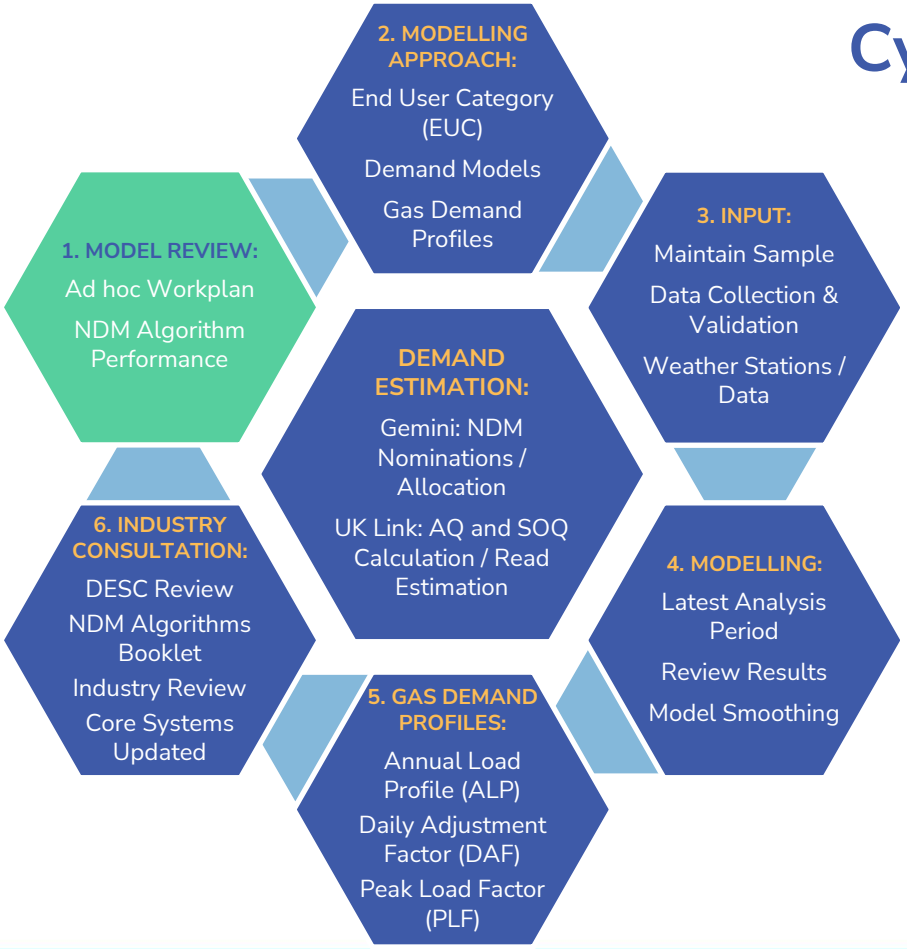
Demand Estimation Sub Committee

4.0 NDM Algorithm Performance Review
Gas Year 2022/23 - Introduction
19 December 2023

Demand Estimation Cycle



- 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 Model Review phase of the Demand Model cycle

CDSP / DESC Obligations and Timetable: October 2023 to September 2024

Milestone	UNC H Ref	2023			2024								
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DESC Membership confirmed	1.12	✔		✔									
NDM Sampling: Data Collection and Validation	1.6	✔						✔					
NDM Algorithm Performance for Gas Year 2022/23	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											✔	
Seasonal Normal Review 2025	1.4	✔		✔			✔		✔		✔		

Background

- DESC has a Uniform Network Code (UNC) obligation to review the performance of the Gas Demand Profiles for the latest completed Gas Year
- UNC Section H 1.8.1 (d) states DESC will submit to the industry:

"a summary of the Committee's analysis of the performance in the Preceding Year of the End User Categories and Demand Models (applicable in the Preceding Year)"

- This activity is referred to as 'NDM Algorithm Performance' and is normally reported on at the December DESC meeting each year
- DESC agreed to use 3 Strands of analysis to satisfy their obligation, they are:
  - Strand 1: Weather Analysis
  - Strand 2: Unidentified Gas Analysis
  - Strand 3: NDM Daily Demand Analysis

