# Demand Estimation Sub Committee

NDM Algorithm Performance (Gas Year 2017/18)
Strand 4 Analysis – Reconciliation Analysis

11th February 2019

# Background

DESC have responsibility for conducting NDM Algorithm Performance

- UNC requirement ‘H 1.8.1 (d)’ states “DESC will submit to all parties 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)”

At the DESC meeting on 15th November 2016, the group reviewed four proposed strands of analysis which would help assess the accuracy of the estimated allocations derived by the revised formula. These analysis strands are as follows:

Strand 1 – Weather Analysis

Strand 2 – Unidentified Gas Analysis

Strand 3 – NDM Daily Demand Analysis

Strand 4 – Reconciliation Analysis

# Reconciliation Analysis to date

- In early 2018, Reconciliation Analysis was performed for gas year 2016/17 (limited to the four months of June to Sep’17) against sites in EUC bands 02 through to 08 (c 270k sites)

- Analysis of sites in EUC band 01 was not performed due to processing limitations for the associated data volumes (c 24m sites)

- In early 2019, the UIG task force have undertaken Reconciliation Analysis for gas year 2016/17 (covering all EUC bands) and findings are expected to be published for industry review by March’19

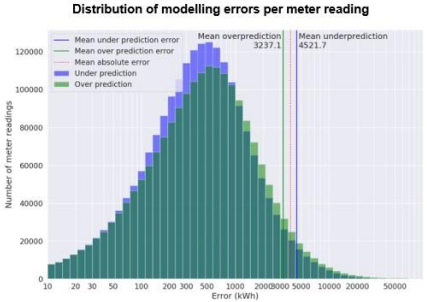
# Preview of Task Force analysis

## Summary of Findings

| | | | |
|---|---|---|---|
| **Area & Ref #** | [Taken from Investigation Log] (Ref #Y) | **Findings Status** | [Closed] |
| **UIG Hypothesis** | There may be relevant insights to be gained from the demand error in the full meter population, even though we don't get daily meter reads as we do for the sample set. It may identify correlations between demand errors and the adjustments. This could also reveal potential differences between the sample set and the full population, as well as spotting worst offenders within EUC1. It may be possible (future task?) to consider points which submit meter readings frequently (i.e. 'good' meters) to identify the impact on volatility.<br><br>**So What?**<br>How well does the NDM modelling work for the larger population especially for EUC1 which has never been assessed before. | **UIG Impact Peak Volatility %**<br>**UIG Impact Annual Average %** | -<br>- |
| **Specific Item** | [Taken from Executive Summary] | **Confidence in Percentages** | - |
| **Data Tree References** | [List which objects within the Data Tree this investigation touches on] | | |

| Findings | Approach to analysis |
|---|---|
| The analysis of East Anglia meter readings indicates the distribution of the demand estimation errors which shows a mean per meter absolute demand estimation error of approximately 3892 kWhr. The net per meter demand estimation error (equivalent to UIG) gives an underestimate of 719 kWhr. As a percentage of the true NDME energy for East Anglia, this is 21.1%.<br><br>Interpreting the analysis carried out on the full meter population is challenging because there are a few large meter points (i.e. high EUCs) that mask a large population of small meter points (low EUCs).<br><br>This analysis requires a breakdown by EUC in order to interpret it more easily.<br><br>The list of demand estimation errors will be provided to support further analysis. | All the meter readings for East Anglia were compared to the predicted gas consumption for the period since the last meter reading.<br><br>The distribution of reading intervals and modelling errors across the full dataset for East Anglia (i.e. all ~2 million meters for this LDZ) and the relationship between this modelling error and the interval between readings was investigated.<br><br>This was carried out for all EUCs across Gas Year 2016-2017 (although this data set had meter readings from outside of this Gas Year). |

## Supporting Evidence (1/3) – Demand modelling error of meter readings




The figure indicates the number of meter readings with a given modelling error.

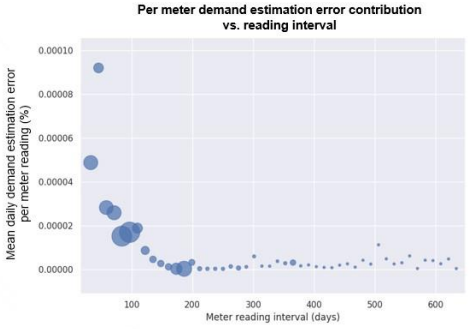
It separates between those that are under estimated (shown in blue) vs. those that are over estimated (shown in green). The bars are partially transparent, so appear dark green where they overlap.

There are more overpredictions occurring at higher energies and more underpredictions at lower energies. The total underpredicted energy exceeds the overpredicted energy, leading to an overall underprediction of NDME. This is consistent with UIG being positive in most cases.

The average under estimation, over estimation and mean absolute error lines are shifted away from the peaks due to the logarithmic axis of the histogram, and a number of very large errors away from the main distribution (not shown in this plot).

The mean overall modelling error as a percentage of the true NDME energy is 21.1%.

## Supporting Evidence (3/3) – UIG contribution of meter readings of a given interval



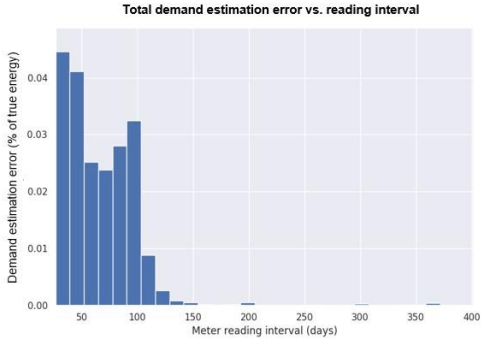

The graph illustrates the mean absolute demand estimation error per meter reading for a given meter reading interval. The size of each point indicates the number of readings in the data set at each interval.

The UIG peaks at meters read with intervals of around 60 days, at a value close to twice that of readings of around 30 days. This may potentially be because readings in the 45-75 days range tend to be late submissions of meters which should be read monthly.

After 60 days, the UIG decreases for increasing reading intervals, staying relatively constant after around 180 days.

This reduction is likely to be due to short-term modelling errors cancelling out, leading to a reduced error over the period of the reading.

## Supporting Evidence (2/3) – UIG contribution of meter readings of a given interval




This figure illustrates the total demand estimation error of all meter readings taken after a given meter reading interval.

The meters that are read at short-intermediate intervals (~30 and ~90 days) contribute the most to the total error in the predicted energy usage. This is due to both their greater average consumption and occurrence.

# Reconciliation Analysis going forward

Discussion topics:

- The method of analysing Meter Point Reconciliation does have its limitations in measuring the performance of the NDM Algorithm specifically

- Do DESC have any views on approaches to Reconciliation Analysis which can ensure results are meaningful ?
  - At the DESC meeting on 13th February 2018, Xoserve requested feedback on any alternative approaches to Reconciliation Analysis for gas year 2017/18 (No comments received to date)

- The UIG task force is able to perform additional Reconciliation Analysis for gas year 2017/18
  - Opportunity for DESC to influence what analysis is completed