NDM Proposals 2011/12 – Representation Issues

Introductory Comments:

- According to UNC Section H, Users may submit to the Transporters representations in respect of the proposed End User Categories and demand models for a gas year up to but not later than 15th July in the preceding year.
- Between 16th July and 14th August in the preceding gas year, the Transporters review the representations made by Users and will consult, so far as they deem appropriate, with any User in respect of representations made by them or any other User.
- Not later than 15th August in the preceding gas year, the Transporters need to submit their final proposals for End User Categories (EUC) definitions and demand models (and corresponding values of the derived factors) with such changes as the Transporters may determine appropriate on the basis of Users' representations and the consultation.
- The scope of this consultation covers the proposed EUC definitions and demand models and their derived factors for the defined EUCs i.e.
    - Annual Load Profiles (ALPs)
    - Daily Adjustment Factors (DAFs)
    - EUC load factors
- In response to the Transporters initial proposals for 2011/12, one representation has been received: from E.ON.
- This note reviews this representation and responds to the specific issues raised.

Responses to Specific Points in E.ON Representation:

1. **Representation:** The relative levels of DAF values through the week (i.e. the "shape") are inconsistent with previous years, and suggest an error in derivation (*figs. 1 and 2*). This is apparent upon inspection of the DAF values during non-holiday periods, with Friday at a Monday-Thursday level, Saturday at the Friday level and only Sunday exhibiting the expected weekend shape. This inconsistency is replicated across all EUCs that we have examined.

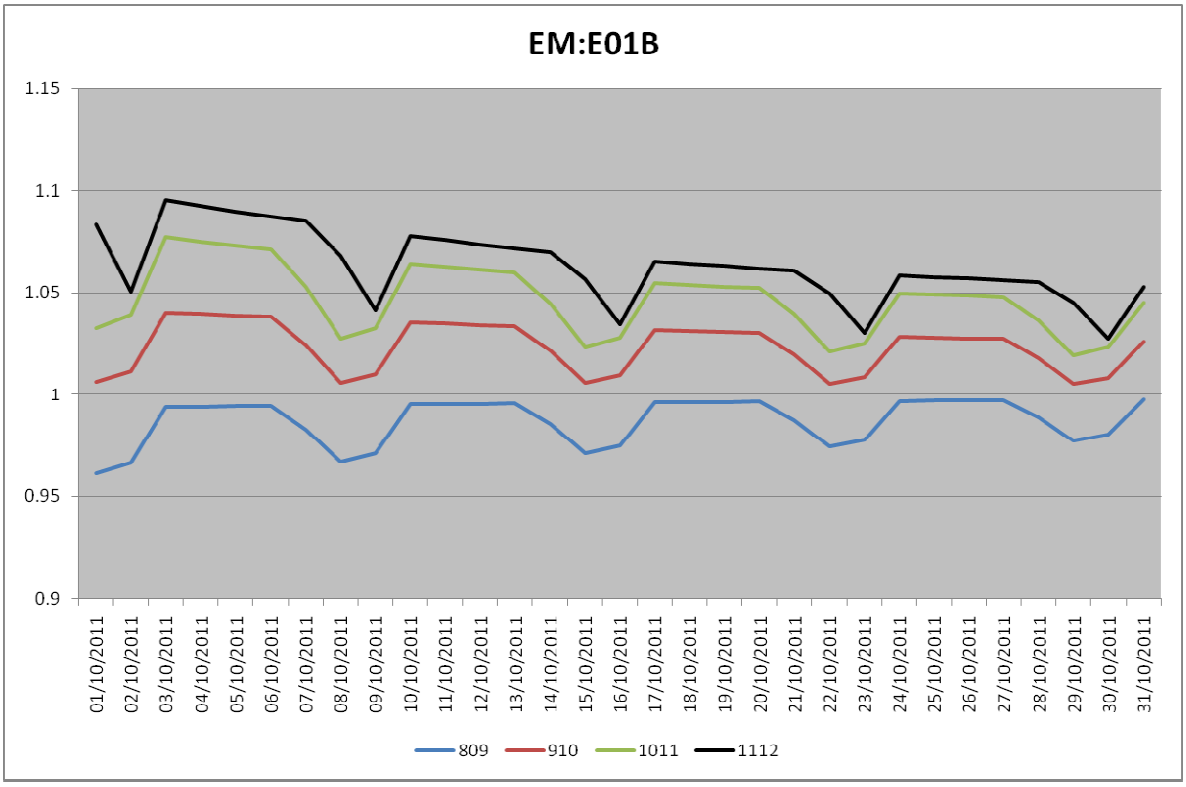


Fig 1. DAF values for EM:E1101B, October 2011. Years prior to 2011/12 mapped to match day of week with 2011/12.

