13th January 2023

AUG Sub-Committee Meeting

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Presentation of draft Weighting Factors

AGENDA

1. **Process and timetable**
2. **Draft Weighting Factors for Gas Year 2023-2024**
3. **UIG Contributors**
4. **Investigations updates**
5. **Next steps (reminder)**

Appendix:

Principles; Methodology

Draft AUG Statement:
Process and timetable

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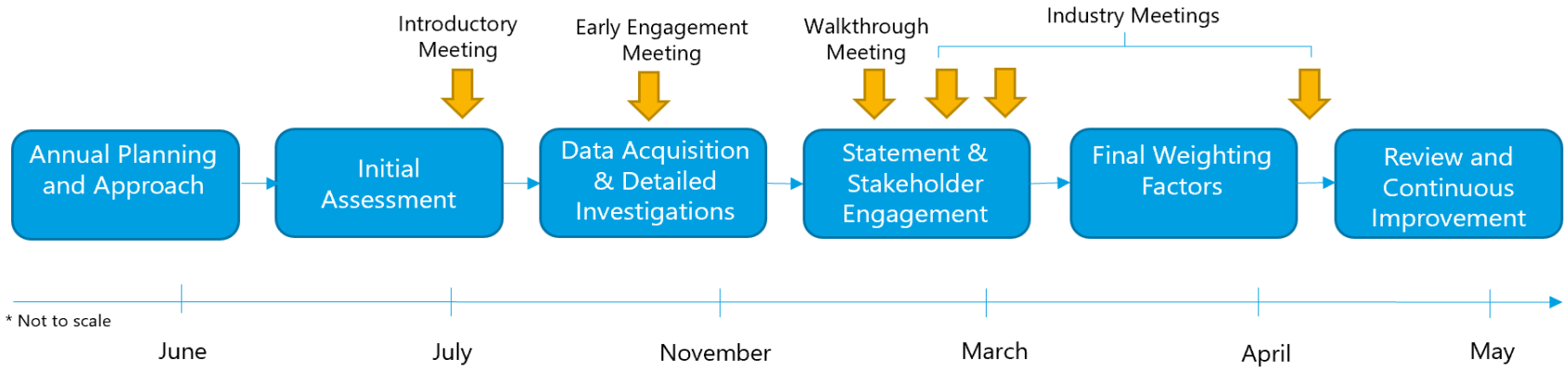
Consultation Process

Timeline

- The draft AUG Statement was provided to the industry via the Joint Office on 29th December 2022, following prior review by the CDSP
- The draft AUG Statement was accompanied by a consultation document
- Responses to the draft AUG Statement consultation are requested by 22nd January 2023
- Please send these to analytical.services@xoserve.com, copying us at auge@engage-consulting.co.uk
- Our assessment of the responses received will be presented at the AUG Sub-Committee Meeting on 17th February 2023

Timetable

- Any revision of the draft AUG Statement following consideration of consultation responses will be provided to the AUG Sub-Committee by 4th March 2023
- Final changes to the draft Weighting Factors and AUG Statement (if required) will be presented at the AUG Sub-Committee Meeting on 10th March 2023
- The final AUG Statement will be provided to the AUG Sub-Committee by 31st March 2023 and presented at the 14th April AUG Sub-Committee Meeting, prior to consideration at the April UNCC Meeting
- Engagement with stakeholders will continue throughout the process. We can be contacted at auge@engage-consulting.co.uk



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Draft Weighting Factors:
Gas Year 2023-2024

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Draft Weighting Factor Table

- The draft AUG Table for 2023-2024 Gas Year is shown here
- The factors will change between now and the final statement
- Note that the relative numbers are comparable with previous Statements, but the absolute numbers are not
- This has been updated to reflect latest TRAS data

Draft Weighting Factors for Gas Year 2023-2024

	CLASS				
EUC BAND		1	2	3	4
	1ND	51.39	51.39	51.39	83.70
	1PD	142.85	142.85	142.85	474.72
	1NI	5.47	872.93	159.03	634.53
	1PI	61.54	61.54	159.03	634.53
	2ND	63.52	63.52	63.55	125.27
	2PD	63.55	66.35	63.55	125.27
	2NI	5.47	292.27	85.42	293.82
	2PI	85.42	140.74	85.42	293.82
	3	5.47	56.25	47.15	53.66
	4	5.47	56.99	57.41	61.02
	5	5.47	65.35	56.33	61.09
	6	5.47	68.14	54.58	63.75
	7	5.47	69.94	55.26	70.81
	8	5.47	59.59	56.20	57.69
	9	5.47	34.29	27.15	29.06

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Year on Year Comparison

UIG as a Percentage of Consumption Forecast

Gas Year 2022-2023

	CLASS				
EUC BAND	2022-2023	1	2	3	4
	1ND	0.0%	1.4%	1.4%	1.9%
	1PD	0.0%	0.0%	1.5%	8.8%
	1NI	0.1%	19.1%	4.0%	17.3%
	1PI	0.0%	0.0%	4.0%	17.3%
	2ND	0.0%	0.0%	1.6%	2.9%
	2PD	0.0%	0.0%	1.6%	2.9%
	2NI	0.0%	2.3%	1.4%	4.6%
	2PI	0.0%	0.0%	1.4%	4.6%
	3	0.0%	1.2%	1.1%	1.2%
	4	0.1%	1.4%	1.2%	1.3%
	5	0.1%	1.3%	1.2%	1.3%
	6	0.1%	1.3%	1.2%	1.6%
	7	0.1%	1.5%	1.3%	1.4%
	8	0.1%	1.2%	1.4%	1.1%
	9	0.1%	0.6%	0.5%	0.6%

Gas Year 2023-2024

	CLASS				
EUC BAND	2023-2024	1	2	3	4
	1ND	0.0%	0.0%	1.0%	1.7%
	1PD	0.0%	0.0%	2.9%	9.5%
	1NI	0.1%	17.5%	3.2%	12.7%
	1PI	0.0%	0.0%	3.2%	12.7%
	2ND	0.0%	0.0%	1.3%	2.5%
	2PD	0.0%	0.0%	1.3%	2.5%
	2NI	0.0%	5.9%	1.7%	5.9%
	2PI	0.0%	0.0%	1.7%	5.9%
	3	0.1%	1.1%	0.9%	1.1%
	4	0.1%	1.1%	1.1%	1.2%
	5	0.1%	1.3%	1.1%	1.2%
	6	0.1%	1.4%	1.1%	1.3%
	7	0.1%	1.4%	1.1%	1.4%
	8	0.1%	1.2%	1.1%	1.2%
	9	0.1%	0.7%	0.5%	0.6%

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Year on Year Comparison

Differences Between This Year and Last

- **Practically all movements in these percentages are in fact attributable to changes to Theft data, due to the high relative proportion of all UIG coming from this contributor:**
  - Matrix Positions in EUC 1ND have seen a downwards shift, with a relative increase in 1PD. This is mainly due to movements in the traditional and smart proportions attributed to each of these bands and how much theft is assigned to those populations
  - Matrix Positions in EUCs 1NI and 1PI have seen a downwards shift, with a commensurate upwards movement in 2NI and 2PI. This is due to movements in the theft proportions driven by our methodology's validation process for thefts EUCs (particularly those before 2019 when the sub-bands were created), along with the shift in the 10 year rolling theft dataset (gaining an extra year of recent data and losing the earliest year)
  - For No Read at the Line in the Sand, the refreshed data included a proportionally larger number of industrial sites with no accepted read. This had a very minor impact on pushing more relative UIG towards 2NI and 2PI
  - There have been material changes to UIG calculated for Consumption Meter Errors; and the LDZ Meter Error contributor has been discounted completely. However, the relative scale of these contributors means that there has been no meaningful impact on Weighting Factors

