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DESC: NDM Algorithm Performance Strand 1: Weather Correction Factor (WCF) and Scaling Factor (SF)

8th November 2011



NDM Algorithm 2010/11 Performance Evaluation

- Each autumn / winter an assessment of the algorithm performance for the recently completed gas year is carried out, in this case 2010/11.
- Analysis performed by considering three sources of information:
 - [Daily values of Scaling Factor \(SF\) & Weather Correction Factor \(WCF\)](#)
 - Reconciliation Variance data for each EUC
 - Daily consumption data collected from the NDM sample
- This presentation covers the first of these strands - Strands 2&3 will be covered during February 2012.
- Accompanying document published on JO website sets out full commentary.

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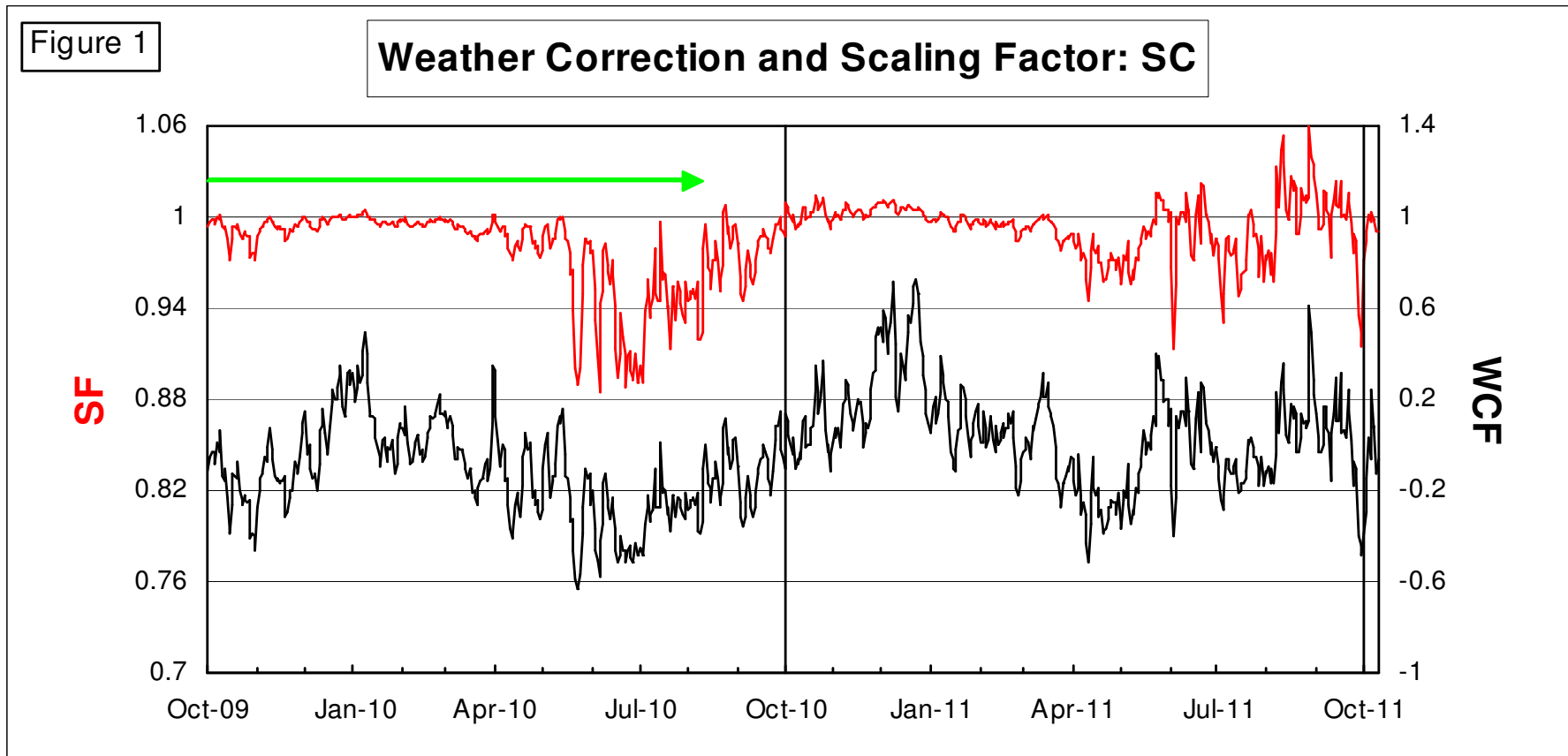
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Analysis of Scaling Factor (SF) and Weather Correction Factor (WCF)

