081	-0.077	-0.072	-0.030	-0.125
AVG	**-0.060**	**-0.064**	**-0.062**	**-0.057**	**-0.027**	**-0.093**

Table 5: Average Values of WCF – EWCF Gas Year 2006/07

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.014	0.001	0.001	-0.006	-0.018	0.000
NO	-0.049	-0.045	-0.053	-0.040	-0.031	-0.064
NW	-0.049	-0.042	-0.042	-0.029	-0.020	-0.068
NE	-0.061	-0.036	-0.050	-0.044	-0.035	-0.071
EM	-0.060	-0.042	-0.059	-0.044	-0.032	-0.077
WM	-0.049	-0.032	-0.057	-0.034	-0.032	-0.059
WN	0.004	0.013	0.020	0.037	-0.023	0.048
WS	-0.033	-0.025	-0.036	-0.002	-0.008	-0.048
EA	-0.011	-0.013	-0.030	-0.016	-0.017	-0.012
NT	-0.001	-0.009	-0.015	0.001	-0.017	0.010
SE	-0.016	-0.020	-0.027	-0.017	-0.020	-0.017
SO	-0.004	-0.001	-0.008	-0.005	-0.010	0.001
SW	-0.047	-0.039	-0.050	-0.040	-0.028	-0.063
AVG	**-0.030**	**-0.022**	**-0.031**	**-0.018**	**-0.023**	**-0.032**

Table 6: Difference Between Average Values of WCF – EWCF in Gas Year 2005/06 and 2006/07

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.038	0.062	0.055	0.043	-0.006	0.096
NO	-0.007	0.003	-0.010	-0.007	-0.029	0.022
NW	-0.017	0.004	0.009	0.009	-0.003	-0.010
NE	-0.017	0.007	0.003	0.006	-0.017	0.002
EM	0.001	0.030	0.017	0.023	-0.010	0.032
WM	0.028	0.053	0.027	0.042	0.009	0.058
WN	0.053	0.041	0.044	0.018	0.010	0.033
WS	0.018	0.034	0.018	0.037	0.015	0.031
EA	0.062	0.065	0.046	0.060	0.026	0.093
NT	0.072	0.064	0.046	0.068	0.028	0.086
SE	0.057	0.047	0.033	0.047	0.016	0.085
SO	0.065	0.069	0.044	0.047	0.029	0.088
SW	0.030	0.042	0.027	0.033	0.001	0.062

Table 7: Root Mean Square Deviation of SF from 1 Gas Year 2005/06

LDZ	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
SC	0.0148	0.0097	0.0168	0.0119	0.0057	0.0055	0.0110	0.0177	0.0104	0.0356	0.0344	0.0110
NO	0.0291	0.0124	0.0178	0.0175	0.0106	0.0105	0.0170	0.0208	0.0209	0.0289	0.0289	0.0223
NW	0.0257	0.0202	0.0305	0.0283	0.0241	0.0239	0.0204	0.0381	0.0419	0.0695	0.0450	0.0430
NE	0.0276	0.0214	0.0305	0.0226	0.0184	0.0181	0.0208	0.0268	0.0329	0.0421	0.0382	0.0385
EM	0.0286	0.0171	0.0274	0.0229	0.0227	0.0210	0.0176	0.0307	0.0542	0.0775	0.0591	0.0592
WM	0.0231	0.0118	0.0130	0.0128	0.0132	0.0132	0.0192	0.0303	0.0230	0.0283	0.0222	0.0228
WN	0.0624	0.0734	0.0854	0.0846	0.0845	0.0823	0.0871	0.0846	0.0535	0.0836	0.0631	0.0607
WS	0.0022	0.0106	0.0131	0.0135	0.0140	0.0131	0.0107	0.0095	0.0081	0.0113	0.0110	0.0115
EA	0.0704	0.0264	0.0270	0.0243	0.0221	0.0214	0.0219	0.0836	0.0511	0.0781	0.0460	0.0798
NT	0.0384	0.0206	0.0142	0.0164	0.0165	0.0158	0.0143	0.0281	0.0483	0.0600	0.0607	0.0566
SE	0.0304	0.0144	0.0106	0.0115	0.0112	0.0106	0.0121	0.0296	0.0272	0.0295	0.0352	0.0355
SO	0.0141	0.0328	0.0397	0.0436	0.0466	0.0442	0.0319	0.0142	0.0117	0.0377	0.0297	0.0243
SW	0.0214	0.0136	0.0145	0.0168	0.0178	0.0169	0.0130	0.0361	0.0692	0.0557	0.0558	0.0701
AVG	**0.0299**	**0.0219**	**0.0262**	**0.0251**	**0.0236**	**0.0228**	**0.0228**	**0.0346**	**0.0348**	**0.0491**	**0.0407**	**0.0412**