	CLASS				
EUC BAND		1	2	3	4
	1ND	0.0%	-1.4%	-0.4%	-0.3%
	1PD	0.0%	0.0%	1.4%	0.7%
	1NI	0.0%	-1.6%	-0.8%	-4.6%
	1PI	0.0%	0.0%	-0.8%	-4.6%
	2ND	0.0%	0.0%	-0.3%	-0.4%
	2PD	0.0%	0.0%	-0.3%	-0.4%
	2NI	0.0%	3.5%	0.3%	1.3%
	2PI	0.0%	0.0%	0.3%	1.3%
	3	0.1%	-0.1%	-0.2%	-0.1%
	4	0.0%	-0.3%	-0.1%	-0.1%
	5	0.0%	0.0%	-0.1%	-0.1%
	6	0.0%	0.0%	-0.1%	-0.4%
	7	0.0%	-0.1%	-0.2%	0.0%
	8	0.0%	0.0%	-0.3%	0.1%
	9	0.0%	0.0%	0.0%	0.0%

Total UIG Estimate

UIG by Contributor and Comparison with 2022-2023 Gas Year

- **The total estimate for the 2023-2024 Gas Year is 9,033 GWh**
- **This is 1,619 GWh less than last year**

Contributor	2022-2023 Gas Year UIG Volume	Change	2023-2024 Gas Year UIG Volume
Theft of Gas	7,602 GWh	↓	7,261 GWh
Average Temperature Assumption	1,220 GWh	↓	1,089 GWh
Average Pressure Assumption	359 GWh	↓	345 GWh
No Read at the Line in the Sand	861 GWh	↓	175 GWh
Incorrect Correction Factors	53 GWh	→	54 GWh
Unregistered Sites	35 GWh	↑	53 GWh
Isolated Sites	47 GWh	↓	22 GWh
Dead Sites	-	↑	20 GWh
IGT Shrinkage	18 GWh	→	19 GWh
Shipperless Sites	26 GWh	↓	17 GWh
Consumption Meter Error	432 GWh	↓	-21 GWh
Total	**10,982 GWh**	↓	**9,033GWh**

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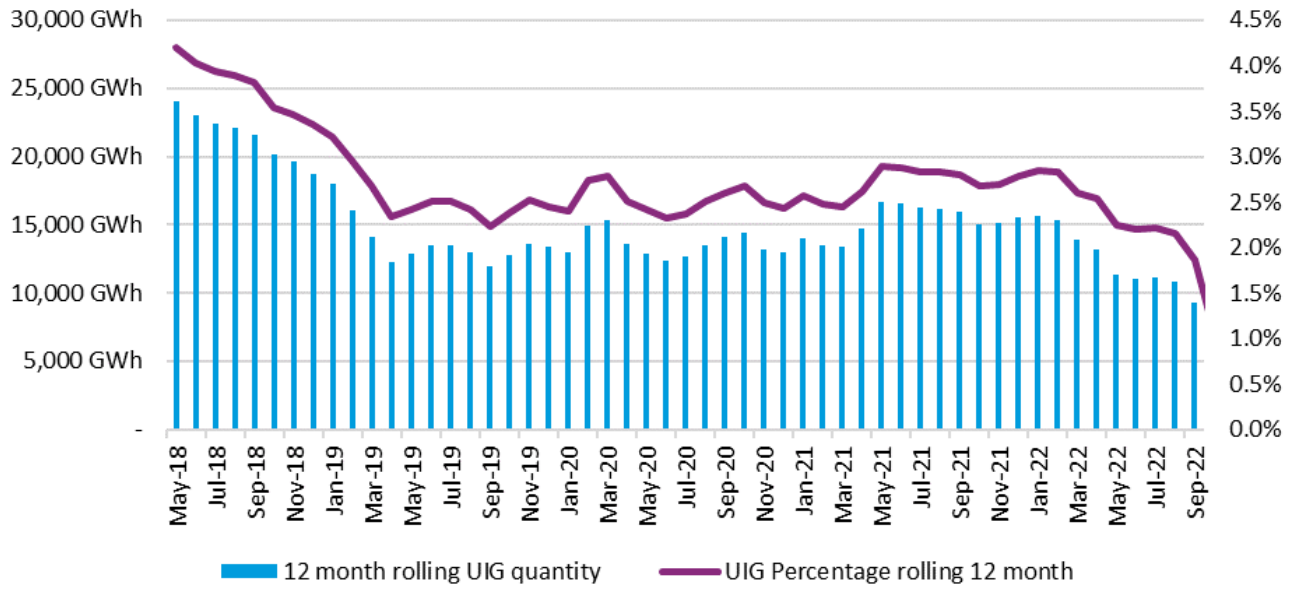
Comparison with Observed Levels

- We compared our results with observed levels of UIG since June 2017 for benchmarking purposes
- Over the latest 2 years, the average 12 month rolling UIG percentage is 2.57%
- Using this 2.57% and our Consumption Forecast, we calculated benchmark UIG close out to be 12,801 GWh
- Our calculated figure is 70.6% of UIG and therefore passes a reasonable sense check against observed levels



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Consumption Forecast

Summary

- A key data input into most of our calculations for the various contributors is an estimate of consumption for the target Gas Year
- We use the ETS function to forecast the AQ and count of Supply Meter Point for the target year based on trends seen since Nexus go-live (June 2017)

Total Supply Meter Points by Matrix Position

EUC BAND	CLASS 1	CLASS 2	CLASS 3	CLASS 4
1ND	-	-	6,082,845	16,739,243
1PD	-	-	84,720	1,524,841
1NI	4	9	107,627	402,079
1PI	-	-	46	1,891
2ND	-	-	2,717	65,556
2PD	-	-	25	1,410
2NI	-	21	60,348	83,508
2PI	-	-	23	94
3	1	38	20,185	23,491
4	1	146	8,727	10,119
5	10	65	1,542	2,625
6	36	87	380	1,004
7	60	118	169	380
8	122	124	68	243
9	361	3	6	18
				25,227,140

Total Consumption by Matrix Position

EUC BAND	CLASS 1	CLASS 2	CLASS 3	CLASS 4
1ND	-	-	65,372	216,916
1PD	-	-	920	13,566
1NI	0	2	2,799	7,867
1PI	-	-	1	30
2ND	-	-	287	7,298
2PD	-	-	3	154
2NI	-	4	8,978	11,947
2PI	-	-	5	9
3	0	19	8,927	10,688
4	3	195	10,288	12,042
5	43	236	5,031	8,916
6	333	1,018	3,339	9,033
7	1,290	2,467	3,449	8,055
8	5,668	5,255	2,674	9,556
9	51,086	132	309	1,895
				498,106

- For all Matrix Positions, where we can, we base our forecast on the trend observed in data from June 2017 to October 2022. Exceptions are EUC 9 and the sub-bands for EUCs 1 and 2
- We expect falling AQs to have a bearing on the consumption forecast in the Proposed Final Statement

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Key Methodology Updates for Gas Year 2023-2024

Impacting UIG	
Dead Sites: additional contributor	An additional contributor to UIG quantified and added to the model to determine the draft Weighting Factors.
LDZ Meter Errors: no longer considered	Removal of this contributor from the model given its inconsequential year on year UIG value, and assumption around large errors always being identified.
Consumption meter errors: change to number averaging	Adjustment to the methodology used to average the meter errors detected for each year. This will bring more year on year stability as the dataset expands.
No Read at the Line in the Sand	Improved accuracy in calculation thanks to collection of more detailed dataset.
Isolated Sites	Adjusted the assumptions around sites with limited read data but no meter present.

