Demand Estimation: Gas Year 2020/21 Update

July 2020

Dear Customers and Industry Colleagues,

Our Xoserve Demand Estimation Team would like to share with you a further update on the annual process of defining the End User Categories (EUCs) and associated Gas Demand Profiles for Gas Year 2020/21.

In **February** this year, we provided an overview of the Demand Estimation process including all of the key upcoming milestones. We also reflected on the completion of the first milestone in this year's demand modelling timetable.

This update focusses on the latest work that has been completed by the Team, alongside the Demand Estimation Sub-Committee (DESC), and provides an overview of the completed milestones.

We have recently published our *2020/21 Non-Daily Metered (NDM) Algorithms booklet.* This provides a more detailed description of the end-to-end process and contains the lower level modelling statistics which sit behind the final output.

The NDM Algorithms booklet, alongside the *Modelling Approach document,* represents a formal record of how the DESC has fulfilled its annual Uniform Network Code (UNC) obligations of producing Gas Demand Profiles for the benefit of the wider industry.

Both documents are available on our UK Link Secured Documentation area in the following location:

Folder 18: NDM Profiling and Capacity Estimation Algorithms/2020-21 Gas Year

To arrange access to the secured area, please ask your Local Security Officer (LSO) to complete and submit a **Secure Site Access Request Form**.

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**.

Key Point
All of the weather data used in this year's EUC demand modelling has been based on the new Composite Weather Variable (CWV) formula, definitions and the new Seasonal Normal Composite Weather Variable (SNCWV). This is because, although they only become effective from 1st October 2020, the output produced by the Demand Estimation Team is required in advance of the new Gas Year.
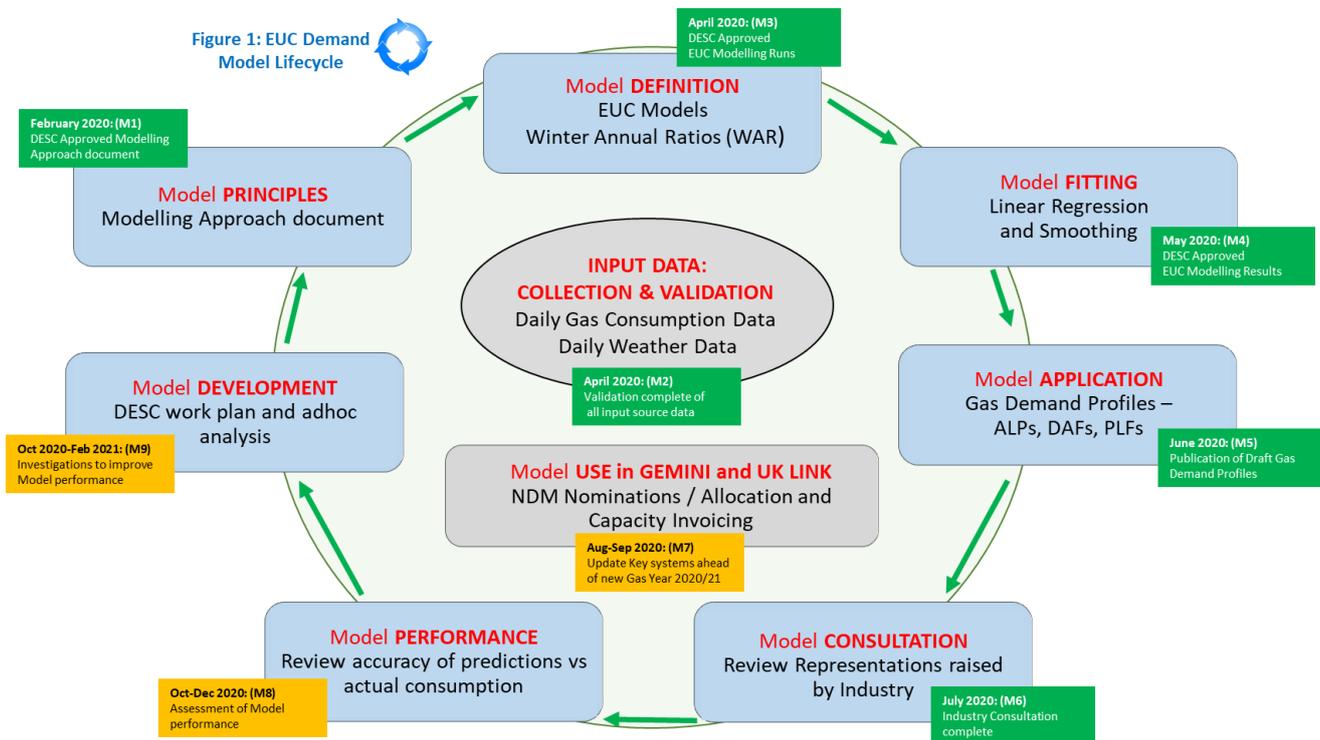
Please find details of the Seasonal Normal Review, including links to the latest news article, **here**.

