



Demand Estimation Sub Committee

**3.0 Adhoc Workplan Update – (a) NDM Sample Validation
Rules**

1st March 2023

Overview



- An overview of the Demand Estimation process and output can be found [here](#)
- Annual modelling cycle of activities are represented in diagram opposite
- This presentation relates to the “Model Review” phase of the Demand Model cycle

CDSP / DESC Obligations and Timetable: October 2022 to September 2023

Milestone	UNC H Ref	10/22	11/22	12/22	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23
DESC Membership confirmed	1.12	✓											
NDM Sampling: Data Collection and Validation	1.6	✓						✓					
NDM Algorithm Performance for Gas Year 2021/22	1.8			✓								✓	
DESC Adhoc Workplan	1.7	✓		✓			✓						
DESC Modelling Approach – EUCs and Demand Models	1.7			✓			✓						
Single Year EUC Demand Modelling	1.7								✓				
Model Smoothing and Draft Gas Demand Profiles	1.7									✓			
Industry Consultation	1.8									✓	✓		
Gas Demand Profiles finalised and Core systems updated	1.9											✓	
Climate Change Methodology progressed (SN Review 2025)	1.4			✓			✓		✓		✓		

Objectives

- To provide an update on the following areas of the DESC Adhoc Workplan, agreed in July ([link](#)):
 - Review of Validation Rules:
 - Review of existing cleansing and validation processes/ rules for managing submissions of daily gas consumption data
- To update action 1003: “CDSP (SB) to share ideas on the Review of Existing Cleansing and Validation processes in December meeting”

UNC Workgroup 754R Conclusions Recap

- Utilise Advanced Analytics to enhance our existing validation routines, to help identify suspicious demand patterns in assessing sample MPRs
- Uncertainty Estimator: UIG Task Force validation suggestions ([UIG TF 13.2.8](#))
- Individual MPR Regression: Use of computer processing capability to target individual MPRs patterns - regression test Monday to Thursday for each MPR for high level pattern
- Winter Zero Consumption: Analysis of the number of zero consumption in the winter period, December to March) (i.e. targeting questionable patterns)
- See workgroup material (Slides 9-36) [here](#)

Analysis

Some of the areas of validation that we have looked further into are:

- Comparing the CWV intercept and R^2 (Regression of CWV vs Demand) against the final cleansed data for each MPRN (particularly suited for those EUCs that you expect to be weather sensitive)
- A review of zero values, specifically in the winter period. This is for all zero consumption not just the continuous zeroes as that is part of the initial validation (although, consideration of the gas price impacts for Autumn/Winter 22/23)
- Day of the Week check. Whilst not in the modelling approach document, this is a check that we have done for a while. However, recently we improved that to match the daily consumption against the CWV
- Another check that has been performed for a while but is not included in the modelling approach document is a check of the Sample AQ vs Rolling AQ in UK Link

CWV Intercept and R²

- The R² and CWV intercept have expected ranges that can be used to filter out suspicious MPRs and in the table below have been categorised into bin ranges.
- For R², the higher its value the stronger the relationship and reaction with weather. Lower values (i.e. < 0.3) would be investigated further especially in domestic EUC. Conversely WAR band 1 MPRs are likely to have poor relationship with weather as they are insensitive.
- For CWV intercept the majority of MPRs are in the range 10-25. Any less then 0 suggest demand increases as it gets warmer and if these are in domestic EUCs for example would be excluded.

These require investigation

R ² Bin Range	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Total	2034	1010	1068	1237	1577	2541	4204	8052	12860	5612

CWV Intercept Bin Range	<0	10-15	15-20	20-25	25-30	30-50	50-99	Over 99
Total	569	7880	22478	4430	1409	1614	1096	719

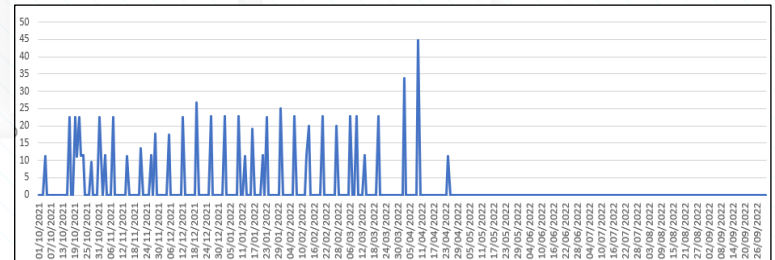
Winter Zero Consumption

- This validation allows us to expand the current process which is to look at consecutive zero consumptions, but as an overall count across the winter period (December to March)
- However, consideration is required for each site type. It may not be excessive to see a large number of zero consumptions for an I&C site if they are at weekends
- We are yet to establish a tolerance for the number of allowable zeros in winter, but this is something we will be working on
- Table below shows breakdown of zeros, while the chart is an MPR that passed validations but would fail this check