Not impacting UIG	
Meter by-pass UIG methodology	Further investigation into assumptions with no conclusions drawn to justify a UIG methodology.
Theft: quality of read history	Investigated quality of read history as an indicator of theft, concluding that this would not be useful.

Refresh of supporting data sets

Most datasets were refreshed to reflect a further year of operation

Accepted Reads for Isolated Sites	Meter Type
Accepted Reads for sites with Theft	Monthly Reconciliation
Reconciliation percentages	Offline Adjustment
AMR History	Orphaned Sites
AMR Snapshot	PAW Risk Assessment Model
Annual Load Profile	Post Code and Elevation Data
AQ Snapshot	Pressure Data
Average Main Length	Read Frequency
By-Pass AQ Report	Rejected Reads for Isolated Sites
Calorific Values (CV)	Rejected Reads for Dead Sites
Connection Details for Orphaned Sites	Rejected Reads for sites with Theft
Connection Details for Shipperless Sites	Rejected Reads for Sites with No Read
Conversion Equipment Fitted	Seasonal Normal Factors
Correction Factor	Shipperless AQ Report
Dead Sites	Shipperless Sites PTS
Embedded AMR	Shipperless Sites SSrP
Flow Weighted Gas Temperatures	Sites with a Meter By-pass
IGT Sites	Smart Meter Data
In-Service Testing (IST) Results	Supply Meter Points with no Reads after April 2020
Isolated Sites	Telemetered Sites
Leakage Rates	Theft Data
Legitimate Unregistered Sites Details	TRAS Theft Information
Less Than 12 months report	Throughput
Measurement Error Register	TOG Theft Information
Meter Location	Unregistered AQ Report

UIG Contributors:

Overview

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UIG Contributors

Summary

- One new contributor has been identified; and one removed
- In some cases, improvements have been made to a step in the methodology or calculations and these are highlighted in the draft AUG Statement
- Data refreshes were applied to all existing Contributors

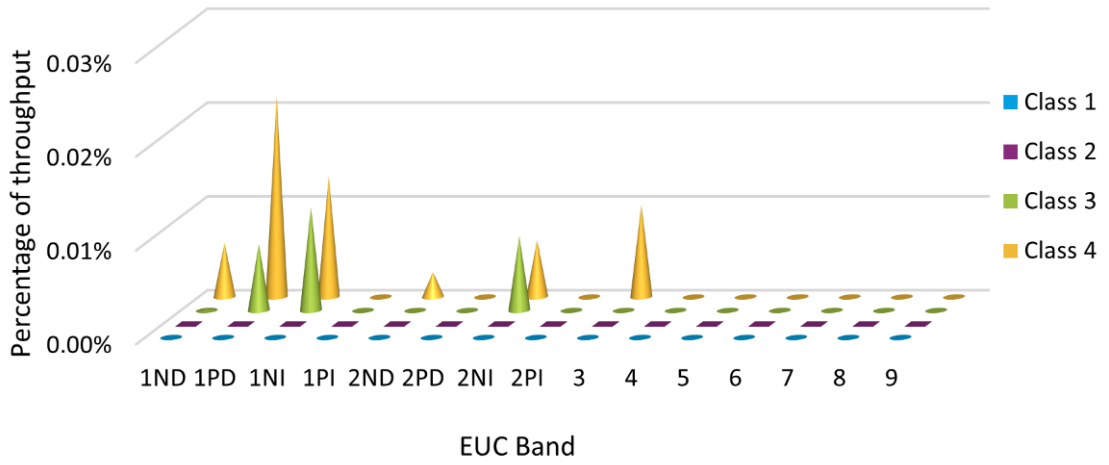
- 200 – Dead Sites
- 040 – Consumption Meter Errors
- 050 – LDZ Meter Errors
- 090 – No Read
- 010 – Theft of Gas
- 160 – Isolated Sites
- 020 – Unregistered Sites
- 025 – Shipperless Sites
- 060 – IGT Shrinkage
- 070- Average Pressure
- 080 – Average Temperature
- 090 – Incorrect Correction Factors

200 – Dead Sites

Results

- **The forecast for this contributor is 20 GWh.**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	0	12
	1PD	-	-	0	3
	1NI	-	-	0	1
	1PI	-	-	-	-
	2ND	-	-	-	0
	2PD	-	-	-	-
	2NI	-	-	1	1
	2PI	-	-	-	-
	3	-	-	-	1
	4	-	-	-	-
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-



200 – Dead Sites

Definition

- **Any Supply Meter Point with a status set to "Dead" in the UK Link central industry database is excluded from allocation as part of standard Settlement processes**
- **The Dead status should indicate that the Supply Meter Point no longer has the ability to flow gas: generally the site has been disconnected completely from the gas mains network. In such cases, the site remains registered to a Shipper but they are not allocated any energy**
- **If the site is recorded as Dead, but for any reason gas is consumed, this consumption will not be directly allocated to a Shipper but will instead contribute to UIG**

200 Dead Sites: Recap

Sites are set to 'Dead' on CDSP system where there is no live service at the site.

- **Hypothesis: Some sites which are recorded as Dead are in fact consuming gas**
- **Any such consumption will potentially create positive UIG, because allocation does not take place for Dead sites**
- **This is similar to the outcome for Isolated Sites – where often service and meter remain at the site, but the meter has been deliberately physically impaired. We have therefore used a similar UIG calculation methodology**

Data inputs are:

1. Dead Sites Portfolio
2. Rejected Reads relating to that portfolio

200 Dead Sites: Analysis

Over half of the sites with 'Dead' status appear to be consuming gas

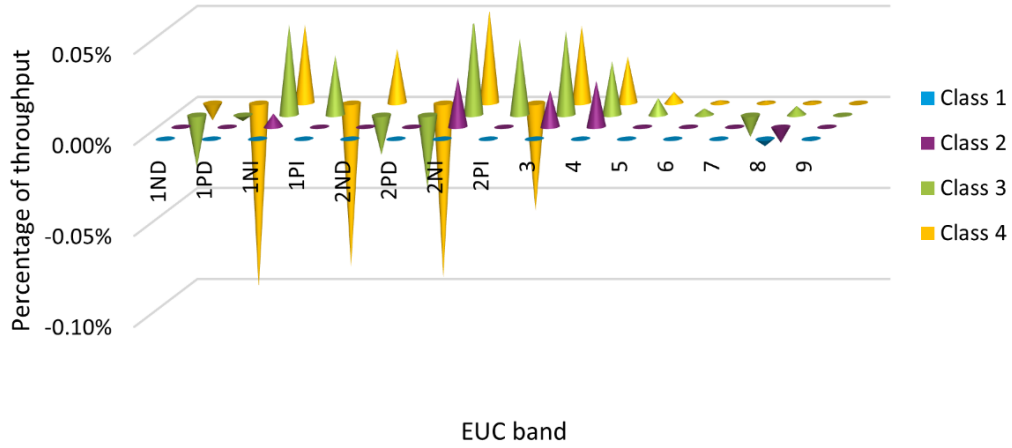
- **Taking a recent snapshot of Dead Sites alongside their rejected reads records, we analysed sites with a status update before April 2020**
- **To assess whether these Dead Sites could in fact be consuming gas, we analysed their associated rejected reads records**
- **Our analysis identified 1,206 of the 2,310 Dead Sites have an indication of gas consumption**
- **Assuming (as we do) that the currently recorded AQ is a fair indicator of consumption, our estimate of UIG associated with Dead Sites is 20 GWh. (To compare, UIG for Isolated Sites is at 22 GWh.)**

