



Demand Estimation Sub Committee

4.0 Modelling Approach 2023

1st March 2023

Overview



- An overview of the Demand Estimation process and output can be found [here](#)
- Annual modelling cycle of activities are represented in diagram opposite
- This presentation relates to the “Modelling Approach” phase of the Demand Model cycle

CDSP / DESC Obligations and Timetable: October 2022 to September 2023

Milestone	UNC H Ref	10/22	11/22	12/22	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23
DESC Membership confirmed	1.12	✓											
NDM Sampling: Data Collection and Validation	1.6	✓						✓					
NDM Algorithm Performance for Gas Year 2021/22	1.8			✓								✓	
DESC Adhoc Workplan	1.7	✓		✓			✓						
DESC Modelling Approach – EUCs and Demand Models	1.7			✓			✓						
Single Year EUC Demand Modelling	1.7								✓				
Model Smoothing and Draft Gas Demand Profiles	1.7									✓			
Industry Consultation	1.8									✓	✓		
Gas Demand Profiles finalised and Core systems updated	1.9											✓	
Climate Change Methodology progressed (SN Review 2025)	1.4			✓			✓		✓		✓		

Background

- The process for determining the EUCs and Demand Models for the following Gas Year begins with the production of a Modelling Approach document
- The Modelling Approach document provides an overview of the EUC definitions and how the modelling shall be performed, from collecting daily gas consumption data from a sample of NDM supply points through to the industry consultation of the proposed gas demand profiles
- Following December's DESC meeting, a draft of the document was shared. This reflected the previous year's approach but updated for the new dates, plus the two wording changes included in this pack
- DESC is asked to formally approve the document at its meeting in the first quarter of each year, ahead of the modelling process starting in the Spring

Objectives

- To provide a summary of the main sections of the Modelling Approach document, which sets out how the End User Categories (EUCs), Demand Models and Gas Demand Profiles shall be produced for Gas Year 2023/24
- To consider any changes / issues which relate specifically to this year's demand modelling process
- To review any comments that have been received on the draft Modelling Approach document since publication in January 2023
- To conclude discussions on the “Model Principles” phase by formally requesting DESC’s approval of the Modelling Approach document

VOTE
REQUIRED

Demand Estimation Changes

Modelling Approach 2023 is required ultimately to deliver a set of Gas Demand Profiles, for use in Gemini and UK Link for Gas Year 2023/24, and the following changes are proposed:

- Instead of limiting stratification to Band 1 Domestic and Band 2 I&C, stratification should be applied to all bands where there is sufficient sample data received
- Following the recent rising energy prices influencing consumer behaviour, additional wording has been added (as we did with COVID-19) to allow DESC to consider how it may want to act given the impact of these socioeconomic factors on the demand modelling
 - Wording is on following slide
- EUC Review changes (see separate slide pack – agenda item 3.2)

Impacts of Significant Socioeconomic Factors on Demand Modelling – Extract from Modelling Approach document

The proposed modelling approach covers a 'standard' analysis year. In the past analysis has been required to understand unusual demand behaviour (such as during the COVID-19 pandemic) and action taken to avoid this detrimentally impacting the forecast.

Analysis may again be required due to consumption changes as a result of the 2022 rise in energy prices.

Actions could range from removal of specific days / periods from the analysis, using different weighting at the model smoothing phase or not using the latest **Analysis Period** data in the derivation of this year's Gas Demand Profiles. The actions may vary across sectors e.g. Domestic and I&C.

End User Categories

EUC Band	AQ Range From: (KWh pa)	AQ Range To: (KWh pa)	Market Sector	Meter Type	Default ('Bucket')	WAR Bands W01 to W04	No. of Demand Models required
01	0	73,200	Domestic & Non-Domestic	PrePayment & Non-PrePayment	x	x	4
02	73,201	293,000			x	x	4
03	293,001	732,000	Non-Domestic	Non-PrePayment	✓	✓	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

- No plans to amend the current EUC Definitions (39 per LDZ) for Gas Year 2023/24

Daily Gas Consumption Data

- Analysis Period:
 - Daily Gas Consumption Data is a critical input to the Demand Modelling process and will be required for the period 25th March 2022 to 7th April 2023, with the main analysis period being **1st April 2022 to 31st March 2023**
- Sources:
 - Transporters and Shipper sampling will contribute towards NDM Sampling numbers
 - Class 3 data for Domestic Prepayment EUC to be used again
- Validation:
 - Appendix 2 of the Modelling Approach document sets out the proposed validation to be applied to the collated data prior to being used in demand modelling
 - This will include any additional new checks identified as part of the Adhoc workplan investigation into validation rules (agenda item 3.1)
 - Aim is to strike the balance of ensuring vast majority of data errors are removed yet maximising the number of sample points available for modelling

