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Demand Estimation Sub-Committee Presentation of 2012 Algorithms

11th July 2012



DESC: Objectives of Meeting

- Key objectives of today's meeting:
 - Recap on DESC obligations following amendments to Section H of UNC
 - Inform DESC of process followed in derivation of NDM proposals
 - Provide summary of where TWG has reviewed the output and had the opportunity to challenge the decisions made
 - Provide summary of TWG responses to draft NDM proposals and their overall recommendation to DESC
- Outcome – Obtain DESC approval to submit NDM proposals to Transporters and Users as per UNC requirement

Purpose of NDM Modelling

- Provides a method to differentiate NDM loads and provide profiles of usage
i.e. End User Category (EUC) Definitions
- Provide a reasonable equitable means of apportioning aggregate NDM demand (by EUC / shipper / LDZ) to allow daily balancing regime to work
i.e. NDM profiles (ALPs & DAFs)
- Provide a means of determining NDM Supply Point capacity
i.e. NDM EUC Load Factors
- The underlying NDM EUC and aggregate NDM demand models derived each year are intended to deliver these obligations only
- NDM EUC profiles are used to apportion aggregate NDM demand and do not independently forecast NDM EUC demand

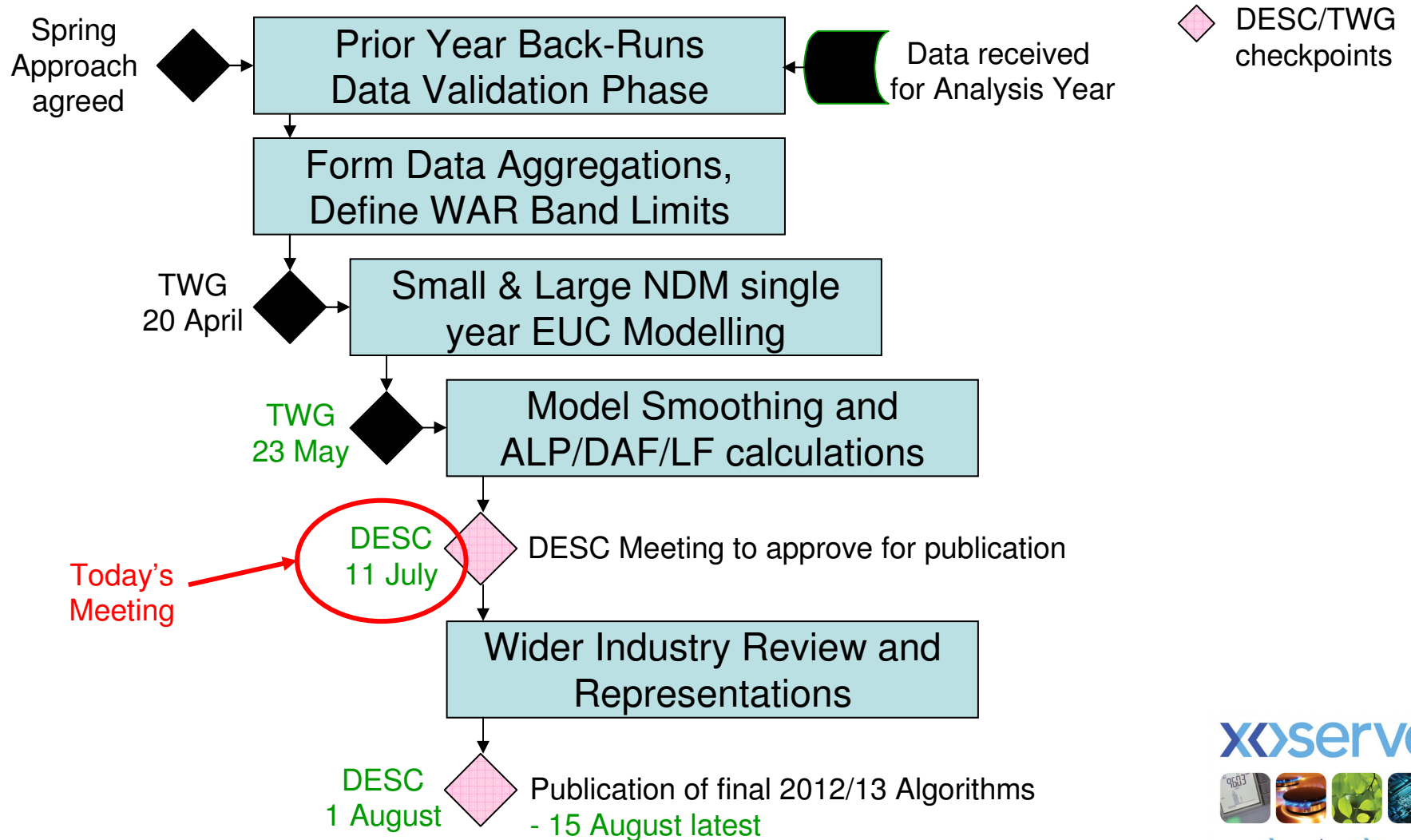
Changes to UNC Section H

- Responsibilities for Demand Estimation changed following implementation of UNC Modification 331 on 3rd January 2012
- DESC collectively required by UNC to:
 - Submit proposals to Transporters and Users for each Gas Year comprising:
 - EUC Definitions
 - NDM Profiling Parameters
 - Capacity Estimation Parameters
 - In addition:
 - Analysis of accuracy of the allocation process
 - Derivation of CWV and Seasonal Normal
 - Consultation with Industry
- Xoserve acts as the common NDM Demand Estimation service provider

Agreed 2012 Modelling Workplan

- Workplan for 2012 Modelling agreed at March DESC meeting
- Workplan aims to provide more transparency of process and introduce checkpoints for DESC/TWG review
- Limited scope for 2012 to change the process or structure of models

Agreed 2012 Timetable



Summary of overall process

- Series of slides to summarise the data collection, modelling, outcomes and TWG involvement / decisions made

