Proposed Final Allocation of Unidentified Gas Statement (For Gas Year 2024-2025)

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1 Executive Summary

INTRODUCTION

This document is the proposed Final Allocation of Unidentified Gas (AUG) Statement for the Gas Year 2024-2025. It provides the proposed Final Weighting Factors in the AUG Table for this Gas Year and sets out how we determined them.

KEY UPDATES

No new contributors to Unidentified Gas (UIG) have been incorporated into our model this year. We investigated four specific areas for potential improvement, but concluded in each case that there was insufficient justification for change based on the data available:

- **Shrinkage Error**: We concluded from our review of Shrinkage Error that although it is more likely than not that it contributes to UIG, it has not been adequately quantified, nor are we qualified to quantify it ourselves;
- **Unfound UIG**: There has been value in thinking about the concept of Unfound UIG. However, we have been unable to propose a sufficiently robust methodology for sizing this UIG, and we now have strong reservations about the fairness of sharing it among Shippers according to throughput;
- **Gas Theft**: Whilst there has been additional focus on energy theft across the industry in the last 12 months, including the publication of a model for estimating theft (including gas theft), we are not convinced that updating our existing assumptions would result in a more equitable outcome for apportioning UIG; and,
- **No Read**: We investigated an overhaul of the existing No Read contributor but for a variety of reasons the output of the adjusted methodology was less robust than the existing approach, and potentially more volatile year-on-year. For that reason, it was not implemented.

Overall, our estimate of total UIG for the target Gas Year (2024-2025) is less than what we estimated in last year's AUG Statement (Gas Year 2023-2024), driven largely by a falling Consumption Forecast. The updated datasets used for our analysis of the individual contributors to UIG have driven some minor redistribution in the Weighting Factors, principally between sites in the non-domestic Matrix Positions in EUC Bands 1 and 2.

OUR APPROACH

The AUGE undertakes detailed analysis of the potential causes of UIG each year and produces a set of Weighting Factors that are used to allocate UIG between Shippers equitably and transparently.

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 Uniform Network Code (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; and
- **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.

Each year, we review our approach in light of the availability of new data sources, external developments, and feedback from stakeholder consultation. This includes a full reassessment of all identified potential UIG contributors, whether or not they have been subject to a previous detailed investigation. The intention is that our methodology does not remain static; reflecting instead the ongoing developments in gas Settlement and incorporating, with each iteration, a reasonable amount of additional investigation and refinement.

RESULTS

We have quantified total UIG at the Line in the Sand for the target Gas Year 2024-2025 as **7,761 GWh**.

In size order, the share of each contributor to that total is as follows[1]:

Contributor	2023-2024 Gas Year UIG Volume	Change	2024-2025 Gas Year UIG Volume
Theft of Gas	6,823 GWh	↓	6,362 GWh
Average Temperature Assumption	1,021 GWh	↓	997 GWh
Average Pressure Assumption	326 GWh	↓	323 GWh
No Read at the Line in the Sand	162 GWh	↓	55 GWh
Unregistered Sites	53 GWh	→	53 GWh
Incorrect Correction Factors	53 GWh	↓	40 GWh
Dead Sites	19 GWh	↑	23 GWh
Isolated Sites	19 GWh	↑	21 GWh
IGT Shrinkage	19 GWh	↑	21 GWh
Shipperless Sites	17 GWh	↓	15 GWh
Consumption Meter Error	-15 GWh	↓	-149 GWh
Total	**8,497 GWh**	↓	**7,761 GWh**

[1] Movement in UIG noted in the table (Gas Year 2023-2024 vs the target Gas Year) is based on a tolerance threshold of more than 1% and 1 GWh change.

Total UIG is broken down across Matrix Positions in the AUG Table as shown below (with figures rounded to the nearest GWh).[2]

CLASS					
		1	2	3	4
EUC BAND	**1ND**	-	-	382	3,155
	1PD	-	-	48	1,343
	1NI	0	0	94	741
	1PI	-	-	0	5
	2ND	-	-	1	117
	2PD	-	-	0	10
	2NI	0	0	159	458
	2PI	-	-	0	0
	3	0	1	71	149
	4	0	4	91	161
	5	0	4	50	109
	6	0	18	30	130
	7	1	32	26	112
	8	11	53	18	136
	9	37	0	0	2

[2] Note that a simple aggregation of the stated individual Matrix Position values may not equal total UIG value, due to rounding of those individual values. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

PROPOSED FINAL AUG TABLE

The AUG Table containing the proposed Final Weighting Factors is shown below. These Weighting Factors are unlikely to change materially between this proposed Final Statement and the Final Statement.

The numbers have been normalised around an average of 100 so that they are comparable year-on-year. Doing this does not impact the relative proportions in any way.

		CLASS			
		1	2	3	4
EUC BAND	**1ND**	51.51	51.51	51.51	107.23
	1PD	51.51	51.51	51.51	107.23
	1NI	5.87	396.20	226.73	450.82
	1PI	5.87	396.20	226.73	450.82
	2ND	66.54	66.54	66.54	116.62
	2PD	66.54	66.54	66.54	116.62
	2NI	5.87	130.40	123.64	199.05
	2PI	5.87	130.40	123.64	199.05
	3	5.87	60.12	60.34	69.60
	4	5.87	59.90	63.63	71.80
	5	5.87	66.17	62.08	68.88
	6	5.87	70.74	59.38	67.86
	7	5.87	73.23	62.12	68.81
	8	5.87	59.71	59.58	58.17
	9	5.87	28.27	26.24	29.45

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2 Document Control

PUBLICATION

Version	Issue Date	Author	Reviewer
0.1	19 December 2023	David Speake, James Hill	Andy Grace
1.0	29 December 2023	David Speake, James Hill	Andy Grace
1.1	1 March 2024	David Speake, James Hill	Andy Grace

VERSION HISTORY

Version	Reason
0.1	Issued for initial review to CDSP
1.0	**Draft AUG Statement** issued for industry consultation
1.1	**Proposed Final** Statement, incorporating feedback from consultation process and outputs from updated datasets

3 Introduction and Key Updates

This document is the proposed Final AUG Statement for the Gas Year 1st October 2024 to 30th September 2025. It presents the proposed Final Weighting Factors and explains the analysis undertaken and methodologies used to derive them.

We have produced this Statement in our capacity as the Allocation of Unidentified Gas Expert (AUGE) in line with our generic terms of reference described in Appendix 1.

BACKGROUND

UNIDENTIFIED GAS

Gas exits the National Transmission System (NTS) network and enters[3] Local Distribution Zone (LDZ) networks. Some of it flows into Independent Gas Transporter (IGT) networks. Gas exits LDZ and IGT networks at customer Supply Meter Points. The gas entering LDZ networks is metered; as is gas exiting the LDZ and IGT networks at Supply Meter Points.

The gas taken from the NTS does not equal the gas metered at Supply Meter Points. Some of the difference is attributable to gas lost in the pipes of the LDZ networks and this is termed 'shrinkage'. The remainder of the difference is Unidentified Gas (UIG).

UIG is caused by a range of issues. These include theft, meter errors, incorrectly classified sites, missing meter readings, and the impact of localised variation in pressure and temperature and the means of correcting for this.

WEIGHTING FACTORS

Settlement attributes the gas measured at Supply Meter Points to the registered Shipper. In order that all gas is accounted for, Settlement allocates UIG across Shippers, based on the Supply Meter Points to which they are each registered. It does this using a set of Weighting Factors.

These Weighting Factors define the proportion of total UIG allocated to:

- Different Classes of Supply Meter Point (relating to the metering in place and the meter reading arrangements); and
- Different End User Categories (EUC) of Supply Meter Point (relating to the type of customer and characteristics of use).

The Weighting Factors are determined annually by the AUGE. The objective is to determine factors that allocate UIG as fairly and equitably as possible. The AUGE undertakes detailed analysis of the causes of UIG each year and produces a set of Weighting Factors that they believe will best achieve this objective for the target Gas Year.

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[3] Along with a relatively small amount from sources embedded within LDZ networks.

AUGE SCOPE

The scope of the AUGE includes:

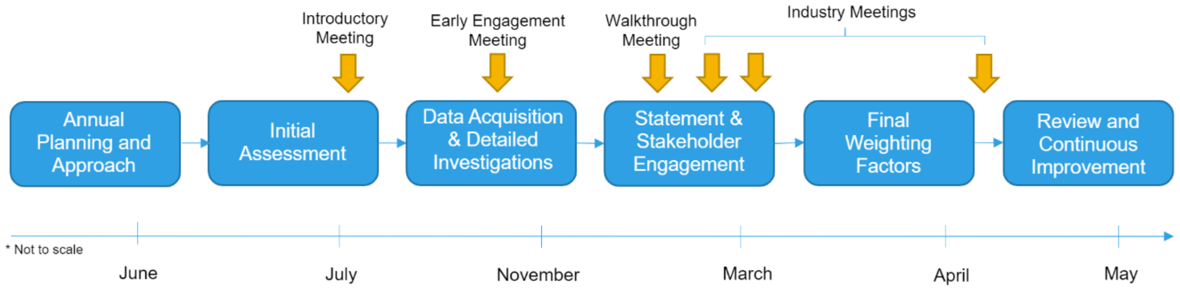
- Developing a methodology for determining annual Weighting Factors;
- Determining data sources for use in the calculation of the Weighting Factors; and
- Documenting the methodology and the Weighting Factors in the Statement and presenting these to industry.

The scope does not include:

- Determining the daily levels of UIG; and
- Implementing any performance assurance techniques.

THE ANNUAL AUG CYCLE

The production of the Statement is an annual cycle, with the AUGE consulting with industry in relation to the development of the Weighting Factors. The timeline below shows the stages in this process.



STRUCTURE OF THIS DOCUMENT

The remainder of this document is structured as follows:

- Section 4 - **Overarching Methodology**: Details the stages we follow in our overarching methodology to determine the Weighting Factors for the target Gas Year;
- Section 5 - **Investigations**: Describes the areas we have considered that were not previously identified as a contributor to UIG (New Investigations) and those existing contributors for which we have looked into extended or alternative methodologies (Refinement Investigations);
- Section 6 - **Contributors**: Describes the analysis undertaken and modelled output for all identified contributors to UIG for the target Gas Year. Rationale is as originally described in the 2021-2022 and 2022-2023 Statements, and so some of the additional contextual description has now been omitted;
- Section 7 - **Results**: Provides a summary of the results and the process we undertook to validate them;

- Section 8 - **Weighting Factor Determination**: Explains the calculation and the process of smoothing the Weighting Factors;
- Section 9 – **Proposed Final AUG Table**: Sets out the proposed Final Weighting Factors for the target Gas Year;
- Section 10 - **Glossary**: Explains terms and acronyms used in this Statement;
- Appendix 1 - **Compliance with the Generic Terms of Reference** (per UNC);
- Appendix 2 – **List of Data Sources**;
- Appendix 3 – **Actual Annual Quantities and Supply Meter Points**;
- Appendix 4 – **Future Considerations**; and
- Appendix 5 – **Changes made following Consultation on the draft Statement** (placeholder).

KEY UPDATES FOR THE GAS YEAR 2024-2025

Each year we consider broadly the potential additional contributors to UIG as part of our initial assessment process. We also undertake a detailed critical review of our contributor methodologies, including all assumptions. On occasion, newly available data allows us to take an approach that was not previously possible.

All of the above can result in minor changes in approach where we believe it can be justified, and we document this under the relevant contributor.

There have been no major changes to UIG estimation or allocation methodologies as a result of our focussed investigations this year.

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4 Overarching Methodology

SUMMARY

The overall approach we have taken in producing the Weighting Factors is founded on the principles of openness and transparency. We have sought to draw out the key issues in quantifying and apportioning UIG and to be very clear about what we have done and why. We have drawn on our knowledge and expertise throughout the process and exercised our balanced judgement to produce Weighting Factors that we believe will allocate UIG in a fair and equitable manner.

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; and
- **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.

Our overarching methodology is developed through the stages below, each described further under the headings that follow:

- Identifying the potential UIG contributors, and undertaking an initial assessment of each one;
- Selecting the set of contributors to be subject to our analysis, including any not investigated in detail before, and any refinements to previous contributor methodologies;
- Determining a reasonable consumption forecast for each Matrix Position for the target Gas Year;
- Acquiring data to support the chosen areas of focussed investigation as well as the quantification and allocation of UIG;
- Investigating the selected contributors:
    - Considering justifiable methodologies for quantifying and allocating UIG in relation to contributors which have not previously been subject to a detailed investigation; and
    - Undertaking additional analysis and augmenting the methodology for those previously investigated contributors identified for refinement;

- Updating the model inputs to all contributors with no material changes to their methodologies;
- Combining the outputs of each contributor's sub-model with our Consumption Forecast to quantify and allocate UIG;
- Determining the initial Weighting Factors using the harness model, based on the aggregated results from each sub-model along with our Consumption Forecast; and
- Smoothing and normalising these Weighting Factors to produce the AUG Table.

IDENTIFICATION AND INITIAL ASSESSMENT OF CONTRIBUTORS

For this year's AUG Statement we identified 26 candidate contributors and refinements for assessment based on:

- Topics identified in previous Statements;
- Topics identified by expert industry stakeholders; and
- Topics that we identified ourselves, based on our own expertise, knowledge and experience.

We scored the candidate contributors based on:

- The likely level of UIG created by that contributor;
- The current degree of uncertainty (based on data, methodology and knowledge) in relation to the level and source of UIG for that contributor; and
- The potential ability to increase the degree of certainty in relation to the level and source of UIG for that contributor.

We ranked the contributors and refinements by their overall score as shown below. A higher score indicates greater adherence to the above three criteria and thus an increased prioritisation for investigation:

Contributor ID	Contributor	Score
010	**Theft of Gas (Total Theft)**	45
090	**No Read at the Line in the Sand**	40
131	Consumption Adjustments (Incomplete)	36
180	Unfound Unidentified Gas Contributors	35
150	Meterless Sites	22
080	**Average Temperature Assumption**	21
011	Theft of Gas (Roll Out)	18
210	Shrinkage Error	18
041	Consumption Meter Errors (Faulty Meter)	16
042	Consumption Meter Errors (Extremes of Use)	16
070	**Average Pressure Assumption**	16
160	**Isolated Sites**	16
200	**Dead Sites**	16
012	Theft Of Gas (Last Read)	13
120	Meter Exchanges	13
130	Consumption Adjustments (Incorrect)	13
170	Incorrect Meter Technical details on UK Link	13
060	**IGT Shrinkage**	12
040	**Consumption Meter Errors (Inherent Bias)**	11
110	CV Shrinkage	9
100	**Incorrect Correction Factors**	8
190	Issues with Xoserve system	7
050	Meter Errors at LDZ input	3
140	Meters with Bypass Fitted	3
020	**Unregistered Sites**	3
025	**Shipperless Sites**	3

Contributors in bold are the contributors that have existing methodologies and were quantified contributors to the Weighting Factors for the current Gas Year 2023-2024.

SELECTION OF CONTRIBUTORS TO PROGRESS

We used the output of the initial assessment to determine the following approach to defining the Weighting Factors for the target Gas Year. We presented this to the AUG Sub-Committee, and considered any feedback received.

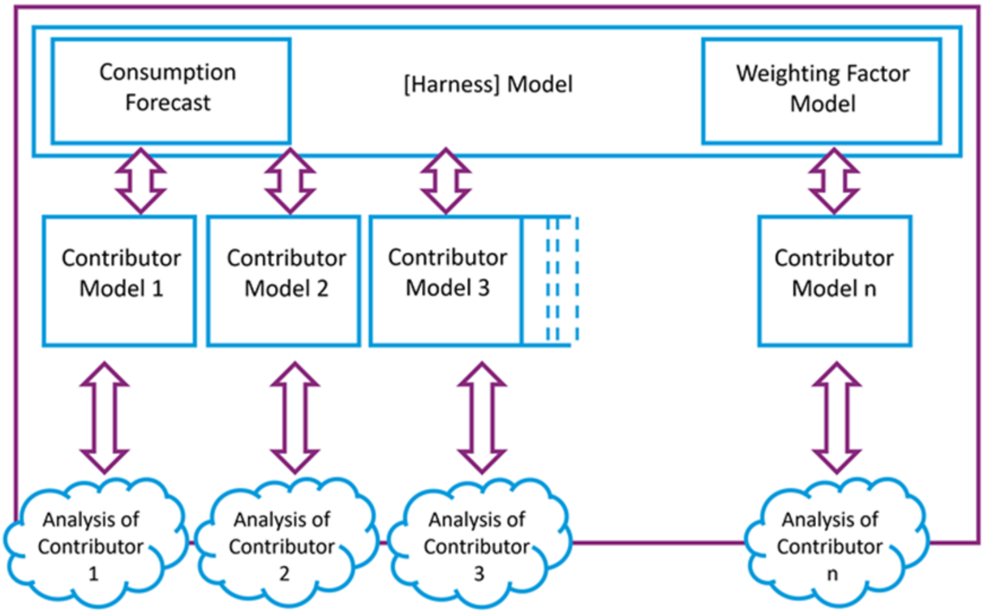
From this year’s assessment process, two new potential contributors to UIG were selected for detailed investigation (Shrinkage Error and Unfound UIG). A further two topics were selected for consideration as potential refinements to an existing methodology (Theft and No Read at Line in the Sand).