Winter Zero - Count of instances grouped into Bin Range

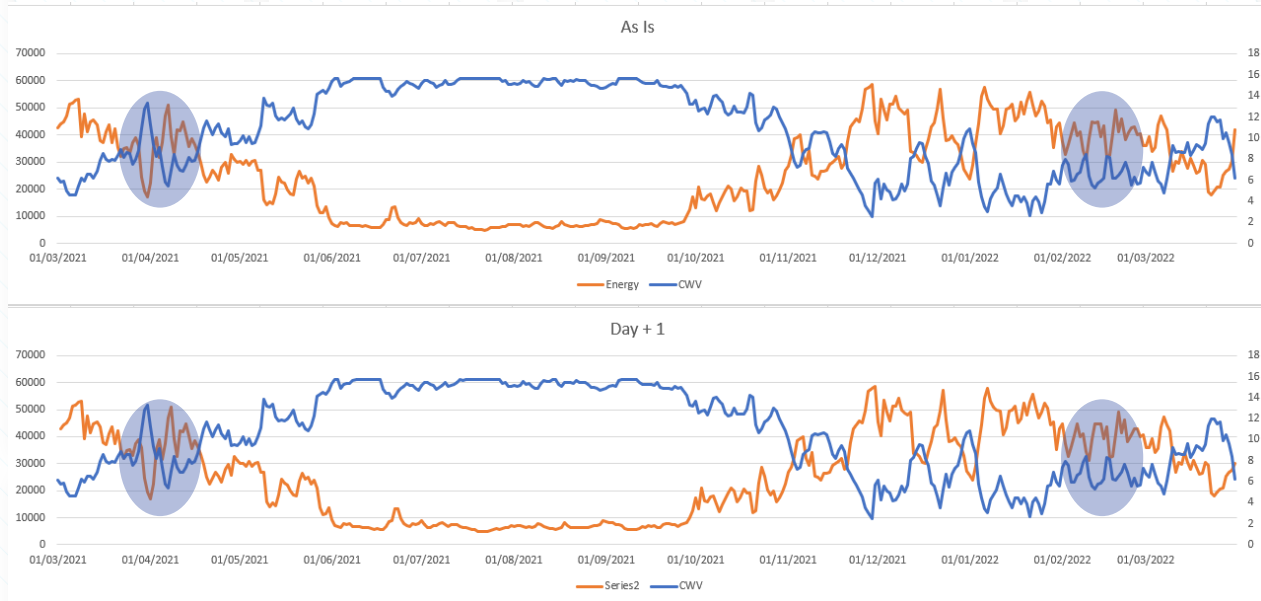
Bin Range	0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110
Count	25483	8580	3009	1293	844	408	320	124	65	32	28	9
Percentage	62.24%	22.36%	7.62%	3.46%	2.24%	0.86%	0.61%	0.27%	0.18%	0.06%	0.08%	0.03%

0 zero instances - occurred for 25483 MPRs
 41-50 instances - occurred for 408 MPRs
 Winter is months of December to March



Day of the Week

- Once all validation has taken place and there is a record for every day, we compare the daily consumption against the CWV. This data is then output in a chart with the day of the week as is and again at D+1
- This makes identifying day of the week errors a lot easier (examples highlighted in blue circles below – incorrect data shown in “Day +1”)



Sample AQ vs Rolling AQ

- Once all validation has taken place, a Sample AQ can be calculated. This Sample AQ can they be compared against the AQ held in UK Link
- This check can highlight a multitude of data errors that would otherwise pass most validations, these include:
 - Incorrect units of measure
 - Volume spikes
 - Incorrect correction factors
- A tolerance of 0.5 to 1.5 is used to identify any potential errors
- This year, tolerances may need to be reviewed due to the significant changes in AQ levels caused by high energy prices

Conclusion

- Existing validation checks will be enhanced in this year's modelling process with the additional tests presented here
- This year, we may see some unusual results pending the changes in behaviour caused by price increases which may lead to additional validation failures ?
- We shall continue to seek improvements to our validation routines and welcome feedback from DESC members if you have any ideas