Basis of 2012 Modelling

- Described in “Spring Approach” document, reviewed at February 2012 meeting
- Key aspects of EUC demand modelling basis for Spring 2012 analysis:
 - 12 month analysis for datalogger data sets (2011/12)
 - Data sets cover April to March (as in 2010/11)
 - 12 month analysis for AMR data sets (2011/12)
 - Aligned with Datalogger data for the first time
 - Data validation rules unchanged except where noted
 - CWV definitions and SN basis same as Spring 2011

TWG Involvement: 20th April 2012

Objectives of Meeting

- First meeting of Technical Workgroup
- Key objectives of April Meeting
 - Inform TWG of numbers of validated data sets collected
 - Consider the most appropriate data sets and aggregations to apply to the most recently available sample data - i.e. 2011/12
- Outcome – **TWG finalised** sample sizes, aggregations and WAR Band Limits.

TWG decided to 'drop' mid-point break investigation for Small NDM bands pending a fuller review across the whole NDM market

- Next phase was then able to commence:
Single Year modelling – 2011/12 data

Total NDM Population Counts: Supply Point & AQ

Consumption Range	% of Total NDM	
	Total AQ	Total Count
0 – 73.2 MWh pa	71.7%	98.75%
0 – 293 MWh pa	77.4%	99.66%
0 – 2,196 MWh pa	87.4%	99.96%
>2,196 MWh pa	12.6%	0.04%

- On an AQ basis:
 - Small NDM is by far the main component of the overall NDM sector
 - The range 0-73.2 MWh pa constitutes nearly 3/4 of overall NDM
 - The range 0-293 MWh pa constitutes nearly 4/5 of overall NDM
 - The range 0-2196 MWh pa constitutes nearly 9/10 of overall NDM
 - Large NDM is very much a minority component of overall NDM

Summary of Validated Data

- Both AMRs & Dataloggers used in Small NDM Analysis (<2,196 MWh pa)
- NDM Sample Counts:

<i>Sample Counts</i>	<i>2011/12 data</i>	<i>2010/11 data</i>
0 to 73.2 MWh pa Range – AMR	2,996 Domestic	2,809 Domestic
73.2 to 2,196 MWh pa Range – AMR & Dataloggers	5,469	5,878
> 2,196 MWh pa Range – Dataloggers	3,632	3,481

Small NDM Supply Points (<2,196 MWh pa) Consumption Band Aggregations

Consumption Band Analysis – 2011/12 data	
Band 01 0 to 73.2 MWh pa	Individual LDZ
Band 02 73.2 to 293 MWh pa	Individual LDZ
Band 03 293 to 732 MWh pa	Individual LDZ
Band 04 732 to 2,196 MWh pa	Individual LDZ