TABLE 8: ROOT MEAN SQUARE DEVIATION OF SF FROM 1 GAS YEAR 2006/07

LDZ	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
SC	0.0202	0.0171	0.0216	0.0191	0.0201	0.0223	0.0275	0.0331	0.0304	0.0305	0.0333	0.0275
NO	0.0460	0.0342	0.0313	0.0319	0.0314	0.0320	0.0386	0.0536	0.0388	0.0441	0.0495	0.0354
NW	0.0370	0.0222	0.0223	0.0194	0.0213	0.0255	0.0438	0.0612	0.0675	0.0575	0.0736	0.0455
NE	0.0443	0.0237	0.0266	0.0197	0.0208	0.0253	0.0401	0.0585	0.0263	0.0214	0.0366	0.0334
EM	0.0786	0.0330	0.0261	0.0235	0.0251	0.0341	0.0754	0.0921	0.0538	0.0583	0.0859	0.0574
WM	0.0539	0.0379	0.0369	0.0348	0.0345	0.0379	0.0575	0.0672	0.0633	0.0585	0.0754	0.0512
WN	0.0453	0.0524	0.0508	0.0501	0.0493	0.0426	0.0325	0.0463	0.0282	0.0478	0.0379	0.0345
WS	0.0216	0.0265	0.0291	0.0504	0.0303	0.0321	0.0362	0.0374	0.0253	0.0225	0.0227	0.0192
EA	0.1042	0.0339	0.0255	0.0227	0.0264	0.0413	0.1039	0.1166	0.0600	0.0870	0.0981	0.0557
NT	0.0882	0.0460	0.0401	0.0393	0.0408	0.0492	0.0925	0.0954	0.0263	0.0457	0.0553	0.0394
SE	0.0634	0.0472	0.0460	0.0457	0.0475	0.0522	0.0714	0.0781	0.0415	0.0697	0.0781	0.0284
SO	0.0677	0.0239	0.0214	0.0201	0.0221	0.0291	0.0802	0.0765	0.0736	0.0667	0.0750	0.0616
SW	0.0595	0.0439	0.0460	0.0439	0.0467	0.0516	0.0735	0.0852	0.0203	0.0297	0.0351	0.0271
AVG	**0.0562**	**0.0340**	**0.0326**	**0.0324**	**0.0320**	**0.0366**	**0.0595**	**0.0693**	**0.0427**	**0.0492**	**0.0582**	**0.0397**

