Demand Estimation Team Update

January 2021

Dear Customers and Industry Colleagues,

Our Xoserve Demand Estimation Team would like to share with you an update on the work performed during a busy last quarter of 2020.

The update provides a summary of the performance of the Gas Demand Profiles for the recently completed Gas Year 2019/20, including positive results which support the introduction from October 2019 of more suitable profiles in the most populated End User Category (EUC) Bands (AQ Range 0-293 MWh pa).

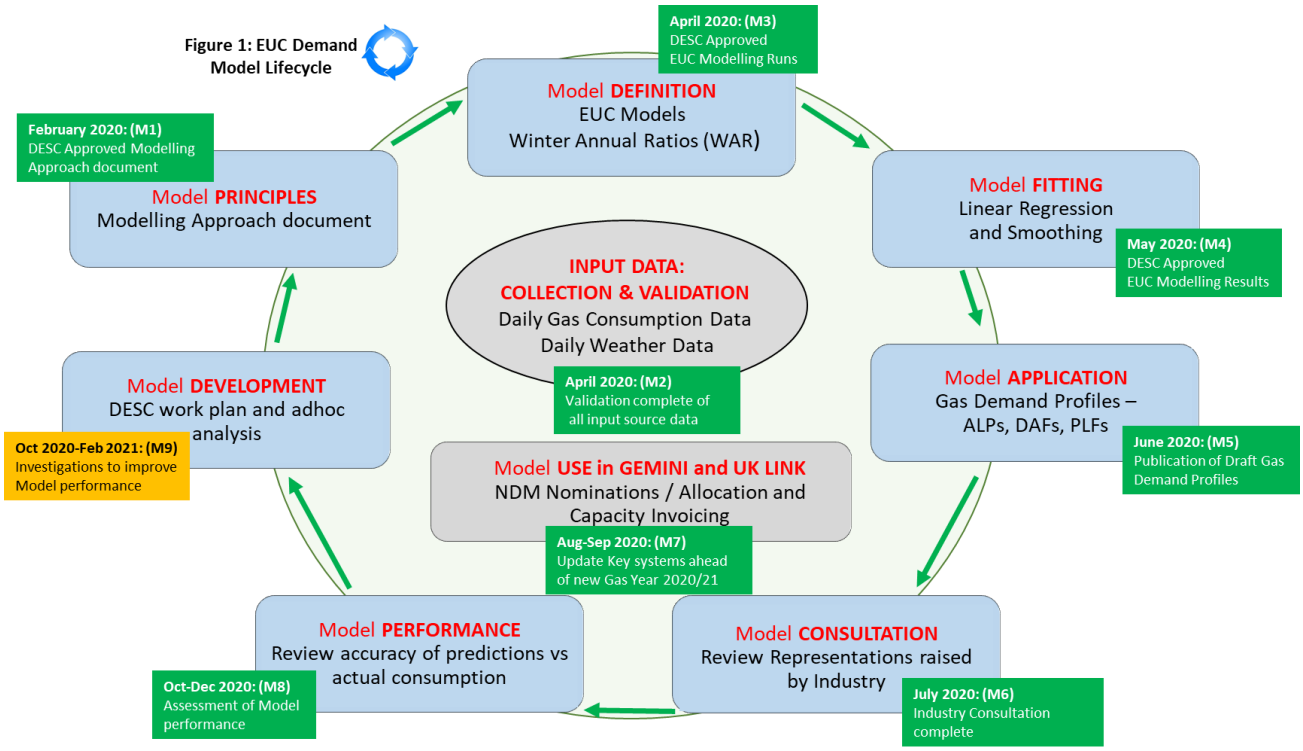
In addition, the team also reports on how improvements in the accuracy of Non-Daily Metered (NDM) Allocation, brought about by enhancements to the industry weather parameter – Composite Weather Variable (CWV), has led to some encouraging **simulated** views of Unidentified Gas levels (UIG) for Gas Year 2019/20, which we can realistically expect to see benefit the current and future Gas Years.

