



Demand Estimation Sub Committee

EUC Modelling Approach – Spring 2019

10th December 2018

Background – Demand Estimation

- Key industry processes require various types of gas demand estimation at NDM Supply Points. These processes include:
 - Determining Supply Point Capacity
 - Daily Nominations and Allocations i.e. NDM Supply Meter Point Demand Formula
 - Determining Annual Quantities (AQs)
- To achieve this estimation, each NDM Supply Point belongs 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
- Demand Models are mathematical models which provides an estimate of gas demand for each EUC by reference to variables determined by DESC

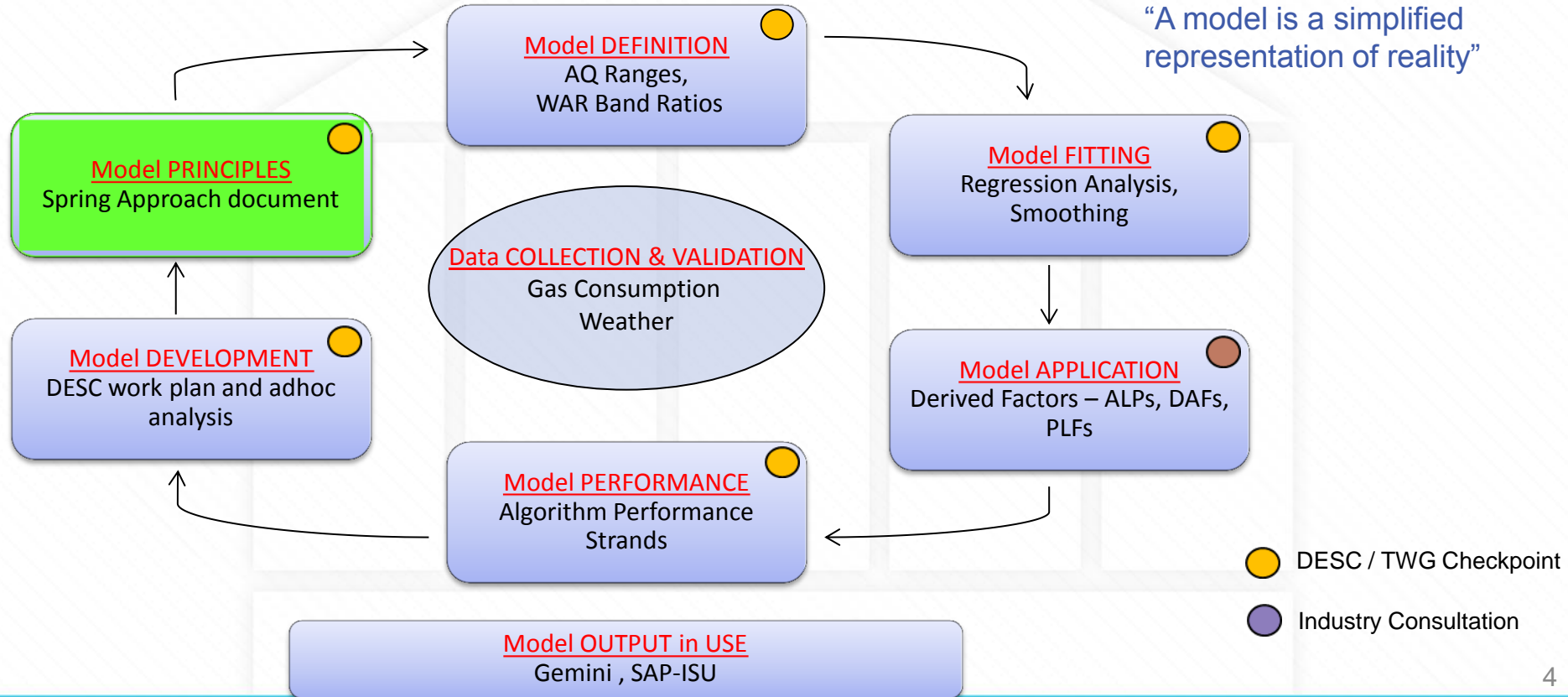
Background – Demand Estimation cont.

