



delivered by  correla

Demand Estimation Sub Committee

3.0 NDM Sample Update

19 December 2023

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Section 1

INFORMATION

Demand Estimation Cycle



- 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 “Input” phase of the Demand Model cycle

CDSP / DESC Obligations and Timetable: October 2023 to September 2024

Milestone	UNC H Ref	2023			2024								
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
DESC Membership confirmed	1.12	✓		✓									
NDM Sampling: Data Collection and Validation	1.6	✓						✓					
NDM Algorithm Performance for Gas Year 2022/23	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											✓	
Seasonal Normal Review 2025	1.4	✓		✓			✓		✓		✓		

Background

- The Demand Estimation Team are responsible for ensuring there is a representative sample of the NDM population (c.25 million supply points) available for:
 - EUC demand modelling and;
 - Reviewing demand model performance (Strand 3)
- Data for the sample is sourced from:
 - Shippers (MOD654S – All EUCs) as per UNC H Ref 1.6.10 to 1.6.14
 - Transporters managed sample (Bands 2-8) as per UNC H Ref 1.6.1 to 1.6.9
 - Class 3 (01BPD Only)
- Data from the various sample sources is then cleansed and validated to remove/reduce data errors being used in the analysis set out above

Objective

- To provide a current view of the Demand Estimation sample following the collection of data for the period 1st October 2022 to 30th September 2023
- To supply adequate sample data to be used in Strand 3 NDM Algorithm Performance and provide a sense check of data ahead of next year's Demand Modelling process
- To summarise the volume and quality of data received
- To provide any other sample related updates

Section 2

ANALYSIS

Approach to Validation

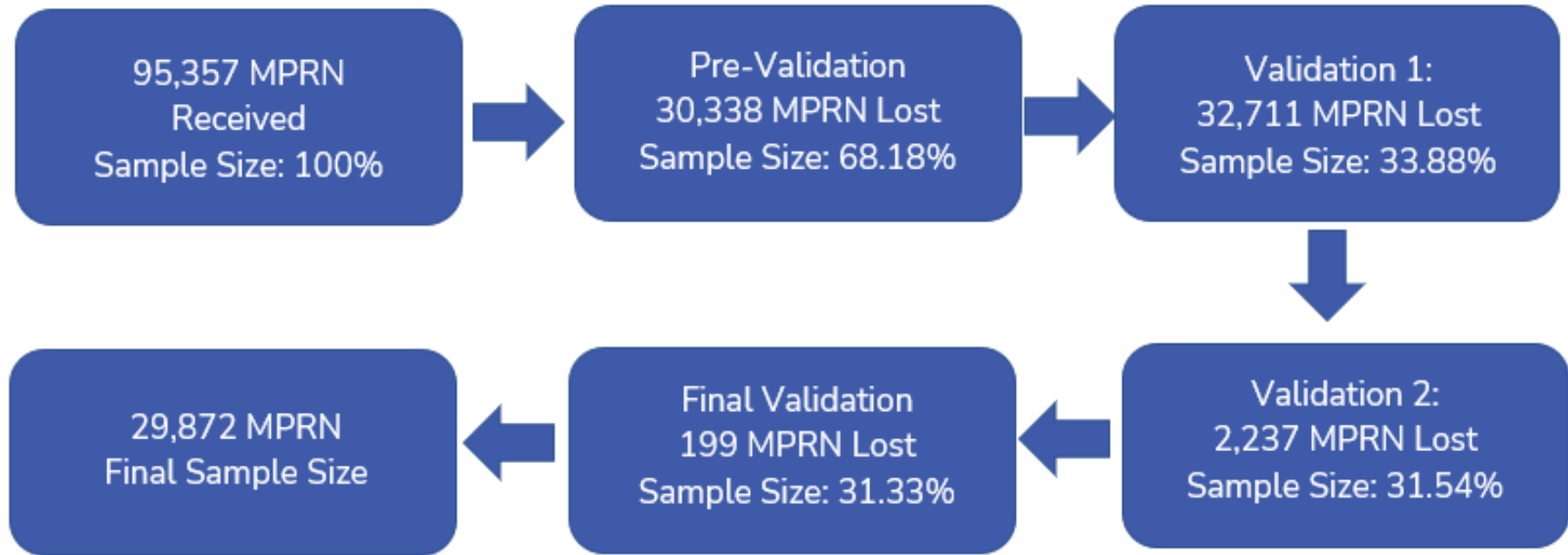
- The data from the Distribution Networks, Shippers and Class 3 (01BPD) is consolidated and formatted ready for validation
- Any site that has too many missing days of consumption (less than 300 days) over the 12 month period is removed prior to running validation
- The remaining data runs through c.14 validation checks that are summarised on the next slide.
- Once all validation has been performed, a 2nd set of validation checks, including high level linear regression analysis between weather (CWV) and daily demand can sometimes identify errors not picked up by the standard validation checks
- The cleansed data is passed over for modelling

