

Approach to Modelling: Cut Offs - Spring 2009

Background

The DESC meeting in January each year is where the proposed approach for the Spring modelling for the NDM analysis is agreed. At this year's meeting on Tuesday 20th January 2009 the issue of when to apply / not apply summer cut-offs was discussed.

Summer cut-offs are applied to the models where demand "levels off" at some point during the "warmest days" or demands associated to the maximum CWV in the model become too close to zero or negative and therefore prevents negative allocations. Within the modelling process there are two 'types' of cut-offs, the first is known as "imposed cut-offs" and relates to those models where the CWV axis intercept of the regression line is very close to the maximum CWV. The second is known as "best fit cut-offs", this is selected when data points in the CWV range (upto 4 below the maximum CWV) sees a 20% improvement in the models compared with no cut-off applied.

A representation regarding the application of "best fit cut-offs" was made in July 2008 regarding the NDM proposals for 2008/09. At the time the Transporters concluded that this was not having a major effect on the models and proposed maintaining the existing approach. It was suggested that the matter could be discussed further at the January DESC.

At this year's January meeting DESC members reiterated they would like to see less "flip-flopping" of models having best fit cut offs one year and not the next. A suggestion was made which would mean the models must indicate the same outcome for the last two consecutive years before applying (or not) best fit cut-offs. DESC agreed to try and implement this in the Spring approach 2009.

Since the meeting it has been confirmed it will not be possible to change the approach to cut-offs in Spring 2009, for the reasons described below.

Impacts to modelling of DESC's suggested approach for 'Best fit' cut-offs

Principles of modelling and model smoothing

This section confirms the high level principles behind the modelling and model smoothing which may help put the cut offs issue into perspective.

1. EUC demand modelling and model smoothing is principally data driven. The results that modelling of the data gives are what is applied – with generally no subjective overrides applied.
2. Exceptions where they exist are based on observed effects, for example:

Using a domestic only data set to model EUC band 01B because this gives weekend factors that reduce weekend scaling factor offsets.

Not applying cut-offs to bands 01B and 02B because this helps reduce summer scaling factor volatility.

3. Model smoothing has been agreed to be a straight average of three years models to help reduce the year on year volatility that results from using single year models.
4. Cut-offs and summer reductions are thus applied when this averaging process indicate that these are required, on average, over the three years.
5. Applying different rules to cut-offs overrides the principles of model smoothing and the predominance of the data.
6. The fresh occurrence or disappearance of cut-offs is a function of the data that is modelled – data sets with warm summers may give more models with cut-offs if demand levels off in the dataset.
7. The occurrence or absence of cut-offs is also dependent on the applicable CWV – when CWV definitions change, the prevalence of cut-offs in EUC models can change and this will be an entirely legitimate change.
8. The application of a 20% qualification criteria means that cut-off behaviour can be exhibited but not to the qualifying level: if the 20% qualification criteria is met the following year, this is not a new behaviour, but an increased demonstration of an existing behaviour.
9. EUC model data sets may never exhibit cut-offs if the data sets never include extreme warm weather, however as soon as warm weather occurs, the data set may show a cut-off. This is not a change of behaviour, it is the expression of behaviour that could not previously manifest itself since the weather conditions did not arise.

Practicalities of applying and removing cut-offs based on DESC proposal

1. Smoothed models are the average of three years' individual models.
2. If consistency of cut-off attribute (present or absent) in the previous 2 years smoothed models is used as the basis of whether or not a change is applied to the next smoothed model then the following needs to be considered :
 - a. A situation will arise where a cut off would have to be retained, because there was one in the previous two smoothed models but the smoothed model for the next year did not indicate a cut-off. It is not possible to apply a cut-off where none is indicated – it is unclear to what the value should be.
 - b. The latest smoothed model might strongly indicate a cut-off, but this would not be adopted if the previous year did not indicate sufficient improvement, perhaps due to less warm weather experience.

