

## UNC Workgroup 0754R Minutes Investigate Advanced Analytic Options to improve NDM Demand Modelling

Tuesday 05 October 2021

via Microsoft Teams

### Attendees,

Loraine O'Shaughnessy (Chair)	(LOS)	Joint Office
Maitrayee Bhowmick-Jewkes (Secretary)	(MBJ)	Joint Office
Cosmin Popovici	(CP)	Total Energies Gas & Power
Dan Stenson	(DS)	British Gas
Fiona Cottam	(FC)	Correla on behalf of Xoserve
Joseph Lloyd	(JL)	Correla on behalf of Xoserve
Katherine Uzzell	(KU)	SSE
Kundai Matiringe	(KM)	BUUK
Mark Perry	(MP)	Correla on behalf of Xoserve
Paul O'Toole	(PT)	Northern Gas Networks
Penny Griffiths	(PG)	Correla on behalf of Xoserve
Sanjeev Loi	(SL)	Cadent
Sarah Palmer	(SP)	E.ON
Steve Mulinganie	(SM)	Gazprom

Copies of all papers are available at: <https://www.gasgovernance.co.uk/0754/051021>

The Workgroup Report is due to be presented at the UNC Modification Panel by 18 November 2021.

### 1.0 Introduction and Status Review

Loraine O'Shaughnessy (LOS) welcomed all to the Workgroup.

#### 1.1. Approval of Minutes (07 July 2021)

The minutes from the previous meeting were approved.

#### 1.2. Approval of Late Papers

No late papers submitted.

#### 1.3. Review of Outstanding Actions

**0303:** Workgroup to consider the UIG taskforce recommendations during Workgroup Development (<https://www.xoserve.com/services/issue-management/unidentified-gas-uir/#task-force-findings-etc>).

**Update:** Ongoing Requirement. LOS advised workgroup that this is an ongoing action and is a fundamental piece of work and encouraged participants to review the content of these recommendations. **Carried Forward.**

#### 1.4. Workgroup Extension

LOS advised the Workgroup that Correla had requested at the last meeting that the Workgroup be extended for six months to May 2022, noting that it will not be possible to complete all of the analysis needed to cover Areas 1 to 3 (identified by the Review Group as

priority items) before the Workgroup Report is due to be submitted to the UNC Modification Panel in November 2021.

Steve Mulinganie (SM) the Proposer of the Request, supported Correlá's request to extend the Workgroup however, suggested that it should be extended for twelve months noting that it would be better to seek for a longer extension to allow sufficient time to complete the analysis and if completed earlier, to submit the Workgroup Report early, than to ask for a further extension if the work was not complete by May 2022 due to BAU obligations through the DESC Sub-committee workgroup.

The Workgroup accepted this suggestion and LOS noted the Joint Office would raise the request to extend the Workgroup for 12 months at the October UNC Modification Panel. LOS asked if an interim report would benefit Panel, however SM advised that this may not be available to provide if analysis was not completed.

SM confirmed that he would request a Workgroup extension for 12 months and the Joint Office to would raise this request at the October Panel.

**New Action 1001:** Joint Office (LOS) to request a 12 month extension of the Workgroup at the October UNC Modification Panel on behalf of Proposer.

## 2.0 Approach to Analysis

Joe Lloyd (JL) provided a brief background of this Workgroup and a recap of the key discussion points from the previous meetings.

For a full detailed update, please refer to the published slides on the meeting page.

### Area 1: Trial alternative approaches to deriving $SND_t$

#### Approach to Analysis:

JL presented an overview of the current approach to analysis to derive the  $SND_t$  and the development cycle, including progress made and challenges faced so far.

For a full detailed update, please refer to the published slides on the meeting page.

JL noted that the focus so far had been to calculate the  $SND_t$  and  $WSEN_t$  and a high-level decision had been made before commencing modelling to reduce the amount of data being processed. LOS noted that  $SND_t$  and  $WSEN_t$  could be added to the Glossary in the slide pack.

JL added that some of the data elements that were reviewed during the approach phase and insight gained from them have been captured.

#### Progression of Modelling:

Penny Griffiths (PG) presented an overview on modelling progression.

For a full detailed update, please refer to the published slides on the meeting page.

SM asked how the modelling compared to the current arrangements.

PG clarified that the modelling could not be benchmarked against the current model until it was possible to calculate a DAF, which would be covered further in the pack, as they were using the best machine learning outcomes, but it was not comparable.

Mark Perry (MP) noted that the chart showing the progression of models (slide 16) include a machine learning linear regression approach which, for the avoidance of doubt, was not the same as the refined linear regression approach currently used for demand modelling.

SM accepted the clarification and advised that it would be beneficial to see a comparison of the modelling being developed against the current process.

LOS reconfirmed that the modelling development presented by the CDSP (Central Data Service Provider) was highlighting the various modelling approaches and these would be refined in the future to be more specific and would then be able to produce more accurate data.

Area 1 Deliverables:

PG advised that the key deliverables from Area 1 is the provision of ALP, DAF and Indicative Peak Load (IPL) Factor, presenting a table summarising the success in producing these deliverables.

PG presented examples of an ALP produced with machine learning (Gradient Boosted with Months and Seasonal Solar Radiation), where the newly calculated ALP differs from the published ALP.

JL presented examples of models showing Gradient Boosted Machine Learning against the current Gas Year 2020 ALP and Gradient Boosted vs Neural Network ALP were presented.