Validation Checks

- The table below details each of the validations that is performed on the NDM Sample data:

Validation Check	Description
Consecutive Zeros	Any supply point that had 33 consecutive zeros during the winter period (1st Oct – 31st Mar)
Summer Reads	Any supply point that has 15 or more days missing over the summer period (1st Apr – 30th Sept)
Winter Reads	Any supply point that has 15 or more days missing over the winter period (1st Oct – 31st Mar)
AQ Ratio	A check against the AQ derived from the Sample data and the AQ held in UK Link
Min Reads	A pre check ahead of validation to ensure that there is sufficient daily values
Infills Rejected	A validation to check the number of infills
Multiple Providers	Any supply point that has been sent in via two or more providers
WAR Ratio	Any supply points with a supply point WAR ratio below 0.2 are excluded since this suggests a potentially unrealistically higher summer consumption than a winter consumption
No LDZ or SIU	Any supply point that does not have an assigned LDZ or Scottish Independent
No Correction Factor	Any supply point that does not have a live correction factor on UK Link
Band 9B Sum/Win Ratio	For supply points in the 09B consumption band a check is made of the overall winter/summer consumption ratio and any supply points for which this is less than 0.9 are excluded
Consecutive Zero Infills	A secondary check for consecutive zeros post the infilling process
Hydrogen Deploy	Any supply point that is on a hydrogen test site
Twin Stream	A supply point that has 2+ meters but only one MPRN

Analysis – Sample Breakdown

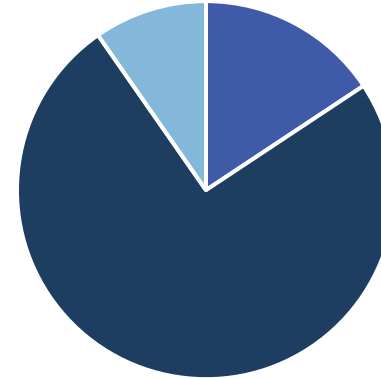


- 95,357 MPRNs ran through the validation system
- 68.18% of MPRNs had enough Data to perform validation

Analysis – Sample Breakdown

- The chart on the right shows the breakdown of meter points by source that passed validation
- Increase in number of Class 3 PPM sites passing validation
- Shippers continue to provide the bulk of data however; this tends to be in EUC Bands 1 & 2
- The number of sites that have passed validation from Shippers has decreased from the previous year; this is due to:
 - Decline in numbers sent by a large Shipper
 - Missing files from a Shipper who submits sample data on a monthly basis didn't provide 12 files