- Aggregations agreed at April TWG
- In the main sufficient data available to allow individual LDZ analysis (usual combination of NW/WN excepted)

Small NDM Supply Points (<2,196 MWh pa)

WAR Band Aggregations

<i>Consumption Range</i>	<i>Comments on 2011/12 data</i>
0 to 73.2 MWh pa (EUC Band 1)	Not generally Monthly read – no WAR Bands
73.2 to 293 MWh pa (EUC Band 2)	Not generally Monthly read – no WAR Bands
293 to 732 MWh pa (EUC Band 3)	Modelled all LDZs separately except: NW/WN combined Merged Band 3 & 4 data for WAR Band Analysis
732 to 2,196 MWh pa (EUC Band 4)	

- Aggregation of sample data to allow sufficient sample analysis
- Groupings agreed at April TWG meeting

Large NDM Supply Points (>2,196 MWh pa) Consumption Band Aggregations

<i>Consumption Range</i>	<i>2011/12 Analysis</i>	<i>2010/11 Analysis</i>
Band 05 2,196 to 5,860 MWh pa	Individual LDZ	Individual LDZ
Band 06 5,860 to 14,650 MWh pa	Individual LDZ	Individual LDZ
Band 07 14,650 to 29,300 MWh pa	By 5 Groups of LDZs	By 4 Groups of LDZs
Band 08 29,300 to 58,600 MWh pa	By 4 Groups of LDZs	By 3 Groups of LDZs
Band 09 >58,600 MWh pa	National	National

- Aggregation of sample data to allow sufficient sample analysis
- Groupings agreed at April TWG meeting

Large NDM Supply Points (>2,196 MWh pa) WAR Band Aggregations

<i>Consumption Range</i>	<i>2011/12 Analysis</i>	<i>2010/11 Analysis</i>
Band 05 2,196 to 5,860 MWh pa	By 5 Groups of LDZs	By 5 Groups of LDZs
Band 06 5,860 to 14,650 MWh pa	By 3 Groups of LDZs	By 3 Groups of LDZs
Band 07 14,650 to 29,300 MWh pa	National	National
Band 08 29,300 to 58,600 MWh pa	National	National
Band 09 >58,600 MWh pa	N/A - No WAR Bands	N/A - No WAR Bands

- Aggregation of sample data to allow sufficient sample analysis
- Groupings agreed at April TWG meeting

Single Year Modelling – 2011/12 data

- Analysis carried out...
 - Aims to assist in the creation of profiles based on the relationship between demand to weather
 - Identify the best fit model based on available data samples
 - View of results so far and highlight any issues raised
- Tools used to identify best model :
 - R^2 Multiple Correlation Coefficient – statistical tool for identifying ‘goodness of fit’ (100% = perfect fit / direct relationship)
 - Variations in Indicative Load Factors.....

TWG Involvement: Early May 2012

Email exchanges

- During modelling phase of Small and Large NDM sample data various questions arose for TWG to consider
- Emails sent on 4th and 10th May requesting guidance from TWG on whether to:
 - Accept individual model or combined model for WS Band 3
 - Accept model for NO Band 3&4 WAR Band 1
 - Continue with use of previously Interruptible sites within datasets
- Outcome – **TWG provided a consensus view** on all above items in order to move forwards
- Next phase to commence:
Review of Single Year modelling results

Small NDM Modelling Results

EUC Band 1: 0 – 73.2 MWh pa Domestic Sites

	Indicative Load Factor	R ² Multiple Correlation Coefficient	Sample Size
SC	37%	98%	225
NO	32%	97%	240
NW / WN	35%	98%	236
NE	35%	97%	266
EM	33%	99%	263
WM	30%	99%	237
WS	32%	97%	248
EA	31%	99%	273
NT	30%	99%	239
SE	31%	99%	251
SO	28%	98%	260
SW	30%	98%	258

- **Indicative Load Factor** : **R² Multiple Correlation Coefficient** : **Sample Size**