EUC Demand Modelling Lifecycle Background

The calculation of Gas Demand Profiles which are used for the population require a Demand Model.

The lifecycle of an EUC Demand Model ultimately begins with the production of a set of principles, which define how the models should be created. In order to produce EUC Demand Models that provide a robust representation of the population, the establishment of a set of modelling principles is an important milestone. This is described in more detail in our **February** update.

Figure 1 below shows the cyclical nature of the EUC Demand Model lifecycle. The logical starting point being the establishment of modelling principles, and the end point being the review of model performance. However, it is important that results from the performance review and recommendations feed into future iterations of model development and principles, hence the cyclical approach.

Figure 1: EUC Demand Model Lifecycle

April 2020: (M3) DESC Approved EUC Modelling Runs

Model DEFINITION EUC Models Winter Annual Ratios (WAR)

February 2020: (M1) DESC Approved Modelling Approach document

Model PRINCIPLES Modelling Approach document

Model FITTING Linear Regression and Smoothing

May 2020: (M4) DESC Approved EUC Modelling Results

INPUT DATA: COLLECTION & VALIDATION Daily Gas Consumption Data Daily Weather Data

April 2020: (M2) Validation complete of all input source data

Model DEVELOPMENT DESC work plan and adhoc analysis

Oct 2020-Feb 2021: (M9) Investigations to improve Model performance

Model APPLICATION Gas Demand Profiles – ALPs, DAFs, PLFs

June 2020: (M5) Publication of Draft Gas Demand Profiles

Model USE in GEMINI and UK LINK NDM Nominations / Allocation and Capacity Invoicing

Aug-Sep 2020: (M7) Update Key systems ahead of new Gas Year 2020/21

Model PERFORMANCE Review accuracy of predictions vs actual consumption

Oct-Dec 2020: (M8) Assessment of Model performance

Model CONSULTATION Review Representations raised by Industry

July 2020: (M6) Industry Consultation complete

Key Point
Each of the green milestones shown above, completed every year, are reviewed and approved by the DESC. This ensures the work performed by the Demand Estimation Team has regular checks and balances, as many of the obligations belong to the DESC.

Reminder
The DESC is an open forum and meets several times per year. This year's timetable and meeting content available **here**. Although voting can only be performed by DESC members, the forum welcomes fresh ideas and views, which can help us collectively improve the demand modelling outcomes.

Collection and Validation of Gas Consumption Data - *Completed April 2020*

All year round the Demand Estimation Team is receiving daily gas consumption data from multiple sources. These include:

- Xoserve's own managed sample of gas consumers
- The Distribution Network's samples
- Since the introduction of UNC Modification 654S, Shippers who are required to submit data for Demand Estimation purposes (those with a portfolio of consumers >25,000)

March and April is a particularly busy period as data for the latest analysis period (1st April 2019 to 31st March 2020) is collated and validated in order to be used as a key input to the demand modelling.

Ultimately the accuracy of the final Demand Models depends greatly on the quality of the input data, in this case daily gas consumption. The validation is therefore a crucial part of the Demand Model Lifecycle and needs to ensure all data errors are removed (where possible) and ensure there are sufficient data points available to build robust Demand Models for each of the EUCs (currently over 500 of them).