Those other contributors that have existing methodologies from last year’s AUG Statement were subject to a refreshed dataset and UIG calculation.

CONTRIBUTOR MODEL

We continued with our contributor-based model originally developed for the 2021-2022 Gas Year. This comprises an overarching harness model, which calculates the Weighting Factors by linking the separate contributor sub-models with our Consumption Forecast.

Each sub-model provides UIG energy values and characteristics for the relevant contributor and has a common interface with the harness model, namely the UIG by Matrix Position in the AUG Table. This model structure is detailed in the diagram below.



CONSUMPTION FORECAST

A forecast of the consumption in the target Gas Year is a key data input for several of our UIG calculations and an essential component in the calculation of the Weighting Factors.

We forecast:

- Seasonal Normal consumption nationally for the target Gas Year based on trends in the numbers of Supply Meter Points in each Class; and
- AQs for each Class and new and lost Supply Meter Points in each Class including movements between Classes.

INPUTS

We used the following data inputs in the construction of our Consumption Forecast:

- AQ Snapshot reports from the CDSP; and
- Annual Load Profiles from the CDSP.

FORECAST METHODOLOGY

We used CDSP data from October 2019 to February 2024 to forecast consumption, including the actual Class and EUC bands with which Supply Meter Points are associated for Settlement purposes.

This is a change to previous years' methodology for which we used data going back to the Project Nexus Implementation Date of June 2017.

We decided that the two years immediately following Nexus implementation were unlikely to be reflective of the future distribution of sites. This is because the Product Class populations on day one would not be reflective of a future state as Shippers became accustomed to operating the new Classes, moving sites between them to meet their business requirements. Further, we now have sufficient recent data to allow the exclusion of that immediate post-Nexus period from our forecasting dataset. Therefore the 2017 to 2019 data has now been removed from our dataset.

Additionally, the early post-Nexus period included data from before the introduction of the sub-EUC bands for EUCs 01 and 02[4]. Historically we have artificially populated these sub-EUC bands during data validation. This is no longer required, as we consider the data since 2019 is a robust basis for our forecast.

We used an Exponential Triple Smoothing (ETS) algorithm to forecast future AQ and Supply Meter Point counts for each Matrix Position and month in the target Gas Year. This algorithm smooths minor deviations in past data trends by detecting seasonality patterns and confidence intervals. We prevented any consumption forecasts from becoming negative values as a result of this smoothing process.

For each Matrix Position:

- We used the monthly AQ forecast, together with the sum of the Annual Load Profiles for the West Midlands (WM) LDZ (as a proxy for the national view) over each month to forecast the annual consumption in the target Gas Year;
- We used the monthly Supply Meter Point forecast, and then took an average, to forecast the annual Supply Meter Point count in the target Gas Year; and
- We split the annual consumption forecast across LDZs based on current AQ proportions to obtain the LDZ specific consumption forecasts for the target Gas Year.

We then made the following updates to the Consumption Forecast after analysis of the initial results.

- Class 1 EUC Band 9: we only went back to April 2021 (rather than October 2019) as the AQs for this Matrix Position during 2019 and 2020 were significantly higher compared to the more recent data and would have given an unreasonably high estimate of the future state if included;
- Class 2 EUC Band 9: we only went back to January 2021 for the same reason as Class 1 EUC Band 9;

[4] Introduced as a result of Data Services Contract (DSC) Change Proposal XRN4665 Creation of New End User Categories

- Class 3 EUC 01PD: This Matrix Position saw a dramatic eight-fold increase in AQ and site numbers in August 2023. This reduced the relevance of the history of this Matrix Position for forecast purposes. We therefore ignore data prior to August 2023 for this Matrix Position;
- Class 3 EUC 01ND, Class 4 EUC 01ND, 01PD, 01NI: Due to the constant month on month reductions to AQs in these Matrix Positions over the past two years, the result is a markedly reduced average AQ over the period. Projecting this trend forwards results in a forecast of average AQ by the end of the target Gas Year which was felt to be unrealistically low, especially given the recent evidence of a levelling off in reductions; and

  We have therefore decided to take an alternative approach to forecasting total AQ for these Matrix Positions. This involves multiplying the forecast number of sites by the latest average AQ seen in each Matrix Position to get the forecast Total AQ for each month.

RESULTS

The output from the forecast detailed above is shown in the tables below. Actual snapshots for February 2023 and February 2024 are provided in Appendix 3 by way of comparison.

Forecast Number of Supply Meter Points[5] in the target Gas Year:

		CLASS			
		1	2	3	4
EUC BAND	**1ND**	-	-	3,751,569	18,762,197
	1PD	-	-	584,151	1,425,045
	1NI	9	14	91,685	437,957
	1PI	-	-	84	3,340
	2ND	-	-	591	48,174
	2PD	-	-	16	1,520
	2NI	2	23	44,878	85,868
	2PI	-	-	9	48
	3	1	190	15,816	23,468
	4	3	262	6,703	8,847
	5	9	86	1,379	2,303
	6	26	114	370	928
	7	52	97	131	376
	8	147	87	33	251
	9	277	3	2	11
					25,299,155

[5] Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

Forecast Consumption in the target Gas Year (GWh):

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	39,611	210,155
	1PD	-	-	4,331	10,841
	1NI	0	1	2,183	8,686
	1PI	-	-	1	33
	2ND	-	-	56	5,563
	2PD	-	-	2	174
	2NI	0	5	6,790	12,127
	2PI	-	-	2	6
	3	1	100	7,028	10,571
	4	4	327	7,872	10,569
	5	38	323	4,694	7,815
	6	269	1,158	3,293	9,078
	7	1,194	2,118	2,678	8,050
	8	6,540	3,662	1,288	9,681
	9	36,923	387	128	1,037
					437,389

It is worth highlighting that there is significant continued uncertainty over this consumption forecast, driven by a material reduction in gas consumption due to the energy crisis during 2022 and 2023, the gradual movement away from gas because of climate concerns and the continuing challenging economic climate. We have adjusted our approach in some of the smaller EUC bands to reflect this unprecedented shift in consumption, but future customer behaviour is unknown and may be materially different to past behaviour.

MODIFICATIONS AND REVIEW GROUPS

Throughout the application of our overarching methodology, we considered any relevant output from modifications that have been approved or are in the process of being considered and output from recently closed or ongoing Review Groups that could impact our target Gas Year or the AUGE process. These include:

- **0734S - Reporting Valid Confirmed Theft of Gas into Central Systems** – This modification was implemented in 2023 with the result that thefts reported via the Theft Detection Incentive Scheme (TDIS) automatically feed into Settlement processes. This change has also updated our theft inputs making this a transition year where we received some data as per previous years, and some as a result of the new process;
- **0664VVS - Transfer of Sites with Low Valid Meter Reading Submission Performance from Classes 2 and 3 into Class 4** – This was implemented in July 2023, and any impacts of this modification have been reflected in the movement of sites seen in our monthly update of populations of the Matrix Positions;
- **0819 - Establishing/Amending a Gas Vacant Site Process** – This modification came from review group 0778R – Gas Vacant Sites Process review. It has now been approved for implementation. Once implemented (date TBC) it will have an impact on the

allocation process and consequently on UIG. There is potential for sites flagged as vacant to contribute to UIG in the future in the same way isolated and dead sites are considered to by our methodology. We believe that the number of impacted sites will be low in advance of the target Gas Year particularly with the oversight being introduced as part of the modification. This will be reconsidered next year;

- **0843 - Establishing the Independent Shrinkage Charge and the Independent Shrinkage Expert** – This modification came from review group 0828R - Introduction of an Independent Shrinkage Expert. Now shrinkage is no longer out of the scope of the AUGE we are watching this modification with interest. Shrinkage has been considered this year in our investigations - please refer to Section 5 for further information. If this modification is implemented before publication of our final Statement for next year we will need to consider its impact on our existing processes for IGT Shrinkage and any ongoing investigations on both Shrinkage and the Unfound contributor;
- **0862 – Amendments to the current Unidentified Gas Reconciliation Period arrangements** – We do not anticipate this modification to have a direct impact on our methodology or Statement, however, as the modification is concerned with the apportionment of UIG, we will monitor the output to assess any unexpected impacts on our consideration of Weighting Factors next year; and
- **0868 – Change to the current Allocation of Unidentified Gas Statement frequency** – This modification will have no impact on the AUGE process for this year, however, it has the potential to impact approach or thinking for subsequent years.

This list is non-exhaustive. Further information on these Modifications can be obtained from the Joint Office of Gas Transporters website.

5 Investigations

Each year we assess all identified potential contributors to UIG, including those previously investigated, on the basis of the potential amount of UIG impacted and the likely availability of data for assessment.

During this year's assessment process, two new potential contributors to UIG were selected for detailed investigation (Shrinkage Error and Unfound UIG). A further two topics were selected for consideration as potential refinements to an existing methodology (Theft and No Read at Line in the Sand).

Ultimately, none of these investigations have resulted in changes to our UIG allocation methodology. It seems to be increasingly unlikely that data of sufficient quantity and quality becomes newly available to identify and justify the inclusion of previously unidentified contributors.

Whilst the primary purpose of the AUG Statement is to describe the methodology behind the Weighting Factors, we have nevertheless recorded a short summary of thought processes and conclusions from these investigations in case they are useful to current or future stakeholders.

This section summarises our investigations into:

- **210 Shrinkage Error (new)**

  We consider whether Shrinkage Error may be contributing to UIG and if so whether it is possible to estimate the scale of this contribution and propose a justifiable allocation methodology;

- **180 Unfound UIG (new)**

  We consider whether there exists UIG whose source we are unable to identify, and if so, whether it can be scaled and there is an equitable way to share it between Shippers;

- **010 Theft (refinement)**

  We assess whether there is justification for updating the assumptions which drive our estimate of UIG attributed to gas theft; and

- **140 No Read at the Line in the Sand (refinement)**

  The existing process to calculate a view of how much gas will contribute to Final UIG from sites which do not receive a valid meter read before the period crystallises has had multiple updates over the last two years. We investigate whether there is a way to simplify the methodology and improve its output.

210 SHRINKAGE ERROR (NEW INVESTIGATION)

INTRODUCTION AND HYPOTHESIS

Gas taken from the LDZ system, but not attributed to a supply point or Shrinkage is Unidentified Gas. The underestimation of Shrinkage will create positive UIG. Where actual Shrinkage is lower than the estimates used in Settlement, negative UIG will arise.

Shrinkage is any gas that the gas network loses during transportation. There are three identified areas of Shrinkage:

1. NTS Shrinkage: This is managed outside of the LDZ Settlement process;
2. IGT shrinkage: This is explicitly excluded from the LDZ Shrinkage model and so we make an estimate to identify UIG under the contributor 060 – IGT Shrinkage; and
3. LDZ Shrinkage: This is calculated using a model developed and maintained by the gas network operators (The Shrinkage and Leakage Model).

This investigation considers LDZ shrinkage only, as that is what gives rise to the Shrinkage Error that is a potential contributor not yet accounted for in other processes or calculations.

Gas Distribution Network operators (GDNs) estimate LDZ Shrinkage using the Shrinkage and Leakage Model (SLM) which establishes LDZ Shrinkage as a percentage of total throughput. The difference between the estimation determined by the SLM and actual LDZ Shrinkage is Shrinkage Error.

Our hypothesis was that Shrinkage Error contributes positive UIG.

SCOPE OF INVESTIGATION

We focus on areas of potential UIG with two broad questions in mind: can we identify the creation of UIG and its extent, and can we propose a methodology to share it fairly? The second question may not need to be addressed if we cannot confidently identify UIG in the first place.

To identify UIG and its extent required either a review of available studies into Shrinkage and Shrinkage Error, or a new study into Shrinkage Error (or a combination of both). We determined that as the AUGE (as currently procured) is not resourced or appropriately qualified to undertake the kind of study needed to propose a robust update or alternative to the existing SLM.

Therefore, our approach was to review previous studies into Shrinkage Error to come to a view on the possibility of including Shrinkage Error as a UIG contributor in our methodology.

FURTHER BACKGROUND: SHRINKAGE ERROR IN THE AUG STATEMENT

In 2016 the previous AUGE (DNV) proposed the use of a 20% Shrinkage Error as a UIG contributor. UNC Modification 0622[6] was raised in response, proposing the removal of the Shrinkage Error from the calculation of Weighting Factors, and secondly proposing a cost recovery mechanism for Shippers to recover additional costs from GDNs. GDNs argued that the SLM provided the most robust and accurate methodology for calculating Shrinkage, and this was complemented by further sensitivity analysis by DNV. They concluded that the AUG table for 2017/2018 would assume a zero Shrinkage Error.

[6] Modification 0622 - Correct allocation of Shrinkage Error as identified by the AUGE

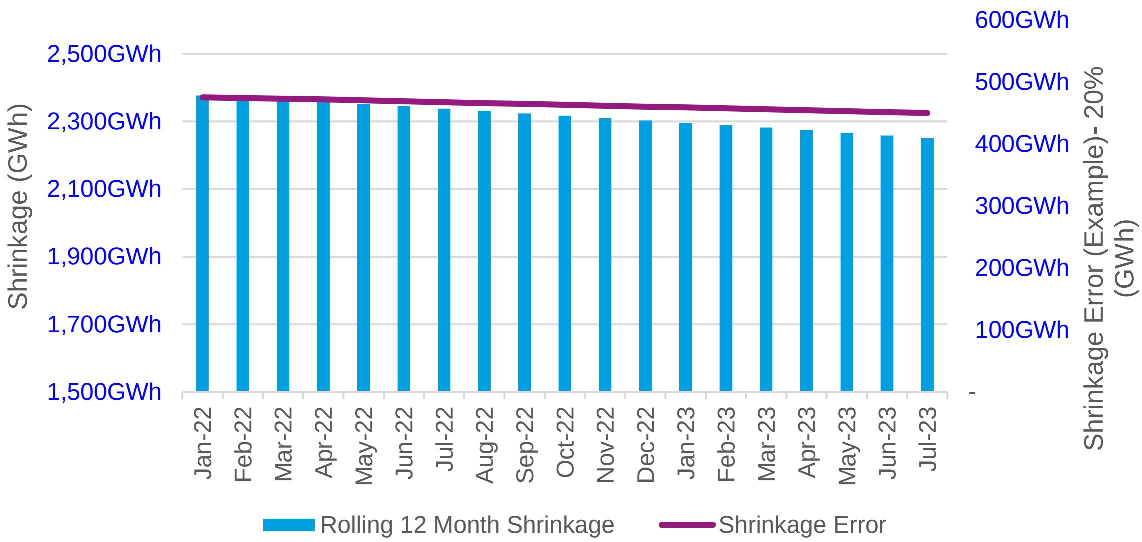
Shortly after, the AUG framework was updated to place LDZ Shrinkage Error outside of AUGE's scope. In May 2023 the AUG framework was revised to reverse this position. However, no further meaningful studies have been undertaken since 2015 to quantify Shrinkage Error.

PREVIOUS STUDIES

The Gas Retail Group (GRG) under Energy UK (EUK) commissioned a study into the potential cost of Shrinkage Error for domestic customers. The 2015 IC Consultants Ltd for Energy UK study concluded the Shrinkage Error "could easily be … at least 20%".

If Shrinkage Error exists, and assuming an error of 20% and a rolling average Annual Shrinkage, recent levels of Shrinkage Error would have been in the region of **400-500 GWh.** For context, that would have been the third largest contributor to UIG after Theft and Temperature in our 2023 – 2024 estimations.

Shrinkage, and so Shrinkage Error, has a direct proportional link to throughput, meaning a recent downward trend as consumption has fallen (20% Shrinkage Error assumption used in the illustration below).



We note that some of the assumptions and conclusions drawn in the IC Consultants study were at the time challenged by GDNs, and subsequently in a review of the IC Consultants study and GDN response to it, carried out by DNV[7]. DNV disagreed with several of IC Consultants' broader assumptions and conclusions, but nevertheless conceded that Shrinkage Error is unlikely to be zero.

There is further support for the view that the SLM may underestimate Shrinkage (specifically relating to gas leakage) in studies by Imperial College into airborne methane measurements[8].