- For each Gas Year, DESC will develop or revise the definitions of the EUCs for the LDZ and the Demand Models for each EUC. The CDSP will then implement these decisions
- The annual process for determining the EUCs and Demand Models for the following gas year begins with the production of a document called the “Spring Approach”
- The Spring Approach provides an overview of the EUC definitions and how the modelling shall be performed, which DESC is asked to formally approve at its meeting in February each year
- Prior to this, DESC’s Technical Workgroup (TWG) are sent a draft of the document to review and comment on
- Section H of UNC and the NDM Demand Estimation Methodology document provides more detail of the Demand Estimation process

Development of EUCs and Demand Models

The purpose of the **EUC Demand Model** is to represent the behaviour and reactions of the **EUC Population**

“A model is a simplified representation of reality”



Demand Modelling Framework

- DESC's obligation of producing a set of End User Categories and Demand Models for the next gas year have 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**
 - The Final EUCs and Demand Models must be approved and submitted to the Authority and loaded to CDSP's systems **by 15th August**
 - 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 above explains why it is necessary to agree modelling principles and methodologies in February, as there is not time in the Spring/Summer to make fundamental modelling decisions and gain agreement from all DESC members

Objective

- The final objective of the “Model Principles” phase is to produce a Spring Approach document for the derivation of EUCs and Demand Models effective for Gas Year 2019/20, which is approved by DESC (Target: February 2019 meeting)
- Objective of today’s session is to formally launch the process for determining the EUCs and Demand Models for Gas Year 2019/20 by discussing the high level principles to be included in the draft of the Spring Approach document
- In addition we shall provide a high level view of the Demand Estimation timetable for the production of Demand Models for Gas Year 2019/20

Spring Approach 2019 – Industry Changes

- Spring Approach 2019 is required ultimately to deliver a set of Derived Factors for use in Gemini and SAP-ISU for Gas Year 2019/20 and will be impacted this year by the following industry changes / discussions:
 - New End User Categories (change proposal – XRN4665) for Bands 1 and 2. Introduces additional EUCs to represent Domestic in Band 2, Non-Domestic in Band 1 and Pre-payment in Band 1 and 2.
 - UNC Modification 0654 (mandating the provision of NDM sample data) implements on 1st March 2019 – likely to lead to additional streams of sample data to CDSP
 - Investigations currently being performed by **UIG Task Force** include a review of NDM demand models. Recommendations from this work, where possible, to be included in Spring Approach and referenced during presentation

Spring Approach 2019 – Demand Estimation Changes

- In anticipation of discussions around additional EUC for Bands 1 and 2, last year DESC produced additional EUC demand models to represent:
 - i) meter points in Band 1 (0-73.2 MWh pa) which are categorised as non-domestic
 - ii) meter points in Band 1 which use pre-payment meters
 - iii) meter points in Band 2 (73.2-293 MWh pa) which are categorised as domestic
- The 2019 Spring approach will propose the same additional set of models, however this will be reliant upon receiving the appropriate sample data
- **UIG Task Force** investigations supports this approach, quote from UIG Investigations Tracker (13.2.5): *“There is a difference between the EUC1 Industrial/Commercial and Domestic behaviours. This corroborates the planned segmentation into EUCs based on the I/C & D split.”*

Spring Approach 2019 – End User Categories (Bands 1-2)

- Proposed EUC Definitions and Demand Models for Bands 1 and 2
- For some EUCs it is unlikely sample data will be provided due to low population numbers and issues with recording daily consumption*
- Do DESC agree with proposed use of Demand models ?