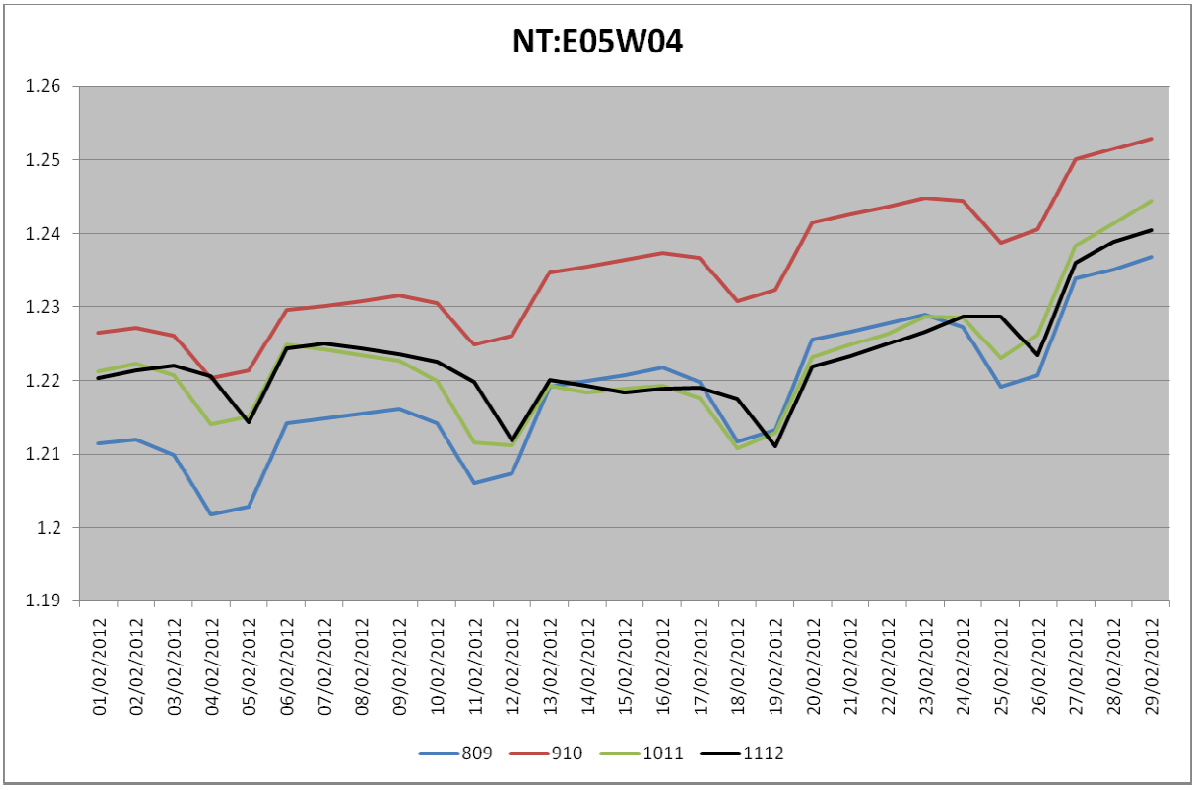


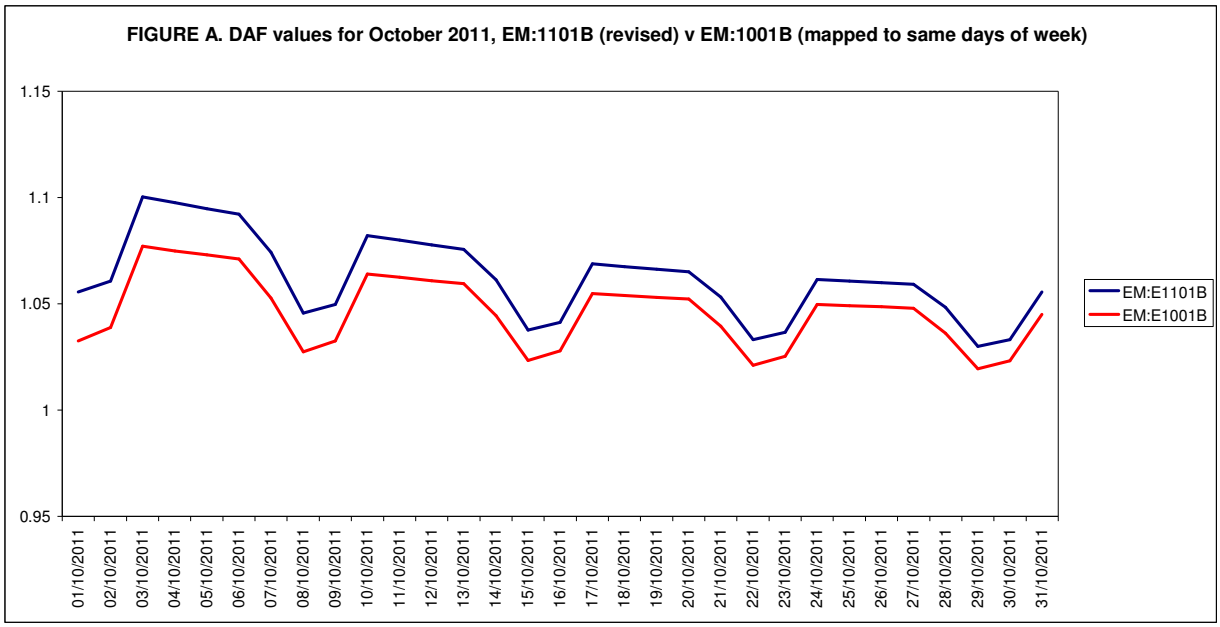
Fig 2. DAF values for NT:E1105W04, February 2012. Years prior to 2011/12 mapped to match day of week with 2011/12.