TABLE 9: DIFFERENCE BETWEEN GAS YEAR 2005/06 AND 2006/07

LDZ	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
SC	-0.0050	-0.0070	-0.0050	-0.0070	-0.0140	-0.0170	-0.0160	-0.0150	-0.0200	0.0050	0.0010	-0.0160
NO	-0.0170	-0.0220	-0.0130	-0.0140	-0.0200	-0.0210	-0.0220	-0.0330	-0.0180	-0.0150	-0.0210	-0.0130
NW	-0.0110	-0.0020	0.0080	0.0090	0.0030	-0.0020	-0.0240	-0.0230	-0.0250	0.0130	-0.0290	-0.0020
NE	-0.0160	-0.0030	0.0030	0.0030	-0.0030	-0.0070	-0.0190	-0.0310	0.0070	0.0210	0.0010	0.0060
EM	-0.0500	-0.0160	0.0010	-0.0010	-0.0020	-0.0130	-0.0570	-0.0610	0.0000	0.0190	-0.0270	0.0020
WM	-0.0310	-0.0260	-0.0240	-0.0220	-0.0210	-0.0250	-0.0380	-0.0370	-0.0400	-0.0300	-0.0530	-0.0280
WN	0.0170	0.0210	0.0340	0.0350	0.0360	0.0390	0.0550	0.0390	0.0250	0.0360	0.0250	0.0270
WS	-0.0200	-0.0150	-0.0160	-0.0360	-0.0160	-0.0190	-0.0250	-0.0280	-0.0170	-0.0110	-0.0120	-0.0080
EA	-0.0340	-0.0080	0.0020	0.0010	-0.0040	-0.0200	-0.0820	-0.0330	-0.0090	-0.0090	-0.0520	0.0240
NT	-0.0500	-0.0250	-0.0260	-0.0230	-0.0240	-0.0330	-0.0780	-0.0670	0.0220	0.0140	0.0060	0.0180
SE	-0.0330	-0.0330	-0.0350	-0.0340	-0.0360	-0.0410	-0.0590	-0.0480	-0.0140	-0.0400	-0.0430	0.0080
SO	-0.0540	0.0090	0.0190	0.0240	0.0250	0.0150	-0.0480	-0.0620	-0.0620	-0.0290	-0.0450	-0.0380
SW	-0.0380	-0.0300	-0.0320	-0.0270	-0.0290	-0.0350	-0.0610	-0.0490	0.0490	0.0260	0.0210	0.0430
AVG	**-0.0263**	**-0.0121**	**-0.0065**	**-0.0071**	**-0.0081**	**-0.0138**	**-0.0365**	**-0.0345**	**-0.0078**	**0.0000**	**-0.0175**	**0.0018**

TABLE 10: NDM WEATHER CORRECTED DEMAND AS % OF NDM SEASONAL NORMAL DEMAND GAS YEAR 2005/06

LDZ	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
SC	100.99%	100.47%	95.31%	97.88%	97.89%	100.30%	95.80%	96.33%	90.50%	81.03%	89.44%	90.68%
NO	102.90%	100.16%	99.15%	97.83%	97.61%	103.53%	94.70%	94.11%	88.89%	87.66%	92.93%	91.43%
NW	99.95%	99.01%	97.66%	98.19%	95.03%	99.38%	94.77%	98.49%	96.32%	90.41%	89.95%	95.90%
NE	101.19%	99.21%	97.50%	96.97%	94.53%	99.45%	97.79%	99.30%	94.26%	87.05%	85.92%	91.90%
EM	97.85%	99.29%	97.68%	97.50%	96.30%	98.23%	96.57%	94.51%	90.95%	82.69%	82.39%	88.97%
WM	97.62%	97.93%	95.81%	95.05%	93.18%	95.40%	93.58%	90.78%	88.80%	85.02%	83.52%	89.55%
WN	100.18%	88.14%	96.03%	98.84%	96.60%	99.53%	93.13%	96.26%	90.60%	86.64%	90.76%	95.22%
WS	96.75%	97.59%	97.40%	97.17%	96.59%	100.70%	93.61%	91.53%	88.04%	92.07%	91.12%	96.88%
EA	93.99%	96.68%	96.44%	95.62%	93.96%	97.44%	93.80%	93.00%	90.86%	84.49%	86.72%	88.63%
NT	96.40%	95.26%	95.96%	95.24%	93.86%	95.99%	93.47%	93.51%	91.37%	87.54%	87.37%	89.47%
SE	94.30%	96.96%	97.47%	96.89%	95.13%	97.66%	94.31%	93.91%	91.03%	84.53%	86.96%	88.57%
SO	100.65%	96.84%	94.92%	95.47%	94.03%	94.36%	93.74%	91.16%	90.96%	87.89%	92.14%	90.50%
SW	97.32%	95.63%	97.65%	95.60%	96.14%	99.59%	91.13%	90.68%	86.97%	84.55%	84.47%	87.98%
AVG	**98.21%**	**97.80%**	**96.83%**	**96.64%**	**95.19%**	**98.17%**	**94.51%**	**94.27%**	**91.17%**	**85.98%**	**87.48%**	**90.81%**

