



# **CDSP CONSULTATION ON THE NDM ALGORITHM**

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<b>Contents</b>	<b>Page</b>
Executive Summary	2
Summary of Responses	3
Appendices	6

## Executive Summary

### Context

Xoserve, as the Central Data Services Provider (CDSP) has requested industry views on the future of the Non-Daily Metered (NDM) Algorithm and the Sector it supports. This is to support the Demand Estimation Sub Committee's (DESC) UNC obligation to review the NDM Algorithm and to follow up on UIG Task Force recommendations relating to the improvements to NDM modelling error.

### Questions this paper addresses

- 1) What level of support is there to make improvements to the NDM Algorithm?
- 2) What level of support is there to include Machine Learning techniques?
- 3) How important to the industry is it to retain the NDM Algorithm and its component parameters?
- 4) How does the industry expect the NDM Sector to look in the future?
- 5) What financial benefits could be realised in reducing UIG levels?

### Input Received

There have been 8 responses received, thanks to E.ON, Gazprom Energy, SSE Energy, Scottish Power, Total Gas & Power, Cadent and 2 other parties for providing valuable feedback.

### Conclusions

- 1) There was **strong** support from most respondents to continue to seek improvements to the performance of the NDM Algorithm, with many referencing the consequential benefits of lower/less volatile UIG.
- 2) There was support for exploring Machine Learning 'light', in other words any support was generally **qualified** with a statement that 'Option 2' as described in the [Machine Learning Options paper](#) (i.e. retaining ALPs and DAFs) was as far as they would like to see it being used (assuming benefits have been proven during a period of parallel running / simulation).
- 3) There was **strong** support from most respondents to retain the existing parameters (ALPs and DAFs) within the NDM Algorithm. This was justified by a common number of reasons i) audit trail and transparency ii) forecasting certainty iii) system implications of moving away from current approach iv) widespread use of parameters in industry processes other than the NDM Algorithm.
- 4) There was insufficient data in the responses to determine a numerical view of how the NDM market may look in between 2 and 10 years, however there was enough insight from the comments to confirm that an NDM Algorithm is likely to be necessary for a significant period into the future for a significant number of meter points. This supports any further development of the NDM Algorithm.
- 5) There was insufficient data in the responses to determine an approximate financial benefit to the industry however it was clear that there would be less risk with increased accuracy.

### Next Steps

- 1) Conclusions to be presented to Industry Work Groups and Forums during December.
- 2) To maintain focus and to increase visibility of options it is suggested that a UNC Review Group be established to explore the use of enhanced analytical techniques e.g. Machine Learning.

## Summary of Responses

### Consultation Objective (1 of 4):

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.

Question 1	Answer	Responses	Result
<i>“Do you support the industry’s efforts to improve the accuracy of the NDM gas allocation algorithm?”</i>	Yes	8	100%
	No	0	0%

Question 2	Answer	Responses	Result
<i>“How strongly do you support the industry’s efforts to improve the accuracy of the NDM gas allocation algorithm, on a scale of 1 to 5?”</i>  <i>Please provide a brief explanation of your reasons”</i>	5 – Strongly Support	6	75%
	4 – Somewhat Support	1	12.5%
	3 – Neither oppose nor support	1	12.5%
	2 – Somewhat oppose	0	0%
	1 – Strongly oppose	0	0%

Question 3	Answer	Responses	Result
<i>“Do you support the use of Machine Learning as the future approach to NDM demand modelling?”</i>	Yes	7	87.5%
	No	1	12.5%

Question 4	Answer	Responses	Result
<i>“How strongly do you support the use of Machine Learning as the future approach to NDM demand modelling, on a scale of 1 to 5?”</i>  <i>Please provide a brief explanation of your reasons”</i>	5 – Strongly Support	2	25%
	4 – Somewhat Support	1	12.5%
	3 – Neither oppose nor support	4	50%
	2 – Somewhat oppose	0	0%
	1 – Strongly oppose	1	12.5%

### High Level Verdict (based on scores/comments):

Overwhelming support to continue to explore options for improving the accuracy of NDM allocation and acknowledgement of the benefits this can have in reducing volatility and overall levels of UIG.