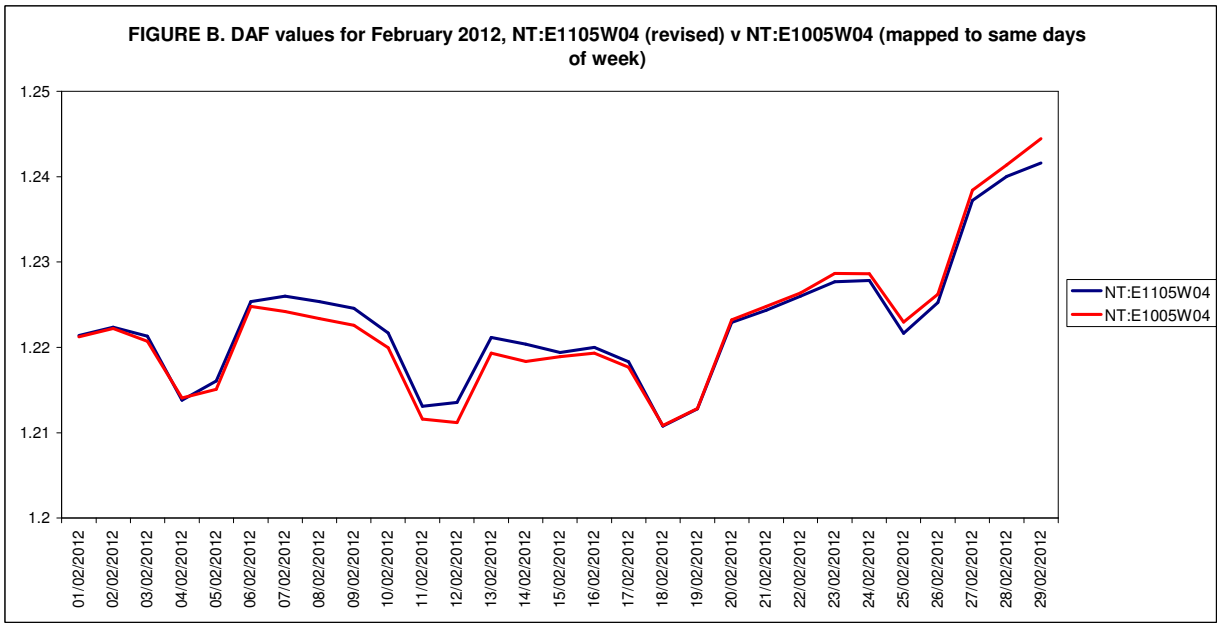
We request that this be investigated and should any underlying error be identified, that this be rectified and the profile data reissued.

Response: The difference in the shape of the DAF profiles is due to a change in this year's aggregate NDM model weekend effects (used to calculate the denominator of the DAFs). Upon investigation, it was discovered that there was an error in the programs that produced these models (the programs had been changed recently for various reasons including the change to the holiday codes). The impact of the error was that no Friday reductions had been applied, Friday reductions were applied to Saturdays and Saturday reductions to Sundays. The error also had a small impact on the large NDM load factors as the calculation of these includes the DAF values on the day of maximum seasonal normal demand in each LDZ (see Appendix 10 of the NDM profiling report). Note that the ALPs and small NDM load factors were unaffected by this error as these do not use the aggregate NDM demand models in their derivation.

The Transporters are grateful to E.On for bringing this to our attention and as a result, we have corrected the aggregate NDM demand models and recalculated the DAFs and large NDM load factors. Revised versions of the ALPDAF11, SNDWSENS11 and LF11 files have been issued and loaded onto the UK Link Docs Extranet. Note that the large NDM load factors in LF11 have changed only slightly from those in the draft version.