Figure 2 provides a theoretical example of a supply meter point which passes validation, while **Figure 3** provides an example where it has been rejected due to unreliable consumption patterns such as consecutive zeros, missing reads etc.

Review and Approval of EUC Modelling Runs - *Completed April 2020*

Once the daily gas consumption data has been cleansed and classified for demand modelling, we need to work with the DESC to consider how we should use it in conjunction with the agreed EUC definitions.

In April, the DESC were presented with the counts of validated supply meter points per EUC in order to decide how the demand modelling should be performed. The primary objective is always to create unique models for each combination of EUC and Local Distribution Zone (LDZ). However, this is not always possible due to low sample counts. In these cases, the DESC may choose to aggregate the consumptions across LDZs, for example the 'Northern LDZs' of SC, NO and NE may be combined to form one Demand Model.

Another key decision at this stage relates to the setting of the Winter Annual Ratios (WAR) for those EUCs where the AQ is greater than 732 MWh pa (Bands 3 to 8).

> **Note**
> Read more about both these Milestones in **Section 1 and 2** of the NDM Algorithms Booklet.

**Review and Approval of EUC Modelling Results - *Completed May 2020***

The model fitting process represents the engine room of how the demand models are built.

Using the validated daily gas consumption data and the EUC modelling runs approved by the DESC in April, a series of Monday to Thursday non-holiday linear regressions are performed. This defines a core relationship (the model) between the aggregated consumption from the EUC, and the weather, Composite Weather Variable (CWV). In addition to the linear regressions, analysis is performed on the weekend and holiday days in order to understand how consumption levels change on these days.

This year, all of the EUC demand modelling work has been performed using a new system which was developed during the previous Autumn and Winter period. The new system offers much more efficiency, speed and flexibility. In addition, the extensive chart outputs provide greater insight to customers when reviewing the EUC demand model characteristics.

Figure 4 provides an example of the output shared with DESC this year. The full results were presented to DESC in May and are available **here**.

Figure 4
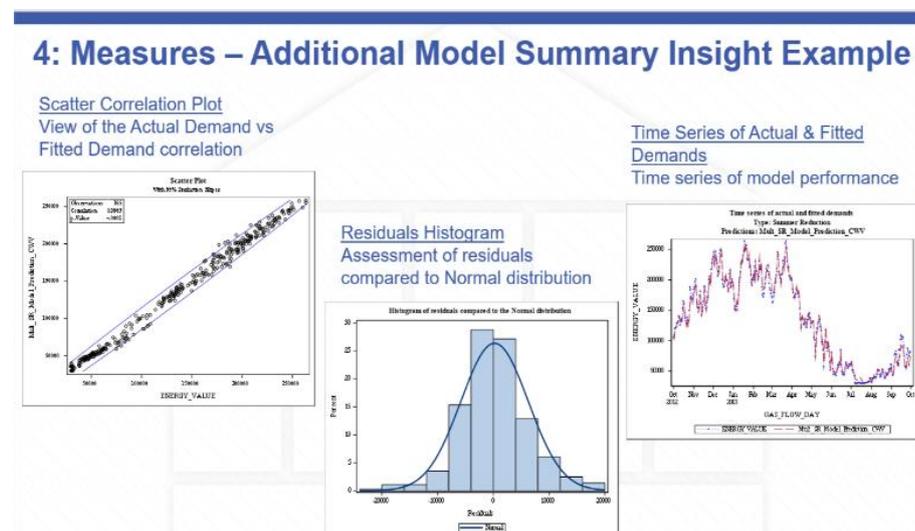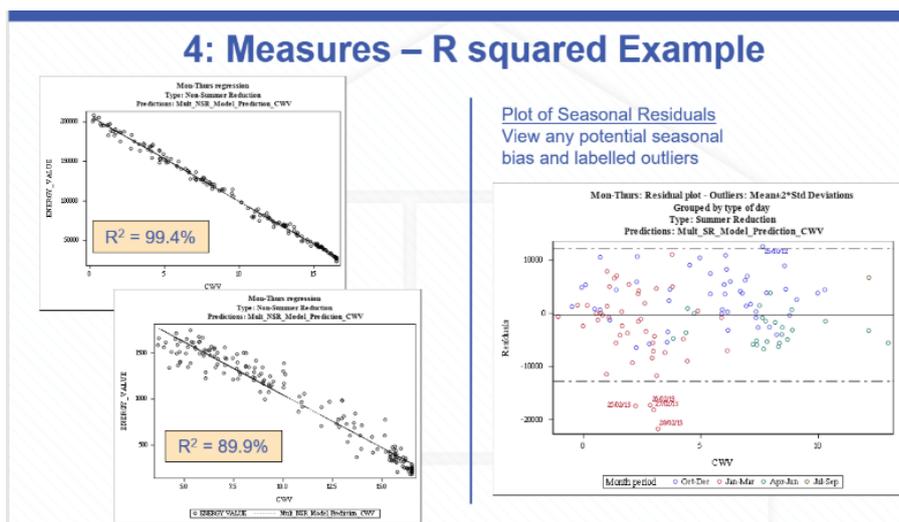
Impacts of the Coronavirus (COVID-19) Pandemic on EUC Modelling Results