Passed Validation Source Breakdown

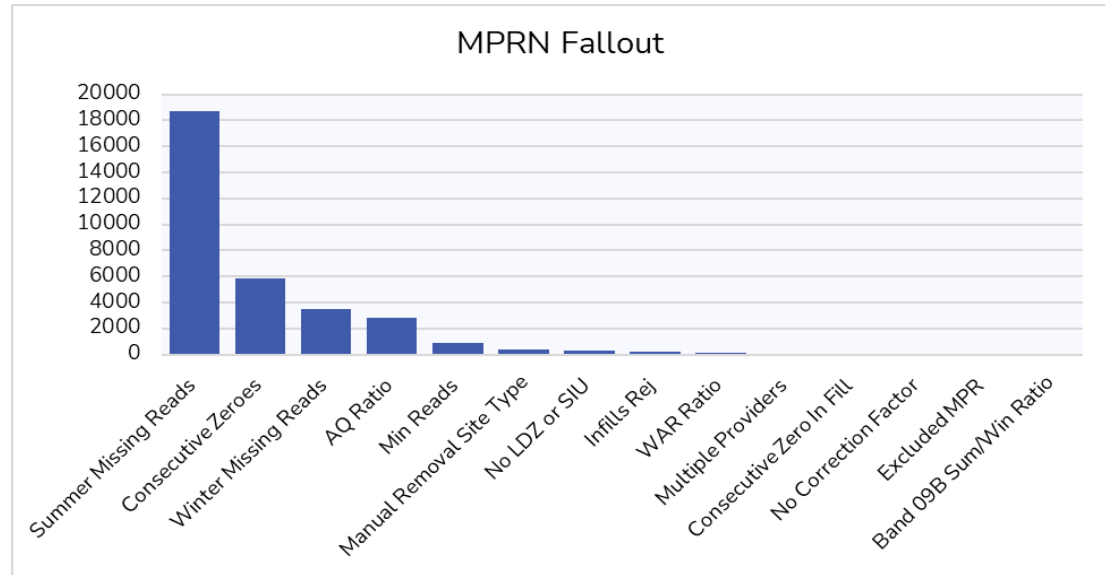


■ Networks ■ Shippers ■ Class 3 PPM

Year	Networks	Shippers	Class 3 PPM
2023	5,069	24,110	3,129
2022	5,165	32,135	1,533

Analysis – Sample Errors

Validation Check	MPRN
Summer Missing Reads	18,673
Consecutive Zeroes	5,809
Winter Missing Reads	3,453
AQ Ratio	2,783
Min Reads	915
Manual Removal Site Type	359
No LDZ or SIU	269
Infills Rej	234
WAR Ratio	102
Multiple Providers	89
Consecutive Zero In Fill	13
No Correction Factor	10
Excluded MPR	1
Band 09B Sum/Win Ratio	1



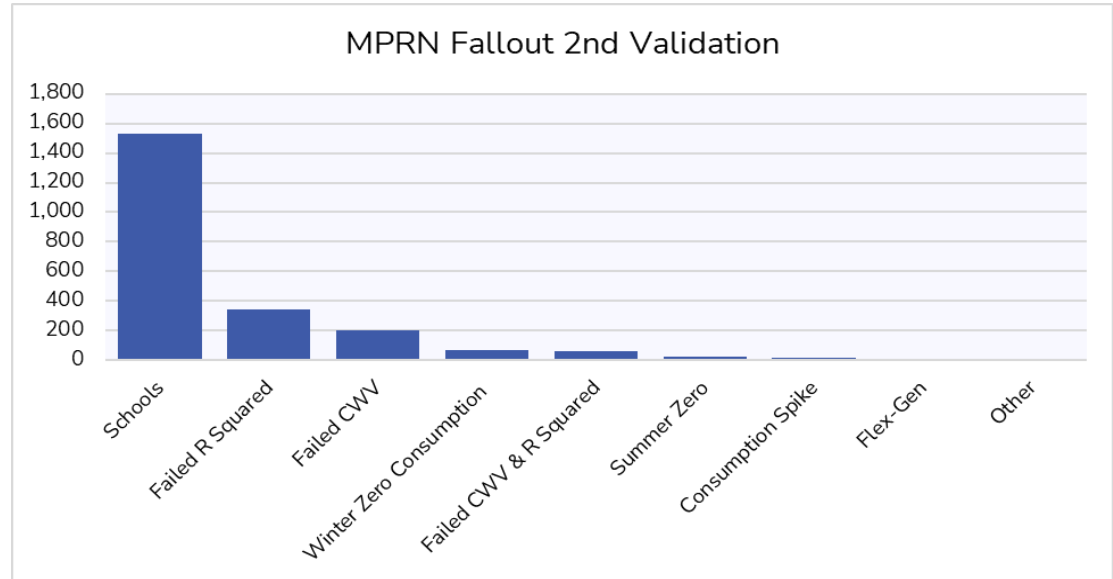
- There were 65,485 MPRN Failures. 30,338 failures were due to insufficient days (<300 records), 2,237 were due to failure of the 2nd validation procedure. The remaining failure reasons are charted.
- Please Note: it is possible for an MPRN to have multiple failure reasons but is only recorded for the first validation check it fails. The validation checks are run sequentially in the order above. Missing data continues to be the biggest reason for rejection, if Missing Winter Reads was run first, you would see an increase in winter reads.

