Joint Office of Gas Transporters

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DESC Technical Workgroup Minutes
Monday 13 May 2019
at Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA

Chris Shanley (Chair)	(CS)	Xoserve
Helen Bennett (Secretary)	(HB)	Joint Office
Anupa Purewal	(AP)	E.ON
David Mitchell *	(DM)	SGN
Emma Buckton*	(EB)	Northern Gas Networks
Jason Blackmore	(JB)	British Gas
John Jones*	(JJ)	Scottish Power
Joseph Lloyd	(JL)	Xoserve
Josh Mallet	(JM)	npower
Lisa Li	(LL)	British Gas
Louise Hellyer*	(LH)	Total Gas & Power
Luke Reeves*	(LR)	EDF Energy
Mandeep Pangli	(MPa)	Xoserve
Mark Perry	(MPe)	Xoserve
Neil Crompton	(NC)	SSE
Simon Geddes	(SG)	National Grid

via teleconference

Copies of papers are available at: www.gasgovernance.co.uk/desc/130519

1. **Introduction and Status Review**

Chris Shanley (CS) welcomed everyone to the meeting before outlining the Fire Evacuation requirements.

1.1. Apologies for Absence

None.

1.2. Note of Alternates

None.

1.3. Approval of Minutes (24 April 2019)

The minutes from the previous meeting were approved.

1.4. Review of Outstanding Actions

Action 0401: *Reference the Demand Estimation Methodology document -* Xoserve (MPe) to prepare both a change marked and clean version of the updated document for DESC approval via an email communication.
Update: Joint Office to provide status update on the approval request email issued on 4 April 2019. See new action 0402. **Closed**

Action 0402: *Reference the Demand Estimation Methodology document -* Joint Office to provide status update on the approval request email issued on 4 April 2019.

Update: It was confirmed that the approval summary for the Demand Estimation Methodology Document is published here: www.gasgovernance.co.uk/desc/080719. **Closed**

Action 0403: *Yeovilton Weather Station* - Xoserve to provide clarification on Reconciliation.
Update: Mark Perry (MPe) confirmed that an explanation was provided in the DESC Key Messages statement following the April DESC TWG which can be viewed here: http://www.gasgovernance.co.uk/desc/summarykeymessages It was clarified that this is purely for AQ calculations and there is no impact on any reconciliation processes. **Closed**

2. **Progress on Single Year Modelling results – Small and Large NDM (2018/19 data) –** *review and validation of modelling run outcomes and way forward*

Introduction

MPe provided Workgroup with the background to Demand Estimation explaining the key industry processes that require various types of gas demand estimation at NDM Supply Points.

Demand Estimation is achieved by allocating each NDM Supply Point to an End User Category (EUC). EUCs are used to categorise NDM Supply Points in an LDZ and are defined by reference to variables which are maintained in the Supply Point Register. Each EUC requires an associated Demand Model which represents its gas usage characteristics, e.g. weather sensitivity; consumption profile etc.

Each Gas Year DESC develop or revise the definitions of the EUCs for the LDZ and the Demand Models. The CDSP then implements the decisions. New EUCs are a major part of this year's process.

The annual process for determining the EUCs and Demand Models requires the production of the Spring Approach document. This document provides an overview of the proposed EUC definitions and how the modelling shall be performed.

At the February 2019 DESC meeting, the latest version of the Spring Approach was approved. This latest version includes the additional EUCs in Bands 1 and 2 that are looking to be introduced.

Section H of UNC and the NDM Demand Estimation Methodology provide more detail of the Demand Estimation process.

It is necessary to agree modelling principles and methodologies in February each year, as there is not time in the Spring/Summer to make fundamental modelling decisions and gain agreement from all DESC members.