Finally, an update on the Central Data Service Provider(CDSP) consultation on the future of the NDM Algorithm is also provided, along with a look ahead to the impacts of the COVID-19 pandemic on the coming year's modelling process in 2021.

End User Category Demand Modelling

The annual End User Category (EUC) Demand Modelling activities performed by the Demand Estimation Team are summarised in **Figure 1** below. In February and July last year, we provided updates on the Modelling phases of "Principles", "Definition", "Fitting", "Application" and "Consultation". This update will focus on the "Performance" phase of the cycle which is traditionally performed in the final quarter of the year following the 'close-out' of the relevant Gas Year.

Figure 1: EUC Demand Model Lifecycle



Model Performance – Gas Year 2019/20

The Demand Estimation Sub Committee (DESC) has several UNC Section H obligations relating to the EUC Demand Modelling process, including some which refer to 'Model Performance'. This is achieved via three different strands of analysis, the first reviews the actual weather experienced, the second analyses the Unidentified Gas (UIG) levels and the third compares actual daily gas consumption from a sample of NDM consumers with a view of the allocation calculated from the relevant Gas Demand Profiles.

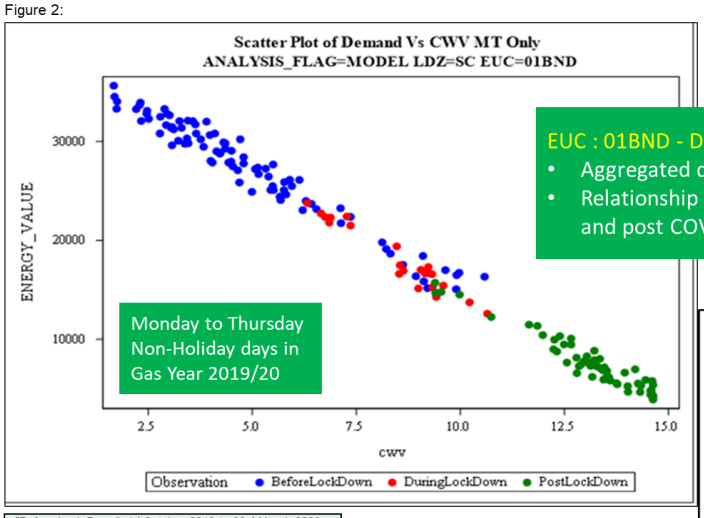
During October and November the Demand Estimation Team processed and validated daily gas consumption data from a sample of thousands of supply meter points across all LDZs covering the period 1st October 2019 to 30th September 2020. The consumption from the successful sites was compared to the allocated value based on an Annual Quantity (AQ) derived from the sample and the Gas Demand Profiles used in Gemini.

Unsurprisingly this year's analysis has been severely impacted by the COVID-19 pandemic. The downturn in gas demand within the Industrial and Commercial (I&C) sector meant the performance of the profiles was not as accurate as in previous years, particularly in the second half of the year. The Domestic sector was not impacted as much, due to the warm Spring and the 'space heating period' concluding around the time the first pandemic lockdowns occurred.

Figure 2 provides an example of the demand reactions as a result of the COVID-19 pandemic restrictions for the Domestic and Industrial and Commercial sectors, which was typical across all LDZs.

Figure 3 highlights the performance of the Domestic Non-Prepayment profiles in the AQ range 0-73.2 MWh pa. across all LDZs for Gas Year 2019/20.