Further Validation Checks

- Once the data has passed through all the validation checks mentioned previously, we then run them through a secondary validation system to try and remove anything that could cause a bias
- These checks mainly cover:
 - Excessive number of schools in sample (following discovery in recent data collections that a Shipper submission contained a disproportionate number of schools in the sample)
 - Erroneous R^2 (Typically only for sites in Bands 1 and 2)
 - Erroneous CWV Intercept
 - Significant number of zero energies (not necessarily continuous zeros)

Analysis – Sample Errors

Validation Check	MPRN
Schools	1,531
Failed R Squared	345
Failed CWV	198
Winter Zero Consumption	66
Failed CWV & R Squared	58
Summer Zero	25
Consumption Spike	12
Flex-Gen	1
Other	1



- A further 119 MPRN were removed due to Domestic classification in bands 3 & 4
- 80 More MPRN were lost after the first run of the modelling system

Final Counts – EUC Breakdown

- The table below shows a breakdown of the sites that were passed through for Strand 3 analysis:

EUC Band	AQ Range (mWh)	Customer Type	LDZ													Total
			SC	NO	NW	NE	EM	WM	WN	WS	EA	NT	SE	SO	SW	
1	up to 73.2	Dom Non Pre Pay	375	386	381	357	395	394	301	345	397	418	403	392	394	4,938
		I&C Non Pre Pay	595	515	743	524	504	427	56	373	443	402	499	374	435	5,890
		Dom PrePay	229	365	819	379	353	421	254	257	425	300	227	817	401	5,247
		I&C PrePay	0	0	0	0	0	0	0	0	1	0	1	0	0	2
2	73.2 to 293	Dom Non Pre Pay	30	20	36	39	43	38	13	21	44	49	38	33	30	434
		I&C Non Pre Pay	730	380	791	435	576	558	44	249	351	528	440	536	431	6,049
		Dom PrePay	0	0	0	0	0	0	0	0	0	1	0	0	0	1
		I&C PrePay	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3	293 to 732	All	471	152	326	189	239	209	32	123	219	291	280	240	187	2,958
4	732 to 2,196	All	417	176	221	216	208	202	32	111	177	241	307	256	153	2,717
5	2,196 to 5,860	All	141	76	87	81	78	91	12	37	61	92	103	63	38	960
6	5,860 to 14,650	All	60	26	42	43	47	31	4	17	20	24	29	30	28	401
7	14,650 to 29,300	All	14	22	20	24	30	18	2	6	8	3	13	6	7	173
8	29,300 to 58,600	All	14	8	6	11	17	11	1	6	8	2	5	1	2	92
9	Over 58,600	All	3	0	2	0	1	1	0	1	1	0	0	0	0	9
		Total	3,079	2,126	3,474	2,298	2,491	2,402	751	1,546	2,155	2,351	2,345	2,748	2,106	29,872

Section 3

DISTRIBUTION NETWORKS SAMPLE

NDM Population

- Around 2006, DESC agreed target sample numbers for each of the Distribution Networks
- This target number was calculated based on the population of each EUC/LDZ combination
- Following the work Technolog are doing to provide the NDM Sample for some DNs, it has become apparent that these target numbers are no longer possible due to the change in the population's consumption, meaning there is insufficient sites to meet the target numbers
- As the majority of data in the larger bands is from the Distribution Networks, accurate target numbers will help to ensure we have sufficient data
- We suspect this has been caused by a change in consumption due to factors such as COVID-19 and high energy prices. In turn this has seen a decrease in the overall AQs calculated
- The following slides shows the difference in population between 2023 and 2019

NDM Population 2023 - 2019

Oct-23														
	EA	EM	NE	NO	NT	NW	SC	SE	SO	SW	WM	WN	WS	
01BND	1,938,521	2,346,895	1,353,372	1,167,363	2,112,508	2,602,303	1,909,500	2,451,072	1,745,104	1,581,529	1,985,045	244,024	809,649	22,246,885
01BNI	41,296	53,464	37,312	26,911	61,178	65,227	40,875	56,881	40,390	39,821	45,481	7,312	20,781	536,929
01BPD	134,503	194,295	129,734	139,804	228,694	307,336	228,215	222,261	91,823	103,033	189,456	26,425	91,808	2,087,387
01BPI	213	307	214	138	619	492	175	514	129	203	294	49	171	3,518
02BND	3,504	3,915	2,678	1,711	7,573	4,530	3,418	7,066	2,781	2,152	3,363	259	925	43,875
02BNI	11,015	13,437	8,771	7,090	16,638	15,970	11,721	14,557	11,236	9,427	12,410	1,635	4,418	138,325
02BPD	122	145	130	102	215	233	143	161	66	61	157	8	65	1,608
02BPI	5	4	1	4	11	6	4	5	5	2	5		1	53
03B	3,231	3,732	2,321	2,248	5,557	4,648	4,212	4,107	3,152	2,456	3,675	428	1,181	40,948
04B	1,312	1,518	973	849	2,646	1,767	1,867	1,561	1,277	931	1,559	221	537	17,018
05B	282	398	244	201	680	482	468	339	242	198	414	51	139	4,138
06B	120	187	109	83	201	207	150	100	98	102	130	27	53	1,567
07B	51	104	50	39	50	103	75	30	33	45	62	14	25	681
08B	42	81	34	20	29	84	52	32	27	34	46	12	22	515
	2,134,217	2,618,482	1,535,943	1,346,563	2,436,599	3,003,388	2,200,875	2,758,686	1,896,363	1,739,994	2,242,097	280,465	929,775	25,123,447