040 – Consumption Meter Error – Inherent Bias

Results

- The forecast for this contributor is -21 GWh
- The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 432 GWh.
- Adjustment to the methodology used to average the meter errors detected for each year
- The very significant reduction is due to both the latest in-service testing results and the number of ultrasonic meters replacing synthetic diaphragm ones

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	-19	-21
	1PD	-	-	-0	-14
	1NI	-	0	1	3
	1PI	-	-	0	-0
	2ND	-	-	-0	2
	2PD	-	-	-0	-0
	2NI	-	0	5	6
	2PI	-	-	0	-0
	3	-	0	4	5
	4	-	0	3	3
	5	-	0	0	1
	6	-	0	0	0
	7	-	0	-0	0
	8	-0	-0	0	0
	9	-1	-	-	-



050 – LDZ Meter Error (Removed)

Indicative results

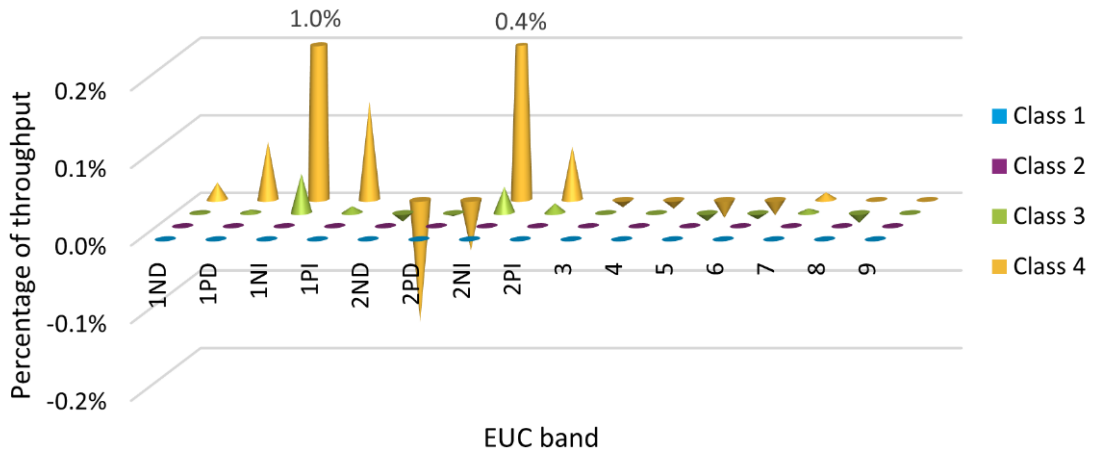
- **The forecast for this contributor with this year's data was -1. In previous years this value has been 1 GWh and 0 GWh**
- **This year's dataset included instances of significant under-recording at LDZ meters. However, we now assume that all significant instances are identified and accounted for**
- **Stripping these out from the data leaves a mix of small positive and negative errors which produce a result around zero**
- **We decided to remove the LDZ Meter Error contributor from our UIG model because the UIG output is immaterial**

090 – No Read at the Line in the Sand

Results

- **The forecast for this contributor is 175 GWh**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 861 GWh**
- **Extra reconciliation data available this year enabling a much more accurate estimate of UIG**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	1	48
	1PD	-	-	0	10
	1NI	-	-	1	77
	1PI	-	-	0	0
	2ND	-	-	-0	-12
	2PD	-	-	-0	-0
	2NI	-	-	3	54
	2PI	-	-	0	0
	3	-	-	-0	-1
	4	-	-	-0	-1
	5	-	-	-1	-2
	6	-	-	-0	-2
	7	-	-	0	1
	8	-	-	-0	-0
	9	-	-	-	-

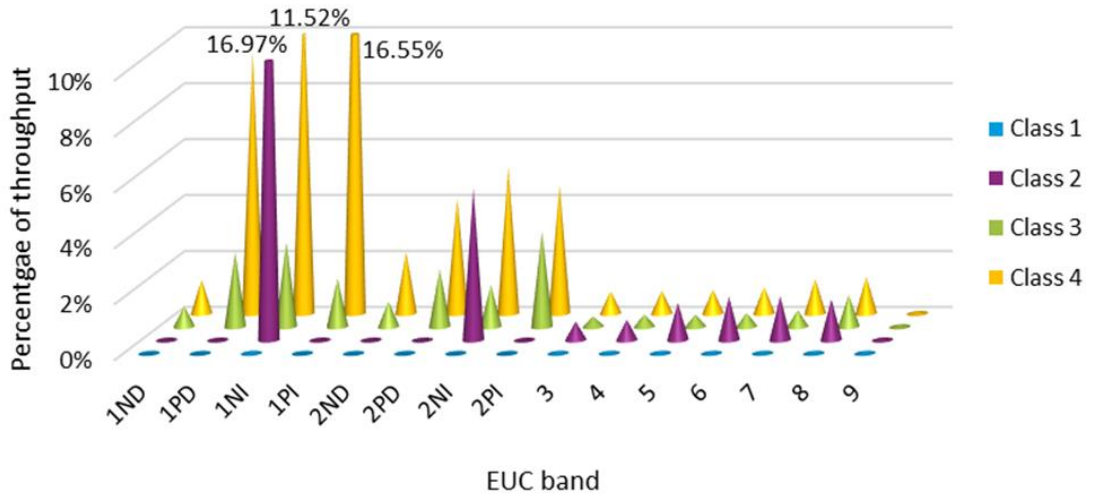


010 – Theft of Gas

Results

- The forecast for this contributor is 7,261 GWh
- The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 7,602 GWh
- [Numbers will be updated for final presentation on 13th Jan – pending recent TRAS data analysis]

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	486	2,610
	1PD	-	-	25	1,271
	1NI	0	0	85	906
	1PI	-	-	0	5
	2ND	-	-	3	161
	2PD	-	-	0	6
	2NI	-	0	136	627
	2PI	-	-	0	0
	3	0	0	33	86
	4	0	1	46	98
	5	0	3	22	76
	6	0	16	17	86
	7	1	39	21	99
	8	6	78	31	127
	9	50	0	0	2