The revised 2011/12 DAFs for the EUCs and periods illustrated in the representation are shown in Figures A and B overleaf compared against the equivalent DAFs for 2010/11 (mapped to the same days of the week). As can be seen from these charts, the shape of the revised 2011/12 DAF profiles for these EUCs is consistent with those from gas year 2010/11.





2. **Representation:** The relative levels of ALP values (i.e. the "shape") in the Christmas Holiday are not consistent with what would be expected from the sequence of Bank Holidays in that period (*figs. 3 and 4*). Christmas Day in Lieu (Monday 26th December) and Boxing Day in Lieu (Tuesday 27th December) currently have values higher than the following weekdays, which consist of non-Bank Holiday days with holiday reductions (Wednesday 28th to Friday 30th December). Additionally, the New Year period appears questionable, with no reduction for New Years' Day (a Sunday) relative to the previous day, and a rise into Monday 2nd January 2012, which would be expected to be a Bank Holiday in Lieu, and consequently reduced relative to 28th-30th December.

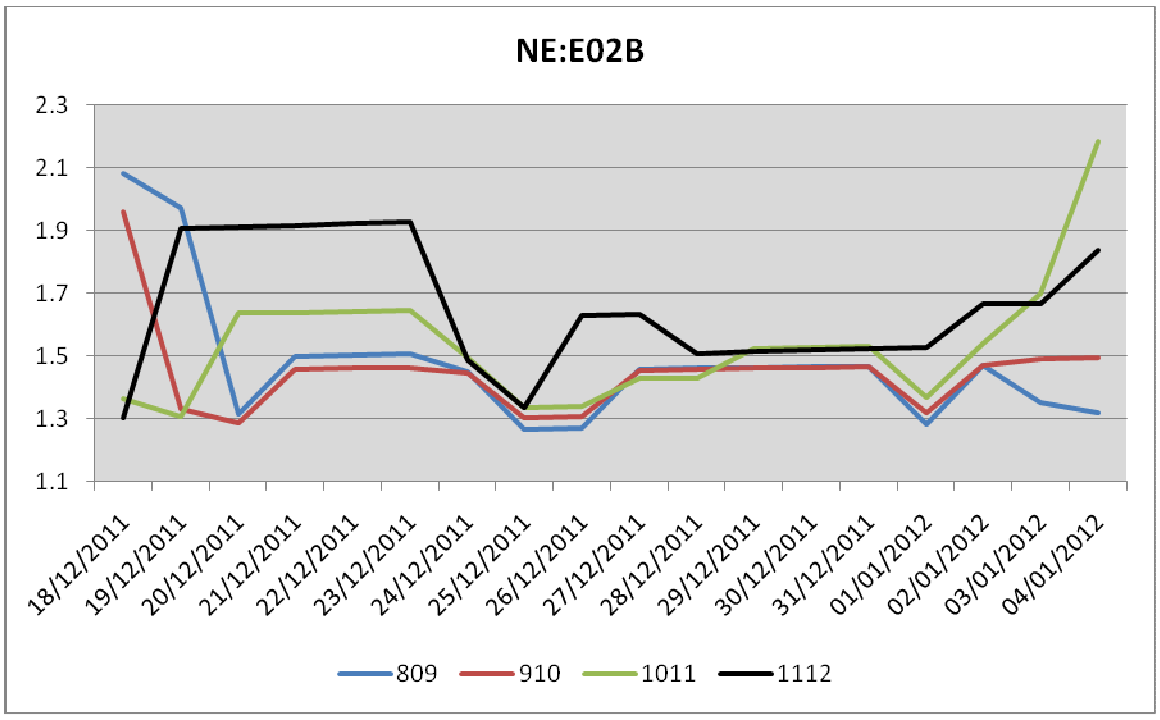


Fig 3. ALP values for NE:E1102B, Christmas 2011. Years prior to 2011/12 mapped to match day of week with 2011/12.