- Analysis: Data graphs represent daily trends for SF and WCF
 - SF is a multiplier used to ensure total aggregate NDM demand = Allocated demand. Ideal value is one, however variations may occur for a number of reasons:
 - Errors in aggregate AQs, DM measurements, imperfections in algorithms such as modelling parameters (ALPs, DAFs, holiday factors)
 - WCF is a value which represents the extent to which actual aggregate NDM demand in the LDZ differs from the sum of the ALP weighted daily average consumption for all EUCs in the LDZ (based on snapshot taken for 1st October and potentially subject to revision within the gas year).
- 3 LDZ specific examples highlighted for period 2009/10 and 2010/11 and first 10 days of 2011/12
 - All LDZs and full explanatory detail contained in supporting document

Weather Correction & Scaling Factor: SC

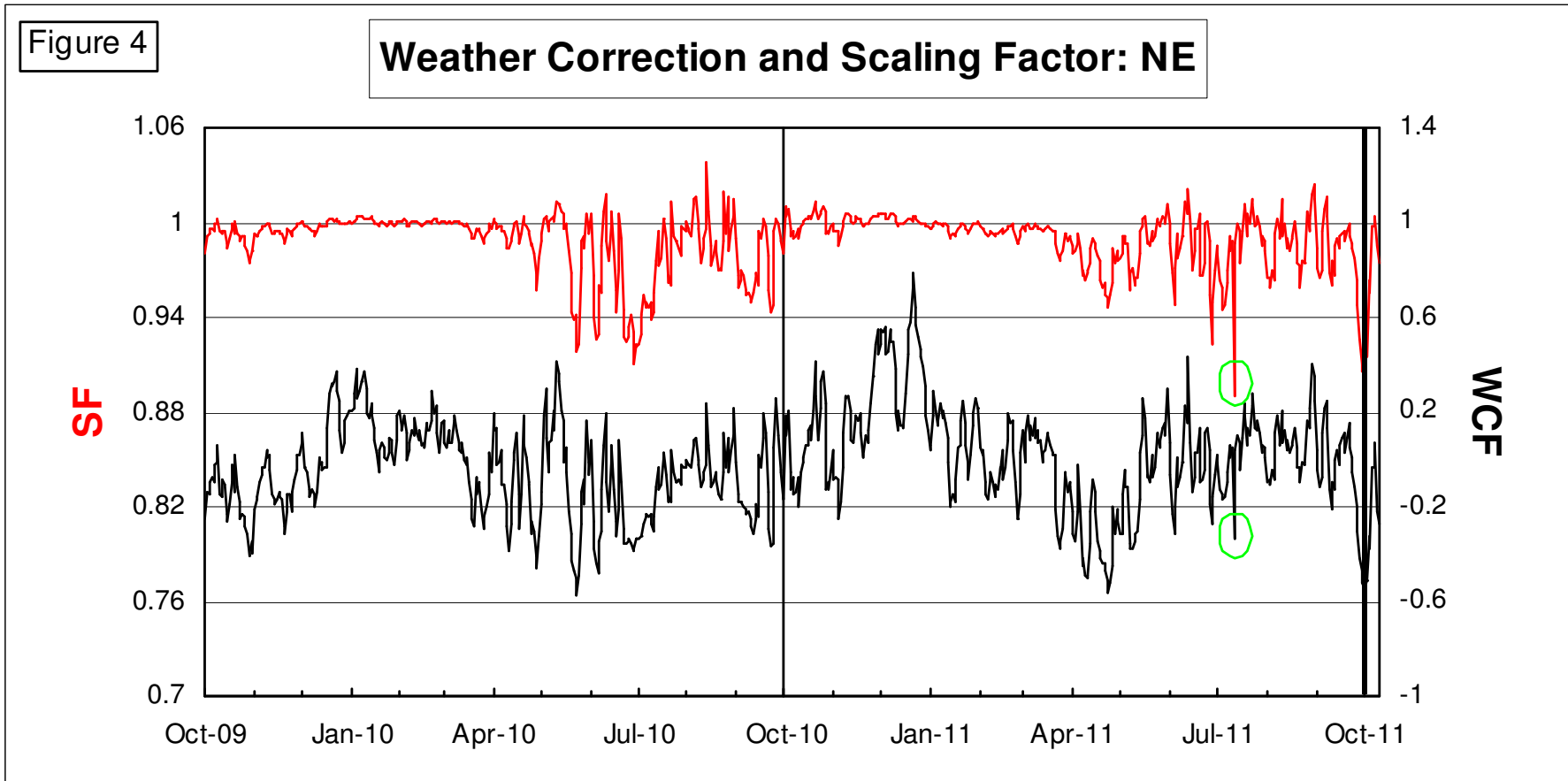
Example 1



- Last year it was reported that off take measurement error for period 21st July 09 to 10th August 10 which resulted in under recording of demand would have contributed to average SF being below one for most of the gas year.
- This year average SF for SC is closer to 1 and has benefited from identification of issue.