DESC's obligation of producing a set of End User Categories and Demand Models for the next gas year has to be delivered within certain timescales:

- The sample data collected for analysis must include the most recent Winter period (December to March), meaning the sample data collation and validation cannot start until early April
- In between April and August is when the sample data validation results are reviewed, WAR Band ratios are set, single year models are developed and reviewed, model smoothing is applied, draft Derived Factors are produced and reviewed, followed by an industry consultation commencing early June
- The Final EUCs and Demand Models must be approved and submitted to the Authority and loaded to CDSP's systems by 15 August.

The 6 phases of the EUC & Demand Model Lifecycle was shown, and it was confirmed that the Technical Workgroup are currently in Model FITTING (Regression Analysis and Smoothing) phase.

MPe confirmed that the objective for this meeting is for Workgroup to:

- Consider and review all EUC model summary results from single year modelling (2018/19 data) for both Small and Large NDM EUC Bands. The data collected covers a 13 month period.
- Raise any questions on modelling results and where more than one modelling run has been produced for an EUC band, confirm which should be selected as the final model.
- Confirm DESC TWG is satisfied for all relevant single year EUC models to be deployed in the next activity, which is model smoothing.

MPe went on to explain the main principles for this year's modelling which is described in the Spring Approach document, approved by DESC in February 2019.

The key points of EUC demand modelling basis for Spring 2019 analysis is as follows:

- New EUC models in EUC Bands 1 and 2 were requested for Domestic, Non-Domestic and Pre-payment consumers.
- Sample data this year has been boosted by Third party provided data. 7-8 parties provided samples, whereas some issues have been experienced with some of this data, this is a huge improvement on previous years. This sample provision was boosted by the implementation of Modification 0654: Mandating the provision of NDM sample data which became effective on 01 March 2019.
- In line with last year the process shall be using Composite Weather Variable (CWV) definitions and Seasonal Normal basis (SNCWV) agreed by DESC at the end of 2014 and effective from 1st October 2015.
- Holiday codes and rules applicable to Christmas / New Year period are the same as used in Spring 2018 (changes last made at Nov 2011 DESC).
- In line with last year, holidays have been excluded from the regression models for Domestic EUCs.
- All demand modelling is data driven – if the modelling results indicate then Holiday & Weekend Factors, Summer Reductions & Cut-Offs will be applied.

Warm-weather cut-offs:

- Not applied to EUC models < 293 MWh pa, meaning no cut-off is placed on warm weather demand reduction in EUC models representing nearly 80% of NDM load.
- Any cut-offs are based on modelling results from 3 years

Summer Reductions:

- Summer reductions can apply to EUC models over the period from the Sunday before Spring Bank Holiday Monday to last Sunday in September – i.e. 27th May to 30th September 2018
- Above applies along with the more general summer holiday period in July and August
- Any summer reductions are based on modelling results over 3 years
- Modelling methodology in NDM Algorithms Booklet (Sections 3 & 4)

MPe went on to advise Workgroup of the tools used to identify the best model, which are as follows:

- R^2 Multiple Correlation Coefficient – statistical tool for identifying 'goodness of fit' (100% = perfect fit / direct relationship)
- Variations in Indicative Load Factors (ILFs)
- Charts of Monday to Thursday demands vs CWVs with seasons highlighted
- Monthly Residuals also provided for those EUC Bands with multiple modelling runs, to support decision making

Further clarification was given to advise how the Indicative Load Factors (ILFs) are calculated:

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- Indicative Load Factors (ILFs) provide an indication of the weather sensitivity for a model
- ILFs are only used to compare prospective demand models as an aid to making decisions on model choice.
- It is expected that there should be distinguishable ILF values between EUC consumption bands and WAR bands.
- ILFs are not the same as proper Peak Load Factors (PLFs) and their values are not an indicator of the values of proper PLFs (ILFs not used for determining NDM capacities). Formulas below:
  - PLF = average daily demand (i.e. AQ/365) / 1 in 20 peak demand
  - ILF = (AQ/365) / model demand corresponding to 1 in 20 CWV

Single Year Modelling results – Small

Mandeep Pangli (MPa) provided Workgroup with confirmation of the agreed modelling runs for the Small NDM Consumption Bands highlighting the following:

Band	Prepayment/Domestic/Industrial	Recommendation
1	Prepayment Industrial	Sample size issues – no model is viable
2	Prepayment Domestic	Sample size issues – no model is viable
2	Non Prepayment Domestic	Decision required: National model, or 2 LDZ Groups (SC/NO/NW/WN/NE/EM/WM and EA/NT/SE/WS/SO/SW)
2	Prepayment Industrial	Sample size issues – no model is viable

Talking through the modelling results for **EUC Band 1 – Domestic Non-PPM**, MPa explained that sample sizes have increased compared with those provided in 2017/18. All R^2 multiple correlation coefficient percentages are within range of ~~95~~97-99%.

She went on to explain the rogue demand indication for Oct-Dec shown on slide 8 is due to some missing data and that 2 gas days' worth of data has been aggregated instead of 1 day, this relates to circa 1500 meter points. MPa then reviewed the additional slides that have been produced and published with the removal of the 1500 meter points and they show better results.

Moving on to **EUC Band 1 – I&C Non PPM** which shows all LDZs (apart from SC) have less than the required sample size (target ranges from ~~363~~364-382). For the first time, WN LDZ has been modelled on its own.

The **EUC Band 1 – Domestic PPM** analysis introduced a discussion point, MPa explained that daily volumes were not available last year which means that the ILFs are lower than those derived last year. MPa asked the Group for their thoughts on whether last year's data should be used for this year, or, this year's data should be used for all 3 years. Most of the Group agreed to go with the 1 years of smoothing data for this year.

MPa showed the Group the results of **EUC Band 2 – Domestic Non-PPM** which is where a decision is required. The results show that an ILF of 37% with an R^2 of 96% if a National Model is to be used, whereas, ILF of 39% and 36% and R^2 of 95% and 97% should the two LDZ Group Models be used.

After considering the analysis provided and Xoserve suggesting that using 2 LDZ Groups looks the best to use, Workgroup agreed on the following:

EUC Band 2	**Decision required:**	**DESC TWG Decision:**
Non Prepayment Domestic	National model, or 2 LDZ Groups	2 LDZ Groups

A review of the modelling results for weekend effects for EUC Band 2 are shown in the table on slide 25. Concerns were raised on the accuracy of the Market Sector Code (MSC) held on the Supply Point Register.

The MSC is a critical data item that is used to assign a correct EUC Band. The Group discussed how best to ensure MSC data is accurate and agreed to raise this at the next PAC meeting for PAC to promote the need for accurate MSC data in the modelling and settlement systems.

New Action TWG0501: PAC to promote the need for accurate MSC data to enable the correct assigning of MPRNs to EUC Bands in the DESC modelling and the settlement system.

Moving on to review Winter Annual Ratio (WAR) Band EUCs, MPa provided an overview of how the WAR value of a supply point is defined. She explained that WAR values are affected by December to March weather experiences, 2018/19 was considerably milder than that of 2017/18, therefore, thresholds can be expected to decrease this year.

The modelling runs that were agreed at April DESC TWG were shown for small NDM WAR Bands:

EUC Band	TWG Agreed Modelling Run
Band 1	Not generally Monthly read – no WAR Bands
Band 2	Not generally Monthly read – no WAR Bands
Band 3 and Band 4 (combined)	Individual LDZ analysis (NW/WN combined) or Individual LDZ analysis (NW/WN and WS/SW combined)

The slides that followed showed the analysis gathered for EUC Bands 3 and 4. The data showed the difference in results if SW LDZ was run on its own compared to WS and SW LDZs combined and WS LDZ compared to WS and SW combined. It was confirmed that Yeovilton data has been stripped out of the data usedhad been corrected for the modelling analysis.