Daily Weather Data

- The Composite Weather Variables (CWVs) used in the modelling will be those derived using the new formula introduced in 2020 (including Solar Radiation) and optimised parameters
- There have been no changes to the weather stations used since the Seasonal Normal Review in 2020, details of which can be found in Section 11 of the NDM Algorithm booklet
- The EUC demand modelling for CWVs and Seasonal Normal Composite Weather Variables (SNCWVs) is based on the Seasonal Normal basis effective from 1st October 2020

High Level Modelling Principles

- Band 01 (0-73.2 MWh) and Band 02 (73.2 – 293 MWh) modelled as 4 separate models
 - Domestic Prepayment and Non-Prepayment
 - Non-Domestic Prepayment and Non-Prepayment
- Bands 03 and 04 WAR Bands now modelled separately (subject to DESC approval)
- Bands 07 and 08 Consumption Bands merged for modelling purposes
- Bands 05 to 08 WAR Bands merged for Bands 06 to 06 WAR Band modelling purposes only – Band 05 WAR Band to be modelling separately (subject to DESC approval)
- Band 09 to use Band 08 Consumption Band model (subject to DESC approval)
- Holiday Code Rules applied will be those revised as part of the 2021/22 Ad Hoc work plan and are set out in Appendix 5 of the Modelling Approach document
- Warm weather analysis in order to identify 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 2020 (DESC approved continued use of Model Smoothing), analysis years to be used for smoothing are covered on the Smoothing Analysis slide

Smoothing Analysis Periods

- The 2022/23 Analysis Period has been impacted by unusual weather and rising energy prices, particularly on Domestic meter consumption
- As it stands our recommendation is to include the data collected for the Analysis Period 22/23. However, the approach can be flexible depending on results shared with DESC in April and May
- The proposed approach to Model Smoothing is shown on the right, picking up the latest Analysis Period for all EUCs, and the two latest used Analysis Periods for Smoothing
- For the 2021/22 Gas Year it was decided by DESC that only EUC “01BND” would use data from Analysis Period 2020/21 (due to the impacts of COVID-19)
- To limit the impact of a step change on the Peak Load Factors for Domestic prepayment meters (“01PBD”) if it was decided by DESC to smooth the transition to class 3 data over 3 years

Suggested Smoothing Analysis Periods

Analysis Year	01BND	01BPD	Other EUCs
2012/13		✓	
2019/20			✓
2020/21	✓		
2021/22	✓	✓	✓
2022/23	✓	✓	✓

Gas Demand Profiles

- 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 across the full weather history (Gas Year 1960 onwards)

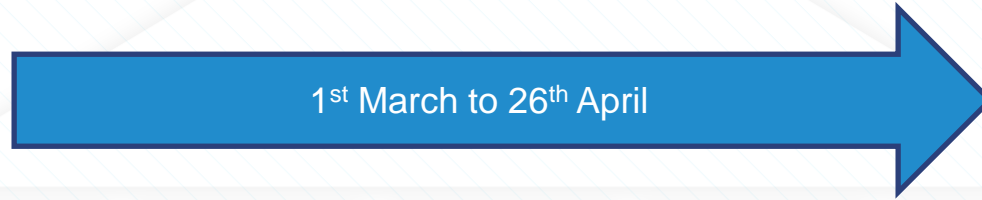
Fall-back position:

In the event the NDM proposals derived from the analysis performed in 2023 are rejected by DESC, the underlying demand models from 2022 would be used - referred to as 'fall-back' proposals (UNC Section H)

Summary of changes

- EUC Review changes
 - to be incorporated into document after meeting, based on results of DESC vote
- Stratification wording change (as included in draft document published in January 23)
- Socioeconomic factors wording change (as included in draft document published in January 23)
- Are DESC happy to approve the principles as set out in the Modelling Approach document and those changes discussed today?

Next Steps



Publish Modelling
Approach

Demand Estimation
Early March

Prepare Sample
Data and Modelling
Systems to reflect
agreed Approach

Demand Estimation
1st March to 31st
March

Collect and Validate
Sample Data

Demand Estimation
10th to 18th April

Agree Gas Demand
Modelling Runs

DESC
26th April