Weather Correction & Scaling Factor: NE

Example 2



- 11th July 2011 – sharp negative spike in WCF and much reduced SF value
- Probably caused by an erroneous high consumption reading for a single DM supply point in the LDZ which resulted in corresponding error in actual aggregate NDM consumption

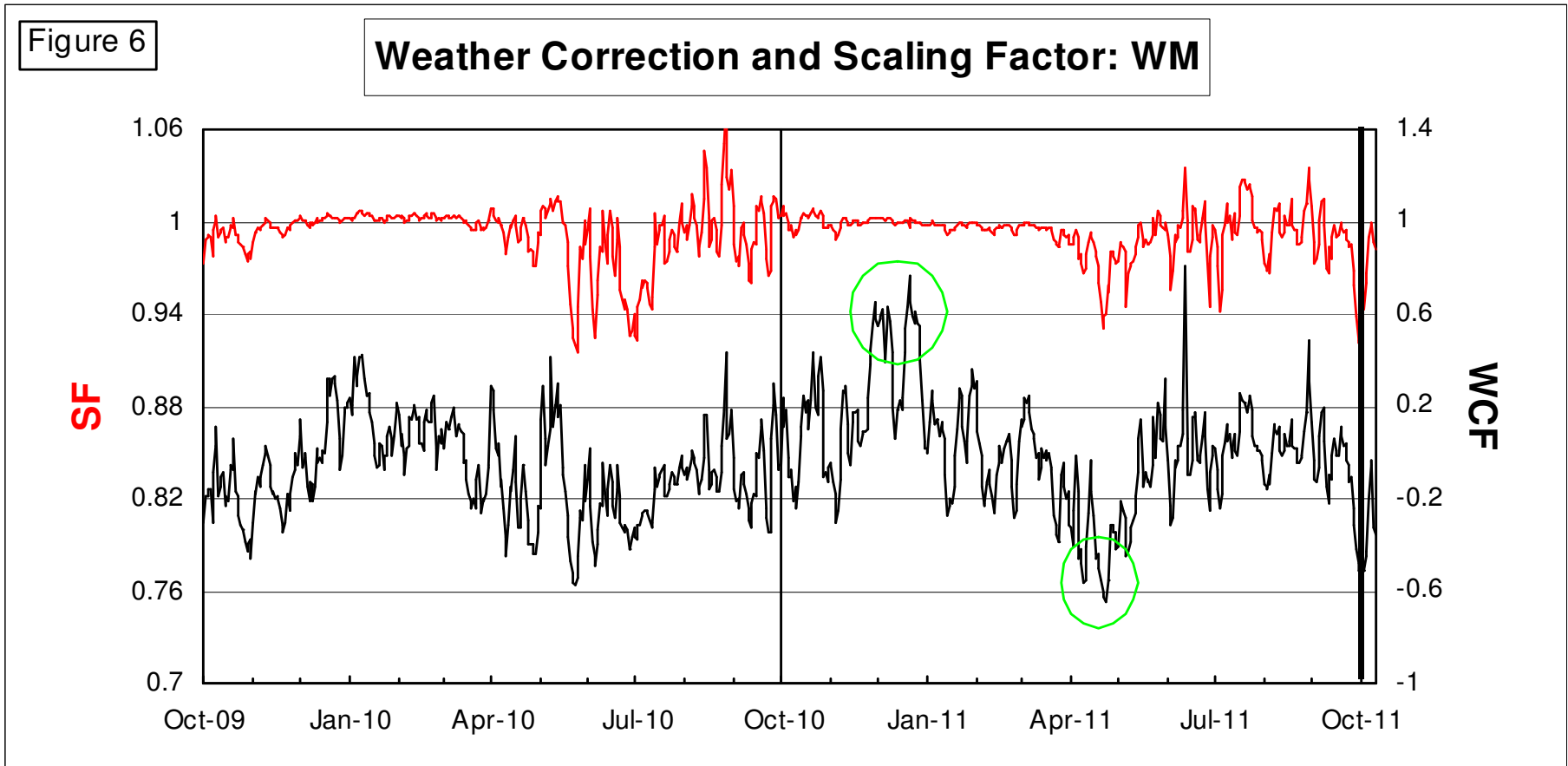
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Weather Correction & Scaling Factor: WM

Example 3



- Coldest December in over 100 years – inflated aggregate NDM demand resulted in sharply positive WCF values
- Warmest April in gas industry history – aggregate NDM demand consistently depressed resulting in negative WCF values. SF more variable perhaps due to less predictable end user behaviour over shoulder period – to be investigated when NDM sample analysis performed.