After considering the analysis provided Workgroup agreed on the following:

Band 3 and Band 4 (combined)	**Decision required:**	**DESC TWG Decision:**
	Individual LDZ analysis (NW/WN combined) or Individual LDZ analysis (NW/WN and WS/SW combined)	Individual LDZ analysis (NW/WN combined)

Summary of decisions made:

	DESC TWG Decision:
EUC Band 2 Non Prepayment Domestic	2 LDZ Groups
Band 3 and Band 4 (combined)	Individual LDZ analysis (NW/WN combined)

Single Year Modelling results – Large

Joseph Lloyd (JL) provided Workgroup confirmation of the agreed modelling runs for the Large NDM Consumption Bands highlighting the following:

Band	**TWG Agreed Aggregations**
Band 5	Individual LDZ Analysis (NW/WN combined)
Band 6	Individual LDZ Analysis (NW/WN combined) AND or Individual LDZ Analysis (NW/WN and WS/SW combined)
Band 7 and Band 8	4 Individual LDZs and 4 Groups (Run 1): AND or 5 LDZ Groups (Run 2):
Band 9	National

He confirmed there is a need for two decisions (Band 6 and Band 7 & 8) and advised that the groupings were selected approach has been changed to satisfy the small sample sizes received.

Showing the large NDM modelling results table for **EUC Band 5** on slide 6, JL explained that the results are good overall for individual LDZs with R^2 values in the range of 95% to 98%. Even though WS LDZ has a small sample size of 38, it does produce the R^2 value of 95%.

For **EUC Band 6** the summary results table again shows good results overall for individual LDZs. JL highlighted that the R^2 value of 88% for EA LDZ is mainly due to the low sample size of just 27 and unfortunately this is one of the LDZs that cannot be aggregated. He advised the Group that CDSP are currently working to replace their updating the modelling system to hopefully allow more flexibility in circumstances like this.

After considering the analysis provided, Workgroup agreed that the R^2 values are good on their own, therefore, Workgroup agreed to keep them separate:

EUC Band 6	**Decision required:** Individual LDZ Analysis (NW/WN combined) or Individual LDZ Analysis (NW/WN and WS/SW combined)	**DESC TWG Decision:** Individual LDZ Analysis (NW/WN combined)

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For **EUC Band 7 and Band 8** the summary results table shows Run 1 (4 Groups) and Run 2 (5 Groups) producing good overall results for individual LDZs.

JL confirmed that CDSP would always promote individual modelling runs unless there is a clear benefit from aggregation.

After considering the analysis provided Workgroup agreed on the following:

EUC Band 7 and Band 8	**Decision required:**	**DESC TWG Decision:**
	4 Individual LDZs and 4 Groups (Run 1): Or 5 LDZ Groups (Run 2):	(Run 1): 4 Individual LDZs and 4 Groups:

For **EUC Band 9** JL showed the Group the national aggregation model results and confirmed there is no TWG decision required for this EUC Band.

Moving on to review Winter Annual Ratio (WAR) Band EUCs, JL provided the summary of the TWG Agreed Aggregations and confirmed there would be two decisions (Band 6 and Band 7 & 8) required from this set of analysis:

Band	TWG Agreed Aggregations
Band 5	5 LDZ Group
Band 6	3 LDZ Group (Run 1) ~~AND~~ or 2 LDZ Group (Run 2)
Band 7 and Band 8	National ~~AND~~ or 2 LDZ Group

For **EUC Band 5** WARs JL produced the modelling results and highlighted that they show R^2 values range between 86% and 98%. The WAR Band 1 is the least weather sensitive.

EUC Band 6 Run 1 modelling results show reasonably good R^2 values, however, there is a concern that the sample size of 26 and 29 are too small.

EUC Band 6 Run 2 modelling results show R^2 values range between 87% and 97%.

EUC Band 6	**Decision required:**	**DESC TWG Decision:**
	3 LDZ Group (Run 1) or 2 LDZ Group (Run 2)	2 LDZ Group (Run 2)

EUC Band 7 and Band 8 Run 1 (National) modelling results show National aggregation produces good R^2 values.