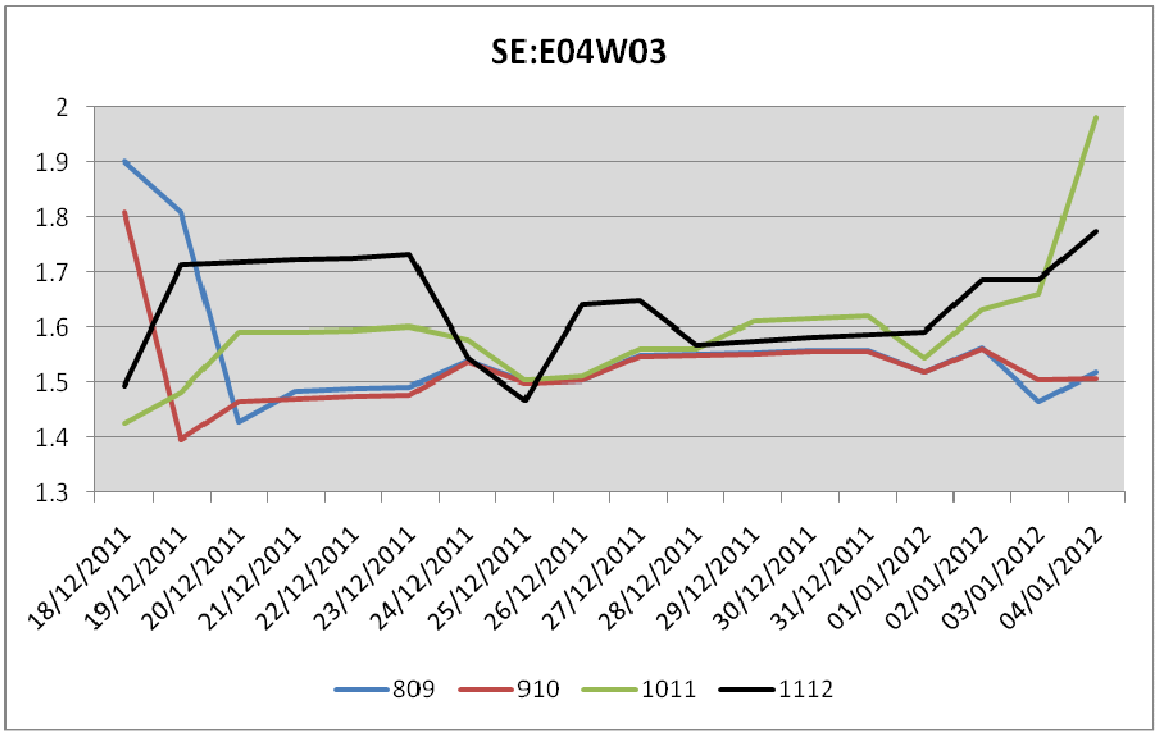


Fig 4. ALP values for SE:E1104W03, Christmas 2011. Years prior to 2011/12 mapped to match day of week with 2011/12.

We are aware of the modifications to the Holiday Code period as proposed and accepted at the DESC meeting of November 2011. We do not expect that this change in period and Holiday Code designation should cause the observed effect and we would like to seek confirmation that the Holiday Factor values, in particular with regard to 26th December 2011, 27th December 2011, 1st January 2012 and 2nd January 2012, are robust and as expected.

Response: The holiday periods and holiday codes used to derive the 2011/12 profiles were those agreed at the 10th November 2010 DESC meeting (option P5V1, with the proviso that 25th December should always be considered separately). These are summarised below.

Christmas/New Year (Holiday codes 1, 2, 3, 4, and 5)

Holiday period starts on the Monday before 25th December (but if 25th December falls on a Monday, Tuesday or Wednesday, it starts on the Friday before 25th December) and ends on the first Friday on or after the second New Year bank holiday in Scotland.

Holiday code 1:
25th December

Holiday code 2:
Other bank holidays (except second Scotland New Year bank holiday if this falls on a Friday and hence is the final day)

Holiday code 3:
24th December and remaining days between 25th December and second Scotland New Year bank holiday

Holiday code 4:
Remaining days before 24th December

Holiday code 5:
Remaining days of period (and will therefore consist of second Scotland New Year bank holiday only if this falls on a Friday)

Using the above rules, the holiday period and holiday codes applied to the 2011/12 Christmas/New Year period were therefore as follows (see also file WKHOLDEF11.TXT):

Holiday period: 19/12/11 (a Monday) to 06/01/12 (a Friday)

Holiday code 1:
25/12/11

Holiday code 2:
26/12/11 (Christmas Day bank holiday, a Monday), 27/12/11 (Boxing Day bank holiday, a Tuesday), 02/01/12 (UK New Year bank holiday, a Monday), 03/01/12 (Scotland New Year bank holiday, a Tuesday)

Holiday code 3:
24/12/11, 28/12/11-01/01/12

Holiday code 4:
19/12/11-23/12/11

Holiday code 5:
04/01/12-06/01/12

For each EUC, the values of the holiday factors derived for each holiday code are determined from the NDM sample demand data on the relevant days in the three years included in model smoothing. The holiday factors applying to each holiday code for a particular EUC are calculated as follows:

- For each of the individual 3 years of sample data, calculate the 'fitted demand' for each day (C1+C2*CWV) from that year's Monday to Thursday non-holiday model. Sum these demands for each holiday code. (For the avoidance of doubt, a CWV cut-off is applied where appropriate in this calculation).
- For the same gas days sum the total actual demand from the sample for each holiday code
- Total actual demand / Total fitted demand = Holiday Factor (for holiday code) for year
- A minimum of 0.1 and a maximum of 1.0 are applied to the individual year Holiday Factors to ensure sensible results (see Appendix 3 of the NDM profiling report).
- Average of 3 individual years = Overall smoothed model Holiday Factor (for holiday code)

The calculations for holiday codes 2 and 3 for EUC NE:1102B have been replicated in the Appendix to illustrate the process.