The last few days of this year's analysis period covered some of the early days in lockdown relating to Government announcements as a result of the COVID-19 pandemic.

When reviewing the Industrial and Commercial EUC demand model results it was clear that these days were significant 'outliers' (lower than expected demands), and as such were undermining the model, which is designed to reflect expected behaviours. See **Figure 5** as an example.

The flexibility of the new EUC Demand Modelling System really came into its own when dealing with this scenario, as we were able to select individual days to remove from the analysis.

Figure 5
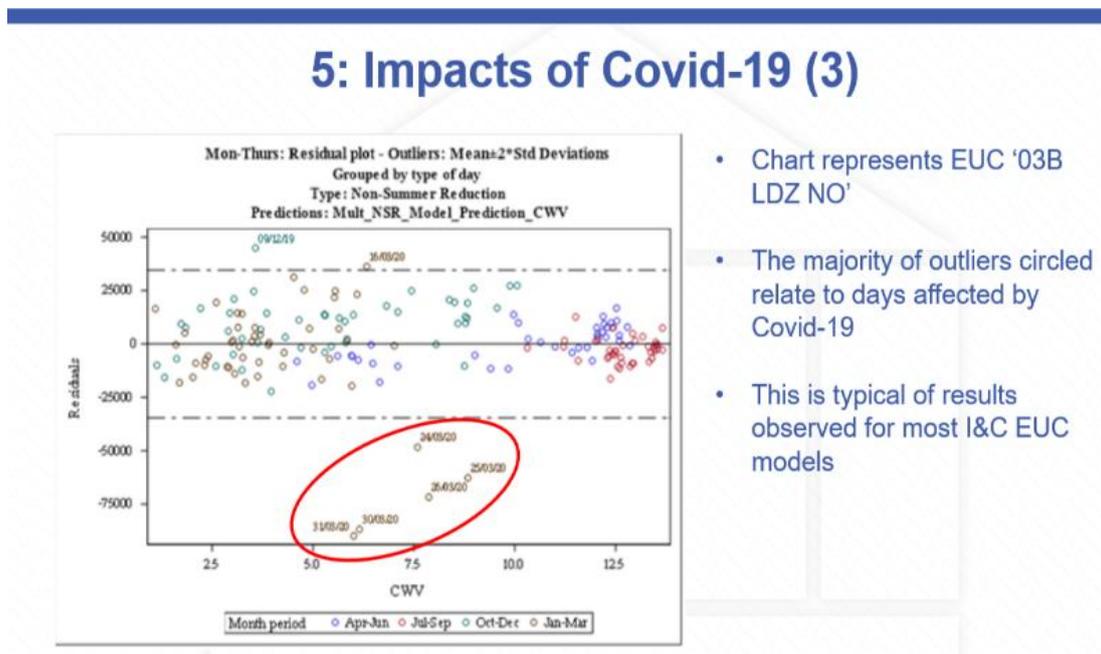
> **Note**
> Read more about this Milestone in **Section 3 and 5** of the NDM Algorithms Booklet.