EUC Band 7 and Band 8 Run 2 modelling results shows that having 2 groups produces good R^2 values for WAR Bands 2-4, but the results are not so good for the southern group LDZs in WAR Band 1 which has an R^2 value of 54%.

The National model for WAR Band 1 produces an R^2 value of 79%, whereas individually, the two groups show an R^2 value of 79% and 54%.

Having considered the analysis provided, DESC TWG agreed the following for EUC Band 7 and Band 8:

EUC Band 7 and Band 8	**Decision required:** National or 2 LDZ Group	**DESC TWG Decision:** National

In conclusion, DESC TWG confirmed they are happy to move to the model smoothing phase with the Large NDM modelling results presented.

Summary of decisions made:

Small	**DESC TWG Decision:**
EUC Band 2 Non Prepayment Domestic	2 LDZ Groups
Band 3 and Band 4 (combined)	Individual LDZ analysis (NW/WN combined)
Large	**DESC TWG Decision:**
Consumption Band 6	Individual LDZ Analysis (NW/WN combined)
Consumption Band 7 and Band 8	(Run 1): 4 Individual LDZs and 4 Groups
Consumption Band 6 WAR	2 LDZ Group (Run 2)
Consumption Band 7 and Band 8 WAR	National

3. Review of final results from the optimised CWV definition

CS explained that this item is part of the Seasonal Normal Review and therefore it is discussed under section 4.

4. Seasonal Normal Review

Review of final results from the optimised CWV definition

Jason Blackmore (JB) updated the Committee on the Final Benchmark results of CWV calculation. JB provided the Workgroup with an overview of the approach used:

- Gas years used for deriving parameters are 2010/11 to 2017/18
- For these gas years the demand data used in CWV optimisation process is:
  - Aggregate NDM demand for LDZ. Note: All available Mon. to Thurs. non holiday demand data points used in analysis (bad NDM measurements excluded)

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- For these gas years the weather data used in CWV optimisation process is:
  - Weather data from each weather station as listed in Appendix: LDZ/Weather Stations. Combination of WSSM and our weather provider history. LDZ SW is now based upon Yeovilton weather station observations.
- All gas years are used to derive Pseudo SNET profiles.

JB went on to explain, in conjunction with viewing the results in the presentation material provided, the analysis shows that winter results are better (in most LDZs), but this is offset with worse results for July and August. This can be seen on the table on slide 5.

Results are much better in March, April, May, September and October across all years.

The R^2 summary results (slide 6) show that the new suggested weights for 2020 provide better results in 10 out of the 13 LDZs.

The MAPE summary (slide 7) shows that the new weights for 2020 provide worse results in 8 out of the 13 LDZs.

To summarise, JB clarified that, in terms of what was recommended at the last meeting, (24 April 2019). with regards to the revised weights they have improved the R2 result for some LDZs but not the MAPE and overall this is a better model.

The MAPE analysis (Slide 10) shows a summary of LDZ MAPE results where it can be seen that NE LDZ shows improved results for April and May. EA shows the worst results in July and August.

The material provided continues through to provide detailed analysis for the following areas:

- LDZ MAPE Variance – Optimisation alone
- Detailed LDZ Results

JB confirmed that the next meeting is being held to discuss CWV variations and that these results can now be used as a comparison to CWV+, He added that rainfall data collection has been initialised and it would be useful if Users could provide weather data they may have; rainfall, wind and any other variables.

The Group agreed it would be interesting to see how the changes would be incorporated into the calculations would look like. CS asked if JB was to use sample days to illustrate the effects of the new variables, as he had done previously for Solar, before showing how they fit into the calculation and interact with the other parameters. JB confirmed that story boards are being developed to do this. JL also mentioned that 'cut offs' are currently being used to turn off the effect of a parameter at an agreed point and this could also be considered as part of the methodology. It was confirmed that the intention is to make minimal changes to the calculations in order to manage the complexity of any enhancements.

Next Steps

- At the 10 June DESC TWG meeting – present recommendations on CWV+ for trial LDZs.
- At the 08 July DESC – confirm the form of CWV+ definition.

