



Holiday Codes Review

DESC 14th September 2010

Holiday Codes Review - Introduction

- In recent times DESC has queried some of the holiday code 'rules' within the demand modelling process, particularly the Christmas period.
- Following this feedback it has been agreed that analysis of the currently defined rules for holiday codes be carried out in the Autumn of this year.
- Prior to carrying out this work and presenting the results at the November DESC meeting we would like to discuss and agree the approach beforehand.
- Feedback today from DESC will help shape the scope of the Autumn analysis.

Holiday Codes Review - Background

- EUC demand models are derived from sample data using regression analysis
- Regression co-efficients (C_1 and C_2) are derived from sample demands for Mondays to Thursdays
- In some EUC demand models a reduction in demand is observed during holiday periods compared with the non-holiday Monday to Thursday demand
- In these cases it is necessary to carry out separate modelling of holiday effects by excluding holiday days from the regression
 - Note: 01B models do not currently have holiday days treated separately – see later slide
- A multiplicative factor for the days assigned in each holiday period is calculated separately.
- Holiday factors are calculated from the NDM sample data and therefore cannot be specified in advance of the Spring analysis, however rules for defining holiday periods can be reviewed.

Holiday Codes Review - Example

- Each holiday period during the year is defined by a set of rules
 - Current holiday code rules are provided in separate document '[Holiday Code Rules_140910.pdf](#)'
- For example Easter holiday period is defined as follows:
 - Start of Easter: Wednesday before Good Friday
 - End of Easter: Friday after Good Friday
- Within this period there are currently 3 holiday codes
 - Code 4 represents Easter Saturday and Easter Sunday
 - Code 5 represents Good Friday and Easter Monday
 - Code 6 represents all other days in Easter holiday period

Holiday Codes Review – Example

- To calculate holiday factor for code 4 for a single analysis year:
 - Sum actual demands from EUC sample for Easter Saturday and Easter Sunday
 - Sum ‘fitted’ demands ($C_1 + C_2 * CWV$) from non holiday Monday to Thursday data (a cut-off may apply to the CWV value)
 - Holiday Code 4 factor = $\frac{\text{Sum of actual demands}}{\text{Sum of fitted values}}$
- Holiday factor for code 4 is calculated for other two single years used in modelling (model smoothing) and the average value of the 3 single years is then taken forward for modelling purposes.
- The process for defining the holiday factor is explained in Appendix 3 of the NDM profiling report.
- The holiday factors for each EUC model are provided each year as part of the NDM proposals – the 2010/11 versions are called EUCHOL10S (Small NDM) and EUCHOL10L (Large NDM).
- Note that if a day is treated as a holiday this does not mean that demand will necessarily be reduced for all EUCs. If the data for any particular EUC does not suggest a reduction, a holiday factor of 1.000 will be applied.

Holiday Codes Review – Where are they used ?

- Where EUC models have holiday days excluded from the main regression analysis a holiday factor is calculated and used in the following outputs:
 - Annual Load Profiles (ALPs)
 - SND_t used in the ALP formula will be impacted by holiday factors.
 - Daily Adjustment Factor (DAFs)
 - $WSENS_t/SND_t$ for the EUC (numerator) in the DAF formula will be impacted by holiday factors, but the impact is relatively small due to cancelling out of holiday factors in both weather sensitivity and SND.
 - Load Factors (LFs)
 - The Aggregate AQ from the EUC model (numerator) in the LF formula will be affected by the holiday factors. The EUC peak (denominator) in the LF formula is affected by days excluded from the regression as holidays, via the Monday to Thursday model.
- Aggregate NDM demand modelling
 - Holiday codes are used when determining the $WSENS_t$ and SND_t values for the denominator of the DAF formula, however this is not as important as the ratio of $WSENS_t$ to SND_t

Holiday Codes Review – Scope

- The Autumn review of holiday codes will use existing systems to examine holidays and utilise existing model results.
- There are currently 14 holiday codes in use which should be sufficient for all scenarios
- When determining the scope we need to consider system / resource constraints which means analysis needs to be focussed on the main issues as DESC sees them.
- It is not intended that the summer reduction period from late May to late September will change in this review, as this would unduly complicate the analysis.
- The analysis will use data and models back from 2006/07 to 2009/10 – these years are the only ones for which models are available using the new CWVs and SN basis
- Two main proposed objectives of analysis:
 - Identify any days within or neighbouring existing holiday periods which may need to be reclassified as holidays or non-holidays and reallocate the holiday codes for each period if necessary
 - Review whether it is still appropriate to include holiday days within regression analysis for the 01B “domestic” EUC models

Holiday Codes Review – DESC Issues

- DESC has questioned the application of certain holiday codes in and around the defined Christmas period, specifically:
 - Christmas Start and End
 - Use / Non use of Bank Holiday codes
- Considering each of the existing holiday periods (outside the May to September summer reduction period):
 - Which days do DESC members think should be considered for inclusion in a revised definition of the period?
 - Within the preferred definition of the period above, which (if any) reallocations of the current holiday codes should be considered?
 - Bear in mind that any suggestion must be expressed in a general way that can be applied to any given past or future year

Holiday Codes Review – Approach to analysis (1)

- Holiday codes review will make use of sample (datarecorder and datalogger) data from EUCs >73.2 MWh pa (i.e. bands 2 and above).
 - These EUCs are those for which we may expect a reduction in demand on a holiday day
- EUC models used will be from the Spring 2010 NDM analysis (2007/08, 2008/09, 2009/10), and additionally from 2006/07.
- EUC models use the new CWV and SNCWV definitions.

Holiday Codes Review – Approach to analysis (2)

- The analysis will use the following data for each day (April to March) in each analysis year:
 - Proportion of small NDM (>73.2 MWh pa) and large NDM EUCs with large negative residuals from fitted values (i.e. demand – fitted value). This is used when considering an existing non-holiday for holiday status (large proportion favourable to holiday status).
 - Proportion of small NDM (>73.2 MWh pa) and large NDM EUCs with large positive residuals from fitted values (i.e. demand – fitted value). This is used when considering an existing holiday for non-holiday status (large proportion favourable to non-holiday status).
 - Proportion of small NDM (>73.2 MWh pa) and large NDM EUCs with large negative residuals from Monday to Thursday model values (i.e. demand – Monday to Thursday model value). This is used when considering an existing holiday for non-holiday status (large proportion not favourable to non-holiday status).

Holiday Codes Review – Results / Options (1)

- All suggested extensions/contractions of existing holiday periods (outside the summer reduction period) will be evaluated and evidence for or against the suggested change presented.
- Evidence will be based on the measures on the last slide.
- We will also evaluate any suggested reallocation of holiday codes within existing or suggested periods in terms of the measures above.
- There is likely to be more than one acceptable combination of length of period and allocation of holiday codes for each period considered.
- We will select a preferred combination in each case, plus acceptable alternatives (these may include the current period).
- DESC will be able to choose between all these options, with the preferred option selected if there is no consensus or majority among DESC members.

Holiday Codes Review – Results / Options (2)

- There will be a separate parallel review of whether holiday codes should continue to not apply to 01B EUCs (0-73.2 MWh), based on runs with the existing holiday codes for the years 2006/07, 2007/08, 2008/09 and 2009/10.
- Detailed results will be presented, with a recommendation based on whether holiday factors are consistently greater than one.
- In the event that DESC approves any recommended changes proposed at the November DESC then these will be incorporated in the Spring 2011 NDM analysis for implementation from October 2011.