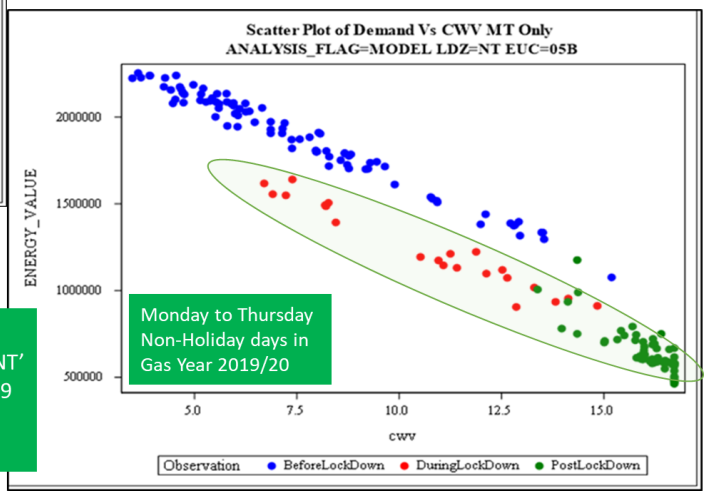
Figure 2:



"Before Lock Down": 1st October 2019 to 22nd March 2020
"During Lock Down": 23rd March to 14th May 2020
"Post Lock Down": 15th May to 30th September 2020

EUC : 01BND - Domestic Non-PrePayment - AQ Range: 0 to 73.2 MWh

- Aggregated daily gas consumption for all sampled Domestic sites in LDZ 'SC'
- Relationship to weather (CWV) remains consistent throughout Gas Year pre and post COVID-19

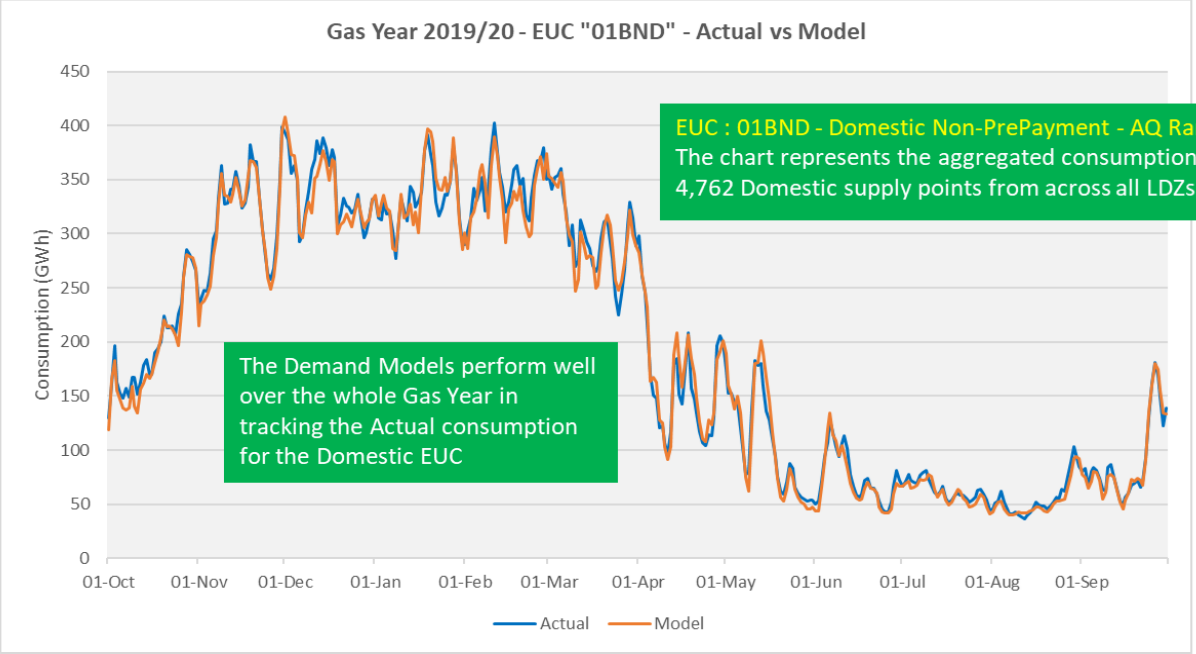


EUC : 05B – I&C - AQ Range: 2,196 to 5,860 MWh

- Aggregated daily gas consumption for all sampled I&C sites in LDZ 'NT'
- Noticeable change in demand levels between Pre and Post COVID-19 impacted periods. Normal levels would be expected to be on the same 'line' as blue data points

Reminder: All of the obligations of DESC and the Xoserve Demand Estimation Team are set out in UNC Section H and the Demand Estimation Methodology.