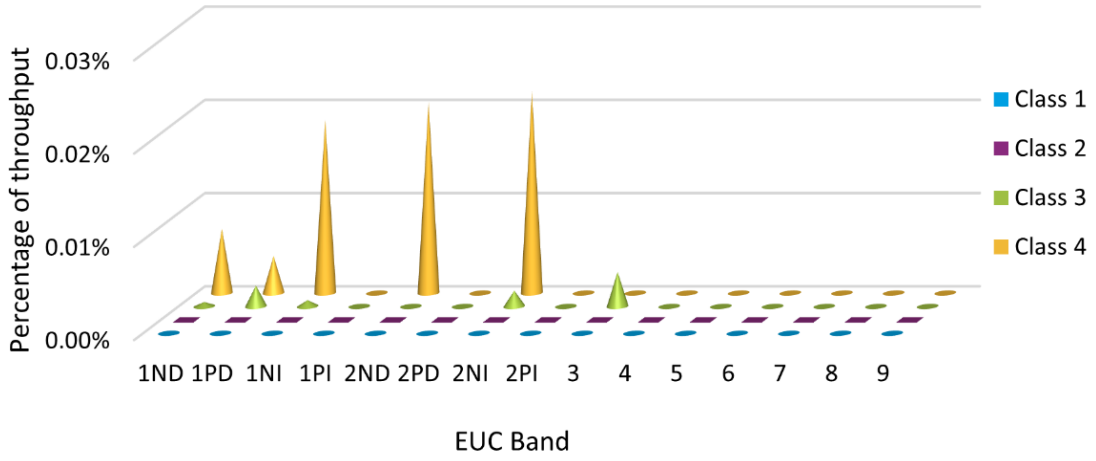


160 – Isolated Sites

Results

- **The forecast for this contributor is 22 GWh**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 47 GWh**
- **Methodology updated for sites with insufficient reads**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	0	15
	1PD	-	-	0	1
	1NI	-	-	0	1
	1PI	-	-	-	-
	2ND	-	-	-	1
	2PD	-	-	-	-
	2NI	-	-	0	3
	2PI	-	-	-	-
	3	-	-	0	-
	4	-	-	-	-
	5	-	-	-	-
	6	-	-	-	-
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-

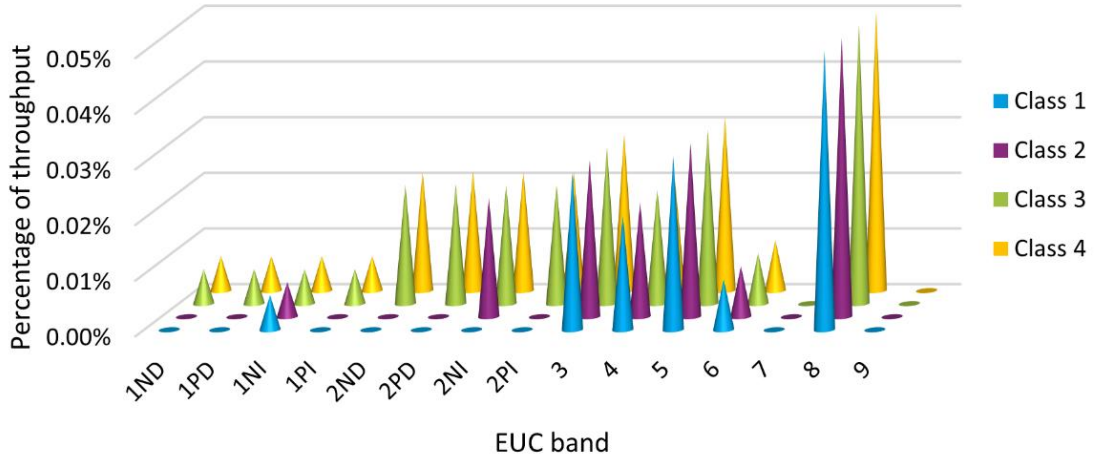


020 – Unregistered Sites

Results

- **The forecast for this contributor is 53 GWh**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 35 GWh**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	4	14
	1PD	-	-	0	1
	1NI	0	0	0	0
	1PI	-	-	0	0
	2ND	-	-	0	2
	2PD	-	-	0	0
	2NI	-	0	2	3
	2PI	-	-	0	0
	3	0	0	3	3
	4	0	0	2	2
	5	0	0	2	3
	6	0	0	0	1
	7	-	-	-	-
	8	3	3	1	5
	9	-	-	-	-

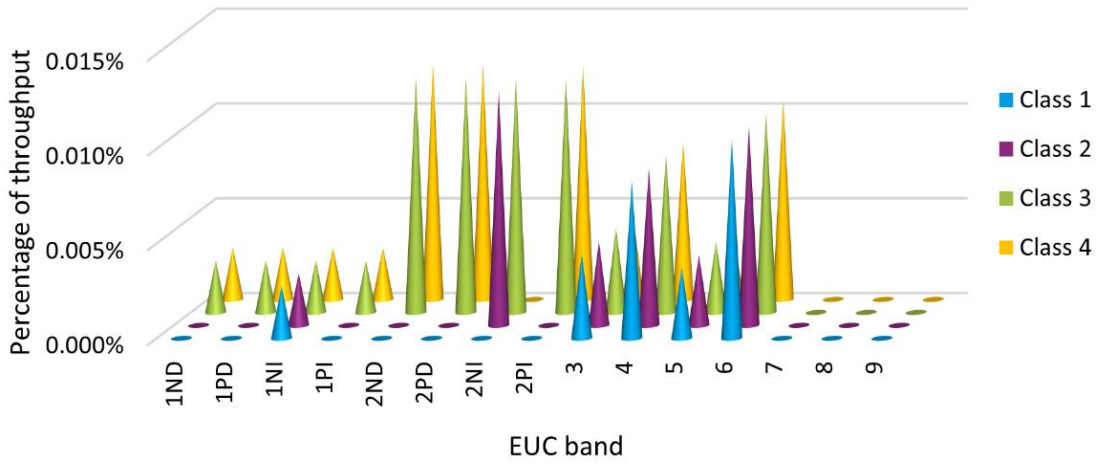


025 – Shipperless Sites

Results

- **The forecast for this contributor is 17 GWh**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 26 GWh**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	2	6
	1PD	-	-	0	0
	1NI	0	0	0	0
	1PI	-	-	0	0
	2ND	-	-	0	1
	2PD	-	-	0	0
	2NI	-	0	1	1
	2PI	-	-	0	0
	3	0	0	0	0
	4	0	0	1	1
	5	0	0	0	0
	6	0	0	0	1
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	-

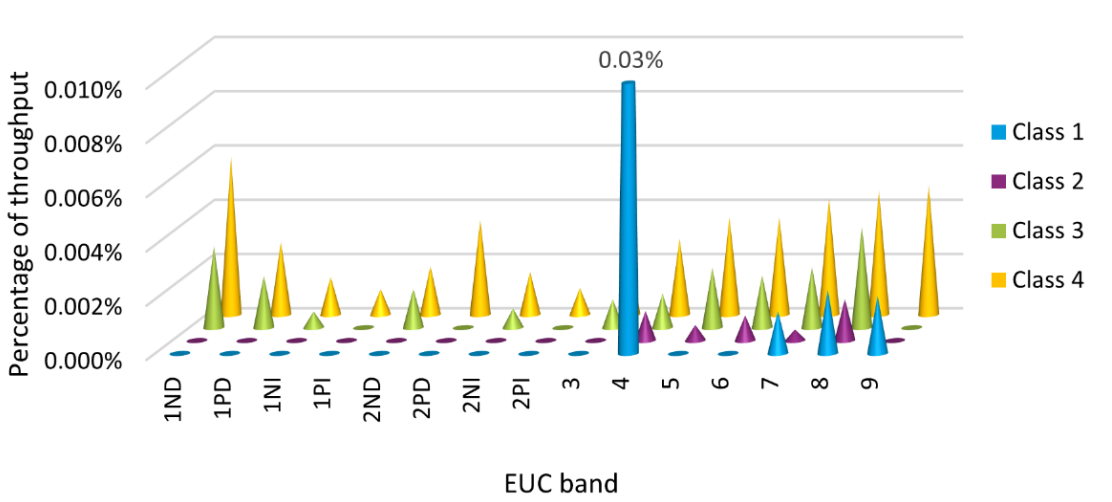


060 – IGT Shrinkage

Results

- **The forecast for this contributor is 19 GWh**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 18 GWh**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	2	13
	1PD	-	-	0	0
	1NI	0	-	0	0
	1PI	-	-	-	0
	2ND	-	-	0	0
	2PD	-	-	-	0
	2NI	-	-	0	0
	2PI	-	-	-	0
	3	-	-	0	0
	4	0	0	0	0
	5	-	0	0	0
	6	-	0	0	0
	7	0	0	0	0
	8	0	0	0	0
	9	1	-	-	0