TABLE 11: NDM WEATHER CORRECTED DEMAND AS % OF NDM SEASONAL NORMAL DEMAND GAS YEAR 2006/07

LDZ	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
SC	94.63%	99.64%	100.51%	99.36%	96.65%	98.48%	93.04%	94.36%	109.64%	97.86%	103.51%	102.02%
NO	93.96%	97.93%	99.51%	96.08%	96.04%	97.47%	91.37%	90.76%	103.73%	92.20%	88.77%	96.24%
NW	96.98%	98.97%	97.73%	98.84%	98.41%	96.93%	91.06%	89.26%	93.28%	98.58%	94.13%	92.65%
NE	92.80%	98.84%	97.60%	99.16%	95.14%	95.62%	91.17%	88.03%	99.54%	94.65%	92.50%	91.41%
EM	91.74%	98.31%	97.91%	99.26%	97.48%	96.19%	90.73%	90.85%	96.68%	95.47%	91.26%	88.48%
WM	94.60%	98.52%	97.02%	98.30%	96.73%	95.51%	91.29%	91.32%	94.53%	98.67%	94.41%	94.43%
WN	95.91%	97.59%	99.56%	97.97%	97.26%	97.57%	96.85%	93.13%	109.92%	114.98%	111.65%	100.34%
WS	100.24%	101.53%	100.07%	99.71%	97.12%	96.25%	85.91%	90.46%	96.24%	108.58%	96.56%	92.94%
EA	93.15%	100.79%	99.14%	99.73%	99.73%	97.55%	98.19%	99.45%	101.04%	101.71%	100.15%	91.35%
NT	95.37%	99.59%	99.47%	100.23%	98.21%	96.92%	95.16%	96.99%	100.27%	107.50%	107.66%	95.40%
SE	94.16%	99.59%	99.31%	100.22%	97.48%	97.01%	94.30%	93.96%	97.08%	103.94%	103.66%	95.46%
SO	97.98%	100.99%	98.87%	100.65%	98.58%	97.54%	98.26%	99.34%	99.51%	102.03%	103.57%	97.60%
SW	95.66%	99.71%	100.31%	98.81%	94.77%	93.64%	91.76%	88.01%	96.59%	95.63%	97.23%	93.19%
AVG	**94.88%**	**99.39%**	**98.81%**	**99.27%**	**97.39%**	**96.69%**	**93.01%**	**92.90%**	**99.03%**	**99.88%**	**98.20%**	**94.34%**

