1. Objective

Xoserve, as the Central Data Services Provider (CDSP), is seeking industry views on the future of the Non-Daily Metered (NDM) Algorithm and the Sector it supports. The 4 main objectives are:

- To gather quantitative information from a wide range of gas industry participants on the level of support for improvements in the Non-Daily Metered (NDM) gas allocation algorithm, including the use of Machine Learning techniques
- To gather additional information on whether there is a requirement to retain the existing NDM gas allocation formula and its component parameters
- To gather industry participants' views on the future direction of the NDM sector of the GB gas market to help assess the business case for changes to it
- To quantify any financial benefits of a reduction in UIG due to improvements in the NDM allocation algorithm

2. Background

Following the implementation of the Project Nexus suite of process and systems changes in June 2017, the arrangements for daily allocation of gas changed, introducing the new concept of daily Unidentified Gas (UIG) as the balancing factor in each LDZ.

Since then, the level and variability of daily UIG has been unpredictable and this has caused industry participants considerable issues. Following approval of a UNC Modification and Change Proposal in July 2018 Xoserve set up an Unidentified Gas Task Force in order to investigate all the possible causes and provide recommendations. One area the Task Force investigated, in conjunction with an external analytics consultancy, was the use of Machine Learning as either a replacement of or support to the Algorithm which estimates the daily view of NDM demand. As a large percentage of LDZ demand is estimated using the Algorithm (rather than being daily metered), the limitations of the Algorithm can be a big contributor to UIG.

2.1 What is Machine Learning ?

Machine learning is a branch of artificial intelligence which involves complex computer systems teaching themselves how to perform tasks without being explicitly programmed to do so, usually based on input data and observed outcomes. The process of providing the input data to the Machine Learning system so that it can "learn" the relationships between historic data and results is often referred to as "training"

All recommendations produced by the UIG Task Force can be viewed here. Those specific to Machine Learning can be viewed below:

13.2.5 – Accuracy of NDM Algorithm – Basic Machine Learning

13.2.6 – Accuracy of NDM Algorithm – Advanced Machine Learning

A paper was also presented to DSC Contract Management Committee on possible Machine Learning options in relation to the NDM Algorithm and you may find this is a good introduction:

Options for the Use of Machine Learning in Non-Daily Metered Gas Allocation

2.2 Role of Demand Estimation Sub Committee (DESC)

The NDM Algorithm is defined in Section H of Uniform Network Code (2.2.1) and is overseen by DESC who, since the implementation of Project Nexus, now have an obligation to review the formula every 3 years (2.2.2) – see Appendix 1.

The current NDM Algorithm has now been in place for just over 3 years and DESC have recently started to consider how such a review will be carried out, given this is the first occurrence since the change to the existing NDM Algorithm in June 2017.

3. Consultation – Why is this needed ?

As we stand today we have a set of UIG Task Force recommendations which suggest there would be benefit in introducing Machine Learning in some form to the estimate of daily NDM demand and we have a DESC obligation to review the NDM Algorithm. However, we don't have a clear view on what the industry as a whole would support in terms of changes in these areas. The reasons for taking time to consult with the industry and explore its views are set out below:

3.1 Clarity for DESC

DESC are aware that the recent UIG Task Force recommendations relating to Machine Learning and the wider interest in reducing the 'NDM modelling error' (thus improving UIG volatility) is an important issue for the industry to discuss. DESC has therefore deduced it would be sensible to support an industry consultation first so to avoid any wasted effort and ensure that any future options that DESC analyses and promotes are more likely to be supported by the wider industry.

3.2 Industry use of NDM Algorithm parameters

The NDM Algorithm is primarily used in Gemini for NDM Nominations and Allocation, however the formula is also used by Xoserve in the calculation of Annual Quantities (AQs) and Read Estimation processes. We are also aware that customers use NDM Algorithm parameters such as the Annual Load Profiles (ALPs) and Daily Adjustment Factors (DAFs) within their own systems and so understanding the implications of not having these available or something equivalent (i.e. parameters known ahead of a gas year) is an important feature of the consultation. See Appendix 2 for examples of ALPs and DAFs.