Overall, we are not able to draw sufficient certainty around a level of Shrinkage Error from the studies that have been undertaken.

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[7] DNV GL engaged two experts from within DNV but outside the AUG Expert process to independently scrutinise the IC Consultants report on Shrinkage Error and the Gas Distribution Networks' response to it.

[8] Area fluxes of carbon dioxide, methane, and carbon monoxide derived from airborne measurements around Greater London: A case study during summer 2012 – O'Shea – 2014 – Journal of Geophysical Research: Atmospheres – Wiley Online Library; and acp-2021-606.pdf (copernicus.org)

CONCLUSIONS AND FUTURE CONSIDERATIONS

We do not intend to include UIG from Shrinkage Error in our calculations to determine this year's Weighting Factors. It is almost certain that Shrinkage Error exists, and on the basis of our review of existing studies, we consider it probable that the current SLM underestimates Shrinkage rather than overestimating it. That would give rise to positive UIG.

However, we are clear that the robustness of the information available to allow the sizing of Shrinkage Error as a contributor is insufficient to justify inclusion in our model. Nor do we believe that its inclusion would result in a material impact on Weighting Factors, owing to the relative scale of UIG and what would be likely to be a uniform allocation according to throughput.

180 UNFOUND (NEW INVESTIGATION)

INTRODUCTION AND HYPOTHESIS

The very nature of UIG makes it uncertain and hard to identify in full. It is therefore probable that our existing contributors do not identify everything that makes up total UIG. Indeed, when actual final UIG is measured, its scale is nearly always greater than the sum of the UIG from identified contributors which make up our methodology.

Because UIG is ultimately allocated based on the Weighting Factors in the AUG table, it is allocated according to the proportional share of each estimated source of UIG in our methodology. It has been argued that if we think UIG exists that has not been estimated (and so has no bearing on the Weighting Factors), then the impact of identified sources of UIG on the Weighting Factors is greater than it should be.

Therefore, the hypothesis for this investigation is: There is an amount of final unidentified gas which is not identified in our existing contributors. There may be justification to adjust allocation of UIG (i.e. the Weighting Factors) to recognise an element of total UIG whose source is unknown.

DEFINITION

A starting definition for Unfound UIG was:

- UIG for which *the source is not known*.

We then considered that it would be better to define Unfound UIG in terms of the way that it manifests, that is:

- An amount of UIG determined by *the difference between the estimate that our methodology produces, and the amount of actual UIG observed*.

But this definition still relates to the way the UIG is sized, and not to its source, which is inconsistent with – and less objective than - all other identified contributors. Instead, asking why there is a difference between estimated forecast UIG and actual UIG, we get to a more specific definition based on what we think are the likely components that contribute to Unfound UIG:

1. Contributors to UIG that we are unaware of;
2. Likely contributors to UIG that we are aware of, but are unable to estimate; and
3. Manifest error in the calculation of contributors to UIG that we do estimate.

This gives us a good basis on which to consider how to treat Unfound UIG in our methodology.

- Source 1 covers the completely invisible and as yet unseen (therefore un-investigated) contributors;
- Source 2 covers those contributors that we believe are likely to impact actual UIG – and may have already been investigated – but for which it has not been possible to suggest a robust estimate. We think this would include UIG from Shrinkage Error and Meter Bypass, for example; and
- Source 3 recognises that all existing contributor UIG is a best estimate based on a methodology and input data. The estimate will not match reality.

As such, a more accurate label for Unfound UIG might be:

- *Unknown, uncalculated, and estimation error UIG*.

The scale of Unfound UIG is just as likely to be driven by sources 2 and 3 as it is source 1. This is important, especially when thinking about how it might be shared among market participants.

SCALING UNFOUND UIG

The starting point in considering how to forecast an Unfound UIG contributor for the target Gas Year was to identify past patterns. We review actual UIG levels over the six years since Nexus go live and compared this actual UIG to relevant AUG Statements:

Gas Year	% Actual UIG at the time of investigation	View of final UIG (TWh) at the time of investigation	Predicted identified UIG (TWh)	% of identified UIG
GY 17/18	3.81%	21.6	Different estimation approach by previous AUGE	
GY 18/19	2.19%	11.7		
GY 19/20	2.69%	14.5		
GY 20/21	2.90%	16.5		
GY 21/22	2.50%	12.5	11.0	88%

NB, Data is only included up to Gas Year 2021-2022 due to the fact Gas Year 2022-2023 is still (at the time of writing) changing more significantly each month.

Although data fluctuates month to month and year to year, and continues to move for four years as per the industry reconciliation mechanism, final actual UIG has been running at around 2.5% of throughput since Nexus go-live.

Gas Year	Predicted % Actual UIG at time of AUG Statement production	View of actual final UIG (TWh) at time of AUG Statement production	Predicted identified UIG (TWh)	% of identified UIG
GY 21/22	2.42%	12.7	11.0	86%
GY 22/23	2.43%	12.7	10.7	84%
GY 23/24	2.50%	11.7	8.5	73%

Each year we sense check our estimate of UIG for the target Gas Year by comparing it to ~2.5% of the estimated throughput for that same year, and to previous years' actual UIG. This shows a tendency for our methodology to underestimate total UIG, giving further credence to the notion of Unfound UIG.

With a sound understanding of the gap to actual UIG since Nexus go-live, we considered whether there was a basis for a robust methodology to predict this (assumed) continued gap. Each option has drawbacks.

- **Option 1** – Base forecasts on the Gas Year 2021-2022 AUG Statement as this is the only period for which we can make a full comparison:
    - Still only one year into its reconciliation process, so another three years until we get a more accurate view;
    - Changing methodology for identified UIG contributors since the AUGS for that year was created.

- **Option 2** – Wait until final Statement production (March) to get the latest view of current UIG percentages and use the results from our sense check:
    - No certainty on outcome;
    - Actual UIG will not be the same as our predicted number – potentially invalidating approach.
- **Option 3** – Select a fixed estimate or proportion of our total estimate, for example by using average of past differences:
    - Limited evidence - neither justifiable nor robust.

All three options would propose a number that could be used in our model to produce the Weighting Factors. None of them represents, in our view, a robust way of estimating the likely delta between total UIG estimate and future actual UIG.

ALLOCATION OF UNFOUND UIG

The assumption stated to the AUG Sub-Committee when we proposed this investigation was that Unfound UIG – if it was possible to estimate - would be allocated in our methodology according to throughput. Having considered this assumption alongside our more detailed definition of Unfound UIG, we have changed our position on this.

Allocation of UIG by throughput has a notable impact on smaller numbers of very large consuming sites in the higher EUC bands. This fact was recognised by Modification 0831A (Alternative to Allocation of LDZ UIG to Shippers Based on a Straight Throughput Method).

The stated aim of our methodology is the equitable allocation of UIG, and our polluter pays principle supports this. Knowing that Unfound UIG arises from a combination of unknown elements, known but un-estimated contributors, and inaccuracies in the estimation of found UIG, it would not be equitable to allocate (all of) that UIG according to consumption. Doing so could be argued to be penalising large consuming sites simply because it is not possible to properly identify some causes of UIG, rather than because there is a demonstrable link between the UIG being allocated and level of consumption.

CONCLUSION AND FUTURE CONSIDERATIONS

The only conclusion we can currently draw is that to remain in line with the stated principles of our methodology, the most equitable treatment of Unfound UIG is to not allocate it at all.

There is no robust means of estimating the size of this contributor in advance. On that basis, there is no equitable way of allocating it.

The only way to develop the methodology beyond this would be either:

- To identify and secure the data required to robustly estimate UIG that we are currently unable to, and to continue to improve the estimates produced by existing contributor methodologies, or;
- To consider changes to the methodology principles, Terms of Reference, priorities and desired outcomes against which the AUGE operates, which might allow the development of an allocation approach even in the absence of robust evidence.

010 THEFT (REFINEMENT)

INTRODUCTION AND HYPOTHESIS

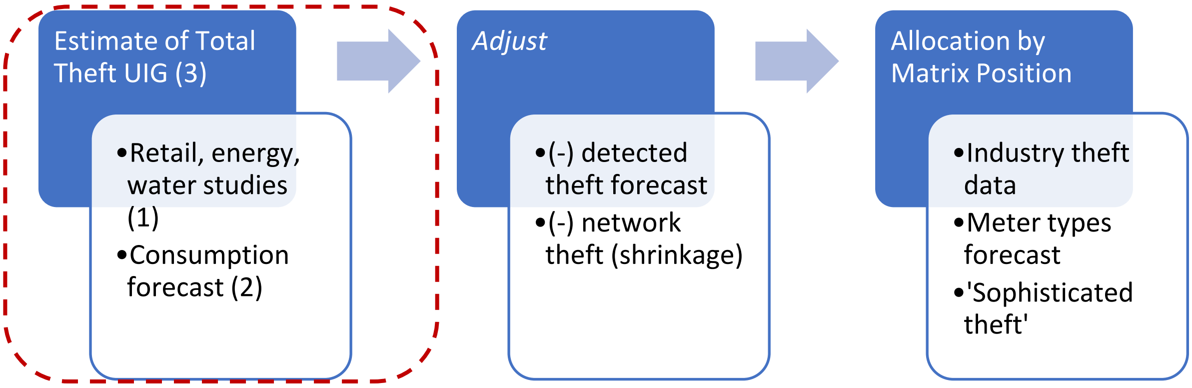
Last year, we investigated potential improvements to the **allocation methodology** for theft, looking at whether a change to the way Theft UIG was allocated to smart meters could be justified. We also analysed the potential use of read history to predict the likelihood of theft at a site.

This year we committed to a review of the total estimate for Theft UIG, given the time elapsed since our methodology was established, the changing energy industry landscape, and the availability of a new estimation methodology whose output is materially different to our estimates. Because theft is the largest identified contributor, it warrants a continued focus.

The overall hypothesis was that new insights or inputs are available that would improve our methodology for estimating and allocating Theft UIG.

EXISTING METHODOLOGY

A reminder of the high-level methodology serves to identify those components which we wanted to review. Although elements are interdependent, our focus was to consider the box on the left – the estimate for total Theft UIG.



Within this area, we identified three sub-hypotheses for testing:

1. Updating the assumptions that feed into our current total theft estimate will result in a more equitable allocation of UIG;
2. Breaking the model's assumed link between total theft and total consumption would be a justifiable improvement to the methodology; and
3. The inputs to and output of the Theft Estimation Methodology commissioned under the Retail Energy Code (REC) could be used to produce justifiably better view of total theft to be used in our methodology.

We will discuss each hypothesis in turn.

UPDATING ASSUMPTIONS THAT FEED CURRENT TOTAL THEFT ESTIMATE

Several assumptions feed the current total gas theft estimate of 1.48% of total consumption. We have looked at whether new information was available regarding these assumptions.

Input	Assumption	Update?
Studies into electricity theft	1% – 2.5% of throughput across 5 sources	No new insights or data identified
Studies into water theft	1% - 3% of throughput across 3 sources	No new insights or data identified
Studies into retail theft	1% – 1.2% of sales across 2 sources	Recent media focus supports view on likely trends

The estimated total gas theft of 1.48% was driven largely by the views of electricity theft, supported by the studies from the water industry and data from the retail sector. We have identified no material updates to the information available for electricity or water theft[9].

Data on retail theft is more regularly updated. It is tracked consistently, presumably because it is much more visible or more easily traceable to the primary victim (the retailer). The recent economic climate in Britain has given rise to increased media attention on retail crime.

The following pertinent indications from the last year or two illustrate this:

- All incidents of theft recorded by the police increased by 10% in the year ending June 2023 (to 1.7 million offences). This rise was predominantly the result of increases in theft offences against businesses;
- The Crime Survey for England and Wales (CSEW) shows a 25% increase of incidents of shop theft to a total of 365,164 offences in the year;
- Research by the British Retail Council suggest that incidents of theft have increased by 27% across ten of the largest cities in the UK, with some cities up as much as 68%; and
- One third of those committing theft are first time offenders (or at least have been reported for the first time).

Although we do not intend to update our view of the proportion of sales revenues lost to retail theft, we consider it highly likely that there is a strong upward trend in propensity to steal, and that owing to the significant recent increase in the retail price of gas, this trend would be reflected at least to some degree in the behaviours of gas consumers.

BREAKING THE LINK BETWEEN TOTAL THEFT AND TOTAL CONSUMPTION

Our estimate for total gas theft is calculated as a proportion of total estimated consumption for the target Gas Year. Even though we are essentially treating total consumption as a proxy for market size, it would be valid to challenge the assumption that the level of gas theft has a relationship with consumption trends.

[9] Aside for the new model for estimating electricity theft provided by the TEM which predicts 0.5% to 0.9% of all electricity generated being lost to theft – discussed later in this section.

Recent world events have driven a significant rise in the price of gas, and consumption has fallen materially in response. The demand for gas – especially among domestic consumers – is clearly price elastic. Whilst there is a limit in most cases on how much gas a consumer can steal (it is difficult to bottle mains gas for storage or re-sale), it would be a reasonable assumption that a thief will not steal any less in response to higher prices. Recognising this may warrant an alternative approach to estimating total Theft UIG, with the advantage of removing the counter-intuitive effect of falling theft during a period of shrinking real incomes and rising retail gas prices.

The two most obvious ways to de-link total theft from throughput are:

1. Peg total Theft UIG estimate at a point in time

   This approach would use the Theft UIG estimate produced in the first year of the current AUG methodology (for the 2021 – 2022 Gas Year) and maintain this level of UIG, unaffected by our ongoing consumption forecasts, updating the the total theft estimate only on the basis of compelling new evidence or assumptions.

2. Determine a theft propensity and average theft quantity for (groups of) gas consumers.

   This would involve making an assumption about how many households have one or more consumers willing to steal gas, and then deriving a figure stolen per year. This could be achieved in more than one way:

   a. Take a view on the proportion of households with a propensity to steal using broader indicators

      This could be based on metrics such as retail theft or even more general crime figures, plus fuel poverty or deprivation data. Scale this up across the total population of gas consuming households, and assume that the AQ of the property (or even an AQ value slightly inflated against the CDSP view) is stolen in each full year period.

   b. Assign a scaler to the populations of supply points that appear in the available detected theft data

      This would essentially be an attempt to scale up existing detected theft data to the general population, by making an assumption about the proportion of all theft (for each consumer type) is actually detected.

Each approach has pluses and minuses.

Alternative approach	Advantages	Disadvantages
1. Peg total theft at a point in time	Relative stability of the Theft UIG value; ability to reflect consumer behavioural changes without being offset by consumption reduction	Relative impact of the theft contributor on Weighting Factors continues to grow if decline in consumption continues

2a. Theft propensity per household – societal indicators	Adjusts theft figure to account for the influence of external factors on likelihood to steal; can account for households rather than individuals	Requires justifiable judgement on the relationship between general criminality indicators and propensity for gas theft (assumed no data)
2b. Theft propensity per household – scaler from detected theft	(Partly) based on available data	Detected theft data is reasonably limited and arguably much more reflective of theft detection practices (ease of detection, and incentives to investigate) than of consumer behaviours Fluctuations in quality and quantity of theft data could drive high volatility in total theft, especially when scaling No obvious basis for scaling from the detected theft dataset to an actual theft level

ADOPTING RECCO THEFT ESTIMATION METHODOLOGY INPUTS OR OUTPUT

RECCo commissioned a project to model the amount of energy theft there could be in Great Britain. The output of the project was the Theft Estimation Methodology (TEM) which used a variety of data inputs and a machine learning approach to calculate the value of energy theft.

The model is very different and more complex than ours. At a high level, it selects regions for which detected theft data is considered to be relatively more complete, applies additional indicators such as socio-economic factors, and then scales the outputs to regions where energy theft data is more sparse.

Our intention was not to critique the TEM approach or its outputs, but to understand whether any elements of it might lead to a justifiably better outcome for our UIG calculation and allocation methodology. To that end we were most interested to understand whether:

- There were reliable relevant data inputs used that we did not have access to in our methodology; and
- There was a robust evidenced-based output that we could justifiably use as to produce a more equitable allocation of UIG.

Data inputs

The TEM project set out to acquire a broad range of data inputs on energy, settlements, criminality and property from a variety of sources. This proved challenging and the initial methodology was revised on the basis of a smaller set of data, as below:

Source	Data
Experian	Theft Risk Assessment Service (TRAS Data)
Xoserve	Reconciliation by month Theft of Gas Reporting
National Grid Transmission Data	Gas Total Shrinkage Gas Total Assessed Demand Total Temperature
REC Performance Assurance Team	Confirmed Thefts Post TRAS
Elexon Data	GSP Group Take Corrected 3ySFRF ADR components GSP Aggregated Metered Volume P315 + P0276 + P0277
Crimestoppers	Reports of Energy Theft
ONS	Deprivation data Crime data Fuel poverty Housing Rural/Urban Population density Spatial data

We did not identify among these data sets any additional data that would be pertinent to update our gas theft methodology.