Oct-19														
	EA	EM	NE	NO	NT	NW	SC	SE	SO	SW	WM	WN	WS	
01BND	1,841,676	2,241,869	1,312,600	1,146,205	2,042,916	2,523,161	1,813,351	2,355,211	1,661,963	1,501,742	1,898,213	230,460	780,256	21,349,623
01BNI	42,539	54,723	38,004	26,613	63,212	67,133	40,406	57,670	40,090	39,167	46,371	7,134	19,964	543,026
01BPD	156,303	212,003	127,536	122,014	273,419	315,698	242,241	262,050	108,227	122,670	212,619	32,317	102,726	2,289,823
01BPI	292	281	260	184	602	523	252	556	180	180	365	37	214	3,926
02BND	3,603	3,679	2,850	1,807	8,108	4,446	3,730	6,798	3,040	2,299	3,334	285	958	44,937
02BNI	12,900	15,918	10,610	8,116	19,999	18,881	13,594	17,639	12,837	10,956	14,799	1,970	5,083	163,302
02BPD	112	168	108	80	271	186	166	184	62	74	223	14	82	1,730
02BPI	3	4	2	7	12	6	7	8	3	4	8	1		65
03B	3,654	4,245	2,811	2,505	6,259	5,268	4,710	4,611	3,596	2,820	4,193	498	1,310	46,480
04B	1,474	1,722	1,104	929	2,937	2,084	2,066	1,740	1,413	1,087	1,794	236	598	19,184
05B	361	465	305	230	764	559	530	397	295	239	485	60	156	4,846
06B	116	201	126	98	211	184	179	102	105	118	163	25	54	1,682
07B	56	98	53	43	57	104	73	34	41	46	60	14	22	701
08B	33	74	27	21	27	69	44	21	22	24	52	7	25	446
	2,063,122	2,535,450	1,496,396	1,308,852	2,418,794	2,938,302	2,121,349	2,707,021	1,831,874	1,681,426	2,182,679	273,058	911,448	24,469,771

NDM Population 2023 – 2019 Difference

- The table below shows the difference in MPRN population from 2023 to 2019
- There is a decline in the majority of EUCs (except for 01BND and 08B)
- In some cases, the current DESC target numbers exceed the population, as a result we are proposing to review the target numbers for the Distribution Networks so that they are more reflective of the current population
- Note: This does not impact Shipper's NDM sampling obligations as per UNC Section H 1.6

Oct-23 - Oct-19 Difference														
	EA	EM	NE	NO	NT	NW	SC	SE	SO	SW	WM	WN	WS	
01BND	96,845	105,026	40,772	21,158	69,592	79,142	96,149	95,861	83,141	79,787	86,832	13,564	29,393	897,262
01BNI	-1,243	-1,259	-692	298	-2,034	-1,906	469	-789	300	654	-890	178	817	-6,097
01BPD	-21,800	-17,708	2,198	17,790	-44,725	-8,362	-14,026	-39,789	-16,404	-19,637	-23,163	-5,892	-10,918	-202,436
01BPI	-79	26	-46	-46	17	-31	-77	-42	-51	23	-71	12	-43	-408
02BND	-99	236	-172	-96	-535	84	-312	268	-259	-147	29	-26	-33	-1,062
02BNI	-1,885	-2,481	-1,839	-1,026	-3,361	-2,911	-1,873	-3,082	-1,601	-1,529	-2,389	-335	-665	-24,977
02BPD	10	-23	22	22	-56	47	-23	-23	4	-13	-66	-6	-17	-122
02BPI	2	0	-1	-3	-1	0	-3	-3	2	-2	-3	-1	1	-12
03B	-423	-513	-490	-257	-702	-620	-498	-504	-444	-364	-518	-70	-129	-5,532
04B	-162	-204	-131	-80	-291	-317	-199	-179	-136	-156	-235	-15	-61	-2,166
05B	-79	-67	-61	-29	-84	-77	-62	-58	-53	-41	-71	-9	-17	-708
06B	4	-14	-17	-15	-10	23	-29	-2	-7	-16	-33	2	-1	-115
07B	-5	6	-3	-4	-7	-1	2	-4	-8	-1	2	0	3	-20
08B	9	7	7	-1	2	15	8	11	5	10	-6	5	-3	69
	71,095	83,032	39,547	37,711	17,805	65,086	79,526	51,665	64,489	58,568	59,418	7,407	18,327	653,676