Figure 3:



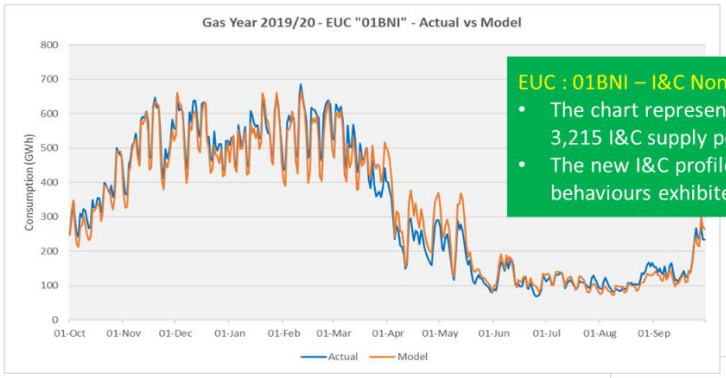
New End User Categories for Bands 1 and 2

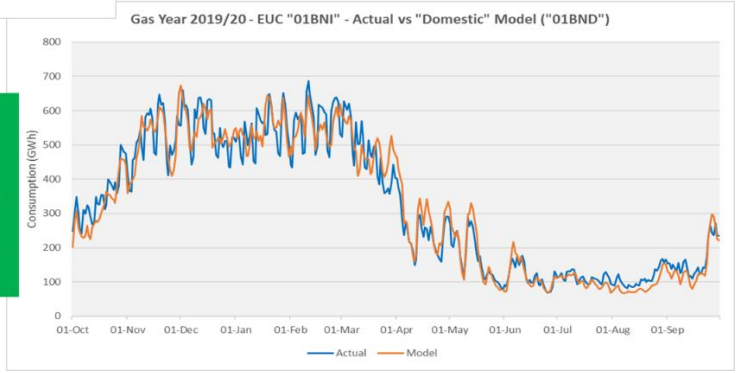
Gas Year 2019/20 saw the introduction of an additional six End User Categories (EUC) to represent the AQ Range 0 to 293 MWh pa in order to improve the accuracy of NDM allocation. There are now eight EUCs instead of two to represent c.80% of the NDM AQ population.

Figure 4 provides a clear demonstration of the benefits the new profiles have provided, by comparing Actual aggregated consumption from the Band 1 Industrial & Commercial (I&C) sample with its new dedicated profile ("01BNI") and the profile it would have used without the introduction of the new EUCs ("01BND").

Approximately 500,000 supply meter points are now benefitting from more accurate allocation which will be contributing to less reconciliation and UIG.

Figure 4:





A view of the same 3,215 I&C supply points but using Domestic profiles (not actually used following the introduction of 01BNI)