Output (total gas theft)

We were interested in the impact on the Weighting Factors of applying our allocation model to a much smaller level of total theft. We applied the TEM upper bound total annual theft prediction of 1281 GWh, and considered the relative change in the proportional share of *all* UIG that would be allocated to each Matrix Position.

The most significant impacts were seen in Matrix Positions where total UIG for that position comprises a high amount from theft relative to the other contributors.

Considered at a higher level, the impact of adopting the TEM total theft estimate would be that:

- The total UIG ratio between Theft UIG and all other contributors would be 45% to 55%, compared to the 80% share that theft took in the draft Statement; and

- The comparison of our total UIG estimate would make up only 26% of a calculated benchmark forecast of actual UIG for the target Gas Year, compared to 72% for our unchanged approach in the draft Statement[10]. Put differently, Unfound UIG would be a predicted 74% of all likely UIG if we adopted the TEM estimate of total theft.

CONCLUSIONS AND FUTURE CONSIDERATIONS

We approached this investigation with an open mind, and were especially interested in the availability of new information in the form of the TEM. Our existing methodology results in a large share of all UIG coming from the theft estimate, and this means that the theft allocation methodology has a material impact on the overall Weighting Factors. However, we remain clear that these are not necessarily shortfalls of the methodology that must be solved; they are simply outcomes.

Having reviewed the assumptions that input to our view of total (undetected) gas theft, we have not identified new authoritative sources to justify updating those assumptions. We note, however, that in the current climate it would be reasonable to expect consumer propensity to steal to be increasing. Since our assumptions were established, retail gas prices have risen dramatically, average real income has fallen, theft detection activity by Suppliers (an assumed deterrent) has stalled, and indicators of theft in sectors where data is better than energy industry show a rise in propensity to steal, including among those who have not stolen previously. But we would not change our assumptions only on the back of retail theft data as it is not easy to read across from shoplifting to gas theft; nor do we have a clear view on whether an increased regulatory focus on energy theft will bear fruit in advance of the target Gas Year.

It is right to question whether total theft levels move in line with gas consumption but we are unable to propose an alternative approach without drawbacks. We need to be reasonably certain that moving from the current approach would give rise to a more accurate picture of total theft or a more equitable allocation of UIG. In this case, an update to this approach would seem arbitrary.

We concluded on reviewing the TEM that it was not a source of new data (and that the project supported our view on the difficulty of sourcing and working with energy theft data). The output view of total annual gas theft from the TEM is very different to our estimate. However, we are reminded that this is an alternative modelled outcome, and not observed reality.

We are unconvinced that TEM's view of total gas theft provides a better (or worse) basis for the equitable allocation of UIG. But we are also mindful both of the likely unwelcome volatility that such a change would bring about[11] and also the questions this would raise over the signifcantly increased gap between our estimate of total UIG and the probable level of actual UIG at the Line in the Sand. Under previous AUG methodologies, UIG not estimated was assumed to be theft. In this case, we would be inferring that 70% (or more) of actual UIG was unexplained[12].

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[10] See Comparison to Observed Levels of UIG in Section 7 for details of this sense check process. Numbers presented here are numbers from the draft Statement for 2024-2025 when this analysis was undertaken.
[11] Volatility in Weighting Factors is an assumed unwelcome side effect of changes to methodology, but in itself not a reason to withhold changes if they can be otherwise justified. We note that minimal volatility might be an additional working principle for discussion under future AUGE arrangements.
[12] Or 'Unfound' – which we defined earlier in this section as 'Unknown, uncalculated, and estimation error UIG'

In short, we have not been able to justify a changed approach to those areas of the total theft methodology we investigated. The allocation methodology benefits from the usual annual updates on the back of refreshed theft data and analysis.

090 NO READ AT THE LINE IN THE SAND (REFINEMENT INVESTIGATION)

INTRODUCTION

The existing method to calculate UIG from sites for which no valid meter read is accepted into Settlement before the period crystallises has had multiple updates over the last two years.

Our annual assessment process identified the potential to streamline and improve the methodology for this contributor.

UIG CONTEXT

This contributor relates to consumption at a Supply Meter Point that is not reconciled to the relevant Shipper prior to the Line in the Sand, because a timely valid meter read is not accepted into Settlement.

This includes situations where:

- The Line in the Sand has passed for the date of the previous valid read accepted into Settlement for a Supply Meter Point and there has not been a subsequent valid read accepted into Settlement; and
- The Line in the Sand has passed for the date of the previous valid read accepted into Settlement for a Supply Meter Point and, since this Line in the Sand passed, a valid subsequent read has been accepted into Settlement.

EXISTING METHODOLOGY AND CASE FOR CHANGE

The existing methodology was identified as being overly-complex as a result of incremental year-on-year changes. The complexity related to the use of datasets from specific periods, requiring a forwards and backwards-looking view at once. Iteration in the methodology over time resulted in a complicated combination of data inputs and sub-methodologies, which makes validation and testing of outcomes difficult.

PROPOSED NEW APPROACH

Our starting position was that any changes should be designed to simplify and increase clarity. We did not intend to design a completely new approach, as the fundamental elements of the methodology remain sound.

The focus would be an annual calculation of the UIG created from the most recent change in the Line in the Sand (April 2023) and applying that to the target Gas Year’s AQ.

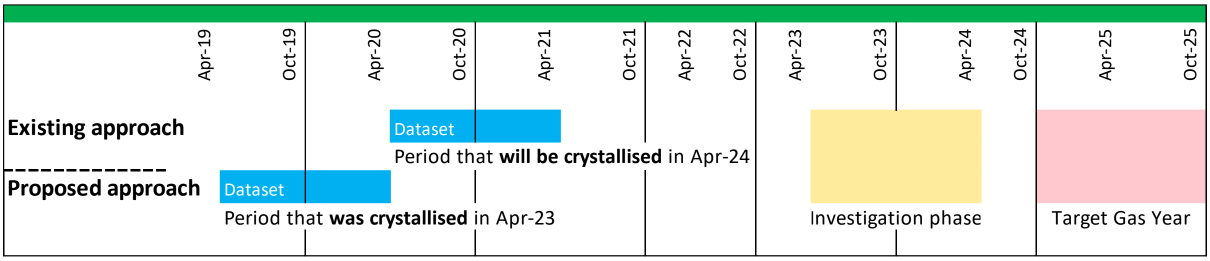
This investigation was therefore to align periods of analysis in order to determine the amount of UIG present for the most recent period frozen in April 2023 (i.e. April 2019 - March 2020).

Like the existing methodology this involves a two-strand approach to consider

- the final reconciled position at Line in the Sand; and
- the rejected reads for the portfolio of sites which have not received a read for four years.

The intended outcome is to establish a forecast of likely consumption compared to the AQ-derived allocation actually used for Settlement.

The below diagram shows the timespans for the dataset used in the existing methodology compared to the change proposed by this investigation.



Our proposed revised approach takes the actual period that was frozen in April 2023, (i.e. April 2019 - March 2020) to calculate the actual UIG for this period. This calculated UIG figure is then used as a proxy for the target Gas Year October 2024 – September 2025.

By contrast, the current methodology forecasts what a reconciled position will look like six months after the main analysis phase of the Statement in April 2024 for a period in the past (April 2020 – March 2021) and considers read rejections from a much longer period (April 2020 – October 2023) to calculate an actual volume to be used as a proxy for the target Gas Year October 2024 – September 2025.

The below table summarises the changes for the key elements of the methodology.

Process	Existing	Proposed
Unreconciled percentage	Due to the need to propose the draft Weighting Factors (Dec23) before the LiS change in Apr24, and how long data takes to wash through the system anyway, we have to forecast what that position will look like by looking at the position at snapshots, Jul23 & Oct23 and then extrapolate out to Apr24. (This does get a further update in Feb24 in time for the final Statement).	A one-off snapshot of data at the point that the Line in the Sand changes in Apr23. No subsequent extrapolation or forecasting required.
Actual consumption vs AQ calculation	Looking at the actual energy usage for any period in past 3 years where reads are a year apart and have the same rejection reason to calculate an 'actual AQ' and compare to the recorded AQ.	Look at the energy used during the period which has now crystallised where we have any information and make sure it is properly profiled as per the date of the last read to compare to a profiled view of the recorded AQ

DATA INPUTS

We identified that we would be able to reuse all previously specified CDSP data outputs, as long as they were generated at the correct point in time to suit the revised methodology. (We required a one off extract from April 2023 rather than successive iterations in July 2023, October 2023 and February 2024). No new data inputs were required for this investigation.

CDSP provided:

- A snapshot of the original allocation and how much of that allocation had then been reconciled in April 2023 of the period April 2019 – March 2020 by EUC;

- A portfolio of sites which had not received a read since April 2020 in April 2023; and
- The list of rejected reads for this portfolio of sites received since the date of the last recorded read for each site.

We also used from our existing datasets;

- A view of the split between Matrix Positions of the actual recorded AQs in April 2023; and
- The Consumption Forecast for the target Gas Year.

VALIDATION

As part of the investigation, we also wanted to validate the revised approach by acquiring the equivalent dataset for a year earlier, that is, for the period April 2018 – March 2019. Similar outcomes would have increased confidence in our approach.

Therefore, the datasets above were procured for a snapshot as it would have been in April 2022 looking at the portfolio of sites which at the time had not had a read since April 2019.

PROPOSED STEPS FOR REVISED METHODOLOGY

Unreconciled Percentage

1. Taking the reconciled position, further split the allocation that has been reconciled data by Class using the portfolio of No Read sites which have not had a read since April 2020 in April 2023. The reconciliation data is not available at Product Class level so must be derived. This also needs to be done by month during the period April 2019 – March 2020 as some sites had a last read recorded during that period April 2019 – March 2020.
2. Split the original allocation by Class using the actual AQ shares in April 2023 again by month during the period. A further step is required here to backfill the sub-EUC bands that were introduced by Data Services Contract (DSC) Change Proposal XRN4665 - Creation of New End User Categories, as that was introduced midway through the period under investigation (October 2019). This was achieved by applying the splits seen in October 2019 back to April 2019 data.
3. This data can then be annualised to give the percentage of each Matrix Position that was remaining to be reconciled at the Line in the Sand change in April 2023 of the period April 2019 – March 2020.

As a sense check, this can be compared against the position we forecast for 2023-2024 Gas Year which applied to the same period (April 2019 – March 2020). One of the key differences was that the data was not split by sub-EUC band last year.

Actual Volume Calculation and comparison to AQ

1. Obtain the snapshot of Supply Meter Points without a read since April 2020, the snapshot as it would have been in April 2023.
2. Obtain all the Shipper rejected reads (along with the rejection reason) for Supply Meter Points without a read since April 2020, as at April 2023;
3. Calculate the new average AQ for the set of Supply Meter Points with multiple reads that were rejected (using reads rejected as close to a year apart as possible).
4. If the site has rejected reads either side of the period April 2019 – March 2020, less than 3 years apart, this is the set of reads selected.

5. If no rejected read combinations satisfy step 4, reads may be taken within the April 2019 – March 2020 period, with the combination closest to a year selected, providing the reads cover at least 75% of the period.
6. Profile the reads, then calculate the energy over the April 2019 – March 2020 period for the set of Supply Meter Points with rejected reads established in step 3.
7. Determine the percentage error on the original AQs by EUC Band as:

$$100 \times \frac{\sum Profiled\ Energy\ (April\ 2019 - March\ 2020) - \Sigma Original\ AQ}{\Sigma Original\ AQ}$$

8. Apply this percentage error to the total AQs for Supply Meter Points that had no read rejections (on the basis that a proportion of these are likely to encounter this issue when a read is finally obtained and submitted for them);

This can then be repeated for the prior year, snapshot of sites and reconciled position in April 2022 and looking at the period April 2018 – March 2019.

<u>Combining reconciliation and AQ error percentages</u>

1. As per current methodology, the two outcomes are multiplied together and then by the Consumption Forecast to give the amount of UIG for this contributor for each Matrix Position.

RESULTS

April 2019 – March 2020 (snapshot at April 2023)

Unreconciled percentage

Unreconciled percentages came out as broadly similar as those derived for the 2023-2024 Statement last year, although we now have a proper split of the sub-EUC bands.

Actual Volume Calculation and comparison to AQ

The lack of rejected reads during 2020 proved problematic for our investigation, meaning that we were unable perform the required calculation *for the majority of sites*. We suspect this lack was driven by the impact of the Covid-19 pandemic on energy Supplier/Shipper processes and the pause in meter reader activity.

Below is the proportion of relevant sites for which we were able to carry out the required calculation. We have compared it to the equivalent proportion of relevant sites for which the existing No Read methodology can perform a calculation this year (at the time of the draft Statement). The difference is material, and this gives us lower confidence in the outcome from the revised methodology given that the calculated results are extrapolated across the relevant portfolio of sites.

EUC	Percentage of sites we could calculate an AQ error for (Investigation Method 19-20)	Percentage of sites we could calculate an AQ error for (Existing Method 20-21)
1ND	8%	20%
1PD	3%	3%
1NI	1%	3%
1PI	2%	2%
2ND	2%	24%
2PD	0%	4%
2NI	1%	5%
2PI	0%	0%
3	0%	11%
4	0%	13%
5	0%	16%
6	0%	3%
7	0%	46%
8	0%	0%
9	0%	0%
Total	7%	15%

April 2018 – March 2019 (snapshot at April 2022)

Unreconciled percentage

CDSP was able to provide the reconciliation position for this period at that snapshot only at a national level. Despite splitting this data down to the required granularity just by actual AQ share the loss of accuracy seen was a concern. This was compounded by the fact that during the period April 2018 – March 2019 the new sub-EUC bands introduced in October 2019 were not yet in existence and so it was not possible to split the dataset down to that sub-EUC band level.

Actual Volume Calculation and comparison to AQ

While the proportion of sites with rejected reads in the right period was higher than for April 2019 – March 2020 (see above), it was still lower than achieved using the existing method.

Limited data points in the higher EUC bands was also a concern, as shown in the table below.

EUC	Percentage of sites we could calculate an AQ error for (Investigation Method 18-19)	Percentage of sites we could calculate an AQ error for (Existing Method 20-21)
1ND	13%	20%
1PD	8%	3%
1NI	4%	3%
1PI	7%	2%
2ND	7%	24%
2PD	0%	4%
2NI	5%	5%
2PI	0%	0%
3	1%	11%
4	1%	13%
5	0%	16%
6	0%	3%
7	0%	46%
8	0%	0%
9	0%	0%
Total	11%	15%

Comparing the two datasets for validation

As a way to validate the revised method we assumed that good alignment of outputs across the two datasets would increase our confidence in putting this forward as a proxy for the target Gas Year.

Unreconciled percentage

Comparing the outputs of the two datasets for the reconciliation percentages we observed that the unreconciled percentages were materially different:

Apr18-Mar19	3	4
1ND	0.70%	5.55%
1PD	0.70%	5.55%
1NI	0.70%	5.55%
1PI	0.70%	5.55%
2ND	0.50%	4.57%
2PD	0.50%	4.57%
2NI	0.50%	4.57%
2PI	0.50%	4.57%
3	0.12%	1.99%
4	0.24%	2.28%
5	2.38%	7.06%
6	0.00%	9.46%
7	0.00%	14.06%
8	23.12%	3.23%
9	0.00%	0.00%

Apr19-Mar20	3	4
1ND	0.01%	0.60%
1PD	0.03%	1.11%
1NI	0.02%	1.31%
1PI	0.00%	2.29%
2ND	0.00%	1.32%
2PD	0.00%	2.01%
2NI	0.01%	0.69%
2PI	0.00%	4.16%
3	0.01%	0.42%
4	0.03%	0.41%
5	0.00%	0.84%
6	0.00%	1.01%
7	0.00%	1.37%
8	4.61%	0.80%

This is likely to be a result of improved performance across the industry between the two years and the need to apply different apportioning methodologies due to the data constraints giving different answers.

Actual Volume Calculation and comparison to AQ

The two different periods of investigation April 2018 – March 2019 & April 2019 – March 2020 yielded very different results and as explained above were based on a very small subset of the sites in scope. This provided limited confidence that the revised methodology was in fact an improvement on the existing one.

CONCLUSION

The results of the investigation do not give us sufficient confidence that the revised methodology would yield a more robust estimation of UIG than the existing one. In fact, it is likely to be the opposite. We will not be applying the revised methodology to the calculation of UIG relating to No Read at the Line in the Sand.