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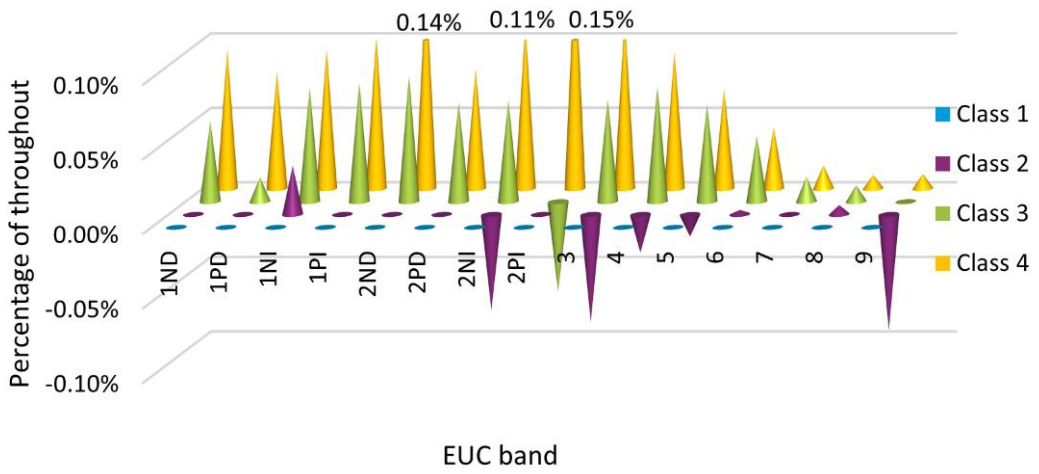
070 – Average Pressure Assumption

Results

- **The forecast for this contributor is 345 GWh.**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 359 GWh.**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	35	204
	1PD	-	-	0	11
	1NI	-	0	2	7
	1PI	-	-	0	0
	2ND	-	-	0	10
	2PD	-	-	0	0
	2NI	-	-0	6	13
	2PI	-	-	-0	0
	3	-	-0	6	12
	4	-	-0	8	11
	5	-	-0	3	6
	6	-	0	1	4
	7	-	0	1	1
	8	-0	0	0	1
	9	0	-0	-	0



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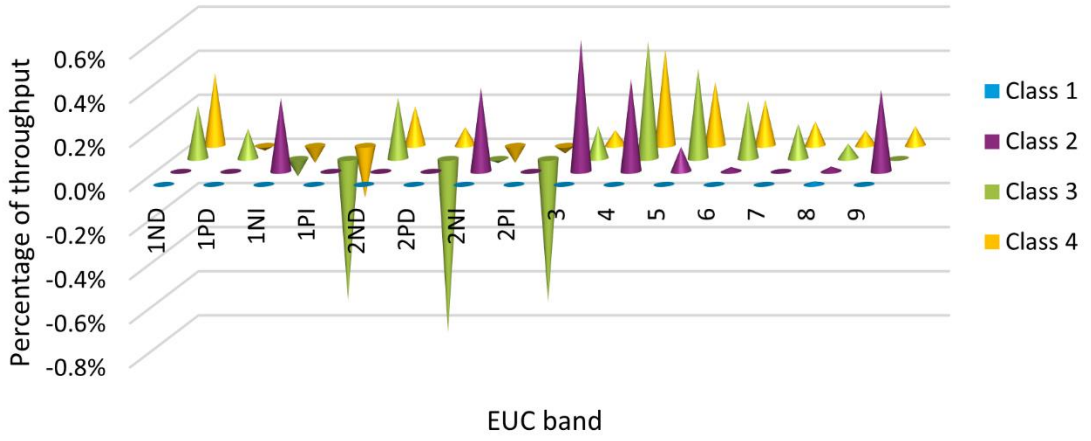
080 – Average Temperature Assumption

Results

- **The forecast for this contributor is 1,089 GWh.**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 1,220 GWh.**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	157	708
	1PD	-	-	1	-3
	1NI	-	0	-2	-6
	1PI	-	-	-0	-0
	2ND	-	-	1	13
	2PD	-	-	-0	0
	2NI	-	0	-2	-9
	2PI	-	-	-0	-0
	3	-	0	13	7
	4	-	1	55	53
	5	-	0	21	26
	6	-	0	9	19
	7	-	0	5	9
	8	1	1	2	7
	9	2	0	-	2



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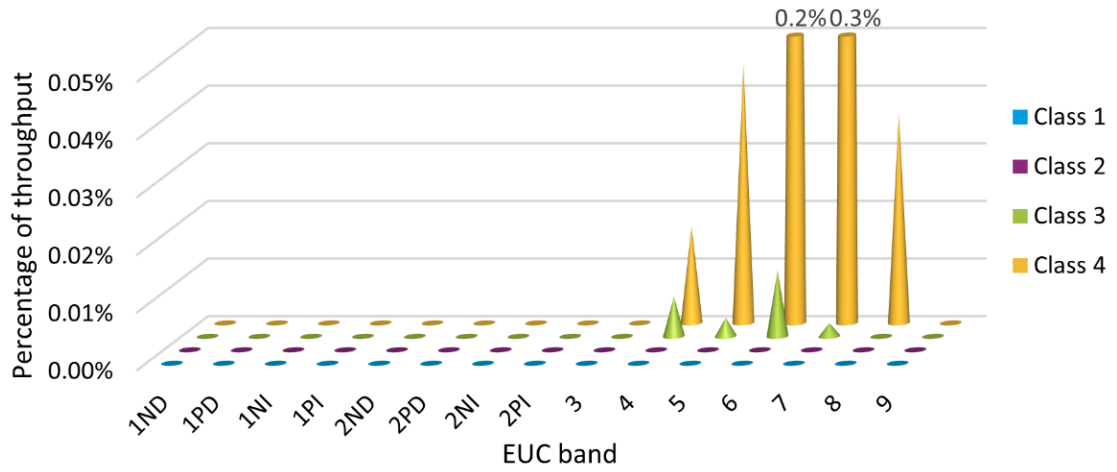
100 – Incorrect Correction Factors

Results

- **The forecast for this contributor is 54 GWh.**
- **The Statement for Gas Year 2022-2023 quantified the UIG for this contributor as 53 GWh.**

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	-	-
	1PD	-	-	-	-
	1NI	-	-	-	-
	1PI	-	-	-	-
	2ND	-	-	-	-
	2PD	-	-	-	-
	2NI	-	-	-	-
	2PI	-	-	-	-
	3	-	-	-	-
	4	-	-0	1	2
	5	-	-	0	4
	6	-	-0	0	21
	7	-	-	0	23
	8	-	-	-	3
	9	-	-	-	-



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Investigations:
Overview and updates

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Introduction to the Investigations

Background

- **Our Initial Assessment process identified four focus areas for investigation this year**
  - **Refinement Investigation – 012 - Theft of Gas – Quality of Read History**
  - **Refinement Investigation – 011 - Theft of Gas – Smart Rollout Impact**
  - **Detailed Investigation – 140 - Meters with By-Pass Fitted**
  - **Detailed Investigation – 200 - Dead Sites**
- **We have identified UIG for Dead Sites (see UIG Contributors above)**
- **Three other investigations have not led to further UIG being identified or existing UIG being more equitably shared**

012 Theft: Quality of Read History: Recap

We are investigating the suggestion that gas theft may go hand-in-hand with low read submission – making it much easier for theft to occur and endure, and deliberate withholding of reads as a possible correlation to theft propensity.