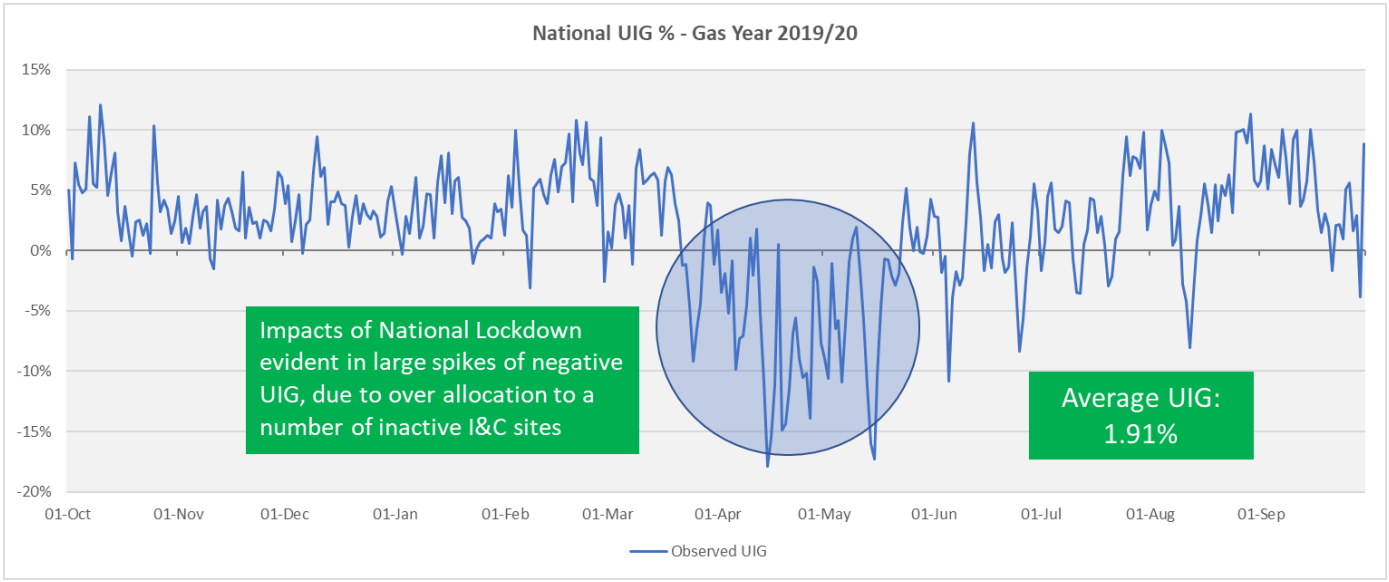
- Throughout the Gas Year the Model is clearly not providing a good prediction of the actual demand levels
- From Gas Year 2019/20 the I&C sites in Band 1 are no longer seeing their allocation follow this unsuitable profile

Unidentified Gas (UIG) – Gas Year 2019/20

One of the strands of NDM Algorithm Performance includes reviewing the Unidentified Gas (UIG) levels. UIG as the balancing figure in each LDZ can be caused by multiple factors, including NDM demand modelling error. Therefore, reviewing UIG can be a useful exercise in measuring the success of the Gas Demand Profiles. NDM modelling error can be caused by inappropriate AQs and/or inaccurate Gas Demand Profiles.

Figure 5 provides a view of the National UIG for Gas Year 2019/20 which averaged at 1.91% across the whole year. Impacts of the COVID-19 restrictions are clear to see during the Spring. This negative spike will have been caused predominantly by NDM modelling error which in turn will have been caused by the NDM AQs not being suitable for the sudden drop in consumption, particularly across the I&C sector.

Figure 5:



Unidentified Gas (UIG) - Gas Year 2019/20: Simulation Analysis

On 1st October 2020, a new formula for deriving the Composite Weather Variable (CWV) became effective. The **CWV** is a key building block in the production of EUC demand models and is a unique variable to the gas industry because it's main driver is to provide a linear relationship to gas demand. The more accurate we can make this relationship the more accurate the EUC demand models and NDM allocation will be. This will subsequently result in a reduction in UIG (all things being equal).

Analysis has been performed by the Demand Estimation team which takes the new EUC demand models for Gas Year 2020/21 and recreates the Gas Demand Profiles for Gas Year 2019/20. In addition, a revised CWV and SNCWV history which reflects the new formula is also available. Using these revised parameters, it has been possible to simulate a revised NDM allocation and UIG.

Figure 6 shows how the 'Simulated UIG' has been generally reduced across the Gas Year resulting in a reduction of c.31% over the annual period. It is also noticeable how many of the UIG 'peaks and troughs' have been supressed.