It is possible that the values of holiday factors in particular EUCs may not always turn out as expected if the sample data does not behave as expected on the relevant days in those years. This may be more likely to happen for holiday codes that have only a few days assigned to them, where large variations in the ratio of actual demand to fitted demand may occur from year to year.

The files EUCHOL11S.TXT and EUCHOL11L.TXT hold the values of the smoothed model holiday factors for small and large NDM EUCs respectively.

For the two EUCs shown in the representation (NE:E1102B and SE:E1104W03), the holiday factors for the five Christmas / New Year holiday codes are shown in the table below for each of the individual year models and for the smoothed model that was used to derive the proposed ALPs.

Christmas / New Year Holiday Factors for Two EUCs for Individual Year and Smoothed Models

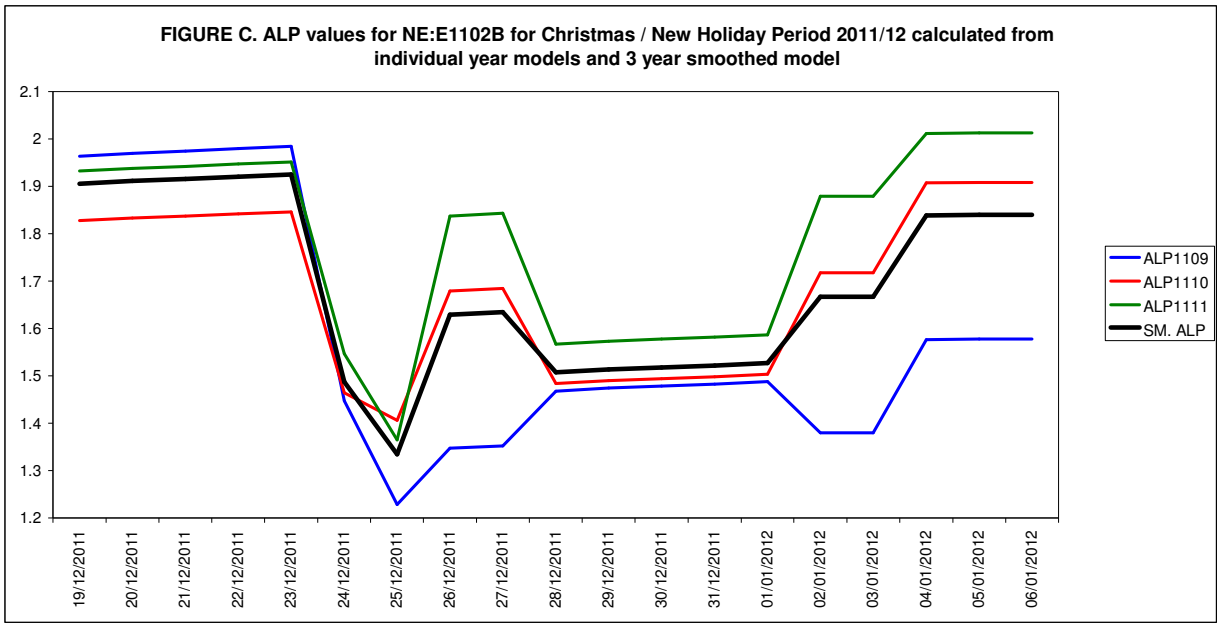
EUC	Model	Holiday Factor 1	Holiday Factor 2	Holiday Factor 3	Holiday Factor 4	Holiday Factor 5
NE:E1102B	2008/09	0.572	0.625	0.676	0.929	0.714
	2009/10	0.701	0.834	0.732	0.925	0.926
	2010/11	0.696	0.934	0.791	1.000	1.000
	Smoothed	**0.656**	**0.798**	**0.733**	**0.951**	**0.880**
SE:E1104W03	2008/09	0.786	0.757	0.784	0.912	0.820
	2009/10	0.764	0.894	0.806	0.903	0.903
	2010/11	0.748	0.908	0.835	0.912	0.969
	Smoothed	**0.766**	**0.853**	**0.808**	**0.909**	**0.897**

As can be seen from the table above, for both EUCs, the value of the smoothed model holiday factor for Code 2 is higher (i.e. shows less demand reduction) than the values of the smoothed model holiday factor for Code 3. This explains why the Christmas and Boxing Day bank holidays on 26th and 27th December (both assigned to Code 2) have higher ALP values than the following weekdays (Wednesday 28th to Friday 30th December) that are assigned to Code 3. It also explains why for both EUCs, the ALP values for the New Year bank holiday (2nd January, assigned to Code 2) are higher than those for New Years' Day (1st January) and the previous weekdays (Wednesday 28th to Friday 30th December), all of which are assigned to Code 3.