New Service Provider Update

- In April 2023 a new service provider for Cadent, Northern Gas and Wales & West Utilities went live to provide the CDSP with NDM Sample data as per the obligation in Section H 1.6
- They have been focusing on bringing the number of sites in the sample back up to the target numbers, the tables below shows the improvement from go live until November 23
- Please note, these new sites will need to accumulate 12 months of daily data before they can be used (Strand 3 in 2024)

Apr-23											
	EA	EM	NE	NO	NT	NW	SW	WM	WN	WS	Total
02B	126	118	81	78	119	97	104	99	9	37	868
03B	149	133	136	108	112	131	93	85	16	46	1,009
04B	153	147	262	188	170	167	115	161	24	71	1,458
05B	68	90	110	81	100	106	53	105	16	33	762
06B	38	72	63	41	28	67	31	45	7	20	412
07B	11	41	38	24	7	31	17	26	3	10	208
08B	14	36	18	18	10	26	15	23	4	10	174
Total	559	637	708	538	546	625	428	544	79	227	4,891

Nov-23											
	EA	EM	NE	NO	NT	NW	SW	WM	WN	WS	Total
02B	180	155	103	88	174	121	117	141	10	38	1,127
03B	189	187	172	134	228	177	130	130	23	87	1,457
04B	452	482	336	292	472	418	262	391	57	188	3,350
05B	202	296	219	156	326	311	161	298	35	104	2,108
06B	87	130	80	62	76	115	66	106	16	33	771
07B	32	60	38	22	25	51	27	45	7	20	327
08B	16	33	16	15	8	27	8	23	2	7	155
Total	1,158	1,343	964	769	1,309	1,220	771	1,134	150	477	9,295

Section 4

CONCLUSIONS

Conclusions

- The number of Shippers we receive data from has increased, but the number passing validation remains low. We have still managed to provide a robust number of sample points for the majority of EUCs to assess Algorithm Performance for Gas Year 2022/23 (Strand 3)
- MOD654S data is continuing to improve, however there are still a few Shippers that are not sending in data
- Class 3 Data has once again been used in the sample for this year's Algorithm Performance. This has meant that we can test the Pre-Payment models. Some Pre-Payment data is now also being received from Shippers
- We will review the target numbers for the Distribution Networks and provide any proposals at the next DESC meeting

NDM Sample Reminders

- Shippers with a portfolio greater than 25,000 sites are required to send daily NDM sample data to Xoserve (MOD654s)
- It's preferred that this data is sent to us monthly as this will allow time for any errors to be spotted and rectified. However, it can be sent every 6 months (April and October)
- Please ensure that it is actual daily volume that is sent. In the October submissions we received reads, energies and estimates. This means that the whole 12 months' worth of data was rejected
- If a site has not consumed anything over a 12-month period, then please do not include it in your submission

Feedback

- All Shipper that are required to send data in through MOD654S will be contacted in December 2023 with feedback on the data within their submissions
- One of the requirements of MOD654s is to provide analysis to The Performance Assurance Committee (PAC) to advise which Shippers are meeting the obligation
 - If you were unable to meet your obligation, then PAC will be in touch
 - Please contact the Demand Estimation Team should you need any assistance establishing this process
- We will continue to provide the quarterly feedback to each of the DNs

Next Steps



December 2023 onwards

Sample Provider
Feedback

December 23

NDM Population
Review

February 24

Sample Validation
for Modelling

April 24

Appendix

- Demand Estimation Contact:
Xoserve.Demand.Estimation@Xoserve.com
- MOD654S NDM Sample File Format can be found [here](#)
- Common data errors found in the NDM Sample submissions can be found [here](#)