There may be some merit in re-testing the proposed revisions next year once we have had another year of data including one in which the lack of sub-EUC band level information is not a problem, smart meter data is more widely available, and the impact of the Covid-19 pandemic will no longer be as relevant in the necessary datasets.

6 UIG Contributors

Each year, we assess previously identified contributors in light of new information, including suggestions made during industry consultation and the availability of potential additional data inputs. Dataset refreshes have occurred for all previous contributors. In some cases, small improvements have been made to a step in the methodology or calculations, and we highlight these instances.

No additional contributors have been identified for inclusion this year.

For contributors analysed in previous years, any detailed description of supporting analysis and rationale remains unchanged, and so has not been reproduced in the body of this Statement. Instead, we refer you to the Statements from the previous three years held on the Joint Office website if needed.

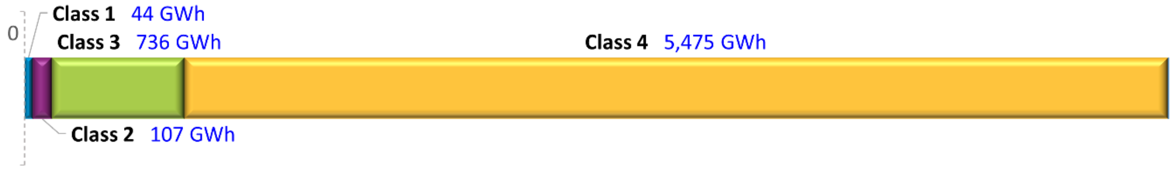
Each of these contributors is described with the following structure:

- **Dashboard**: charts showing the UIG for the contributor split by Class and then by market sector, and a table summarising any minor updates made to methodology. Also compares this year's UIG to last year's;
- **Description**: details of the Settlement context, the definition of the contributor and how the contributor impacts UIG;
- **Methodology**: how we determined the level of UIG associated with the contributor and allocated this across Matrix Positions;
- **Calculation**: a detailed description of the data inputs, the calculation steps, and the data output;
- **Results**: the calculated UIG value, the value split by Matrix Position and a chart showing the UIG as a percentage of throughput; and
- **Notable Observations**: our observations, including a comparison to the output of the Statement for Gas Year 2023-2024, with our considered reasons.

010 Theft of Gas

DASHBOARD

UIG split by Class



UIG split by Sector

Gas Year 2024 – 2025 Updates

Some existing data inputs have been updated and refreshed as well including an additional year of industry data.

Data feeds for this contributor changed in April 2023 due to the implementation of UNC Modification 0734S and the absorption of various industry processes into the governance of the REC. This is discussed in the relevant sections below.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
010 Theft of Gas	6,823 GWh	**6,362 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Introduction

Theft is the use of gas from the LDZ or IGT gas networks, where steps have been taken to deliberately avoid paying for it. There are many ways in which gas is stolen – ranging from the elaborate to the rudimentary.

In many cases, the stolen gas is not metered. These cases include: bypassing the meter so that the gas used is not recorded, interfering with the meter so that it stops or under-records, and swapping out the correct meter for an alternative for a part of the period between meter readings. In all these situations, the stolen gas is not allocated to a Shipper in Settlement and appears as UIG.

In other cases, the stolen gas is metered, but steps are deliberately taken to avoid paying for it. These cases are termed 'Fiscal Theft' and include fraudulent vends for pre-payment meters. In these situations, the stolen gas is correctly allocated to a Shipper in Settlement and does not appear as UIG.

Gas is also stolen from the mains network. For LDZ networks this is estimated and accounted for in the determination of Shrinkage and does not appear as UIG (subject to the accuracy of the estimate).

Detection of Theft

There have been several industry schemes in place to identify theft in recent years. These are:

- The Theft Risk Assessment Service (TRAS) which enables Suppliers to assess the risk of energy theft at consumer premises to help target theft investigations. The service uses data provided by Suppliers and augments it with third-party data such as credit history to derive potential consumption outliers;
- The Energy Theft Tip Off Service (ETTOS), previously operated by Crimestoppers. This service allows tip offs about suspected energy theft, received from the general public, to be sent to the relevant Supplier or GDN for investigation; and
- The Gas Theft Detection Incentive Scheme (GTDIS) which sets targets for identifying theft and rewards Suppliers based on the number they detect.

All three schemes have now been fully incorporated under Retail Energy Code (REC) arrangements.

Whilst these schemes are undoubtedly highly beneficial, they do not always result in the highest amounts of theft being detected. For example, the detection of certain types of theft is time-consuming and expensive, requiring site visits and access warrants to be obtained. This can lead to a disproportionate focus on detecting certain sorts of theft. For example, fiscal theft, which can be undertaken more readily as an office-based activity, prepayment thefts and now increasingly thefts from smart meters. Another example is that the GTDIS scheme is incentivised based on the number of thefts detected rather than the amount of gas stolen, which results in a disproportionate focus on the easier to detect cases. Another consideration, more generally, is that the consequence of a Shipper detecting theft is that the stolen gas is attributed to them rather than being shared across all Shippers via UIG. This does not in itself provide a compelling incentive to detect theft.

Settlement Adjustments

Until this year there was no automatic feed from thefts detected resulting in a Settlement adjustment for the relevant Shipper. Where Shippers or GDNs became aware of theft, either from one of the above schemes or elsewhere, they were required to report this and, where possible, adjust for it in Settlement. They used to do this via the Theft of Gas (TOG) regime provided by the CDSP. This mandated an investigation by the Shipper or GDN to determine the amount of theft and the period over which it took place. It also included an adjustment being made in Settlement such that the stolen gas is attributed to the correct Shipper. In those cases, it ceased to appear as UIG (subject to the accuracy of the estimate). When trying to establish the levels of detected theft and how much has been adjusted for in Settlement, and therefore how much could be attributed to UIG, this was made much harder by this variety of data sources and differing approaches to reporting and managing theft. Previous AUG Statements detail how the AUGE has managed this over the years. Since April 2023, on implementation of UNC Modification 0734S, the Settlement adjustment is now fed directly by data received by the CDSP from RECCo. This will ensure that going forward all detected theft reported is reflected in Settlement, which wasn't the case under the old regimes.

Settlement Impacts

Despite the range of arrangements in place to identify theft, it is broadly accepted that only a small fraction is detected. This means that only a small fraction is adjusted for in Settlement.

All non-fiscal theft that is not detected, or is detected and not adjusted for, remains as UIG at the Line in the Sand.

DEFINITION

For the purposes of this Statement, theft of gas is considered to have taken place where any person deliberately tampers with (including removing) the gas metering equipment so that the amount of gas consumed is incorrectly measured at the Supply Meter Point.

Specifically excluded from this definition are:

- Theft of gas upstream of the Emergency Control Valve (ECV), including illegal connections to the mains network. This is accounted for within the relevant Transporter's Shrinkage calculations; and
- Fiscal theft from Pre-Payment meters, whereby the meter records the correct amount and the energy flows into Settlement, even though the Supplier does not receive payment.

UIG IMPACT

Theft of Gas (as defined above) creates positive UIG. If this is not identified and adjusted for in time, it remains at the Line in the Sand.

METHODOLOGY

Despite the work undertaken in our investigations (see Section 5) the overall approach to calculating UIG associated with Theft of Gas remains as per last year:

- Estimate the total theft for the target Gas Year based on an assessment of the available information on retail theft in various like sectors;
- Determine the levels of detected theft, from TOG and TRAS/GTDIS data and the proportion of this that is adjusted for in Settlement. Use this to determine a forecast for the detected theft that will be adjusted for in the target Gas Year;
- Determine the level of undetected theft in the target Gas Year, the proportion of this that is typical (akin to detected theft) and the proportion that is sophisticated (more likely to be undertaken by organised criminals); and
- Allocate these different categories of theft to the Matrix Positions using the selected allocation approach.

CALCULATION

INPUTS

- TOG Theft Information from the CDSP (up to April 2023);
- Legacy TRAS/GTDIS Theft Information report[13];GTDIS report provided by RECCo via the CDSP since April 2023;
- Theft Data report provided by Energy UK (obtained from a sub-set of their members);
- Overall theft percentage determined as described in the Setting a Level for Total Theft section in Appendix 5 of the Statement for 2022-2023;
- Undetected Sophisticated Theft percentage as described in the Undetected Theft section in Appendix 5 of the Statement for 2022-2023;
- Our Consumption Forecast (as described in Section 4 of this Statement);
- AMR Supply Meter Point information from CDSP;
- Meter Type forecast (created for the Consumption Meter Error Contributor); and
- Quarterly DESNZ report of smart meters installed and projected smart meter installation rates.

ASSUMPTIONS

- Ongoing development in industry theft arrangements will not significantly affect the number of thefts identified by Suppliers in advance of the Line in the Sand;
- Detected theft trends are a reasonable indicator of typical undetected theft; and
- There is a proportion of undetected theft that is sophisticated and undertaken by organised criminals operating across all market sectors.

CALCULATION

Calculate the total theft forecast for the target Gas Year

1. Obtain the overall theft percentage, as described in the Setting a Level for Total Theft section in Appendix 5 of the Statement for 2022-2023; and
2. Apply this to the total Consumption Forecast for the Gas Year to get the total theft for the Gas Year.

Combine historical TOG and TRAS data and GTDIS data and rationalise to obtain a comprehensive theft dataset

3. Combine all the historical TOG, confirmed theft TRAS data and GTDIS data to obtain a single superset of theft data;
4. Rationalise instances in all datasets (eliminating duplicates) by matching on Supply Meter Points, theft size and duration; then matching based on size only; then based on duration only; and
5. Remove all records of fiscal theft.

[13] Available data covers thefts detected in the period June 2015 to April 2023

Determine a forecast of detected (non-fiscal) theft for the target Gas Year.

6. Determine the relationship between the theft period and the detection taking place, from the combined and rationalised theft dataset;
7. Apply this relationship to the theft dataset to determine the theft:
   a. Already detected by theft year; and
   b. Yet to be detected by theft year;
8. Aggregate theft detected and theft to be detected by theft year;
9. Forecast the detected theft that will take place in 2024 and 2025 using trend extrapolations of the aggregate data;
10. Establish the theft reported in the Energy UK dataset that was not in the combined theft dataset and determine what proportion this was of the combined data set of reported theft; and
11. Increase the forecast of the detected theft that will take place in 2024 and 2025 by this proportion.

Determine a forecast of undetected theft for the target Gas Year

12. Obtain the overall theft forecast for the target Gas Year from steps 1 and 2; and
13. Difference this to the forecast of detected theft for the target Gas Year to get a forecast of the undetected theft for the target Gas Year.

Categorised undetected theft for the target Gas Year

14. Take the Undetected Sophisticated Theft percentage, as determined in the Setting a Level for Total Theft section in Appendix 5 of the Statement for 2022-2023;
15. Apply this to the undetected theft to obtain a forecast of Undetected Sophisticated Theft for the target Gas Year; and
16. Difference this to the forecast of undetected theft for the target Gas Year to obtain a forecast of Typical Undetected Theft for the target Gas Year.

Calculate overall percentages of Undetected Typical Smart and AMR theft

17. A historical view of percentage of typical theft from smart meters is not likely to be reflective of the future due to the smart rollout programme and so to derive a forecasted undetected theft percentage for this population, scale the percentage of historical thefts with the smart rollout percentages for previous years to establish the percentage of typical theft from smart meters in the target Gas Year using the forecasted smart rollout percentages.
18. The forecast percentage of typical theft from the AMR meter population can be based on the percentage of actual AMR detected theft in the 10-year rolling dataset.

Further details of both of these steps can be found in Appendix 5 of the Statement for 2022-2023.

Allocate Undetected Typical Theft and Undetected Sophisticated Theft to the Matrix Positions

19. Allocate Undetected Typical Theft and Undetected Sophisticated Theft across Matrix Positions on the basis described in the table below:

Type of Theft	Sub type	Basis of Matrix Allocation
Undetected Theft	Undetected Typical Theft	**Traditional Meters** The forecast quantity of Undetected Typical Theft, less the amount of this attributable to smart meters and AMR meters (see below). Allocated across sub-EUC bands in proportion to the combined theft data over the last 10 years, excluding theft attributable to smart meters, considering EUC bands 03-08 together because of the limited data for these. Then sub-allocate across Classes as in proportion to our Meter Type Forecast for traditional meters. **Smart Meters** The forecast quantity of Undetected Typical Theft attributable to smart meters. Allocated in proportion to our Meter Type Forecast for smart meters. **AMR Meters** The forecast quantity of Undetected Typical Theft attributable to AMR. Allocated across sub-EUC bands in proportion to the combined theft data over the last 10 years for AMR meters, considering EUC bands 03-08 together because of the limited data for these. Then sub-allocate across Classes as in proportion to the current snapshot of AMR meters.
Undetected Theft	Undetected Sophisticated Theft	The forecast quantity of Undetected Sophisticated Theft. Allocated in proportion to throughput for all Matrix Positions.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **6,362 GWh**. This excludes the detected 111 GWh adjusted for theft which will enter Settlement.

Total undetected theft was calculated to be 6,362 GWh, split as follows:

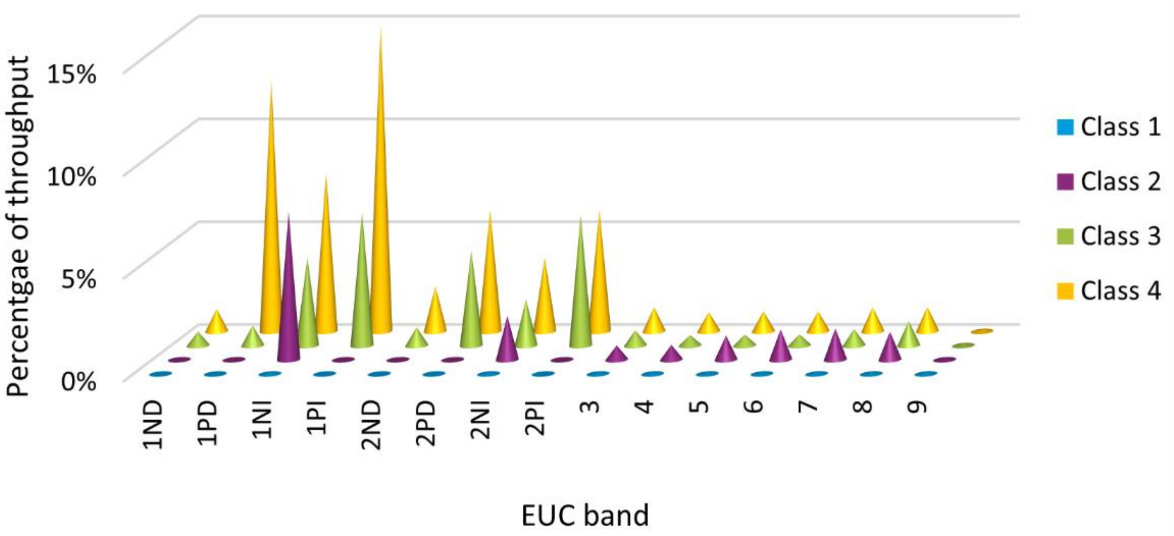
- Undetected Typical Theft (theft akin to detected theft): 5,930 GWh; and

- Undetected Sophisticated Theft (theft using sophisticated techniques that are very difficult to detect): 432 GWh.

The total theft is allocated across Matrix Positions as follows[14]:

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	272	2,299
	1PD	-	-	42	1,330
	1NI	0	0	94	672
	1PI	-	-	0	5
	2ND	-	-	1	122
	2PD	-	-	0	10
	2NI	0	0	153	435
	2PI	-	-	0	0
	3	0	1	53	125
	4	0	2	41	99
	5	0	4	25	77
	6	0	17	18	89
	7	1	32	22	95
	8	6	50	15	115
	9	36	0	0	1

The graph below shows UIG as a percentage of throughput for each Matrix Position:



NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor as 6,823 GWh (compared to this year's quantification of 6,362 GWh).

[14] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

This difference is due to the relative decrease in Consumption Forecast for the target Gas Year compared to the Statement for Gas Year 2023-2024. The difference in allocation of UIG between Matrix Positions is a result of the updates done to the theft dataset removing a year's worth of old data, reviewing sub-EUC bands and meter types for detected thefts and the latest updates we have received from the CDSP of TRAS, TOG, and GTDIS data and AMR portfolios.

020 – UNREGISTERED SITES

DASHBOARD

UIG split by Class

UIG split by Sector

Gas Year 2024 – 2025 Updates
Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
020 Unregistered Sites	53 GWh	**53 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

For gas consumed at a Supply Meter Point to be correctly allocated in the Settlement process, the Supply Meter Point must be registered to a Shipper in the UK Link central industry database.