3.3 Future of NDM Sector

A key question in this debate is the industry's views on the long-term future of the NDM sector. Any change to the current NDM Algorithm inevitably brings costs to the industry and so it's important we can assess any investment alongside the likely payback. The assessment of any proposed solution, such as Machine Learning, should include a view of its predicted useful life.

4. Assumptions

Any alternative option to the current NDM Algorithm, whether like those discussed in the Machine Learning options paper or something different, would still need to produce the following outputs:

- There will still be Peak Load Factors published before the Gas Year to determine SOQs
- There will still be Allocation Factors after the Gas Day to enable industry participants to recreate their own allocation
- There will still be AQ calculation factors in order to derive an AQ (equivalent to a Weather Adjusted Annual Load Profile - WAALP)

5. Consultation Questions

In order to achieve our objectives, we are asking for industry views on the following questions:

NDM Allocation Algorithm Improvements:

- Do you support the industry's efforts to improve the accuracy of the NDM gas allocation algorithm? (Y/N)
- How strongly do you support the industry's efforts to improve the accuracy of the NDM gas allocation algorithm? Scale of 1 to 5. Please provide a brief explanation of your reasons.

Machine Learning Options:

- Do you support the use of Machine Learning as the future approach to NDM demand modelling? (Y/N)
- How strongly do you support the use of Machine Learning as the future approach to NDM demand modelling? Scale of 1 to 5. Please provide a brief explanation of your reasons

Parameters ahead of the Gas Year:

- Do you require access to a set of parameters ahead of the gas year to allow you to forecast/ simulate NDM gas allocation (as currently provided by Annual Load Profiles and Daily Adjustment Factors - ALPs and DAFs)? Y/N
- How strongly do you support the need to retain a set of annual parameters (e.g. ALPs and DAFs) in the NDM gas allocation algorithm? Scale of 1 to 5. Please provide a brief explanation of your reasons.

Future of NDM Sector:

- What proportion of the GB gas market do you believe will still be NDM in 2, 5 and 10 years? Please provide a brief explanation of your reasons.
- What proportion of your portfolio do you believe will still be Non-Daily Metered in 2, 5 and 10 years? (this information will be aggregated with other market participants' responses prior to disclosure outside Xoserve). Please provide a brief explanation of your reasons.

Benefits to Industry in reducing UIG:

- Can you attribute a financial benefit to a reduction in UIG levels, even if this is due to an increase in NDM Allocation? (a more accurate NDM Algorithm could result in higher NDM Allocations and lower UIG). If so please quantify (e.g. a reduction of x% in average UIG would result in a cost saving of £y per annum.

We have provided a template for completing your responses which can be found under the Demand Estimation Sub Committee's home page on the Joint Office website here. Note: The template asks whether you are happy for your template response to be publicly available once the consultation window has closed.

Background Briefings:

Xoserve is offering background briefing sessions (with opportunity for Q&A) on Monday 26th October and Tuesday 3rd November to help put the consultation into wider context. Please book on Eventbrite using this link. The password to book onto the event is **NDM2020**

6. Timetable:

- Invitation to Consultation issued: **23rd October 2020**
- Background Briefing / Q&A Sessions: **26th October 2020 and 3rd November 2020**
- Consultation Closes for Responses: **20th November 2020**
- Summary of Results / Responses published: **w/c 30th November 2020**
- Results presented to Demand Estimation Sub-Committee (DESC): **7th December 2020**
- Results presented to Distribution Work Group: **14th December 2020**
- Results presented to DSC Contract Management Committee: **16th December 2020**

7. Consultation – What Happens Next ?

Once the Industry Consultation closes on Friday 20th November, all responses received will be reviewed and summarised into an industry consultation response overview document, which will be published. In addition, where permission has been given, we shall also publish individual responses.

The consultation response overview document will make recommendations on where to take the NDM Algorithm review and summarise the level of industry support for making changes from the current approach and to what extent. The summarised consultation views will also be shared at various industry forums at the end of the year (see Timetable).

Depending on the findings from the consultation and the feedback received from the industry forums it is quite likely that the next steps will involve setting up a UNC Review Group to establish and evaluate options, develop implementation plan etc. This means although the industry consultation will close on 20th November there will still be extensive industry engagement required to shape the future direction.