3. If consistency of cut-off attribute (present or absent) in the two most recent individual years are used as the basis of whether or not a cut-off applied to the next smoothed model, then the following needs to be considered :
 - a. The current smoothed modelling processes do not make reference to the underlying individual models and this would require either a complex change or a time-consuming manual intervention
 - b. If a model alternates between states each year, alternating between presence and absence of a cut-off, there will never be sufficient evidence for a change of state: thus the current state (either application or non-application) will persist indefinitely, with the arbitrary determining factor being the status when this rule was introduced.
4. Both approaches add complexity to EUC modelling and model smoothing and also introduce additional problems for insignificant material gain.
5. The modelling process is not designed to model each EUC one by one on an adhoc basis. There are 429 EUCs to model and this is too big a task for a one EUC at a time approach. It would require a significant rewrite of the systems to apply additional rules to cut-offs (of either type: best fit or imposed) based on past years results (whether past smoothed years or individual years) in the individual year EUC modelling or model smoothing.

Materiality of the cut-off issue

1. A summary of the cut-offs present in the NDM proposals for gas year 2008/09 are stated below:
 - a. 112 EUCs out of a total of 429 had cut offs – 80 of these were 'best fit' and 32 were 'imposed'.
 - b. Of these 96 had cut-offs in 2007/08 as well (i.e. no change). The remaining 16 EUCs had cut-offs where none previously existed. There were only 2 EUCs where previously existing cut-offs had been removed.
 - c. The presence or absence of cut-offs only affect the EUC profiles in a part of the summer months
 - d. These 16+2 EUCs make up in AQ terms about 1.1% of total NDM load and 0.016% of all NDM supply points
 - e. Since cut-offs only affect the summer months, the effect on allocation will be much smaller than the total AQ of the 18 EUCs affected . For these EUCs consumption in the potentially affected months of May to September is 15 to 35% of annual load depending on weather sensitivity of the EUC.
 - f. In addition, the difference in allocation between having and not having a cut-off (or vice versa) will be even smaller than in the total allocation. This difference will depend in part on the actual weather experienced in the months in question.
 - g. An overall assessment across the 18 EUCs affected in 2008/09 suggest that under conditions of average weather the difference in energy allocation over the months May to September is of the order of 0.04% of the AQ of the affected EUCs which in turn make up only 1.1% of total NDM load.

Options available to DESC

As per the minutes from January DESC the approach to cut-offs for Spring 2009 will remain unchanged due to the lack of time available to clarify business rules and the subsequent impacts to the modelling systems. There are options available to DESC in readiness for the Spring 2010 approach which are detailed below:

1. Bands 01B and 02B do not have cut-offs applied, this rule could be extended to all small NDM EUCs. A rule will have to be agreed to deal with any instances of potential negative ALPs. This would leave only approx 1% of NDM load subject to cut-offs. The downside to this is currently 80 EUC models show a 20% improvement in model 'fit' with a 'best fit' cut-off and so this improvement would be lost.
2. Make the criteria for applying 'best fit' cut off much stricter to minimise those instances and leave 'imposed' cut-offs in place. The current rules require a 20% improvement in the 'best fit' results. Currently 80 EUC models are 'best fit' at the 20% level, a change to this level (e.g. 30%) could lead to increased 'flip-flopping' as many of the 80 EUC models may be between 20 and 30% (certainly in the first year).
3. Implement proposed suggestion from January '09 DESC meeting (see above) with clearly defined business rules to deal with each scenario. This approach will require a fundamental change to the modelling system and so the material benefits to demand attribution should be considered in this context.
4. Keep the existing rules for imposed and best fit cut-offs 'as is'. Add an additional item to Autumn 2009 workplan schedule to analyse the materiality of this issue during gas year 2008/09.

Next Steps

xoserve welcome comments on this issue and any suggested alternative options which could be considered, however please be reassured that the materiality of this topic is very small and the current approach is sound.

Please send your comments to: xoserve.demand.estimate@xoserve.com