Demand Estimation Technical Work Group
EUC Modelling 2018/19
Single Year Modelling Results

15th May 2018

Contents

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Section 1:

Background, Timetable and Objectives of Meeting

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

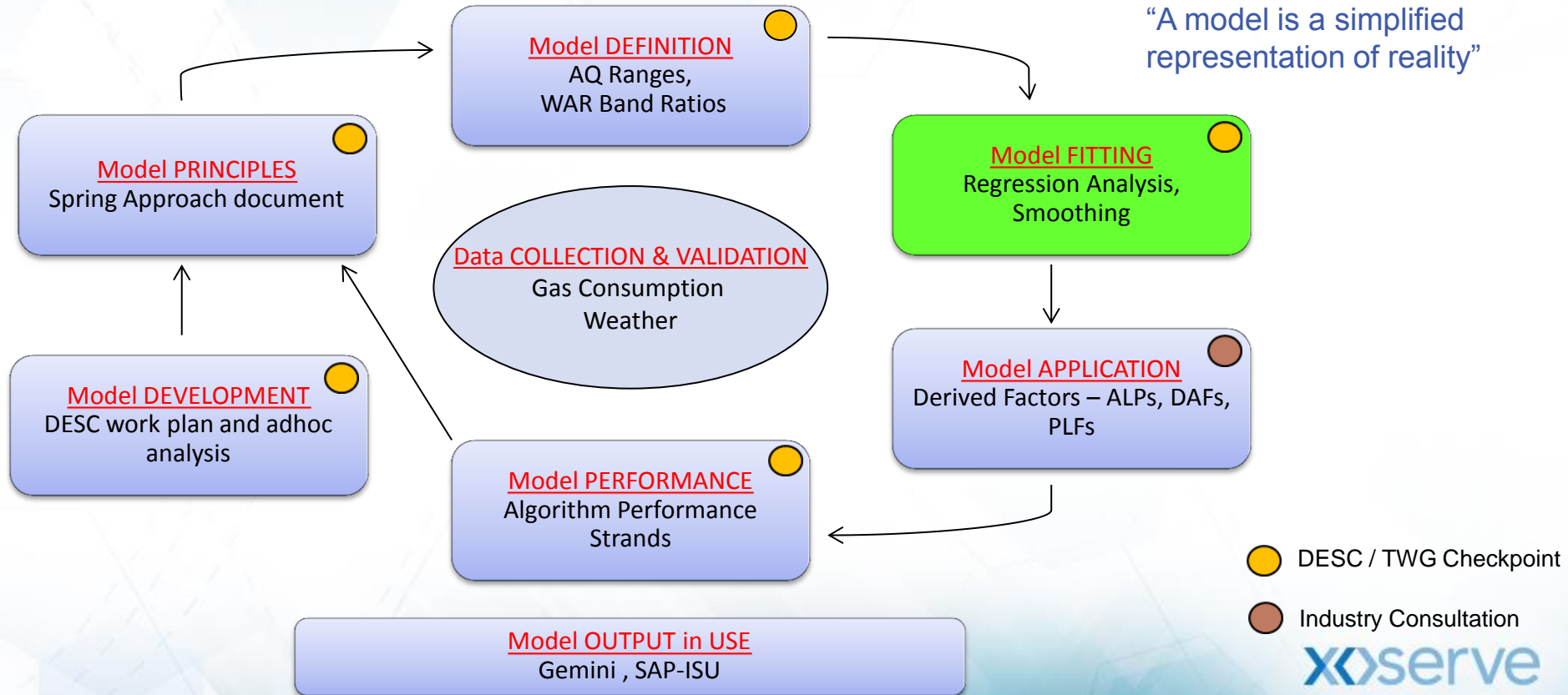XOserve

Background – Demand Estimation

- 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 proposed EUC definitions and how the modelling shall be performed, including a reference to the sample data required in order to produce the relevant demand models

- DESC approved the latest version of the Spring Approach after its meeting in February, which included the possibility of deriving additional EUCs in Bands 1 and 2

- Section H of UNC and the NDM Demand Estimation Methodology document provides more detail of the Demand Estimation process

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Background – Demand Modelling Framework

- 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

  - 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 each year, as there is not time in the Spring/Summer to make fundamental modelling decisions and gain agreement from all DESC members

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Background - EUCs and Demand Model Lifecycle

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"

Model DEFINITION
AQ Ranges,
WAR Band Ratios

Model PRINCIPLES
Spring Approach document

Model FITTING
Regression Analysis,
Smoothing

Data COLLECTION & VALIDATION
Gas Consumption
Weather

Model DEVELOPMENT
DESC work plan and adhoc analysis

Model APPLICATION
Derived Factors – ALPs, DAFs, PLFs

Model PERFORMANCE
Algorithm Performance Strands

Model OUTPUT in USE
Gemini , SAP-ISU

⬤ DESC / TWG Checkpoint

⬤ Industry Consultation

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Demand Estimation Timetable - 2018

PHASE	JAN'18	FEB'18	MAR'18	APR'18	MAY'18	JUN'18	JUL'18	AUG'18	SEP'18	OCT'18	NOV'18	DEC'18
High Level View of Demand Estimation Timetable 2018 - Key Checkpoints												
1. MODEL PRINCIPLES												
Spring Approach 2018 Approved (DESC)		13th Feb										
2. Data COLLECTION & VALIDATION												
Sample data validated (CDSP)				13th 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)						1st June						
Derived Factors Approved for wider industry (TWG/DESC)							9th July					
Final Approval of Derived Factors (DESC)							24th July					
6. MODEL OUTPUT IN USE												
SAP-ISU and Gemini updated (CDSP)								15th Aug				
7. MODEL DEVELOPMENT												
Adhoc Work-plan approved (DESC)							24th July					
8. MODEL PERFORMANCE												
Strands 1 to 4 reviewed (DESC)												TBC

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Objective – Today's Meeting

- The final objective of the "Model Fitting" phase is to review the outcomes for all EUC models and confirm which modelling runs should be used in model smoothing, which is a key input to the next phase "Model Application"

- Objective of today's meeting is for TWG to:

  - Consider and review all EUC model summary results from single year modelling (2017/18 data) for both Small and Large NDM EUC Bands

  - 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 they are satisfied for all relevant single year EUC models to be deployed in the next activity, namely model smoothing

Section 2:

Introduction to Modelling Results

Demand Estimation: Basis of 2018 Modelling (1)

- The main principles for this year's modelling is described in the 'Spring Approach' document - approved by DESC in February

- Key aspects of EUC demand modelling basis for Spring 2018 analysis:

  - 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, once validated, options for aggregations were agreed by TWG during April
  - In line with last year we 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 same as used in Spring 2017 (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

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Demand Estimation: Basis of 2018 Modelling (2)

- 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. 28th May to 24th September 2017
  - 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)

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Demand Estimation: Purpose of Analysis

- Analysis carried out aims to assist in the creation of profiles based on the relationship between demand and weather

- Opportunity to view results so far and identify the best fit model based on available data samples

- 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 (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

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Demand Estimation: Indicative Load Factors (ILFs)

- 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

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