The benefits of using advanced analytical techniques was acknowledged, however Machine Learning was only supported in a regime where the annual parameters (i.e. ALPs, DAFs) are retained. Any changes from the existing modelling approach need to be proven in parallel running alongside a full impact assessment to customers’ systems.

See **Appendix 1 and 2** for scores / comments by organisation

**Consultation Objective (2 of 4):**

To gather additional information on whether there is a requirement to retain the existing NDM gas allocation formula and its component parameters

Question 5	Answer	Responses	Result
<i>“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?)”</i>	Yes	7	87.5%
	No	1	12.5%

Question 6	Answer	Responses	Result
<i>“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, on a scale of 1 to 5?  Please provide a brief explanation of your reasons”</i>	5 – Strongly Support	6	75%
	4 – Somewhat Support	0	0%
	3 – Neither oppose nor support	1	12.5%
	2 – Somewhat oppose	1	12.5%
	1 – Strongly oppose	0	0%

**High Level Verdict (based on scores/comments):**

It was clear from all the comments that retaining access to a set of parameters ahead of the Gas Year, specifically the ALPs and DAFs, is very important to customers. Moving away from this approach will have significant impacts to systems as the parameters are used in several areas of the business.

See **Appendix 3** for scores / comments by organisation

**Consultation Objective (3 of 4):**

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

Question 7	Years from now	% of market which is NDM (aveg of responses)
"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?"	2	<b>*Insufficient Data received to make assessment</b>
	5	
	10	

Question 8	Years from now	% of portfolio which is NDM (aveg of responses)
"What proportion of your portfolio do you believe will still be Non-Daily Metered in 2, 5 and 10 years?"	2	<b>*Insufficient Data received to make assessment</b>
	5	
	10	

*\*Majority of responses did not include a view of forecast market or portfolio numbers*

**High Level Verdict (based on comments):**

Several responses refer to SMART meter roll out and the expectation of easier remote access to more granular read information, however the main thread of responses suggests that the requirement to estimate NDM demand will continue to be needed in the short to medium term. This suggests that the NDM Algorithm has a long enough future to seek more improvements in the approach to demand modelling.

See **Appendix 4** for forecasts / comments by organisation

**Consultation Objective (4 of 4):**

To quantify any financial benefits of a reduction in UIG due to improvements in the NDM allocation algorithm

Question 9	Financial Benefit (aveg of responses)
"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	<b>*Insufficient Data received to make assessment</b>

*\*Majority of responses did not include a financial benefit or felt it was commercially sensitive*

**High Level Verdict (based on comments):**

Limited information provided, although several respondents stated that there is less risk to the industry if the initial allocation / UIG can be improved thus reducing subsequent reconciliation / UIG volumes.

See **Appendix 5** for comments by organisation

## Appendices

A summarised view of individual scores and comments are provided below in Appendix 1 to 5. Note: The full industry responses from those parties who provided permission for them to be published can be viewed [here](#).

### **Appendix 1 - Questions 1 and 2:**

(Q1) Do you support the industry's efforts to improve the accuracy of the NDM gas allocation algorithm?

(Q2) How strongly do you support the industry's efforts to improve the accuracy of the NDM gas allocation algorithm, on a scale of 1 to 5?

### **Summary of Comments / Scores by Organisation:**

Organisation	(Q1) Support	(Q2) Strongly (1-5)	Key Points
E.ON (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Well-functioning energy settlement process is essential</li> <li>Always been prepared to support membership of DESC, TWG and PAC</li> <li>E.ON instrumental in a number of modifications covering the algorithm, including analysis during Project Nexus</li> </ul>
Gazprom Energy (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Strongly support any improvements that can be made to NDM profiles as model error is a major contributor to temporary UIG</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Fully support efforts in this area as they may lead to reduction in UIG.</li> <li>Already seen significant improvements in the NDM allocation algorithm.</li> <li>Machine Learning is not necessarily required in order to make improvements in this area</li> </ul>
Cadent (Network Operator)	Yes	5	<ul style="list-style-type: none"> <li>UIG Task Force identified that the NDM algorithm was a major contributor to daily UIG</li> <li>Fully support measures to reduce UIG</li> </ul>
Scottish Power (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Support efforts to improve accuracy of NDM algorithm, given current volatility in settlement</li> <li>In everyone's interest to improve accuracy where possible</li> </ul>
Total Gas & Power Ltd (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Strongly support anything that improves the error in modelling UIG</li> </ul>
Other Party #1 (Shipper/Supplier)	Yes	4	<ul style="list-style-type: none"> <li>Support improving accuracy to help reduce UIG (magnitude and volatility)</li> <li>UIG has been costly for us due to number of Class 4 customers</li> <li>Would be a '5', but any changes from algorithm will require large system changes</li> </ul>