In fact, for 396 (out of 416) non-"01B" EUCs (the EUCs to which holiday reductions are applied), the smoothed model holiday factor for Code 2 is higher (i.e. shows less demand reduction) than the values of the smoothed model holiday factor for Code 3. This is also reflected in the revised smoothed aggregate NDM models as well, where for all LDZs except SC, the smoothed model holiday factor for Code 2 is higher (i.e. shows less demand reduction) than the values of the smoothed model holiday factor for Code 3. Although this outcome may not have been expected, the Transporters can confirm that the values of the smoothed model holiday factors and the ALPs derived from those factors have been calculated correctly and do reflect the pattern of demand observed over the Christmas / New Year holiday periods in recent years in the NDM sample (and also in LDZ aggregate NDM demand). Any DESC member that obtained the data CDs from the last three spring analysis periods can replicate the holiday factor calculations to check the values if they wish to do so.

Note that the ALPs for the 2011/12 Christmas / New Year holiday period can not be compared directly with those of previous years because the holiday code definitions applying to gas year 2011/12 are different to those that applied previously and because the assignment of dates to each Code varies from year to year as the dates of the bank holidays and the length of holiday period change.

Incidentally, as the table above shows, there can be considerable variation from year to year in the holiday factors in the individual year models. One of the advantages of model smoothing is that these variations are smoothed out, reducing the volatility in the ALP values over the holiday periods. This is illustrated in the chart overleaf that compares the ALP values over the 2011/12 Christmas / New Year holiday period derived from individual year models with the ALP values derived from the smoothed model for EUC NE:E1102B.



3. **Representation:** We would reiterate our concern that the Transporters appear reluctant to undertake the required updates to the seasonal normal analysis. We are disappointed that the industry has been required to raise Mod 330 to require suitable analysis despite the clear understanding that a review would take place for full implementation of the EP2 weather stream as agreed to allow implementation of the previous set of profiles.

   Given the significant concerns we have over the questionable methodology used in the derivation we would not be happy to see this normal used for a full 5 years before a full review and would repeat our request from last year to urge the Transporters to ensure that work takes place to update the values within a two year maximum period..

   Response: Although the seasonal normal basis falls outside of the scope of this consultation on the NDM proposals for 2011/12 the Transporters have stated at DESC previously (e.g. at the 23rd July 2010 meeting) that we would be prepared to update the seasonal normal basis within the 5 year timeframe if and when an agreed industry methodology becomes available. Such a methodology may arise as an outcome of Mod 330.

4. **Representation:** The WAR bands have shifted considerably again this year as a direct result of the cold weather experienced over the winter. Last year we raised the potential of using smoothing to minimise impacts from single extreme years as applied to other areas and we would again question as to whether this approach should be considered for WAR band breakpoints too. Potentially we would like Transporters to consider whether we should weather correct WAR bands to minimise unnecessary movement.

   Response: The WAR band limits proposed for 2011/12 are in fact similar to those in the current gas year as the weather experienced overall in winter 2010/11 was similar to that experienced in the previous winter. However, the WAR band limits for 2010/11 and 2011/12 are quite different from those applying to gas years prior to 2010/11.

   In each consumption range, WAR band EUCs sub-divide the range in to subsets of different weather sensitivity (and hence load factor) with WAR band 1 being the least weather sensitive and WAR band 4 the most weather sensitive. When setting WAR band limits, the approach adopted is to aim for a 20%:30%:30%:20% split of sample numbers on a national basis subject to practical limitations due to the actual distribution of WAR values of individual sample supply points in the consumption band and the requirement to have robust sample sizes in the ensuing data sets. Post-modelling sense check of clear spread in WAR band EUC load factors helps confirm the appropriateness of these limits.

   WAR values are not weather corrected and hence are affected by the December to March weather experienced: 2010/11 and 2009/10 were both cold (with 2009/10 being slightly colder overall), 2008/09 was average, 2007/08 was very warm (i.e. 2009/10 was much colder than 2008/09 and 2008/09 was

colder than 2007/08). In addition, for the two most recent years, reduced sample AQs, due to the new seasonal normal basis, have caused WAR values to increase. Consequently, the WAR band limits in the two most recent year's data sets are closer to one (compared to the previous years).

EUC WAR band limits need to be based on the most recent year's sample WAR values because the WAR values on the live system are computed using this most recent winter's consumption. If the values are based on smoothed values the distribution of population supply points will not follow a 20%:30%:30%:20% split and the load factors calculated from sample data may not be appropriate.

Weather correcting the WAR values would require system changes which may not result in cost benefits given the expected implementation of Project Nexus.