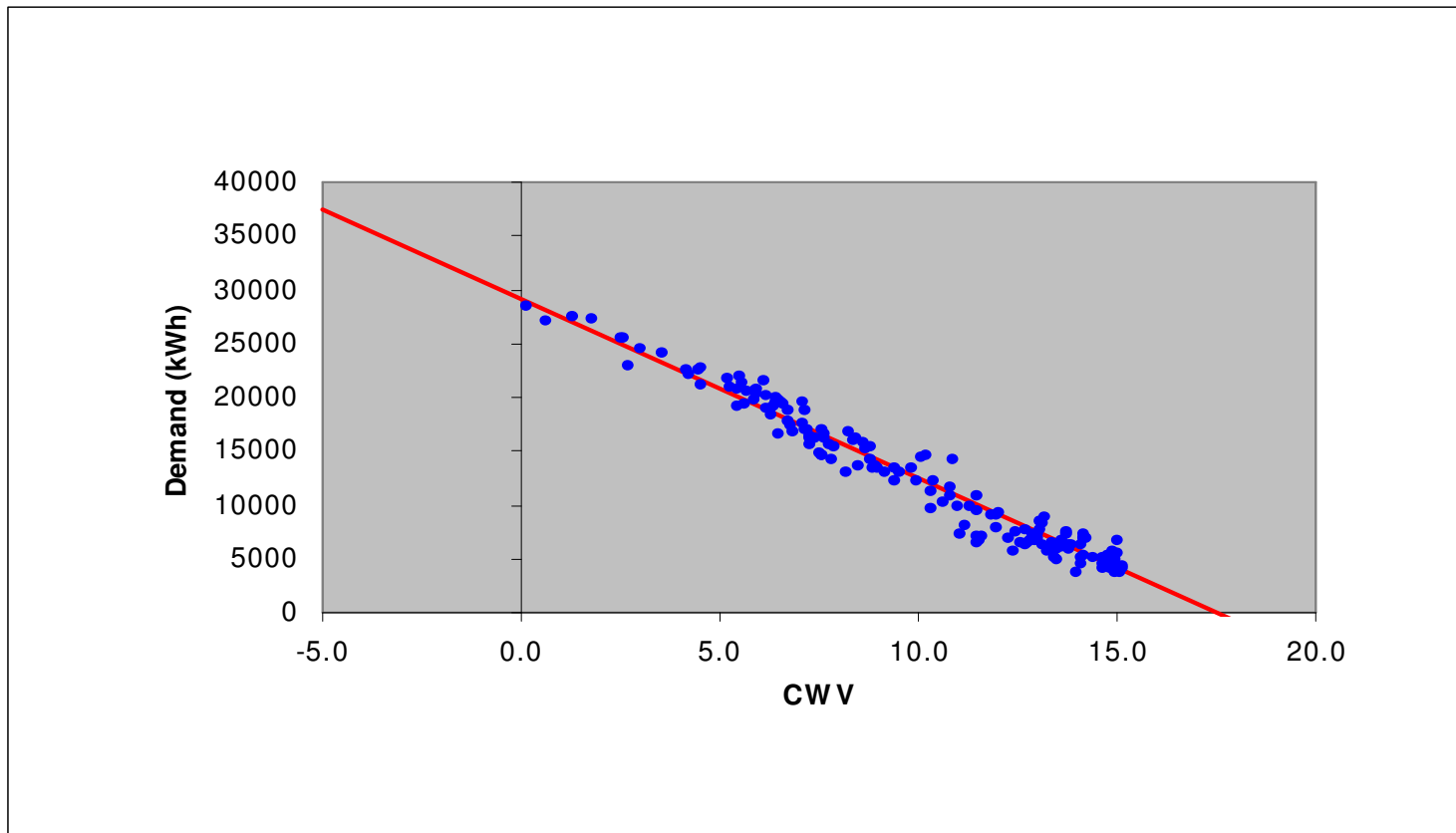
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Small NDM Modelling Results