Other Party #2 (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>Improving accuracy of NDM allocation is effective way to lower and stabilise UIG</li> <li>Significant system changes required if parameters not known ahead of the gas year</li> </ul>
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**Appendix 2 - Questions 3 and 4:**

(Q3) Do you support the use of Machine Learning as the future approach to NDM demand modelling?

(Q4) How strongly do you support the use of Machine Learning as the future approach to NDM demand modelling, on a scale of 1 to 5?

**Summary of Comments / Scores by Organisation:**

Organisation	(Q3) Support	(Q4) Strongly (1-5)	Key Points
E.ON (Shipper/Supplier)	No	1	<ul style="list-style-type: none"> <li>UIG related to weather, changes to CWV that went live In October 2020 need to be assessed over at least 1-2 years as this may prevent need for further costs across the industry</li> <li>Concerned about the management required in moving to a full version of ML to underpin industry settlement process and overheads this will place on all parties</li> <li>'Blackbox methodology' would make Shipper requirement to forecast allocation in advance of the gas day harder</li> </ul>
Gazprom Energy (Shipper/Supplier)	Yes	4	<ul style="list-style-type: none"> <li>Expect a full Impact Assessment and Cost Benefit Analysis to be undertaken</li> <li>Also expect to see proof of concept, parallel running and understand interaction</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>Only support "Option 2" as described in the Machine Learning Options paper (i.e. maintain use of ALPs, DAFs)</li> </ul>
Cadent (Network Operator)	Yes	5	<ul style="list-style-type: none"> <li>UIG Task Force identified that the NDM algorithm was a major contributor to daily UIG</li> <li>Fully support measures to reduce UIG</li> </ul>
Scottish Power (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Support only given where a set of ALP/DAF type variables are made available</li> <li>Strongly oppose a 'Black box' model approach</li> </ul>
Total Gas & Power Ltd (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>Benefits from using new technology need to be backed up with robust business case</li> <li>Parties would need to understand implications from forecasting / procurement perspective</li> </ul>

Organisation	(Q3) Support	(Q4) Strongly (1-5)	Key Points
Other Party #1 (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>Support use of M/L if modifying existing model but not replacing it</li> <li>Benefits of improving model accuracy must not be outweighed by the cons of moving to new</li> <li>Concerned with use of black box model - lack of audit trail, transparency, system implications/costs</li> <li>Would want to see parallel running of options</li> </ul>
Other Party #2 (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>UIG Task Force showed M/L can improve accuracy of NDM forecasting</li> <li>Less transparency means more difficult for suppliers to have confidence in forecasts</li> </ul>

**Appendix 3 - Questions 5 and 6:**

(Q5) 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)?

(Q6) 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, on a scale of 1 to 5?

**Summary of Comments / Scores by Organisation:**

Organisation	(Q5) Access	(Q6) Strongly (1-5)	Key Points
E.ON (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>ALP, DAF parameters become standard usage across our business for customer consumption and AQ and embedded in many IT systems</li> <li>Changes from this will not just impact settlement processes but customer billing, invoice validation and others</li> </ul>
Gazprom Energy (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Based on current arrangements</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Annual parameters used in a number of fundamental business processes</li> </ul>
Cadent (Network Operator)	No	2	<ul style="list-style-type: none"> <li>No requirement to retain the parameters but appreciate other Users may</li> </ul>
Scottish Power (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Annual parameters allow us to replicate NDM allocation</li> <li>Used to shape annual forecasts, AQ and Read Estimation calculations</li> </ul>
Total Gas & Power Ltd	Yes	5	<ul style="list-style-type: none"> <li>Required as part of our current business operations</li> </ul>



(Shipper/Supplier)			
Other Party #1 (Shipper/Supplier)	Yes	5	<ul style="list-style-type: none"> <li>Parameters provide a cornerstone throughout our business</li> <li>Support improving them but not removing them</li> <li>Changes would impact several processes</li> </ul>
Other Party #2 (Shipper/Supplier)	Yes	3	<ul style="list-style-type: none"> <li>If parameters are not available, then significant system changes would be required</li> </ul>

**Appendix 4 - Questions 7 and 8:**

(Q7) What proportion of the GB gas market do you believe will still be NDM in 2, 5 and 10 years?