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Analysis: Comparison Values 2009/10 to 2010/11

- Further analysis of algorithm performance considers:
- Change in average values of SF (09/10 to 10/11)
 - RMS deviation of SF from 1 (09/10 to 10/11): measures variability of SF
- Change in average values of WCF (09/10 to 10/11)
 - Difference of WCF-EWCF no longer a measure of bias in the WCF due to SND for agg.NDM being under or over stated.
 - However for completeness WCF-EWCF analysis has been carried out - results can be seen in supporting document.
- Change in aggregate NDM AQ from gas year 2010/11 to 2011/12

Average Values of SF

Difference between Gas Year 09/10 & Gas Year 10/11

Red: Greater SF deviation from 1 in 2010/11 – **Green:** Lower SF deviation from 1 in 2010/11

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.017	0.017	0.017	0.018	0.004	0.026
NO	-0.004	-0.005	-0.003	-0.003	-0.001	-0.007
NW	0.016	0.013	0.019	0.019	0.002	0.027
NE	0.003	0.002	0.002	0.003	0.001	0.002
EM	0.012	0.010	0.012	0.014	0.003	0.016
WM	0.001	-0.001	0.004	0.005	-0.001	0.001
WN	0.003	0.002	0.003	0.005	0.004	0.001
WS	0.004	0.001	0.002	0.002	0.000	0.005
EA	-0.003	-0.005	-0.003	-0.002	-0.001	-0.007
NT	-0.005	-0.006	-0.004	-0.002	-0.001	-0.008
SE	0.003	0.001	0.002	0.003	0.003	0.001
SO	0.004	0.002	0.003	0.004	0.001	0.005
SW	0.002	0.001	0.000	0.001	0.000	0.002

- The difference between absolute average value of SFs from 1 has been calculated for gas years 2009/10 and 2010/11.
- Table compares the differences in results between gas year 2009/10 and 2010/11
- Green indicates on average the SF was closer to ideal value of one.

Average Values of Root Mean Square Deviation of SF from 1 Difference between Gas Year 09/10 and Gas Year 10/11

Red: Greater SF deviation from 1 in 2010/11 – Green: Lower SF deviation from 1 in 2010/11

LDZ	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
SC	0.0076	0.0024	-0.0029	-0.0006	-0.0033	-0.0011	-0.0136	0.0215	0.0552	0.0284	0.0122	-0.0005
NO	-0.0040	-0.0015	-0.0001	-0.0017	-0.0035	-0.0055	-0.0225	-0.0157	-0.0134	-0.0038	-0.0113	-0.0109
NW	0.0057	0.0009	-0.0034	0.0004	-0.0036	-0.0032	-0.0238	0.0239	0.0491	0.0231	-0.0026	0.0145
NE	0.0052	0.0016	-0.0001	-0.0021	-0.0054	-0.0044	-0.0161	0.0109	0.0236	0.0080	-0.0040	-0.0022
EM	0.0060	0.0016	-0.0018	-0.0016	-0.0053	-0.0020	-0.0194	0.0159	0.0404	0.0333	0.0067	-0.0010
WM	0.0088	0.0016	0.0005	0.0002	-0.0014	-0.0039	-0.0194	0.0148	0.0258	0.0129	0.0089	-0.0091
WN	-0.0013	0.0012	-0.0002	0.0022	0.0001	-0.0014	-0.0214	0.0029	0.0156	-0.0045	-0.0095	-0.0180
WS	-0.0012	0.0001	-0.0006	-0.0010	-0.0021	-0.0041	-0.0219	0.0034	0.0145	0.0098	-0.0027	-0.0099
EA	0.0004	-0.0037	-0.0018	-0.0006	-0.0035	-0.0051	-0.0302	-0.0128	0.0066	0.0110	-0.0002	-0.0159
NT	-0.0080	-0.0063	-0.0037	-0.0025	-0.0062	-0.0089	-0.0386	-0.0284	-0.0149	-0.0073	-0.0005	-0.0166
SE	0.0000	-0.0018	-0.0022	-0.0025	-0.0046	-0.0015	-0.0308	-0.0120	0.0092	0.0136	-0.0014	-0.0099
SO	-0.0043	-0.0025	-0.0021	-0.0032	-0.0048	-0.0024	-0.0266	-0.0088	0.0058	0.0024	-0.0084	-0.0099
SW	0.0003	-0.0005	0.0000	-0.0020	-0.0043	-0.0045	-0.0146	-0.0020	0.0040	-0.0005	-0.0043	-0.0041
AVG	0.0012	-0.0005	-0.0014	-0.0012	-0.0037	-0.0037	-0.0230	0.0010	0.0170	0.0097	-0.0013	-0.0072