Revising the temperature weights

Lisa Li (LL) then went on to explain the results identified and the suggested methodology for new weights for temperature and windspeed, which can be seen in the CWV Optimisation paper provided.

The results show that circa 80% of the LDZs show an accuracy improvement in R^2 from using the revised weightings.

It was noted that the new suggested weights better mimic smart meter data. As smart meter data are extracted by national level, new weight analysis is based at LDZ level, therefore, the graphics from smart meter data shown in the Temperature and Windspeed graphs may smooth out and not capture as many details as LDZ level.

LL and JB confirmed again that rainfall will be added at some point, but they are keen to get windspeed and temperature right first.

There followed a detailed discussion where the Group compared the summary results presented with JB and LL clarifying aspects of the calculations and analysis. As the new weights do not perform as well for the summer months of June, July and August, solar could be added to the model to compensate.

It was confirmed that there is a potential for a new methodology that includes the CWV optimisation, new weightings for windspeed and temperature and new weather variables. DESC members recognized that a step by step approach would need to be understood.

MP reminded the Group that 8 July 2019 is the deadline set for agreeing what the new formula should be and asked the Group that if they have any suggestions to assist British Gas in this piece of work that might help Workgroup decide on the final formula. The expectation of the Industry is that extra variables will be used.

5. Adhoc Work Plan Review

This agenda item was not required at this meeting.

6. Communication of Key Messages

The Group agreed the following key messages should be communicated:

- Approval of the Demand Estimation Methodology document.
- DESC TWG decisions made on Small and Large NDM models.
- As a result of some of the modelling results, some concerns were raised by DESC with regards to the accuracy of the Market Sector Code held on the Supply Point Register and it was recommended these are raised at PAC.

7. Any Other Business

7.1. Revising the temperature weights

CS explained that this item is part of the Seasonal Normal Review and therefore it is discussed under section 4.

8. Diary Planning

Time / Date	Venue	Workgroup Programme
10:00 Monday 10 June 2019	Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA	Consideration of the use of additional weather variables.
10:00 Monday 08 July 2019	Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA	Standard agenda, plus • Final decision on the CWV formula • 2019/20 NDM Algorithms: Review TWG responses • Seasonal Normal Review Update • Communication of Key Messages
10:00 Monday 22 July 2019	Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA	Standard agenda, plus • 2019/20 NDM Algorithms:

		• Response to Industry Representations • Weather Station Review • Review Adhoc Workplan • Seasonal Normal Review Update • Communication of Key Messages
10:00 Monday 07 October 2019	Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA	Standard agenda, plus • NDM Sample Update • Seasonal Normal Review Update • Communication of Key Messages
10:00 Monday 09 December 2019	Radcliffe House, Blenheim Court, Warwick Road, Solihull B91 2AA	Standard agenda, plus • Evaluation of Algorithm Performance for Gas Year 2018/19 • Modelling Approach – Spring 2020 • Seasonal Normal Review Update • Communication of Key Messages

Action Table (as at 13 May 2019)

Action Ref	Meeting Date	Minute Ref	Action	Owner	Status Update
DESC 0401	01/04/19	2.	*Reference the Demand Estimation Methodology document -* Xoserve (MPe) to prepare both a change marked and clean version of the updated document for DESC approval via an email communication.	Xoserve (MPe)	**Closed**
DESC TWG 0402	24/04/19	1.4	*Reference the Demand Estimation Methodology document -* Joint Office to provide status update on the approval request email issued on 4 April 2019. See new action 0402.	Joint Office (MB)	**Closed**
DESC TWG 0403	24/04/19	6.1	*Yeovilton Weather Station -* Xoserve to provide clarification on Reconciliation	Xoserve (MPe)	**Closed**
DESC TWG 0501	13/05/19	2.0 Small NDM	PAC to promote the need for accurate MSC data to enable the correct assigning of MPRNs to EUC Bands in the DESC modelling and the settlement system.	Joint Office (CS)	**Pending**