If this is not the case, any gas consumed at the Supply Meter Point will not be directly allocated to a Shipper and will instead contribute to UIG. Unregistered Sites are the sub-set of these Supply Meter Points that have never been registered to a Shipper.

There are several industry processes to identify such Unregistered Sites. This is so the CDSP can back bill the appropriate Shipper for the gas consumed before the Line in the Sand is reached. There are circumstances where the CDSP cannot do this. In these cases, the UIG remains at the Line in the Sand.

DEFINITION

This contributor relates to Supply Meter Points that have never been registered to a Shipper but where gas is being consumed.

There are situations where Supply Meter Points are not registered to a Shipper but have been at some point in the past. These can also create UIG but are not considered here. They are dealt with under the Shipperless Sites (025) contributor instead.

It is also worth noting that there are several situations where Supply Meter Points are legitimately unregistered, such as when new premises have been built and the service has yet to be physically installed. These do not create UIG as they do not consume any gas.

The cases considered as part of this contributor are Supply Meter Points that:

- Have never had a Shipper registered; and
- Are consuming gas.

UIG IMPACT

Gas consumed at such Unregistered Sites creates positive UIG. If this is not identified and accounted for in time, this UIG remains at the Line in the Sand.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- Using trend analysis to forecast the number of Supply Meter Points per main EUC band that could consume gas whilst they are unregistered (as defined above) in the target Gas Year, along with the sum of their AQs, including a proportion from the Less than 12 months report;
- Using trend analysis of AQ changes subsequent to registration, scale the unregistered AQs to reflect the likely post-registration AQs more accurately;
- Using trend analysis to forecast the number of these Supply Meter Points that are legitimately unregistered or non-issues/data errors and discounting these from the dataset;
- Using trend analysis to forecast the number of remaining Supply Meter Points that will be registered to a Shipper and be capable of being back billed (thereby eliminating the associated UIG) before the Line in the Sand occurs for the target Gas Year and discounting these from the dataset; and
- Determining the UIG per main EUC band at the Line in the Sand for the target Gas Year by applying a national annual load profile to the sum of the AQs per main EUC band in the residual dataset.

MATRIX ALLOCATION

The forecast UIG for each main EUC band is split across the associated Matrix Positions, in proportion to the consumption for these Matrix Positions in our Consumption Forecast for the target Gas Year.

ASSUMPTIONS

- The back bill rules are applied to Unregistered Sites as per Modification 0410A[15].

CALCULATION

INPUTS

- Orphaned Sites report from the CDSP;
- Legitimate Unregistered Sites Details report from the CDSP;
- Connection Details for Orphaned Sites report from the CDSP;
- Less than 12 months report from the CDSP;
- Annual Load Profiles for the West Midlands (WM) LDZ from the CDSP, aggregated to monthly level, as a proxy for the national profile;
- Our Consumption Forecast (as described in Section 4 of this Statement); and
- Unregistered AQ History Report from CDSP.

CALCULATION

The detailed calculation is described below.

Forecast the number of Supply Meter Points that have never been registered to a Shipper and have an indication of meter activity (suggesting the meter is consuming) along with the sum of their AQ, for each month in the target Gas Year.

1. For each successive month's Orphaned Sites report over the last three years, identify the number of:
   a. Supply Meter Points and the sum of their AQ per main EUC band;
   b. Supply Meter Points added to the report (compared to the previous month) and the sum of their AQ per main EUC band; and
   c. Supply Meter Points removed[16] from the report (compared to the previous month) and the sum of their AQ per main EUC band.
2. From step 1, forecast the number of Supply Meter Points and the sum of their AQ for each main EUC band that will meet the criteria for being on the Orphaned Sites report for each month of the target Gas Year. Estimate a proportion of sites from the Less than 12 months report that will ultimately appear on the Orphaned Sites report. This can be calculated by tracking what proportion of sites in these reports end up on the Orphaned Sites report after a year. (Do this as an annual sample rather than month on month). This is the base dataset to take forward.

Determine the likely actual AQs subsequent to registration

3. Using the Unregistered AQ History Report, determine the post-unregistered scaling factor by dividing final registered AQ by initial unregistered AQ. Do this for three bands:

[15] UNC Modification 0410A: "Responsibility for gas off-taken at Unregistered Sites following New Network Connections".

[16] These are likely either to have been registered by the CDSP or a Shipper, or confirmed to be legitimate Unregistered Sites.

    a. Sites with an AQ of 1;
    b. Sites with an AQ greater than 1 and less than 73,200; and
    c. Sites with an AQ greater than 73,200 (median for unregistered).
4. Apply the post-unregistered scaling factor to the Supply Meter Points determined in step 2.

Determine composition of records removed because they were deemed to be legitimate, or were deemed to be non-issues.

5. Sites that are removed from the monthly Unregistered reports and do not appear on the legitimate unregistered site details report or connection details report, are deemed to be non-issues (i.e. they were not Unregistered Sites at all and have been cancelled and so do not contribute UIG). From this determine the percentage of Unregistered Sites deemed to be 'valid unregistered' sites; and
6. Using the Legitimate Unregistered Site Details reports, determine the percentage of the removed Supply Meter Points identified in the last three years in step 1c that are due to those Supply Meter Points being deemed to be legitimate. Do this for each main EUC band.

Note that the remainder of removed Supply Meter Points are due to registration by a Shipper.

Adjust the dataset to remove those that are legitimate

7. Adjust the dataset in step 4 by removing the percentage of Supply Meter Points determined in step 6.

Determine the composition of those removed because they were registered by a Shipper

8. Using Connection Details for Orphaned Sites reports from the last two years, determine the percentage of removed Supply Meter Points in step 1c that are not legitimate (as determined in step 6) and that can be back billed. Do this for each main EUC band. The Supply Meter Points that can be back billed are those that are registered by the Shipper that first requested the Supply Meter Point, where the meter reading at the effective point of this registration is zero.

Note that the remainder of the removed Supply Meter Points cannot be back billed and create UIG at the Line in the Sand.

Adjust the dataset to remove those that are back billed

9. Adjust the dataset created in step 7 by removing the percentage of Supply Meter Points determined in step 8.

Determine the UIG at the Line in the Sand for each sub-EUC band

10. Note that the dataset in step 9 now represents the number of Supply Meter Points, broken down by main EUC band, which are forecast to create UIG at the Line in the Sand for each month in the target Gas Year, along with the sum of their AQs;
11. Sum the product of these monthly AQs and the respective month's annual load profile for the West Midlands LDZ, over the target Gas Year, for each main EUC band, to determine the UIG for each of these EUC bands over the target Gas Year;

12. Split these annual UIG values for each main EUC band into the respective Matrix Positions. Use the annual ratio of consumption in these Matrix Positions in our Consumption Forecast of the target Gas Year to do this; and
13. Sum these values across Matrix Positions to get the overall UIG for this contributor for the target Gas Year.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

RESULTS

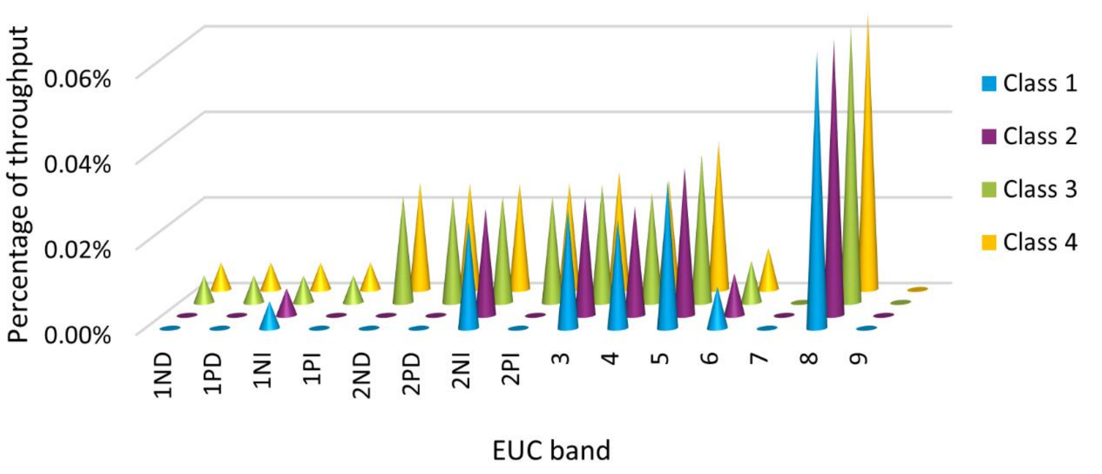
The forecast UIG associated with this contributor at the Line in the Sand for the target Gas Year is: **53 GWh**.

It is broken down[17] across the sub-EUC bands as follows:

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

[17] Note that due to rounding the sub-EUC band values in aggregate may not equal main EUC band values. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

The graph below shows UIG as a percentage of throughput for each Matrix Position:



NOTABLE OBSERVATIONS

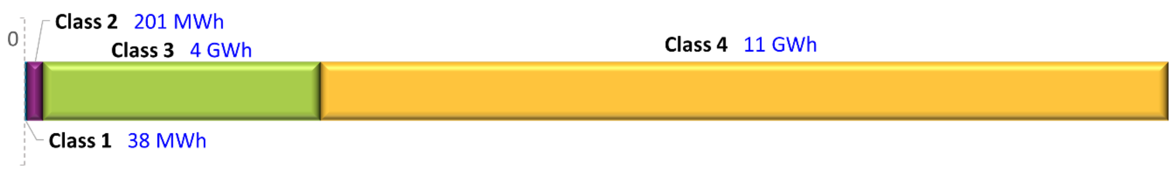
COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor as 53 GWh (compared to this year's quantification of 53 GWh). There was a slight increase in UIG predicted for EUC Band 08, which was offset by a reduction in UIG for EUC Band 01, and with no other material movements in the input data for this contributor has led to a very similar amount of UIG being predicted as was being predicted for last year's Statement.

025 – SHIPPERLESS SITES

DASHBOARD

UIG split by Class



UIG split by Sector

Gas Year 2024 – 2025 Updates
Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
025 Shipperless Sites	17 GWh	**15 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

For gas consumed at a Supply Meter Point to be correctly allocated in the Settlement process, the Supply Meter Point must be registered to a Shipper in the UK Link central industry database.

If this is not the case, any gas consumed at the Supply Meter Point will not be directly allocated to a Shipper and will instead contribute to UIG. Shipperless Sites are the sub-set of these Supply Meter Points that have been registered to a Shipper at some point in the past.

Supply Meter Points are left without a Shipper when the registered Shipper records the meter as being removed and the supply isolated in the central industry UK Link system and withdraws from the registration. It is in situations where the supply has not actually been isolated that the issue of Shipperless Sites occurs. Such issues are often identified during the relevant Transporter's Gas Safety Regulations (GSR) visit which happens approximately 12 months after an isolation has been recorded.

If the same meter is found on site (and the supply is not isolated), the Supply Meter Point is "Passed to Shipper" (PTS), defined as a PTS Shipperless Site, and the previous Shipper is asked to register it using the reading at the recorded isolation date. This ensures that all the consumption can be accounted for. If the Shipper fails to do this and the recorded isolation date is after 1st April 2013, the CDSP re-registers it to the previous Shipper, using the reading at the recorded isolation date.

If a different meter is found on site (and the supply is not isolated), the Supply Meter Point is defined as a “Shipper Specific rePort (SSrP) Shipperless Site” and is reported to all Shippers, so that the relevant Shipper can register it using a reading that is reflective of the point in time that they should have registered it (so that all the consumption they are liable for can be accounted for).

UIG created after the recorded isolation date is back billed if the next Shipper registration uses the meter reading at this recorded isolation date. Otherwise, the UIG created between the recorded isolation date and the date of the meter reading used in the next Shipper registration cannot be back billed and remains in place at the Line in the Sand.

DEFINITION

This contributor relates to Supply Meter Points that are not currently registered to a Shipper but have been at some point in the past, where gas is also being consumed.

There are situations where Supply Meter Points have never been registered to a Shipper. These can also create UIG but are not considered here. These are dealt with under the Unregistered Sites (020) contributor instead.

The cases considered as part of this contributor are Supply Meter Points that:

- Have no Shipper currently registered;
- Have had a Shipper registered at some point in the past; and
- Are consuming gas.

UIG IMPACT

Gas consumed at such Shipperless Sites creates positive UIG. If this is not identified and accounted for in time, this UIG remains at the Line in the Sand.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- Using trend analysis to forecast the number of Supply Meter Points per main EUC band that could consume gas whilst they are Shipperless (PTS and SSrP as defined in the Settlement Context section above) in the target Gas Year, along with the sum of their AQs;
- Using trend analysis of AQ changes subsequent to registration of Shipperless Sites, scale the shipperless AQs to reflect the likely post-registration AQs more accurately;
- Using trend analysis to forecast the number of these Supply Meter Points that are found to be data errors rather than Shipperless Sites, and discounting these from the dataset;

- Using trend analysis to forecast the number of remaining Supply Meter Points that will be registered to a Shipper and back billed (thereby eliminating the associated UIG), before the Line in the Sand occurs for the target Gas Year, and discounting these from the dataset; and
- Determining the UIG per main EUC band at the Line in the Sand for the target Gas Year by applying a national annual load profile to the sum of the AQs per main EUC band in the residual dataset.

MATRIX ALLOCATION

The forecast UIG for each main EUC band is split across the associated Matrix Positions, in proportion to the consumption for these Matrix Positions in our Consumption Forecast for the target Gas Year.

ASSUMPTIONS

- The back bill rules are applied to PTS Shipperless Sites as per Modification 0424[18] and SSrP sites as per Modification 0425V[19];
- The domestic/non-domestic status of Shipperless Sites (where the supply is not isolated) is the same as it was before they became shipperless; and
- SSrP Shipperless Sites were not shipperless prior to the new meter being installed.

CALCULATION

INPUTS

- Shipperless Sites PTS report from the CDSP;
- Shipperless Sites SSrP report from the CDSP;
- Connection Details for Shipperless Sites report from the CDSP;
- Annual Load Profiles for the West Midlands (WM) LDZ from the CDSP, aggregated to monthly level, as a proxy for the national profile;
- Our Consumption Forecast (as described in Section 4 of this Statement); and
- Shipperless AQ History report from the CDSP.

CALCULATION

The detailed calculation is described below.

Forecast the number of PTS Shipperless Sites for each main EUC band, along with the sum of their AQ, for each month in the target Gas Year

1. For each successive month's Shipperless Sites PTS report over the last three years, identify:
    a. The number of Supply Meter Points isolated before 1st April 2013 and the sum of their AQ for each main EUC band; and

[18] UNC Modification 0424: "Re-establishment of Supply Meter Points - prospective measures to address Shipperless Sites".
[19] UNC Modification 0425V: "Re-establishment of Supply Meter Points – Shipperless Sites".

b. The number of Supply Meter Points removed[20] from the report (compared to the previous month's report) and the sum of their AQ for each main EUC band.

2. From step 1, forecast the number of Supply Meter Points and the sum of their AQ for each main EUC band that will meet the criteria for being on the Shipperless Sites PTS report for each month in the target Gas Year.

Determine the likely actual AQs subsequent to registration[21]

3. Using the Shipperless AQ history report, determine the post-shipperless scaling factor by dividing registered AQ by shipperless AQ. Do this for three bands:
   a. Sites with an AQ of 1;
   b. Sites with an AQ greater than 1 and less than 73,200; and
   c. Sites with an AQ greater than 73,200 (median for unregistered).
4. Apply the post-shipperless scaling factor to the Supply Meter Points determined in step 2.

Calculate the proportion of these that will not subsequently be back billed

5. Determine the Supply Meter Points that appear on the Shipperless Sites PTS report two years ago and do not appear on the latest Shipperless Sites PTS report;
6. From these, determine those that were not back billed and were not confirmed to be non-issues. This is the set that appear on a Connection Details for Shipperless Sites report (indicating that they have now been registered) with a different read to the isolation date read (indicating that consumption whilst they were shipperless was not corrected for); and
7. Determine the number that were not back billed and not confirmed to be non-issues (from step 4) as a proportion of those of those that were removed from the Shipperless Sites PTS report over the last two years (from step 5).

Forecast the UIG for each main EUC band in the target Gas Year, which is due to PTS Shipperless Sites

8. Apply the proportion of PTS Shipperless Sites determined in step 7 to the forecast of total AQ of PTS Shipperless Sites for each month in the target Gas Year (from step 4), for each main EUC band; and
9. Sum the product of these monthly total AQs and the respective month's annual load profile for the West Midlands LDZ, over the target Gas Year, for each main EUC band, to determine the UIG due to PTS Shipperless Sites for each of these EUC bands over the target Gas Year.