5. **Representation:** We would also like to raise the issue we made at the Technical forum that there appears to be sufficient evidence to consider splitting EUC band 4 and would question why analysis takes place if the results are not to be acted upon.

   Response: In the opinion of the Transporters there was insufficient evidence to split EUC band 4 (at 1465 MWh pa) – see slides 35 to 37 in the June Technical Forum presentation and the slides on Action DETF0603 (published after the June Technical Forum meeting). Of the three analysis years that went into model smoothing, only 6 LDZs (out of 12) showed >=2% points Indicative Load Factor (ILF) difference across all 3 years between the upper and lower sub-bands. The same analysis presented two years earlier showed similar results (only 5 LDZs with >=2% points ILF difference across all 3 years with the majority of ILF differences being small & inconsistent across LDZs within & between years). Furthermore, the results of the goodness of fit analysis for all years showed that there was no overall improvement in RMSE (Root Mean Squared Error) when splitting Band 4.

6. **Representation:** Finally where extreme days are impacted by other issues to weather – as per the snowy days in January – that are obvious enough to merit mention on the presentation we would question whether they should be excluded from the analysis on the basis we are mapping a temperature to demand relationship. Our opinion is that implementation of Mod 331 would allow questions on analysis methodology to be determined by a cross industry group and satisfactorily resolve these issues.

   Response: See slides on Action DETF0604 (published after the June Technical Forum meeting). It is the view of the Transporters that the data points should not be removed from the models as they are not data errors. We believe the models should include these data points to capture the average impact of such events. It is likely that snow events will occur in the future and the models should be reflective of the range of possible outcomes. There are many other factors that can affect gas demand that are not modelled directly e.g. heavy rain (increases demand), solar radiation (reduces demand), nationwide strikes (reduces demand), recession (reduces demand), gas price increases / decreases (reduces / increases demand) etc. Days affected by such events are not removed from the models and we do not believe that days affected by snow events should be removed from the models either.

   Furthermore, even if the snowy days had been removed from the models, the impact on the smoothed models would have been immaterial e.g for SC 293-2196 MWh pa WAR band 4 (Slide 44 in the Technical Forum presentation), the CWV Intercept in the smoothed model would have changed by only a very small amount from 13.2 to 13.1.

Appendix – Replication of Holiday Factor Calculations for Codes 2 & 3 for EUC NE:E1102B

Holiday Factor Calculations for Code 2 (all demands are in kWh):

2008/09			2009/10			2010/11		
Date	Actual	Fitted	Date	Actual	Fitted	Date	Actual	Fitted
26/12/08	47623.4	84685.0	28/12/09	72563.6	89856.1	27/12/10	83659.7	95323.9
01/01/09	67333.8	99312.0	01/01/10	67766.3	96305.2	28/12/10	78069.1	85508.4
			04/01/10	102264.9	104661.0	03/01/11	84065.8	90574.5
						04/01/11	92409.7	90680.0
SUM	114957.2	183997.0	SUM	242594.8	290822.3	SUM	338204.3	362086.8
FACTOR	114957.2 / 183997.0 = 0.625		FACTOR	242594.8 / 290822.3 = 0.834		FACTOR	338204.3 / 362086.8 = 0.934	
SMOOTHED FACTOR = (0.625 + 0.834 + 0.934) / 3 = 0.798								

Holiday Factor Calculations for Code 3 (all demands are in kWh):

2008/09			2009/10			2010/11		
Date	Actual	Fitted	Date	Actual	Fitted	Date	Actual	Fitted
24/12/08	50025.2	63006.7	24/12/09	76841.8	95295.8	24/12/10	88716.7	101603.6
27/12/08	50019.3	90687.3	26/12/09	55863.1	87556.9	26/12/10	69067.2	100653.7
28/12/08	47296.8	92552.1	27/12/09	55368.7	88790.6	29/12/10	72380.9	79650.9
29/12/08	65945.3	93542.8	29/12/09	75513.1	96809.9	30/12/10	64548.2	77803.9
30/12/08	73190.7	95524.2	30/12/09	76295.7	98155.8	31/12/10	63462.7	75693.0
31/12/08	76333.9	101060.3	31/12/09	72524.3	96473.4	01/01/11	54673.7	80125.8
			02/01/10	68070.1	98268.0	02/01/11	60523.8	83028.2
			03/01/10	77574.0	100959.8			
SUM	362811.2	536373.4	SUM	558050.8	762310.2	SUM	473373.2	598559.1
FACTOR	362811.2 / 536373.4 = 0.676		FACTOR	558050.8 / 762310.2 = 0.732		FACTOR	473373.2 / 598559.1 = 0.791	
SMOOTHED FACTOR = (0.676 + 0.732 + 0.791) / 3 = 0.733								