For a full detailed update, please refer to the published slides on the meeting page.

JL advised that all the models were being given a fair chance and noted that the third party contractors found that neural network can produce quite positive results.

SM asked why the results between the different models were so varied and whether these differences can be resolved.

JL advised that the CDSP were investigating this and will review the analysis to try to identify any errors in the input or process resulting in the poor forecast.

SM asked if the contractors could be asked to do the work. MP noted that if the contractors were tasked to do the work, they would have to be paid. SM accepted this and noted that accessing the knowledge they had would be beneficial and it would also provide the CDSP with support in carrying out this analysis.

The Workgroup discussed the best way to proceed with this. SM suggested it would be most efficient to employ the contractors to carry out the analysis.

JL acknowledged that in the first instance the Neural Network approach requires some more attention to ensure it is given a fair chance to 'prove itself'. MP suggested that more time is allowed to investigate the UIG TaskForce findings material first before engaging further.

**New Action 1002:** CDSP (JL/MP) to investigate and update the Workgroup on progress with the neural networks approach and if necessary to consider obtaining data and/or insight from the independent assessors used by the UIG Taskforce

Challenges:

JL presented a table highlighting the challenges captured during the Model Development phase.

For a full detailed update, please refer to the published slides on the meeting page.

SM noted that the outputs from the model development were not matching up with the current process and asked how this would be resolved.

MP advised that machine learning approaches used to develop the models was using a sample and in order to 'scale this up' to the population a much larger data set would be required for the methodology to be viable.

JL added that at present, predicting over 12 months was difficult, but predicting short term modelling was more accurate.

Sarah Palmer (SP) noted that the ALPs highlighted in these slides were quite spiky and asked if this was because it was produced using a small sample.

JL clarified that the figures identified in the slides were in the purest form and needed further refinement, noting that once the analysis was complete and the data had been refined, it would be worth reviewing whether the figures were still spiky or were uniform.

LOS asked when developing these models, whether the COVID-19 period would have an impact on them.

JL confirmed that the COVID-19 period had been excluded to avoid any uncertainty as in establishing the methodology it was important to ensure it was pure and not impacted by any irregularities and noted that the main period of significant COVID-19 impact was after the 23 March 2020 which was excluded.

Conclusion:

In addition to the above, JL noted in conclusion that:

- Adding calendar months and an element of ranked Solar Radiation into the input data improved the results, and
- Gradient Boosting has produced promising results.

### **3.0 Approach Document**

This was captured in section 2.0.

### **4.0 Model Development**

This was captured in section 2.0.

### **5.0 Next Steps**

JL noted, the focus of the next Workgroup would be on:

- Delivering DAFs and Load Factors: To report on the investigation / development of a weather correction methodology, which is fundamental as otherwise will present a risk to not being able to deliver a Machine Learning solution
- Improvement to models: Including further investigation into previously visited methodology such as Neural Networks
- To understand how to describe the model principles and the metrics for assessing them.

LOS added that although the Workgroup was to be extended, the impacts and costs of implementing this Modification should be considered for inclusion in the Workgroup Report.

SM agreed with this suggestion and noted that against each recommendation being put forward, the costs and impacts on Shipper and CDSP systems needed to be identified and considered. SM also suggested compiling a list of questions around each recommendation to enable implementation. SM noted in-particular the addition of calendar months to the modelling data should be included as a question for consideration.

SM acknowledged that further investigation and analysis was required before these questions could be posed.

SP asked if there were any 'quick wins' for the Workgroup. SM supported this and asked if the CDSP could identify any potential quick wins which the Workgroup could progress. JL noted that any improvements identified as part of this Workgroup that can be incorporated into the current modelling approach will be taken forward, this is easier because it is the same team that are also responsible for the BAU demand modelling activities.

### **6.0 Any Other Business**

None.

## 7.0 Diary Planning

Further details of planned meetings are available at: [www.gasgovernance.co.uk/events-calendar/month](http://www.gasgovernance.co.uk/events-calendar/month)

Workgroup meetings will take place as follows:

Time / Date	Venue	Programme
10.00 am Tuesday 30 November 2021	Microsoft Teams	<ul style="list-style-type: none"> <li>Delivering DAF and Load Factors</li> <li>Improvement to Models</li> </ul>
10.00 am Tuesday 25 January 2022	TBC	TBC
10.00 am Thursday 22 March 2022	TBC	TBC

**Action Table (as at 05 October 2021)**

Action Ref	Meeting Date	Minute Ref	Action	Owner	Target Date	Status Update
<b>0303</b>	23/03/21	3.0	Workgroup to consider the UIG taskforce recommendations during Workgroup Development ( <a href="https://www.xoserve.com/services/issue-management/unidentified-gas-uig/#task-force-findings-etc">https://www.xoserve.com/services/issue-management/unidentified-gas-uig/#task-force-findings-etc</a> ).	All	Ongoing Requirement	<b>Ongoing</b>
<b>1001</b>	05/10/21	1.4	Joint Office (LOS) to request a 12 month extension of the Workgroup at the October UNC Modification Panel on behalf of Proposer.	Joint Office (LOS)	November 2021	<b>Pending</b>
<b>1002</b>	05/10/21	2.0	CDSP (JL/MP) to investigate and update the Workgroup on progress with the neural networks approach and if necessary to consider obtaining data and/or insight from the independent assessors used by the UIG Taskforce.	CDSP (JL/MP)	November 2021	<b>Pending</b>