Forecast the number of SSrP Shipperless Sites for each main EUC band, along with the sum of their AQ, for each month in the target Gas Year

10. For each successive month's Shipperless Sites SSrP report over the last three years, identify the number of:
    a. Supply Meter Points and the sum of their AQ for each main EUC band;
    b. Supply Meter Points removed from the report (compared to the previous month) and the sum of their AQ for each main EUC band; and

[20] These are likely either to have been registered by a Shipper or by the CDSP on behalf of a Shipper.
[21] This is a new methodology step introduced this year.

c. Supply Meter Points added to the report (compared to the previous month) and the sum of their AQ for each main EUC band; and

11. From step 10, forecast the number of Supply Meter Points and the sum of their AQ for each main EUC band that will meet the criteria for being on the Shipperless Sites SSrP report for each month in the target Gas Year.

Calculate the proportion of these that will not subsequently be back billed

12. Determine the Supply Meter Points that have been removed from a Shipperless Sites SSrP report over the last two years by comparing successive months' reports;
13. From these, determine those that were not back billed and were not confirmed to be non-issues. This is the set that appear on a Connection Details for Shipperless Sites report (and so have now been registered) with a non-zero read (indicating that consumption whilst they were shipperless was not accounted for); and
14. Determine the number that were not back billed and not confirmed to be non-issues (from step 13) as a proportion of those of those that were removed from Shipperless Sites PTS reports over the last two years (from step 10).

Forecast the UIG for each main EUC band in the target Gas Year, which is due to SSrP Shipperless Sites

15. Apply the proportion of SSrP Shipperless Sites determined in step 14 to the forecast of total AQ of SSrP Shipperless Sites for each month in the target Gas Year (from step 11), for each main EUC band; and
16. Sum the product of these monthly total AQs and the respective month's annual load profile for the West Midlands LDZ, over the target Gas Year, for each main EUC band, to determine the UIG due to SSrP Shipperless Sites for each of these EUC bands over the target Gas Year.

Determine the UIG at the Line in the Sand for each Matrix Position

17. Sum the forecast PTS UIG in the target Gas Year (from step 9) and the forecast SSrP UIG in the target Gas Year (from step 16) to get the total UIG by main EUC band;
18. Split these annual UIG values for each main EUC band into the respective Matrix Positions. Use the annual ratio of consumption in these Matrix Positions in our Consumption Forecast of the target Gas Year to do this; and
19. Sum these values across Matrix Positions to get the overall UIG for this contributor for the target Gas Year.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

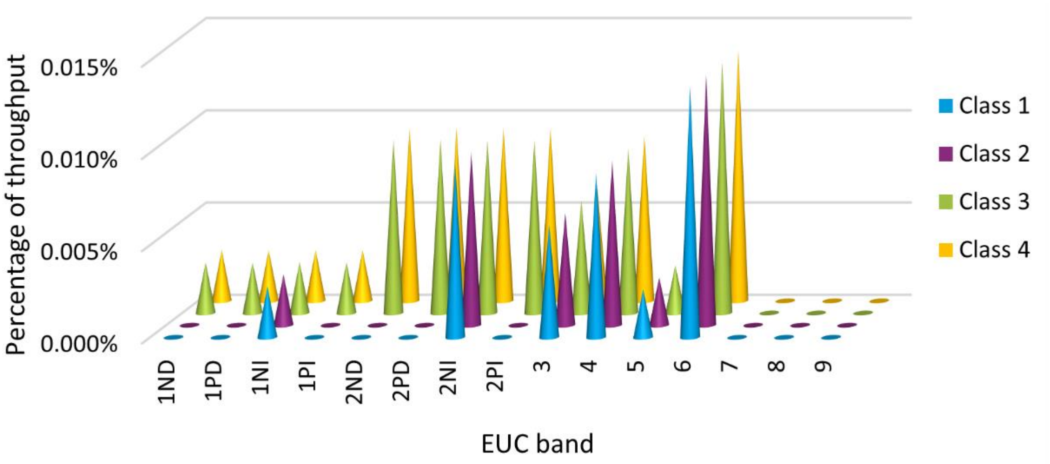
RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **15 GWh**. 3 GWh of this is due to PTS Shipperless Sites and 12 GWh due to SSrP Shipperless Sites.

This is allocated across Matrix Positions as follows:

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

The graph below shows UIG as a percentage of throughput for each Matrix Position:



NOTABLE OBSERVATIONS

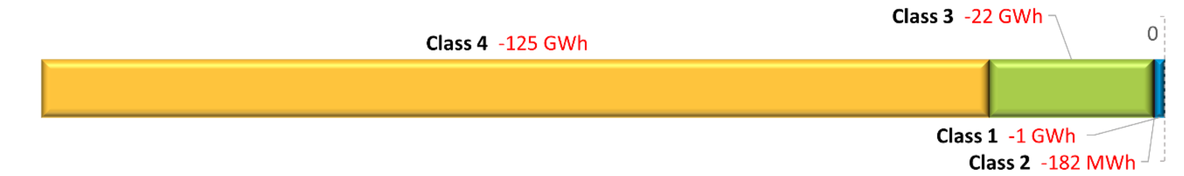
COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 17 GWh (compared to this year's quantification of 15 GWh). The period of the dataset has moved on by a year, and the data suggests slightly fewer of these sites are generating UIG - either because they are now connected or errors in recording these sites as shipperless have been corrected particularly for PTS Shipperless Sites.

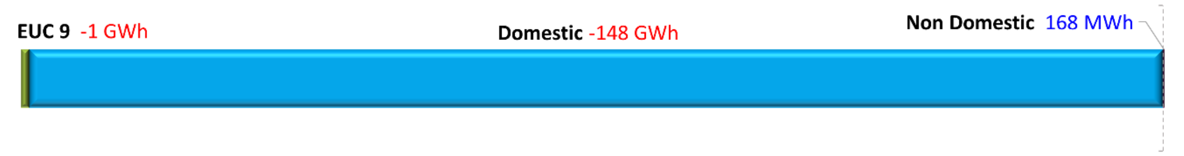
040 – CONSUMPTION METER ERRORS – INHERENT BIAS

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates

Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
040 Consumption Meter Errors	-15GWh	**-149 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Meters are used to measure and record the volume of gas consumed at Supply Meter Points. There are several types of meters that are used to do this, including diaphragm, turbine, ultrasonic and rotary meters.

Shippers are allocated volumes of gas based on the AQ of the Supply Meter Points to which they are registered. This allocation is reconciled as valid meter readings are obtained. In this way, Shippers are charged for the volume of gas that has been measured. Within Settlement, it is assumed that meters measure the volume of gas accurately.

There are three potential sources of meter error:

- Meters manufactured with an inherent bias to slightly over or under-record;
- Meters becoming faulty over time, causing them to record inaccurately; and

- Meters recording inaccurately at the throughput extremes of their specified use.

Incorrect meter volumes due to extremes of use or an inherent bias give rise to UIG at the Line in the Sand.

In the case of faulty meters, the Shipper can submit a consumption adjustment before the Line in the Sand, such that the volume reconciled is correct and the Shipper is charged for the correct volume of gas. In situations where a meter fault is not detected or a consumption adjustment is not submitted, the fault also gives rise to UIG at the Line in the Sand.

DEFINITION

This contributor relates to meters that over or under-record the volume of gas consumed at Supply Meter Points.

We have previously assessed the potential for calculating UIG across the three sources noted above. Of these, only inherent bias has sufficiently robust data to enable a quantification methodology.

UIG IMPACT

Any error in the measurement of the volume of gas consumed contributes to UIG. Meters that under-record create positive UIG; meters that over-record create negative UIG. This UIG remains at the Line in the Sand, save for errors arising from meter faults where the Shipper submits a suitable consumption adjustment.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- The inherent error bias for each meter type from in-service testing results;
- The forecast number of meters of each type for each EUC band 01-02 Matrix Position for the target Gas Year, using the current numbers and meter type proportions, the rate of meter exchanges and the proportions of each meter type being fitted, and the rate of new installations and the proportions of each meter type being fitted; and
- The proportion of meters of each type in each Matrix Position. For EUC bands 01-02, use the numbers determined above; for EUC bands 03-09, use the current numbers.

MATRIX ALLOCATION

The forecast UIG for each main EUC band is split across the associated Matrix Positions, in proportion to the consumption for these Matrix Positions in our Consumption Forecast for the target Gas Year.

ASSUMPTIONS

- The proportion of newly installed meter types will follow the recent trend for EUC bands 01-02;
- Meters typically operate at close to 0.2 Qmax;
- There is no error for rotary or turbine meters; and

- There are no significant regional differences in the types of meters installed throughout the country.

CALCULATION

INPUTS

- Our Consumption Forecast (as described in Section 4 of this Statement);
- Our Supply Meter Point Forecast (also described in Section 4 of this Statement);
- Meter Types report from the CDSP;
- In-Service Testing (IST) Results report from OPSS[22];
- Smart Meter Data report from DESNZ; and
- Smart meters installed – derived from information contained within the Meter Types report from the CDSP.

CALCULATION

The detailed calculation is described below.

Establish the error bias for meter types, from IST results

1. Obtain the error bias at 0.2 Qmax for ultrasonic and diaphragm meter types from all the available in-service testing data from OPSS since 2016. Determine the average error bias for each of these meter types, weighted by the number of meters tested. For rotary and turbine meters, assume the bias is zero.

Determine the number of meters of each type currently in service

2. Determine the number of meters of each meter type currently in service for each Matrix Position from the Meter Type report.

Forecast the number of EUC band 01-02 meter exchanges and new installations prior to the target Gas Year

3. Determine the number of EUC band 01-02 meter exchanges that are likely to take place between the Meter Type report being obtained and the mid-point of the target Gas Year, from the DESNZ smart meter installation projections; and
4. Determine the number of EUC band 01-02 new installs likely to take place, between the Meter Type report being obtained and the mid-point of the target Gas Year, by differencing the numbers in our Supply Meter Point Forecast for the target Gas Year and the meters currently in service.

Determine the number of EUC band 01-02 meters of each type that are likely to be installed or removed prior to the target Gas Year

5. Determine the proportion of EUC band 01-02 meters of each type installed (as part of meter exchanges or new installations) over the last year, from the Meter Type report;

[22] Office for Product Safety & Standards

6. Apply these proportions to the sum of the number of meter exchanges and the number of new installations, for EUC bands 01-02, to get a forecast of the number of new EUC 01-02 meters of each meter type to be put in service before the target Gas Year;
7. Determine the proportion of EUC band 01-02 meters of each type installed prior to 2019 from the Meter Type report; and
8. Apply these proportions to the number of meter exchanges, for EUC bands 01-02, to get a forecast of the number of old EUC band 01-02 meters of each type to be taken out of service before the target Gas Year.

Forecast the population of each meter type for each EUC band 01-02 Matrix Position in the target Gas Year

9. Determine the number of meters of each type for each EUC band 01-02 Matrix Position as: the current number of meters of each type, plus the new meters of each type to be put in service, less the old meters of each type to be taken out of service.

Forecast the error bias consumption (UIG) by meter type for each Matrix Position (using forecast meter type proportions for EUC band 01-02 and the current proportions for EUC band 03-09)

10. Determine the forecast proportion of each meter type in each EUC band 01-02 Matrix Position from the number of meters of each type in each Matrix Position. Apply this to the consumption forecast for each Matrix Position (from our Consumption Forecast) to obtain a consumption forecast per meter type per EUC band 01-02 Matrix Position;
11. Determine the (current) proportion of each meter type in each EUC band 03-09 Matrix Position from the number of meters of each type in each Matrix Position. Apply this to the consumption forecast for each Matrix Position (from our Consumption Forecast) to obtain a consumption forecast per meter type per EUC band 03-09 Matrix Position;
12. Determine the error bias consumption per Matrix Position as: the error bias for each meter type, multiplied by the consumption forecast for each meter type. Add these across meter types for each Matrix Position to get the error bias consumption (UIG) per Matrix Position; and
13. Sum the UIG across Matrix Positions to get the overall UIG for this contributor.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

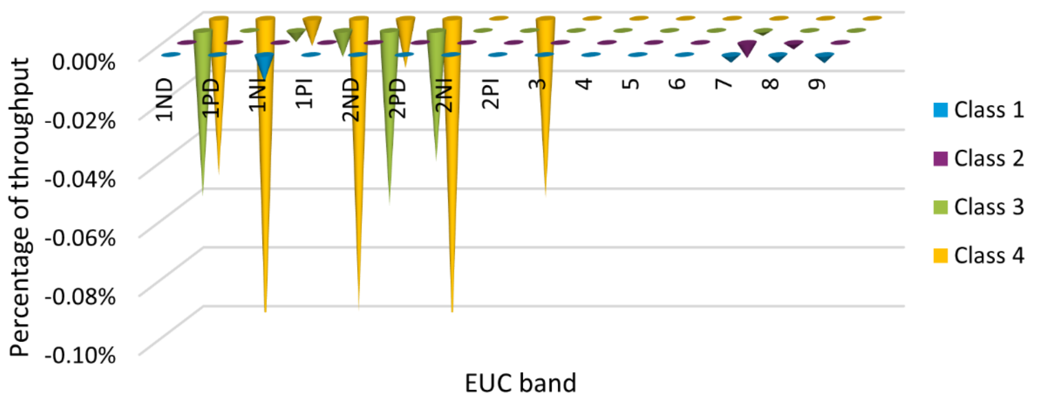
RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **-149 GWh**.

This is allocated across Matrix Positions as follows[23]:

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	-22	-112
	1PD	-	-	0	-12
	1NI	-0	0	-0	-1
	1PI	-	-	-0	-0
	2ND	-	-	-0	-1
	2PD	-	-	-0	-0
	2NI	-	0	0	0
	2PI	-	-	0	-0
	3	-	0	0	0
	4	-	0	0	0
	5	-	0	0	0
	6	-	0	0	0
	7	-0	-0	-0	0
	8	-0	-0	0	0
	9	-1	0	-	-

The graph below shows UIG as a percentage of throughput for each Matrix Position:



[23] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

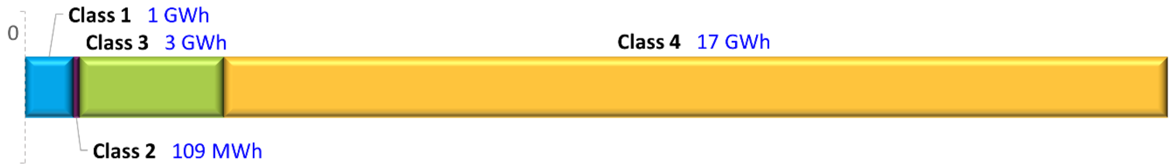
The Statement for Gas Year 2023-2024 quantified the UIG for this contributor as -15 GWh (compared to this year's quantification of -149 GWh).

This change can be attributed to the continued replacement of synthetic diaphragm meters with ultrasonic. The ultrasonic error rate shows a continued over-recording of consumption, which has also increased slightly since last year, therefore the more ultrasonic meters there are, the more negative UIG this creates. This is coupled with the reduction in diaphragm meters which are under recording and so reducing UIG further.

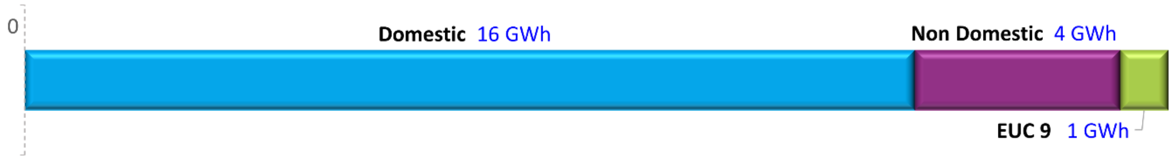
060 – IGT SHRINKAGE

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates

Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
060 IGT Shrinkage	19 GWh	**21 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Shrinkage is any gas that the gas network loses during transportation. There are three different areas of shrinkage: NTS shrinkage, LDZ shrinkage and IGT shrinkage.

NTS shrinkage does not affect Settlement as its inputs (and therefore the outputs) are external to the LDZ Settlement regime. LDZ shrinkage is quantified using an industry-approved methodology and engineering model, and this quantity is directly accounted for in Settlement. This means that such LDZ shrinkage does not contribute to UIG (other than by virtue of any error in its quantification). LDZ shrinkage is discussed this year in our Investigations section of this AUG Statement.

Independent Gas Transporters Arrangements Document (IGTAD), Section C, governs IGT Shrinkage. It is not directly accounted for in Settlement. Instead, it contributes to (and is accounted for via) UIG.

DEFINITION

This contributor relates only to IGT shrinkage. This is any gas lost during transportation between entering the IGT network at the CSEP and the ECV of Supply Meter Points.