WS LDZ, EUC Band 1: 0 - 73.2 MWh pa



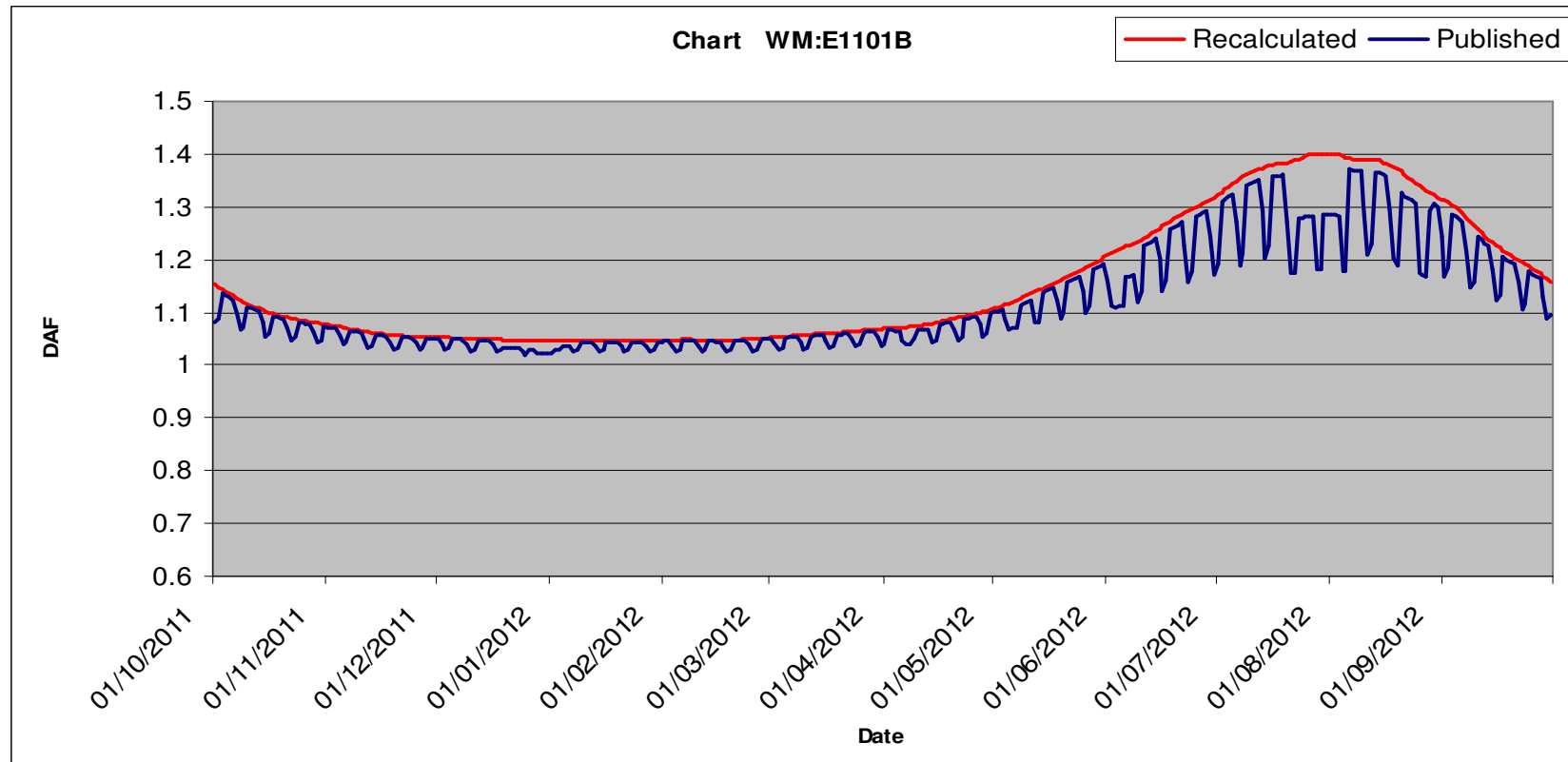
Demand against WS CWV – Monday to Thursday - Holidays included

Changes to Daily Adjustment Factor

- Change to calculation of NDM Aggregate Demand model – following in-sourcing of service
 - Top down approach to modelling LDZ NDM aggregate demand
- Gives “smoother” DAF shape
 - Weather Correction Factor not affected – SND for WCF taken from Gemini connected load
- Testing on Gas Yr 2010 Allocation indicates small improvement to weekend scaling factors
 - No detriment to weekdays