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	Prepayment	Dom or Non-Dom	No. of Demand Models expected *	Comments
01	1	73,200	Y	Dom	1	
			Y	Non-Dom	0	Use 'Dom PPM'
			N	Dom	1	Default
			N	Non-Dom	1	
02	73,201	293,000	Y	Dom	0	Use 'Dom PPM'
			Y	Non-Dom	0	Use 'Dom PPM'
			N	Dom	1	
			N	Non-Dom	1	Default

Spring Approach 2019 – End User Categories (Remaining)

EUC Band	AQ Range From: (Kwh pa)	AQ Range To: (Kwh pa)	WAR Bands W01 to W04	No. of Demand Models req'd
03	293,001	732,000	✓	5
04	732,001	2,196,000	✓	5
05	2,196,001	5,860,000	✓	5
06	5,860,001	14,650,000	✓	5
07	14,650,001	29,300,000	✓	5
08	29,300,001	58,600,000	✓	5
09	58,600,001		x	1

- Bands 3 to 9 unchanged
- This would mean a total of 39 EUCs per LDZ utilising 36 Demand Models

Spring Approach 2019 – Demand Estimation Changes

- Filton weather station closed early October '18. DESC agreed to use Yeovilton as a substitute for LDZ SW – this will mean demand models for LDZ SW will be developed using a combination of actual Filton and pseudo Filton CWVs
- As discussed with DESC previously, the current modelling system which creates the Demand Models and Derived Factors has some inflexibilities and is being addressed via an internal project to replace the processes and systems Xoserve use
- Although progress has been made, due to resource constraints and support to UIG Task Force work it has not been possible to get a replacement system up and running to be ready in time for Spring 2019 modelling, however we are confident that the changes proposed for 2019 can be handled by existing systems

Spring Approach 2019

- The next few slides summarise the high level modelling principles to be used in Spring 2019, including the recommended changes from UIG Task Force
- Pending DESC discussions today the draft of the Spring Approach document for the 2019 analysis will then be published on the Joint Office website and DESC members will be asked to review ahead of the February DESC meeting

Spring Approach 2019 – Modelling Approach 1

- Demand Data:
- For Spring 2019 analysis, daily consumption will be required for the period 22nd February 2018 to 7th April 2019, with the main analysis period being 1st March 2018 to 31st March 2019
- The analysis period is 13 months due to the Easter holiday period in 2018 (as defined by the modelling system) covering days in March and April
- MOD0654S (mandating the provision of NDM sample data) becomes effective on 1st March 2019. This modification will introduce an obligation into the UNC for the provision of regular NDM sample data from Shippers to the Central Data Service Provider (CDSP).
- The sample data that is currently provided voluntarily is still required, subject to Xoserve receiving it in the required format and it passing the standard validation criteria, see document located on DESC's homepage on the Joint Office website