Appendix 1: Section H UNC

Relevant extracts from Section H which refer to the NDM Algorithm – "Supply Meter Point Demand Formula" (2.2.1) and the obligation on DESC to review every 3 years (2.2.2)

2.2 Supply Meter Point Demand Formula

2.2.1 NDM Supply Meter Point Demand ('SPD') for a Day (Day 't') shall be determined according to the following formula:

$$SPD = \frac{AQ}{365} \times \overline{ALP}t \times (1 + (DAF_t \times WCF_t))$$

where AQ is the Annual Quantity (in kWh) in respect of the relevant Class 3 or 4 Supply Meter Point;

and where for Day 't':

ALP_t is the value of the Annual Load Profile for the Applicable End User Category;

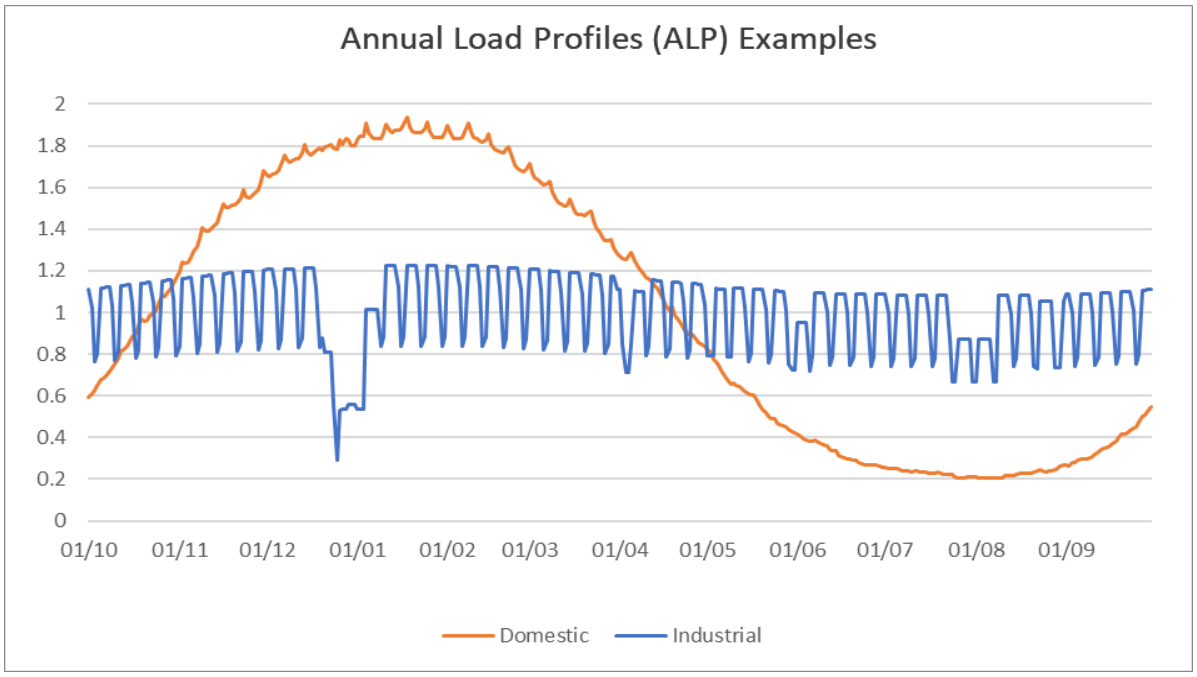
DAF_t is the value of the Daily Adjustment Factor for the Applicable End User Category;

WCF_t is the Weather Correction Factor for the relevant LDZ in accordance with paragraph 2.5.

2.2.2 The operation of the formula in paragraph 2.2.1 shall be reviewed by the Committee every three (3) years.

Appendix 2 – ALPs and DAFs

The Annual Load Profile (ALP) is a parameter which provides an estimated view of how consumers typically use their gas during a year. This is used by several processes in the estimation of gas consumption.



The Daily Adjustment Factor (DAF) is a parameter which represents an estimated view of how consumers gas usage typically reacts to changes in weather. This is used by several processes in the estimation of gas consumption.