Example DAF chart – WM:E1101B

- Published versus Recalculated DAF



- Discussed at May TWG – agreed to proceed with new basis of NDM Agg Demand

TWG Involvement: 23rd May 2012

Objectives of Meeting

- Second meeting of Technical Workgroup (old Technical Forum)
- Key objectives of May meeting
 - Review and confirm results of single year EUC Modelling
- Outcome – **TWG discussed and agreed** single year models to be used including aggregations to take forward for some of the Large NDM consumption bands
 - **TWG also agreed** to use of new approach for aggregate NDM demand model
- Next phase was then able to commence:
Model Smoothing and derivation of draft NDM proposals

Model Smoothing and Derivation of Parameters

- Model Smoothing process carried out on 3 years of sample data (2009/10, 2010/11 and 2011/12)
- Smoothed EUC model parameter values created represent the average value from across the 3 years (in place to address year on year volatility)
- Smoothed model parameter values were then used to derive the various NDM proposals such as the ALPs
- During this phase there was further **TWG interaction** where details of amendments to weekend factor results were shared

TWG Involvement: 11th June to 22nd June 2012 ²⁴

Review of draft NDM proposals

- Draft NDM proposals were published and available for review on 11th June
- Note issued to TWG inviting feedback and comments
- Outcome – Two responses received from TWG:
 - E.On raised some queries regarding specific Annual Load Profiles (ALPs)
 - UKT provided a summary of some analysis of the draft holiday factors
- Next phase was then able to commence: Investigate TWG comments and provide feedback at meeting on 27th June

TWG Involvement: 27th June 2012

Objectives of Meeting

- Third meeting of Technical Work Group
- Checkpoint following review of proposed Algorithms by TWG
- Key objectives of this meeting
 - Review TWG comments and agree any actions
 - Agree approach to presentation of proposals to DESC
- Required Outcome – TWG support for proposals prior to DESC review and discussion

Summary of E.on Response

- Comment 1: Highlighted 'flatter shape' exhibited during Christmas 2012 by model 08 W02 when compared with consumption band model
- Comment 2: Highlighted difference in the expected weekend behaviour for Band 01B model in WS
- Comment 3: Highlighted weekend shape visible around late May bank holiday in model 05 W04
- The data used has determined the various NDM parameters, however all comments were investigated, with underlying calculations checked and verified
- No additional information was available on user behaviour to help explain any changes in profile shapes
- Following discussion TWG concluded that models should remain as-is for this years NDM proposals but in future TWG may want to challenge outcomes which didn't match expectations



Summary of UKT Response

- High level summary of points made below
 - Following focus on holiday periods in recent years
Representations UKT performed a review of holiday factors for 2012/13 from published data – i.e. EUCHOL12S.TXT / EUCHOL12L.TXT
 - UKT observed that the ideal pattern within any defined holiday period is for holiday multipliers to increase for each holiday code
 - Random sample of 30 consumption band EUCs were analysed
 - Results showed 93.3% of cases conformed to the “ideal pattern”
 - Exceptions were noted and listed in the email
 - UKT felt this showed that the holiday code definitions are now “pretty good”

NDM Algorithm Performance

- In addition to production of demand models and derived factors DESC also has the responsibility to provide a summary of the algorithm performance in the preceding year
- Xoserve performs this role as the common demand estimation service provider
- Main algorithm performance analysis for gas year is completed in Autumn, however a review is also undertaken during Spring and published in Appendix 13 of the NDM report
- Appendix 13 has now been completed and published in UK Link Docs area

Recommendations to DESC

- Objective: Obtain DESC approval to submit NDM proposals to Transporters and Users as per UNC requirement
- Draft NDM proposals are ready to be submitted to wider industry for review
- TWG have been involved throughout the process and provided their recommendation to proceed
- Appendix 13 summarising NDM algorithm performance has been published
- DESC majority now required to proceed to next phase

Next Steps

- w/c 16th July
 - Prepare documentation and apply any final revisions
 - Xoserve publish DESC's proposals for industry to review by 20th July
- w/c 23rd July
 - Users and Transporters have 5 b.ds to review and submit representations to DESC
- w/c 30th July
 - DESC meeting to review representations and consider response
 - Proposed meeting date – Wed 1st August
- w/c 6th August
 - DESC provide formal response to representations (via Xoserve)
- w/c 13th August
 - Xoserve on behalf of Transporters publish final proposals to industry (no later than 15th August) and submit interface files to key systems