Figure 7 reveals the results when considering the first half of the year only (1st October 2019 to 31st March 2020) which is when a) the highest UIG volumes are observed and b) before the impacts of COVID-19 take effect (which inevitably dwarfs any modelling performance gains). Alongside the comparison of Observed and Simulated UIG sits the results of the improvement in the Domestic ("01BND") modelling error which is clearly related to the encouraging Simulated UIG outcome.

Figure 6:

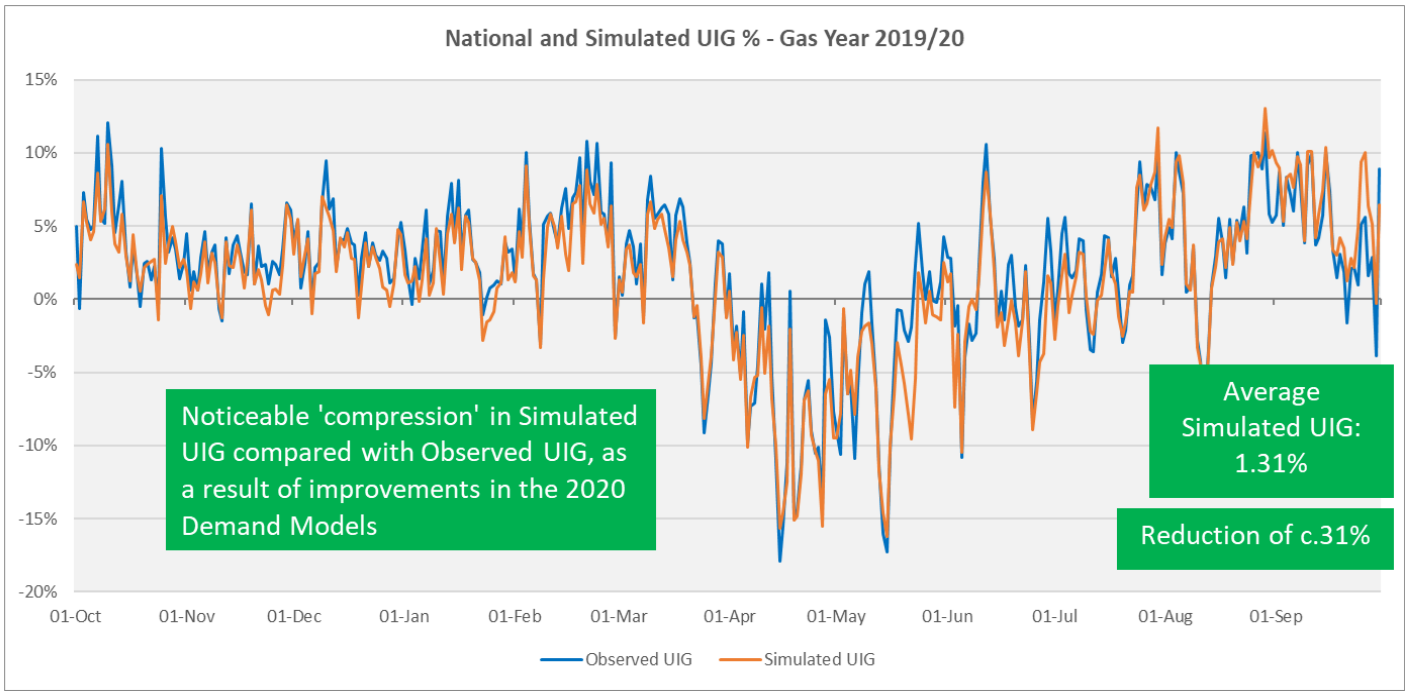
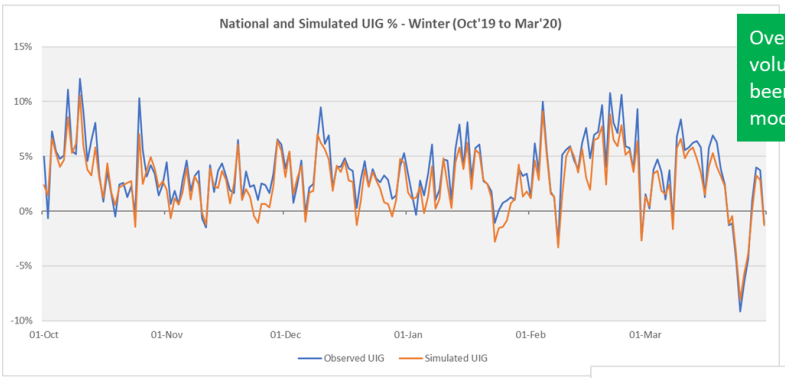
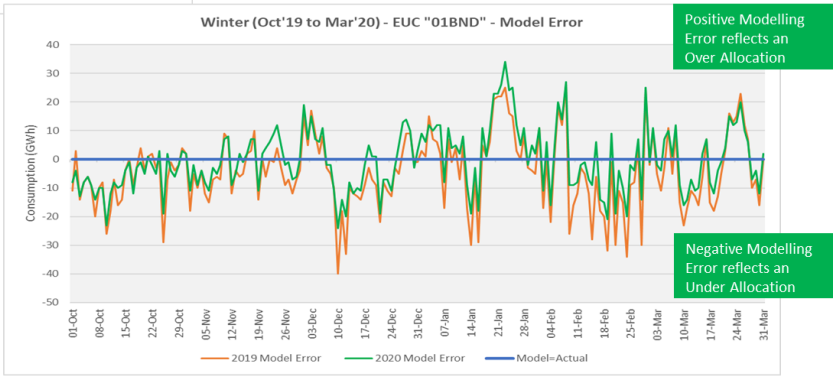