- The deviation from 1 has been analysed for gas years 2009/10 and 2010/11.
- Table compares the differences in results between gas year 2009/10 and 2010/11
- Although on average the SF was closer to one for 2010/11 these results show the SF was generally more variable over the year.

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Scaling Factor Values 2010/11 : Conclusions

- In all LDZs average SFs tended to be a little lower than one.
- For 10 / 13 LDZs, on weekdays and Sundays (and 9 / 13 on Fridays and Saturdays), average values of SF improved compared to 2009/10.
- Average SF values for all of winter 2010/11 showed an improvement over winter 2009/10 in 7 LDZs, were the same in 2 LDZs and showed a very small worsening in 4 LDZs
- For summer 2010/11 average values of SF were better than summer 2009/10 in 10 / 13 LDZs.
- Monthly RMS values of SF (deviation from one) during 2010/11 were in a majority of LDZ / months combinations slightly worse than in 2009/10.
- Considered overall SFs during 2010/11 generally were slightly more variable than over the previous gas year.

Average Values of WCF

Difference between Gas Year 2009/10 and Gas Year 2010/11

Red: WCF deviation further from 0 than 09/10 – **Green:** WCF deviation closer to 0 than 09/10

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.040	0.102	0.121	0.075	-0.127	0.179
NO	0.063	0.069	0.087	0.046	-0.083	0.057
NW	0.066	0.047	0.085	0.015	-0.089	0.066
NE	0.027	0.061	0.044	-0.008	-0.106	0.050
EM	0.028	0.057	0.074	0.038	-0.108	0.049
WM	0.055	0.059	0.080	0.044	-0.091	0.064
WN	0.045	0.042	0.026	-0.029	-0.095	0.031
WS	0.035	0.068	0.073	0.016	-0.107	0.098
EA	0.017	0.040	0.036	-0.001	-0.108	0.001
NT	0.005	0.029	-0.001	-0.039	-0.104	-0.012
SE	0.021	0.041	0.022	-0.011	-0.106	-0.006
SO	0.018	0.048	0.042	-0.003	-0.097	0.062
SW	0.010	0.035	0.014	-0.026	-0.105	0.080

- The difference between absolute average value of WCFs from zero has been calculated for gas years 2009/10 and 2010/11.
- Table compares the differences in results between gas year 2009/10 and 2010/11
- Green indicates on average the WCF was closer to zero than in 2009/10.

Weather Correction Factor Values 2010/11 : Conclusions

- Average WCF was positive for all LDZs on all days of the week (except for 7 LDZs on Fridays and 2 LDZs on Saturdays).
- WCF was closer to zero in 2010/11 than in 2009/10 on weekdays and Fridays in all LDZs, on Saturdays in 12 LDZs and on Sundays in 6 LDZs.
- In winter 2010/11 WCF was further away from zero in all LDZs.
- In summer 2010/11 WCF was closer to zero in 11 out of 13 LDZs.
- The differences between the years are the result of differences in factors such as weather or EUC AQ excess.

Aggregate NDM AQ Changes - start of gas year 2011/12

LDZ	% NDM AQ Change
SC	-0.7%
NO	-2.6%
NW	-1.9%
NE	-0.6%
EM	0.2%
WM	-1.0%
WN	-1.1%
WS	-2.2%
EA	-0.5%
NT	-0.5%
SE	-0.5%
SO	-1.1%
SW	-1.4%
Overall	-1.0%

NDM Algorithm 2010/11 Performance Evaluation

- Next Steps – Strands 2 and 3 to be presented at February 2012 DESC.
 - 1.Daily values of Scaling Factor (SF) & Weather Correction Factor (WCF)
 - 2.Reconciliation Variance data for each EUC
 - 3.Daily consumption data collected from the NDM sample
- As requested by DESC in June this year the NDM sample analysis will focus in more detail on the performance of the NDM allocation process for 2010/11 during the days of cold weather and shoulder periods (e.g. April).