Spring Approach 2019 – Modelling Approach 2

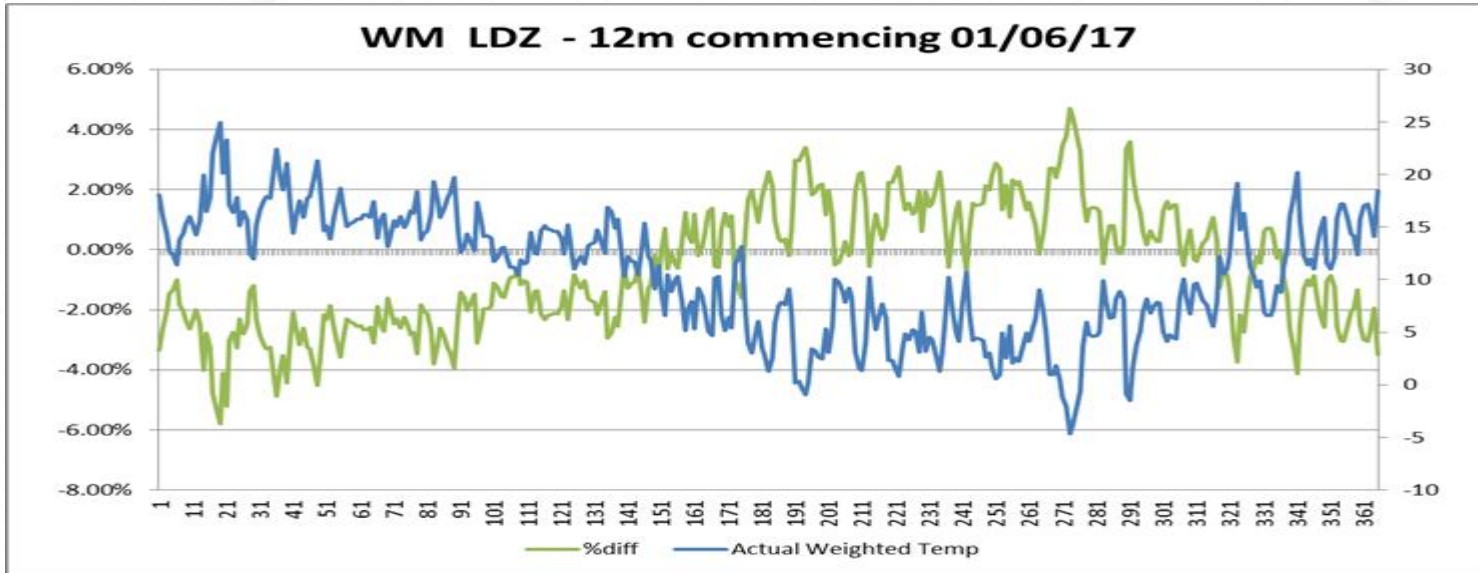
- Demand Data continued:
- In February 2018, the CDSP presented an approach for determining the ideal number of sample sites needed for each EUC in order to produce robust demand models, which DESC approved
- In Spring 2018, the number of sites in CDSP's sample for Band 1 domestic customers were less than 50% of the suggested sample size across all LDZs. Due to SMART meter roll-out we expect this number to decrease again for Spring 2019
- DESC will have to rely on third parties to provide daily consumption data for Domestic Band 1 sites and the additional categories (Non-Dom and PPM) to ensure robust models for the biggest sector of the NDM population are produced
- CDSP will produce a revised view of the ideal sample size numbers based on the latest view of the population (it is likely only EUCs in higher bands will change) and include within the Spring Approach 2019 document

Spring Approach 2019 – Modelling Approach 3

- Demand Data continued:
- **UIG Task Force** findings in Sprint 4 recommended more attention is given to the AQ distribution of the Band 1 domestic model, following their analysis which showed different weather sensitivities for small domestic users compared with the Band 1 average
- Spring Approach 2019 will therefore propose that the sample sites selected for the Band 1 domestic model are sourced appropriately from different sub-bands. For example, the stratification could be use the following sub-bands 0-10, 10-20, 20-30, 30-73.2 MWh, however this can be amended pending further analysis from the UIG Task Force
- A review of the number of sites, post validation, used in each stratified band will be as close to the population composition as possible in each LDZ. This may mean that some sites will not be used as they would influence the resultant Band 1 model too much e.g. too many sites in the range 30-73.2 MWh
- On a similar theme, in the higher EUC bands where the validated sample points are well in excess of the ideal target numbers the CDSP shall consult with TWG to suggest a method of random selection prior to modelling

Spring Approach 2019 – Modelling Approach 4

- **UIG Task Force** findings in Sprint 4 state that the standard meter correction factor of 1.022640 (which uses a standard temperature) may not be appropriate in all weather conditions. The chart below shows an example of the % differences in energy calculated if you use an actual temperature value in the correction factor formula



- TWG to be asked if Spring Approach 2019 document should be changed to use a more weather related correction factor when converting volume to energy

Spring Approach 2019 – Modelling Approach 5

- Weather Data:
- Weather data to be used will mainly be based on the output derived from the Weather Station Substitution Methodology (WSSM) project (up to 30th Sept 2012), UK Link and SAP-ISU data thereafter
- Filton weather station has closed. This was the weather station for LDZ SW. The substitute station used to mimic Filton temperature and wind speed variables is Yeovilton (from 1st Oct 2018).
- The EUC demand modelling to use the CWVs and SNCWVs based on the parameters and Seasonal Normal basis effective from 1st October '15