- **Hypothesis**: Sites at which there is a good/full read history recorded on CDSP systems are less likely to have been subject to theft than sites for which there is patchy or no read history
- If this is true, then we might be able to use the completeness of read history as a proxy for likelihood for theft to take place
- APPROACH:
  - Analyse complete read history for detected theft sites
  - Determine the best proxy for quality of read history
  - If robust correlation identified, determine how to reflect this in existing allocation methodology (i.e. replacing what we have vs. adding an additional step)
  - NOTE Potential overlap with 011 Theft of Gas (Smart Rollout)

012 Theft: Quality of Read History: Analysis (1)

Questions Considered

- For sites on the TRAS and TOG dataset
  - Do they have a read leading up to the recorded start date?
  - Do they have a read following the recorded start date?
  - How many reads in the 2 years before the recorded start date?
  - How many reads in the 2 years following the recorded start date?
  - Is there a better alternative to the start date?
- Can we compare the read history to the full meter population?
- Does the lead type (e.g. tip-off vs. supplier data) introduce any bias into the detected theft read set?

Data inputs

- TOG dataset
- Accepted Reads for TOG and TRAS dataset (complete set for the 1st April 2014 onwards)
- Rejected Reads for TOG and TRAS dataset (complete set for the 1st April 2014 onwards)
- Last Read data for full meter population

012 Theft: Quality of Read History: Analysis (2)

Read history quality does not provide a indicator of propensity for theft – at least in the data available to us

- Most sites on our theft dataset have a read within the year of the assumed start date.
- We looked at the average number of reads submitted for the TRAS and TOG dataset.
  - In the 2 years before theft begins, 7 reads
  - In the 2 years following, 13 reads
- Sites where theft has occurred show no meaningful difference in quality of read history, when compared to the general population of sites.

Time from assumed theft start date	Pre-Theft Start (No. of Sites)	Post-Theft Start (No. of Sites)	Full Population (No. of Sites)
Read within 1 year	88%	80%	94%
Read within 2 years	8%	14%	4%
Read within 3 years	2%	4%	1%
Read within 4 years	1%	1%	0%
4+ years	1%	0%	0%
No read	0%	1%	0%

TABLE: Read history quality proxies in detected theft population, with comparison to non-theft population

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012 Theft: Quality of Read History: Analysis (3)

Detected theft data will always contain unavoidable bias.

Is there any way around this?

- Detected theft data reflects the outcome of industry operations. One way to identify sites for investigation is by examining reads.
- Detected theft may therefore show bias towards sites with more rather than less read data.
- We examined the effect of this by looking at the difference between thefts investigated after a tip-off and thefts investigated on the back of supplier data.
- We note that suppliers use read data AND pre-pay vending patterns as trigger, but ALL types of lead show the same strong correlation to a full read history.

Pre-Theft Start	Crimestoppers	Field Agent	MRA	Other	Police	Supplier	TRAS
Read within 1 year	86%	88%	89%	88%	93%	88%	89%
Read within 2 years	8%	8%	8%	7%	0%	8%	8%
Read within 3 years	3%	2%	2%	3%	0%	2%	2%
Read within 4 years	1%	1%	1%	1%	7%	1%	0%
4+ years	1%	1%	0%	1%	0%	1%	0%
No read	1%	1%	1%	0%	0%	0%	0%

TABLE: Comparing read history quality between theft investigation triggers

012 Theft: Quality of Read History: Conclusions

Quality of Read History is not a sufficiently robust indicator to use to apportion undetected theft

- We have established a proxy for quality of read history and a methodology to investigate our original hypothesis.
- We have also investigated the potential impact of estimated reads existing in the read history dataset. It is possible to identify some estimated reads in the data, but excluding them does not give a marked enough difference in the results to make us reconsider our conclusions.

011 Theft: Smart Rollout: Recap

The data-led assumptions used in the AUGE's theft allocation methodology are not yet reflecting the expected impact of smart rollout.

Our methodology allocates undetected theft to Matrix Positions based on meter type.

Are there alternatives to this approach which might allow us to reflect the assumed benefits of smart meters?

- Hypothesis: The continued rollout of smart meters should already be having a material impact on theft at smart-enabled Supply Meter Points, but the lagging indicators provided by available detected theft data mask this expected impact.
- Proposed on the back of last year's impactful refinement for AMR meter populations
- RECCo theft estimation methodology completed H2 2022
- APPROACH:
  - Desk-based review of allocation methodology, alternative assumptions and data sources (including proposed RECCo output)
  - Impact assessment of alternative approaches (if identified)
  - Assumed no change to the methodology to calculate total theft level

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011 Theft: Smart Rollout

The data-led assumptions used in the AUGE's theft allocation methodology do not reflect the expected impact of smart rollout

However, the inputs to the allocation methodology are in fact relatively beneficial to smart meters

- The proportion of undetected theft allocated to smart meters is increasing year on year. This is as it should be given that smart penetration is increasing
- Smart benefit remains materially greater than the prudent BEIS estimate of 10% theft reduction. This is due to:
  - Lag in theft detection (and impact of COVID seen in recent updates)
  - Lack of clarity and completeness of detected theft data
  - The influence of other factors on detected theft data

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011 Theft: Smart Rollout

The current methodology forecasts smart share of detected theft based on historical data

Year theft took place	2017	2018	2019	2020	2021	2022
Smart share of total detected theft	3%	7%	11%	15%	22%	29%
Smart rollout penetration	19%	29%	37%	42%	50%	54%

- Smart theft allocation is scaled to target Gas Year's forecast smart penetration
- Forecast is based on a rolling average to limit volatility
- Traditional theft allocation remains after AMR and smart allocation are derived
- Smart populations are almost exclusive to Bands 1ND and 1PD, with forecast smart vs traditional proportions for each Class

011 Theft: Smart Rollout

Alternative approaches have been considered

Alternative to existing approach	Comments	Likely impact vs status quo
Recent theft data only Reduce the span of the rolling dataset	Adds volatility, with ebb and flow depending on recent detection activity and performance.	Increased allocation to smart
Smart Rollout – x Forecast smart penetration minus a fixed percentage to reflect assumed benefit	No obvious source for data- driven fixed percentage This could address the issue of increasing burden on shrinking traditional population. BEIS 10% could be used: unproven assumption	Depends on chosen percentage, but likely increased allocation to smart vs today
AMR profile Derive an allocation profile based on equivalent rollout	Addresses perceived lag; Limited dataset; Arguably differing theft detection and motivations	Reduced allocation to smart given low incidence of theft at AMR
Total theft UIG adjustment (plus updated allocation approach) Reflect assumed benefit by adjusting existing total theft assumption	Other (more impactful?) factors at play in total theft UIG than smart – consumption, cost of living Raises 'missing UIG' question	Addresses perceived expanding burden on traditional meters