(Q8) What proportion of your portfolio do you believe will still be Non-Daily Metered in 2, 5 and 10 years?

**Summary of Comments / Forecasts by Organisation (Q7):**

Organisation	% of GB NDM in 2 yrs	% of GB NDM in 5 yrs	% of GB NDM in 10 yrs	Key Points
E.ON (Shipper/Supplier)	90	70	50	<ul style="list-style-type: none"> <li>Poor industry performance for Class 3 sites suggests algorithm still needed</li> </ul>
Gazprom Energy (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Expect with right incentives that NDM products will slowly reduce, however uncertainty due to potential regulatory intervention means not in position to estimate</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Expect it to be largely unchanged from today due to investment required</li> <li>Future NDM/DM proportions could be impacted by AUGE weighting factors</li> </ul>
Cadent (Network Operator)	85.65	85.76	80.48	<ul style="list-style-type: none"> <li>Based on annual Demand Forecasting process</li> </ul>
Scottish Power (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Government regulatory requirement to have 85% of SMART installs by 2024</li> </ul>
Total Gas & Power Ltd (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>We anticipate NDM customers will reduce over time due to increase in AMR/SMART Metering</li> <li>No evidence currently for drive from NDM to DM</li> </ul>
Other Party #1 (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Strongly linked to SMART meter roll out</li> </ul>
Other Party #2 (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>No comment</li> </ul>

**Summary of Comments / Scores by Organisation (Q8):**

Organisation	% of Portfolio NDM - 2yrs	% of Portfolio NDM – 5yrs	% of Portfolio NDM – 10yrs	Key Points
E.ON (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Commercially sensitive</li> </ul>
Gazprom Energy (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Commercially sensitive</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Largely unchanged from today's levels</li> </ul>
Cadent (Network Operator)	-	-	-	<ul style="list-style-type: none"> <li>Do not have a portfolio</li> </ul>
Scottish Power (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>No comment</li> </ul>
Total Gas & Power Ltd (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>Commercially sensitive</li> </ul>
Other Party #1 (Shipper/Supplier)	100%	<100%	c.0%	<ul style="list-style-type: none"> <li>Initial move to Class 3 before moving to DM</li> </ul>
Other Party #2 (Shipper/Supplier)	-	-	-	<ul style="list-style-type: none"> <li>No comment</li> </ul>

**Appendix 5 - Question 9:**

(Q9) 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

**Summary of Comments by Organisation:**

Organisation	Key Points
E.ON (Shipper/Supplier)	<ul style="list-style-type: none"> <li>Reduced UIG would increase allocation and so net costs would be similar. Any IT changes as a result of M/L implementation would be a financial detriment</li> </ul>
Gazprom Energy (Shipper/Supplier)	<ul style="list-style-type: none"> <li>Commercially sensitive – No comment</li> </ul>
SSE Energy Supply Limited (Shipper/Supplier)	<ul style="list-style-type: none"> <li>Unable to quantify, impact is the difference between temporary and permanent UIG after all reconciliation occurred. M/L will do very little to reduce permanent UIG</li> </ul>
Cadent (Network Operator)	<ul style="list-style-type: none"> <li>No impact upon Gas Transporters but happy to consider costs savings demonstrated if M/L is more accurate</li> </ul>
Scottish Power (Shipper/Supplier)	<ul style="list-style-type: none"> <li>No comment</li> </ul>
Total Gas & Power Ltd (Shipper/Supplier)	<ul style="list-style-type: none"> <li>Commercially sensitive – No comment</li> </ul>

Assessment of NDM Algorithm Consultation Responses

Other Party #1 (Shipper/Supplier)	<ul style="list-style-type: none"><li>• Benefits would come if initial allocation/UG is more accurate so less movement overtime</li></ul>
Other Party #2 (Shipper/Supplier)	<ul style="list-style-type: none"><li>• Reducing allocation UG would help us forecast UG costs and lower risk, estimated to be 2K pa. per percent improvement in UG</li></ul>