Spring Approach 2019 – Modelling Approach 6

- Modelling Principles:
 - Band 01 continues to be modelled as 0 to 73.2 MWh but with 3 separate demand models - Domestic only supply points, Non-Domestic and Pre-Payment
 - Band 7 & 8 consumption and WAR bands to be merged for modelling purposes only, as per DESC decision in Spring 2014
 - Holiday code rules to be the same as used in Spring '18, which for the Christmas and New Year holiday period will be those agreed by DESC in November 2011
 - Warm weather analysis in order to identify those models which exhibit 'Summer Reductions' and / or 'Cut-Offs'
 - Analysis performed to assess if 'Weekend and/or Holiday effects' are necessary
 - 3 year model smoothing applied along with existing weightings for each individual year (i.e. 33:33:34) - as agreed in Autumn 2018 (DESC approved continued use of Model Smoothing)

Spring Approach 2019 – Modelling Approach 7

- Derived Factors (ALP, DAF and PLF):
 - The Annual Load Profile (ALP) formula remains unchanged
 - The Daily Adjustment Factor (DAF) formula remains unchanged
 - The Peak Load Factor (PLF) formula remains unchanged, including the methodology for deriving the estimate of peak day demand for Small NDM and Large NDM EUCs i.e. simulation
- Fall-back position:
 - In the event the NDM proposals derived from the Spring 2019 analysis are rejected by DESC, the underlying demand models from Spring 2018 would be used - referred to as 'fall-back' proposals (UNC Section H)

Spring Approach 2019 – Modelling Approach 8

- Reporting Output:
 - NDM Algorithms Booklet summarising the process followed, to be produced
 - Parameters for all smoothed models to be published in an Appendix to the 2019 NDM Algorithms Booklet. All other model parameters to be provided in electronic form
 - The performance evaluation summary (Section 12) to reflect the review of Algorithm Performance (Strands 1 to 4) for Gas Year 2017/18
 - The location of all supporting documents and files to be published on Xoserve's secure SharePoint site (UK Link Documentation):
 - 18.NDM Profiling and Capacity Estimation Algorithms / 2019-20 Gas Year

Spring Approach 2019 – Interaction and Timetable

- Spring 2019 will be the 8th modelling cycle with the DESC / TWG collaborative approach to decision making and transparency
- As such please review decision / interactions timetable (Appendix 2 of Spring Approach document) which provides summary of the anticipated DESC / TWG involvement during the modelling cycle
- To ensure that the correspondence during the Spring Analysis period (April to July) between Xoserve and the TWG remains productive, please ensure the TWG representative within your organisation (as displayed on the master list on the Joint Office website) is still the most appropriate contact

Demand Estimation Timetable 2019

High Level View of Demand Estimation Timetable 2019 - Key Checkpoints

PHASE	JAN'19	FEB'19	MAR'19	APR'19	MAY'19	JUN'19	JUL'19	AUG'19	SEP'19	OCT'19	NOV'19	DEC'19
1. MODEL PRINCIPLES												
Spring Approach 2019 Approved (DESC)		11th Feb										
2. Data COLLECTION & VALIDATION												
Sample data validated (CDSP)				15th Apr								
3. MODEL DEFINITION												
Agree Data Aggregations / WAR Band Limits (TWG)				24th Apr								
4. MODEL FITTING												
Small & Large NDM Single Year modelling review (TWG)					15th May							
5. MODEL APPLICATION												
Publication of Draft Derived Factors (CDSP)						3rd Jun						
Derived Factors Approved for wider industry (TWG/DESC)							8th Jul					
Final Approval of Derived Factors (DESC)							22nd Jul					
6. MODEL OUTPUT IN USE												
SAP-ISU and Gemini updated (CDSP)								15th Aug				
7. MODEL DEVELOPMENT												
Adhoc Work-plan approved (DESC)							22nd Jul			7th Oct		
8. MODEL PERFORMANCE												
Strands 1 to 4 reviewed (DESC)												9th Dec

Spring Approach 2019 – TWG Review

- The first draft of the Spring Approach document for the 2019 analysis will be available to review by the end of the year
- Xoserve will invite TWG representatives and other interested parties to review and comment on the document. Please submit any queries or comments via email to our box account:

Xoserve.demand.estimation@xoserve.com

- In order to meet the Demand Modelling timetable, DESC will be asked to provide final approval of the Spring Approach document for 2019 at the DESC meeting on 11th February 2019