Figure 7:



Over the majority of the Winter period where UIG volumes are at its highest the Simulated UIG has been reduced, this is due to the reduction in modelling error, particularly for EUC 01BND

Average Simulated UIG: 2.76%
Reduction of c. 22%



Positive Modelling Error reflects an Over Allocation

Negative Modelling Error reflects an Under Allocation

Over the majority of the Winter period the general Domestic modelling error of under allocation has been improved thus contributing to the reduction in UIG

The Bias Error (MPRE) improved from a net under allocation of -1.43% to -0.15%

These results are encouraging and support the recent improvements approved by DESC such as the new EUC profiles and enhancements to the industry weather variable. Clearly these improvements are welcome, however it should be noted that during these unprecedented times we can expect NDM allocation to still be unsuitable sometimes for certain sectors and therefore unusual UIG levels could continue to be observed.

For more detailed information on all 3 strands of analysis presented to the Demand Estimation Sub-Committee (DESC) in December 2020, please refer to the NDM Algorithm Performance document **here**

NDM Algorithm Consultation

During the last quarter of 2020, the Demand Estimation team also led an industry consultation on the future of the NDM Algorithm. This was established in order to clarify the industry's views on how much change it was prepared to accept from the existing demand modelling arrangements in order to drive more improvement in the NDM allocation calculations.

We received a good response and some clear guidance which will provide a framework for future discussions. The results of the consultation have now been published and discussed at several industry forums during December 2020. If you have yet to have the opportunity to review the consultation outcomes, please take a look at the summary **here**.

Next Steps include the raising of a UNC Review Group to consider further advanced analytic approaches (e.g. Machine Learning) within the boundaries clearly set by the consultation responses.

Demand Estimation in 2021

The impacts of COVID-19 will continue to affect the preparation of the EUC Demand modelling for Gas Year 2021/22 and DESC will need to carefully consider how it uses the relevant daily consumption data and will have to be flexible in its approach as the year unfolds. The timetable for this year's DESC meetings is now agreed and available **here.** DESC is an open forum and we welcome new faces and contributions from across the industry.

Further Information

If you have any questions or comments on any aspect of the topics covered in this news article, please contact us at **xoserve.demand.estimation@xoserve.com**.

We hope you have found this update useful.

Kind regards

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