011 Theft: Smart Rollout: Conclusions

- The smart share of detected theft input to the model is increasing year on year. But it is still trailing smart penetration by some way, so this benefit will be seen in Matrix Positions with high smart populations (e.g. 1ND Class 3)
- Currently, the benefit is in fact materially better than the (assumed and unproven) BEIS 10% impact
- The trend is driven by increasing theft investigation and detection at smart sites, but a lag effect is clearly evident
- We expect smart share of detected theft to continue to increase (if theft detection practices are agnostic to meter type)
- We do not expect detected theft data to reflect a clear impact attributable to smart meters until a) rollout is complete and b) theft investigations have been taking place at sufficient scale for several years
- We have not identified an alternative approach that is justifiably better than the status quo
- Consideration of total theft UIG assumptions would be required in conjunction with a revised allocation methodology to properly reflect the assumed impact of smart meters
- BUT evidence of this impact does not exist today, and the exercise may prove largely academic given the relative contribution of theft UIG combined with the increasing proportion of ‘unfound’ UIG

140 – Meters with By-Pass Fitted

Definition

- For some limited reasons, a small number of meters are fitted with by-passes so that operations can continue at a Supply Meter Point when a meter is being exchanged/recalibrated
- If the by-pass is used, then a Consumption Adjustment is required (if over the threshold) once the by-pass is closed to correct the energy within Settlement as the gas will not be recorded through the meter
- If the by-pass is used and an accurate Consumption Adjustment is not submitted, then UIG is created

140 Meters with a By-Pass Fitted: Recap

CDSP data shows over 12,000 sites with a by-pass currently in situ.

We're interested in further validating these numbers; and focussing on the in-field operation of by-passes as a basis for assumptions.

- **Hypothesis**: Meter by-passes are operated periodically and the gas consumed during such operations is not always recorded and accounted for in settlement. This creates positive UIG.
- This is a follow-up to the inconclusive investigation for Gas Year 2022-2023, for which the data available in CDSP systems was insufficient as a basis for modelling assumptions.
- This year's approach has two main strands:

Is the portfolio correct?

Further validation of CDSP data; discussion with shippers on their portfolios; GDNs

What might be a normal operating pattern for a meter by-pass?

Operational insights from industry experts; MAMs; supplier siteworks

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140 Meters with a By-Pass Fitted: Analysis

Additional validation of CDSP by-pass portfolio is inconclusive.

Recent industry focus on cleansing 'Open' by-pass statuses was successful but did not address the broader data validity question.

Is the portfolio correct?

- We increased the number of supporting data items in our portfolio dataset to show more site and meter characteristics.
- We looked at distribution between shippers and MAMs, meter types and historical AQs

97% of by-pass statuses haven't been amended in the last five years

50% of all recorded by-passes sit with 2 shippers

92% of all recorded by-passes sit with 1 MAM

60% of MPRNs with by-passes have all attributes of a domestic meter

What might be a normal operating pattern for a meter by-pass?

- Attempted discussions with industry experts including MAMs – unsuccessful to date

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140 Meters with a By-Pass Fitted: Outcome

We almost certainly will again be unable to achieve the required combination of:

1. Justifiable assumption on frequency of by-pass operation
2. Credible portfolio to which those assumptions can be applied

- We have now concluded data validation work.
- We are still continuing to engage with industry experts on in-field by-pass activities.
- We may be able to record further insights or assumptions in the proposed Final Statement, but it is unlikely that a UIG methodology will be pursued, not least because we remain wholly unconfident in the portfolio data available.

Next steps

And Key Contacts

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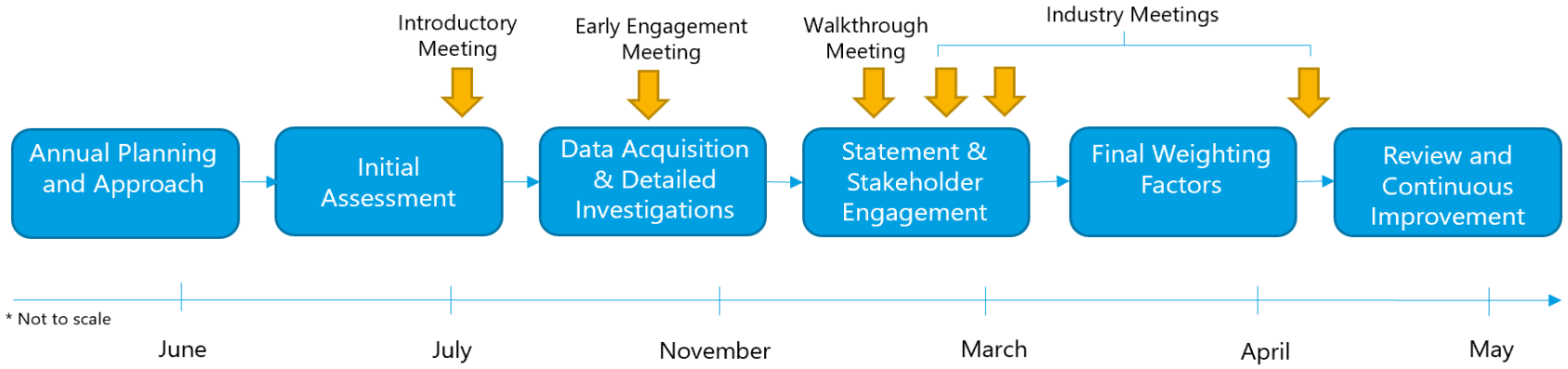
Timetable

- Consultation responses to be provided by 22nd January.
- Consultation responses will be presented and discussed at AUG Sub-Committee on 17th February
- Final changes to the draft Weighting Factors and AUG Statement (if required) will be presented at the AUG Sub-Committee Meeting on 10th March 2023
- The final AUG Statement will be provided to the AUG Sub-Committee by 31st March 2023 and presented at the 14th April AUG Sub-Committee Meeting, prior to consideration at the April UNCC Meeting
- Engagement with stakeholders will continue throughout the process. We can be contacted at auge@engage-consulting.co.uk



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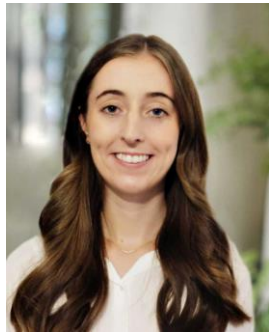

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Appendix:
Further information

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Methodology Principles

Our overarching methodology is founded on three key principles. These are:

- **Bottom-up Determination:** we quantify UIG for each identified contributor and add these together, rather than estimating the overall UIG and apportioning it or using it as a means of differencing

- **'Polluter Pays':** we interpret "fair and equitable" to mean that UIG should be allocated in the same proportions as it is created. As the UNC does not permit the allocation of UIG at a Supply Point level, the best current attainment of this principle is that each position on the matrix of EUC Band and Class attracts its appropriate proportion

- **Line in the Sand:** we only include in our calculation of Weighting Factors the UIG that will exist at the Code Cut-off Date or as it is commonly referred to, Line in the Sand. This will be the 'permanent' UIG present at the final Settlement position, and not UIG that exists temporarily prior to this

Weighting Factor Calculation Process

Methodology

- We calculated the Weighting Factors as a proportion of UIG relative to throughput in our Consumption Forecast for each Matrix Position within the AUG Table
- Some cells had a very small number or no Supply Meter Points so we substituted values
- We smoothed the values in EUC bands 03-09 for class 2-4 to dampen any spikes across like groups with similar characteristics
- After these processes, the factors were normalised so that no UIG was created by the substitution or smoothing process
- We then scaled these factors such that the average of all the Matrix Positions is 100
- We did this to standardise the factors so that the relative values will be comparable year on year

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