Publication of Draft Gas Demand Profiles – *Completed June 2020*

Once approval was given by the DESC for the latest single year analysis period, we were able to commence the Model Smoothing phase. This effectively takes the results of the last three years for each EUC and produces a model which represents a view of the average effect observed during this period.

The smoothing approach reduces year-on-year volatility, which the industry is keen to avoid. Stability in these Demand Models ensures there are no large fluctuations in the resultant Gas Demand Profiles.

The Gas Demand Profiles represent the key output from the Demand Estimation process, and they are:

- The Annual Load Profile (ALP) – *a view of the EUC's typical consumption profile*

- The Daily Adjustment Factor (DAF) – *a view of the EUC's typical weather sensitivity reaction*

- The Peak Load Factor (PLF) – *a view of the EUC's typical reaction to extreme cold weather*

Any model is ultimately an attempt to represent reality, and we try to ensure the sample data used in the demand models is representative of the population. However, these profiles can only be an estimate of how we expect the population to behave, based on the relationships we have learned from the modelling approach applied.

In June, a draft set of ALPs, DAFs and PLFs were published, and made available to the DESC and its Technical Workgroup (TWG) to review.

> **Note**
> Read more about this Milestone in **Section 4, 6, 7, 9 and 10** of the NDM Algorithms Booklet.

Industry Consultation Complete – *Completed July 2020*

The consultation phase begins with the DESC and TWG reviewing the draft profiles. This year questions and clarifications were raised by two of the DESC members. There were some interesting points raised about the Christmas and Summer holiday periods in the upcoming Gas Year, which led to some debate about how they are currently defined. Details of all questions raised and the responses to them from the Demand Estimation Team can be viewed **here.**

Overall the DESC were satisfied with the responses and approved their Release to the wider Industry. Following a five-business day window for review it was confirmed that no further Representations had been made.

The Industry consultation concluded on 22nd July when the DESC approved the latest profiles and, as required by UNC Section H 1.9.1, Ofgem were informed that this year's process for deriving Gas Demand Profiles for Gas Year 2020/21 had been completed.

> **Reflection**
> This year's annual process of deriving new profiles was always going to be a challenge for the Team when you consider the introduction of a new Demand Modelling system and an update to the Seasonal Normal basis, which included a change to the CWV formula for the first time.
>
> The unexpected arrival of a worldwide pandemic and the consequential impacts that had on the modelling results and our ways of working has also contributed to a challenging year, however the Team and the DESC have ensured the agreed timetable milestones have been met.

Timetable for Production of EUCs and Gas Demand Profiles for Gas Year 2020/21

The latest view of the timetable and key checkpoints for this year's process can be viewed below:

Milestone	Status	Date
Modelling Approach Approved	Complete	10th February 2020
Collection & Validation of Gas Consumption Data	Complete	17th April 2020
Review & Approval of EUC Modelling Runs	Complete	27th April 2020*
Review & Approval of EUC Modelling Results	Complete	22nd May 2020*
Publication of Draft Gas Demand Profiles	Complete	5th June 2020
Industry Consultation Complete	Complete	22nd July 2020*
Gas Demand Profiles updated in CDSP Systems	Pending	14th August 2020
Gas Demand Profiles used for new Gas Year	Pending	30th September 2020

* DESC/TWG meeting dates

Next Steps

During August, the Demand Estimation Team will carefully prepare the interface files for both Gemini and UK Link in readiness for the start of the new Gas Year.

Reminder
All Gas Demand Profiles for Gas Year 2020/21 are available in our secure UK Link Documentation area: Folder 18: NDM Profiling and Capacity Estimation Algorithms/2020-21 Gas Year

Shortly, they will also be available in the public domain on the Xoserve.com website. Scroll to the bottom of this page **here**, *and look for* Demand Estimation Derived Factors.

Further Information

If you have any questions or comments on any aspect of the process for deriving this year's Gas Demand Profiles, please contact us at **xoserve.demand.estimation@xoserve.com.**

We hope you have found this update useful.

Kind regards

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