TABLE 12: EQUILIBRIUM SFS

LDZ	Equilibrium SF		WCF bias and SF				Comments
	Month	SF Value (adjusted for residual bias)	Winter Only Mon-Thu Values		Winter Only All Days Values		
			WCF bias	SF	WCF bias	SF	
SC	Nov, Dec	0.980(N) 0.991(D)	-0.022	0.982	-0.018	0.982	• WCF bias would tend to increase SF (by ~2 %pts.) from its observed value; therefore AQs appear to be too high (by ~4%). • Observed winter SFs are similar to one possible equilibrium SF. • Equilibrium SF also suggests AQs are too high (by 1-2%).
NO	Dec	0.964	-0.035	0.963	-0.031	0.966	• WCF bias would tend to increase SF (by ~3 %pts.) from its observed value; therefore AQs appear to be too high (by 6-7%). • Observed winter SFs are very similar to equilibrium SF. • Equilibrium SF also suggests AQs are too high (by 3-4%).
NW	Nov	0.969	-0.023	0.974	-0.020	0.977	• WCF bias would tend to increase SF (by ~ 2 %pts.) from its observed value; therefore AQs appear to be too high (by 4-5%). • Observed winter SFs are a little greater than equilibrium SF. • Equilibrium SF also suggests AQs are too high (by ~3%).
NE	Jan	0.977	-0.040	0.973	-0.035	0.978	• WCF bias would tend to increase SF (by 3 to 4 %pts.) from its observed value; therefore AQs could be too high (by 6-7%). • Observed winter SFs are very similar to equilibrium SF. • Equilibrium SF also suggests AQs are too high (by ~2%).
EM	Jan	0.971	-0.036	0.963	-0.032	0.965	• WCF bias would tend to increase SF (by ~ 3 %pts.) from its equilibrium value; therefore AQs could be too high (by 6-7%). • Observed winter SFs are similar to but lower than equilibrium SF. • Equilibrium SF also suggests AQs are too high (by ~3%).
WM	Nov	0.949	-0.032	0.959	-0.032	0.961	• WCF bias would tend to increase SF (by ~ 3 %pts.) from its equilibrium value; therefore AQs could be too high (by ~7%). • Observed winter SFs are greater than equilibrium SF. • Equilibrium SF also suggests AQs are too high (by ~5%).
WN	Dec	1.046	-0.024	1.035	-0.023	1.046	• WCF bias would tend to increase SF (by ~ 2 %pts.) from its equilibrium value; this suggests AQs are too low by 1-2%. • Equilibrium SF also indicates AQs are too low (but by 5-6%). • AQs are too low due to portfolio error - supply points incorrectly assigned to other adjacent LDZs.
WS	Dec, Jan	0.972(D) 0.962(J)	-0.014	0.971	-0.008	0.971	• WCF bias would tend to increase SF (by ~ 1 %pt.) from its equilibrium value; therefore AQs could be too high (by 3-4%). • Observed winter SFs are similar to one possible equilibrium SF. • Equilibrium SF also suggests AQs are too high (by 3-4%).
EA	Jan, Feb	0.976(J) 0.973(F)	-0.014	0.956	-0.017	0.959	• WCF bias would tend to increase SF (by 1 to 2 %pts.) from its equilibrium value; therefore AQs could be too high (by ~6%). • Observed winter SFs are lower than possible equilibrium SFs. • Equilibrium SF also suggests AQs are too high (by 2-3%).
NT	Nov, Jan	0.952(N) 0.964(J)	-0.015	0.944	-0.017	0.951	• WCF bias would tend to increase SF (by 1 to 2 %pts.) from its equilibrium value; therefore AQs could be too high (by 6-7%). • Observed winter SFs are lower than possible equilibrium SFs. • Equilibrium SF also suggests AQs are too high (by 4-5%).
SE	Nov, Jan	0.950(N) 0.957(J)	-0.018	0.946	-0.020	0.950	• WCF bias would tend to increase SF (by 1 to 2 %pts.) from its equilibrium value; therefore AQs could be too high (by ~7%). • Observed winter SFs are similar to or lower than possible equilibrium SFs. • Equilibrium SF also suggests AQs are too high (by 4-5%).
SO	Jan	0.987	-0.011	0.969	-0.010	0.970	• WCF bias would tend to increase SF (by ~ 1 %pt.) from its equilibrium value; therefore AQs could be too high (by ~4%). • Observed winter SFs are lower than equilibrium SF. • Equilibrium SF also suggests AQs are too high (by 1-2%).
SW	Nov, Dec	0.952(N) 0.958(D)	-0.031	0.949	-0.028	0.952	• WCF bias would tend to increase SF (by ~ 3 %pts.) from its equilibrium value; therefore AQs could be too high (by ~8%). • Observed winter SFs are similar to or lower than possible equilibrium SFs. • Equilibrium SF also suggests AQs are too high (by 4-5%).

Table 13: Aggregate NDM AQs at Start of Gas Year 2007/08

(Based on data extracted from the Gemini system for gas days 30/09/07 and 06/10/2007)

LDZ	% NDM AQ Change
SC	-3.5%
NO	-4.2%
NW	-4.1%
NE	-4.2%
EM	-4.2%
WM	-4.5%
WN	-4.5%
WS	-3.1%
EA	-4.4%
NT	-3.4%
SE	-3.7%
SO	-3.9%
SW	-4.8%
Overall	-4.0%