Background

- Demand Attribution – Daily Balancing

Note: stock change forms part of the calculation and can be positive or negative

LDZ Input (Measured) - DM Energy (Measured) - NDM Energy (Estimated) - Shrinkage (Estimated) = UIG Remaining (Balancing Figure)

Where:
LDZ = Local Distribution Zone
DM = Daily Metered
NDM = Non-Daily Metered
UIG = Unidentified Gas

- Supply Meter Point Demand Formula (NDM Algorithm) – Section H 2.2.1

AQ/365 (Average Daily Consumption) * ALP_t (Seasonal Normal Consumption) * $1 + (WCF_t * DAF_t)$ (Weather Corrected Consumption) = NDM Demand (Class 3 & 4)

Where:
AQ = Annual Quantity
ALP = Annual Load Profile
DAF = Daily Adjustment Factor
WCF = Weather Correction Factor

Approach – Strand 1: Weather Analysis

- Supply Meter Point Demand Formula (NDM Algorithm) – Section H 2.2.1

$$\text{AQ}/365 \text{ (Average Daily Consumption)} * \text{ALP}_t \text{ (Seasonal Normal Consumption)} * (1 + (\text{WCF}_t * \text{DAF}_t)) \text{ (Weather Corrected Consumption)} = \text{NDM Demand (Class 3 \& 4)}$$

- Weather Correction Factor (WCF) represents the difference between Actual and Seasonal Normal Weather (CWV-SNCWV)

- Strand 1: Weather Analysis focusses on the WCF values observed in the Gas Year to:
  - Summarise the weather experienced in the Gas Year to provide context to Strand 2 & 3 Analysis
  - Identify any insight which DESC may wish to consider as part of the next CWV formula review

- Weather Analysis summary to be discussed under Agenda Item 4.1, with full set of results to be provided in Section 12 of the NDM Algorithms Booklet

Approach – Strand 2: UIG Analysis

- Supply Meter Point Demand Formula (NDM Algorithm) – Section H 2.2.1

- Unidentified Gas (UIG) represents the balancing figure in the daily demand attribution calculation and will naturally include any modelling error in the estimate of NDM Energy. UIG will also 'sweep up' any inaccuracies in the LDZ Input, DM Energy or Shrinkage values
- Strand 2: UIG Analysis can therefore be used as an indicator of the performance of the NDM Algorithm and by reviewing UIG volumes and trends, can provide context when reviewing the Strand 3 results
- This Strand also considers the AQ (e.g. trends during the Gas Year) as this is a key input to the NDM Algorithm
- UIG Analysis summary to be discussed under Agenda Item 4.2 with full set of results to be provided in Section 12 of the NDM Algorithms Booklet

Approach – Strand 3: NDM Daily Demand Analysis

- Supply Meter Point Demand Formula (NDM Algorithm) – Section H 2.2.1

$$\underbrace{AQ/365}_{\text{(Average Daily Consumption)}} * \underbrace{ALP_t}_{\text{(Seasonal Normal Consumption)}} * \underbrace{1 + (WCF_t * DAF_t)}_{\text{(Weather Corrected Consumption)}} = \underbrace{\text{NDM Demand}}_{\text{(Class 3 \& 4)}}$$

- Strand 3: NDM Sample Analysis is the key strand for assessing the performance of DESC's EUCs and Demand Models as it compares daily actual demand from the NDM sample with the estimated value from the NDM Algorithm
- Strand 3 results deliver the main conclusions for DESC which can be used in future approaches to Demand Modelling
- Key Point: AQ used in this analysis is NOT the AQ used in the core systems. This analysis focusses on the Demand Models and not changes in AQ levels, which are considered in Strand 2
- NDM Daily Demand Analysis summary to be discussed under Agenda Item 4.3 with full set of results to be provided in Section 12 of the NDM Algorithms Booklet

Objectives

- The main purpose of NDM Algorithm Performance is to:
  - Review the performance of the End User Categories and Gas Demand Profiles for the latest Gas Year
  - Identify possible areas of improvement for future demand modelling
- These objectives will now be considered in more detail in Strands 1, 2 and 3