UIG IMPACT

IGT shrinkage is not directly accounted for in Settlement and therefore creates positive UIG.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- Estimating the length of IGT mains in each LDZ for the target Gas Year, based on a forecast number of Supply Meter Points (from trend analysis) and the average length of main per Supply Meter Point (from the Independent Networks Association);
- Forecasting the associated leakage volume for these IGT mains by applying the leakage rate for polyethylene (PE) mains (from the National Leakage Test (NLT) programme) by the forecast lengths of IGT main; and
- Converting these leakage volumes into energy values using the LDZ Calorific Value (CV).

MATRIX ALLOCATION

The forecast IGT shrinkage UIG for each LDZ is split across the EUC bands and Classes, in proportion to the spread of IGT sites' AQ in each LDZ in September 2023. We then sum these LDZ values to get a national value for each Matrix Position.

ASSUMPTIONS

- IGT shrinkage will not be accounted for in Settlement before the target Gas Year is over through being combined with LDZ shrinkage;
- All IGT mains are PE and there is no leakage from existing services connected to PE mains;
- All IGT shrinkage is due to leakage. That is, gas lost in the purging of new mains and services, own use gas and network theft of gas can all be ignored for the purposes of quantifying IGT shrinkage; and
- The main leaks at the same rate whether it is located at the start or end of a network.

CALCULATION

INPUTS

- Average Main Length from the Independent Networks Association (INA) (sourced in 2021);
- IGT Sites report from the CDSP;
- NLT leakage rates from the public domain. This provides the leakage rates for each type of main and service[24]; and

[24] It is worth noting that there is another source of leakage rates from PE pipes which was published in January 2021 by DNV, which suggests a marginally lower level of leakage. Applying this alternative view in our estimate would make a negligible difference to the amount of UIG arising from this contributor, and would not affect its allocation.

- CVs from National Gas's 'Find Gas Data' portal. Latest CVs for each LDZ for each Gas Day from 1st October 2021 to 30th September 2023.

CALCULATION

The detailed calculation is described below.

Identify the current number of Supply Meter Points by LDZ on IGT networks

1. Using CDSP records, determine total IGT Supply Meter Points in each LDZ.

Use historical trends to forecast the number of IGT Supply Meter Points for the target Gas Year

2. Use a snapshot of CDSP records at an appropriate number of points in history and compare to today's records to determine historic growth trends in IGT Supply Meter Points for each LDZ; and
3. Project this growth trend to the target Gas Year to forecast the total IGT Supply Meter Points for each LDZ for 1st April 2025 (as a mid-year average).

Calculate the total IGT main length per LDZ

4. Multiply the average length of main per Supply Meter Point by the forecast total number of Supply Meter Points per LDZ from step 3.

Calculate the total annual leakage volume in IGT networks per LDZ

5. Multiply the total length of IGT mains from step 4 by the annual leakage rate for PE mains, as per the national leakage survey.

For each LDZ, calculate average CV

6. Calculate the mean CV per LDZ based on the values for the two most recent complete Gas Years.

Calculate the total UIG associated with IGT shrinkage for each LDZ for the target Gas Year

7. Multiply the total annual leakage volume from step 5 by the average CV from step 6; and
8. Divide the resulting value by 3.6 to derive an energy value in kWh.

Determine the UIG at the Line in the Sand for each sub-EUC band

9. For each LDZ, split the UIG value across each sub-EUC band and Class by using the current ratio of consumption in those sub-EUC bands and Classes for that LDZ; and
10. Sum all UIG values to determine the national UIG value for this contributor.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, by Matrix Position.

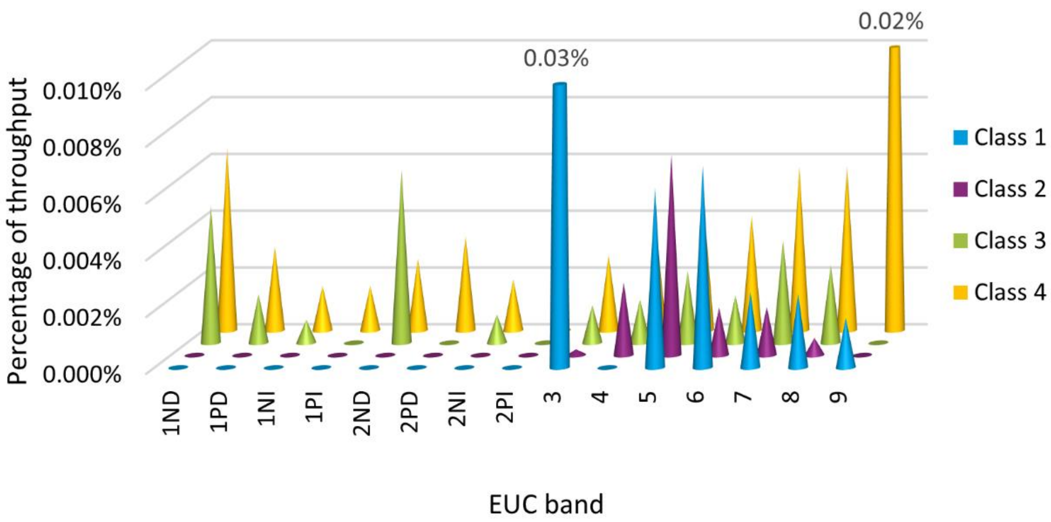
RESULTS

The UIG calculated for this contributor at the Line in the Sand for the target Gas Year is: **21 GWh**.

This is broken down by Matrix Position as follows[25]:

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

The graph below shows UIG as a percentage of throughput for each Matrix Position:



[25] Note that due to rounding the sub-EUC band values in aggregate may not equal main EUC band values. Some values are negative but round to zero. Dashes are where the Matrix Position is forecast to be empty.

NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor as 19 GWh (compared to this year's quantification of 21 GWh). There is a small increase for this contributor down to a projected increase in IGT sites.

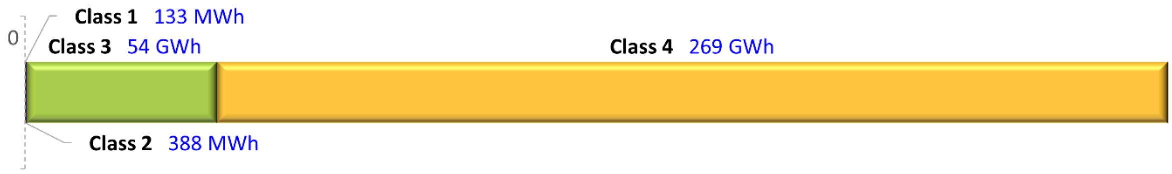
We have considered the possibility that gas new connections will decrease as we approach the target Gas Year owing to net zero policy developments. To date our data shows limited evidence of slowdown; in fact, IGT supply points have continued their linear growth in the last year. This, in conjunction with the recent policy delay for phasing out new gas boilers means we have left our growth assumptions for the IGT portfolio in the target Gas Year unchanged.

The contribution to total UIG from Class 1 EUC band 3 is of disproportionate size. This is because this sparsely populated Matrix Position includes a single large IGT site making up all of its consumption. Notwithstanding this, the overall contribution of UIG for this Matrix Position (and contributor overall) remains insignificant.

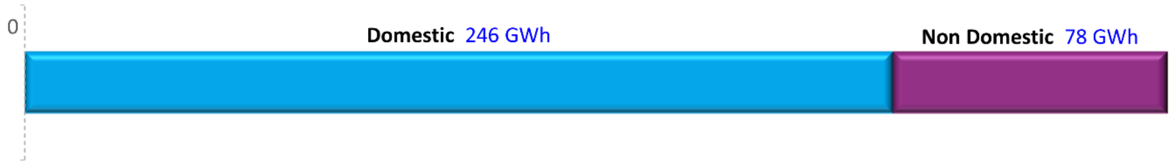
070 – AVERAGE PRESSURE ASSUMPTION

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates

Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
070 Average Pressure Assumption	326 GWh	**323 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

The Settlement calculations assume that meters measure gas volumes that are at a standard temperature of 15°C and a standard atmospheric pressure of 1013.25 hPa. The altitude along with localised weather and atmospheric conditions result in the actual atmospheric pressure at the location of meters being different to the standard.

There is a small number of meters that have correction equipment fitted and dynamically adjust for this according to the actual atmospheric pressure and temperature of the gas. They provide volumes that are consistent with the standard atmospheric pressure and temperature. These are typically high-capacity meters. The vast majority of meters do not do this.

In addition, there are some meters for which a location dependent Specific Correction Factor[26] is applied to the advance between two meter readings as part of the Settlement calculations. These factors are designed to adjust for variances from standard atmospheric pressure that are due to the altitude of the meter. They do not adjust for variances that are due to the prevailing

[26] Also known as Conversion Factor.

atmospheric conditions. They ensure that the volume processed in Settlement is more consistent with the standard atmospheric pressure. This occurs for Supply Meter Points that typically use over 732,000 kWh.

The remaining set of meters have a Standard Correction Factor applied to the advance between two meter readings as part of the Settlement calculations. This factor is also designed to adjust for variances from standard atmospheric pressure that are due to the altitude of the meter. However, it assumes that all meters to which it is applied are at the national average altitude of 67.5 metres. They do not adjust for variances that are due to the prevailing atmospheric conditions. They ensure that the volume processed in Settlement is more consistent with the standard atmospheric pressure, but do not adjust for the fact that most meters do not sit at the national average altitude of 67.5 metres.

The number of gas moles (the amount of gas) in a cubic metre is proportional to the gas pressure. A 1 millibar change in the gas pressure results in there being approximately 0.1% more gas in the same space. Meters measure based on the relative difference between the atmospheric pressure and the pressure of the gas. This means that a lower atmospheric pressure has the same effect as a higher gas pressure and vice versa.

Meters that do not have correction equipment fitted, over or under-record the amount of gas used when the actual pressure differs from that implicitly assumed in the Correction Factor that is applied for them in Settlement (Standard or Specific as appropriate). This over or under-recording of the amount of gas used creates UIG. There is no means for correcting for this in Settlement and so such UIG remains at the Line in the Sand.

DEFINITION

This contributor relates to meters that over or under-record the amount of gas consumed at Supply Meter Points because the actual atmospheric pressure is not implicitly assumed in the applicable Correction Factors applied in Settlement (Standard or Specific).

For the avoidance of doubt, this does not include cases where meters have correction equipment fitted as they dynamically adjust for variances with the standard atmospheric pressure and provide measurement consistent with this.

UIG IMPACT

If the atmospheric pressure at the location of the meter is less than that implicitly assumed in the applicable Correction Factor used in Settlement (Standard or Specific), the meter will over-record the amount of gas and create negative UIG.

If the atmospheric pressure at the location of the meter is more than that implicitly assumed in the applicable Correction Factor used in Settlement (Standard or Specific), the meter will under-record the amount of gas and create positive UIG.

This excludes cases where the meter has correction equipment fitted.

There is no means for correcting for this in Settlement and so such UIG remains at the Line in the Sand.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- Using weather station data to derive an average weather-related pressure variance from the pressure assumptions inherent in the Settlement calculations for each LDZ;
- Using altitude data by postcode to derive an average altitude related pressure variance from the pressure assumptions inherent in the Settlement calculations for each LDZ;
- Using these pressure variances and the Pressure Volume Error Rate (the incremental volume change due to a 1 millibar variance in pressure) to calculate a Weather Pressure Error Factor for each LDZ, and an Altitude Pressure Error Factor for each LDZ;
- Identifying the AQ proportions, for each LDZ and Matrix Position, of Supply Meter Points that:
    1. Have meters with correction equipment fitted; and
    2. Do not have meters with correction equipment fitted but do have a Specific Correction Factor used in Settlement.
- Applying these AQ proportions to our Consumption Forecast for each LDZ and Matrix Position, to obtain a consumption forecast where there is neither correction equipment fitted, nor a Specific Correction Factor used in Settlement; and a consumption forecast where correction equipment is not fitted but where a Specific Correction Factor is used in Settlement;
- Applying the Weather Pressure Error Factor and the Altitude Pressure Error Factor (both explained above) to the consumption forecast for Supply Meter Points that have neither correction equipment fitted or a Specific Correction Factor used in Settlement;
- Applying only the Weather Pressure Error Factor to the consumption forecast for Supply Meter Points where correction equipment is not fitted but where a Specific Correction Factor is used in Settlement; and
- Summing these two results for each LDZ and Matrix Position to derive an estimate of the UIG. Summing these across LDZ to obtain the UIG by Matrix Position; and across Matrix Positions to get the overall UIG for this contributor.

MATRIX ALLOCATION

The UIG by Matrix Position is determined as part of the method for calculating the overall UIG for this contributor.

ASSUMPTIONS

- There are no material changes to the average atmospheric pressure in each LDZ over time (due to climate change for example);
- Weather station atmospheric pressure readings (which are corrected to Mean Sea Level) are a good proxy for the atmospheric pressure within the same LDZ (after it has also been corrected to Mean Sea Level);
- There is no correlation between altitude and the average amount of gas used at Supply Meter Points; and

- The proportion of Supply Meter Points that have correction equipment fitted will be the same in the target Gas Year as it has been in previous years.

CALCULATION

INPUTS

- Pressure Data for the Gas Years 2012-2017 from the CDSP;
- Conversion Equipment Fitted report from the CDSP;
- Postcode and Elevation Data from Open Data[27];
- Correction Factors report from the CDSP; and
- Our Consumption Forecast (as described in Section 4 of this Statement).

CALCULATION

The detailed calculation is described below.

Weather Pressure Difference: determine the difference in the average atmospheric pressure in each LDZ (corrected to Mean Sea Level) and standard atmospheric pressure (which is at Mean Sea Level)

1. Identify the weather station(s) used for each LDZ;
2. Determine the average atmospheric pressure, corrected to Mean Sea Level, for each LDZ, from the respective weather station data; and
3. Difference these values to standard atmosphere pressure for each LDZ.

Altitude Pressure Difference: determine the difference in the average atmospheric pressure in each LDZ and standard atmospheric pressure (corrected to the national average altitude of 67.5m above Mean Sea Level)

4. Determine the average altitude of Supply Meter Points in each LDZ from postcode elevation data, giving equal weightings to each postcode (on the basis that they each contain approximately the same number of Supply Meter Points). Where a postcode spans multiple LDZs, include it in the averaging for each of these LDZs; and
5. For each LDZ, calculate the pressure at the average LDZ altitude, determine the pressure difference between standard atmospheric pressure corrected to the average altitude for the LDZ (as determined above) and standard atmospheric pressure corrected to the national average altitude (67.5m above Mean Sea Level).

Identify the Pressure Gas Volume Error Rate, this being the volume change per millibar of pressure change

6. Use the Ideal Gas Law to determine the energy change for every 1 millibar change in pressure. This is 0.00098692 per millibar. Call this the Pressure Gas Volume Error Rate.

Calculate the Volume Error Factors

7. Multiply the weather-related pressure variance for each LDZ from step 3 by the Pressure Gas Volume Error Rate from step 6, to calculate the Weather Pressure Volume Error Factor; and

[27] https://www.getthedata.com/downloads/open_postcode_elevation.csv.zip

8. Multiply the altitude related pressure variance for each LDZ from step 5 by the Pressure Gas Volume Error Rate from step 6, to calculate the Altitude Pressure Volume Error Factor.

Determine the AQ proportion of the Supply Meter Points for each LDZ and Matrix Position, which require application of the error rates

9. For each LDZ and Matrix Position, determine the AQ proportion of Supply Meter Points that do not have correction equipment fitted but do have a Specific Correction Factor used in Settlement (from the Conversion Equipment Fitted report and the Correction Factor report); and
10. For each LDZ and Matrix Position, determine the AQ proportion of Supply Meter Points that do not have correction equipment fitted and do not have a Specific Correction Factor used in Settlement (from the Conversion Equipment Fitted report and the Correction Factor report).

Determine the weather-related error (UIG) and the altitude related error (UIG) for the target Gas Year for each LDZ and Matrix Position

11. For each LDZ and Matrix Position, determine the weather-related error as: the product of step 7, step 9 and the consumption forecast for the LDZ and Matrix Position for the target Gas Year; and
12. For each LDZ and Matrix Position, determine the altitude related error as: the product of step 8, step 10 and the consumption forecast for the LDZ and Matrix Position for the target Gas Year.

Determine UIG

13. Sum the result of step 11 and step 12 for each LDZ and Matrix Position to determine the UIG by LDZ Matrix Position;
14. Sum the results of step 13 across LDZs to obtain the UIG by Matrix Position; and
15. Sum the results of step 14 across Matrix Positions to obtain the overall UIG for this contributor.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

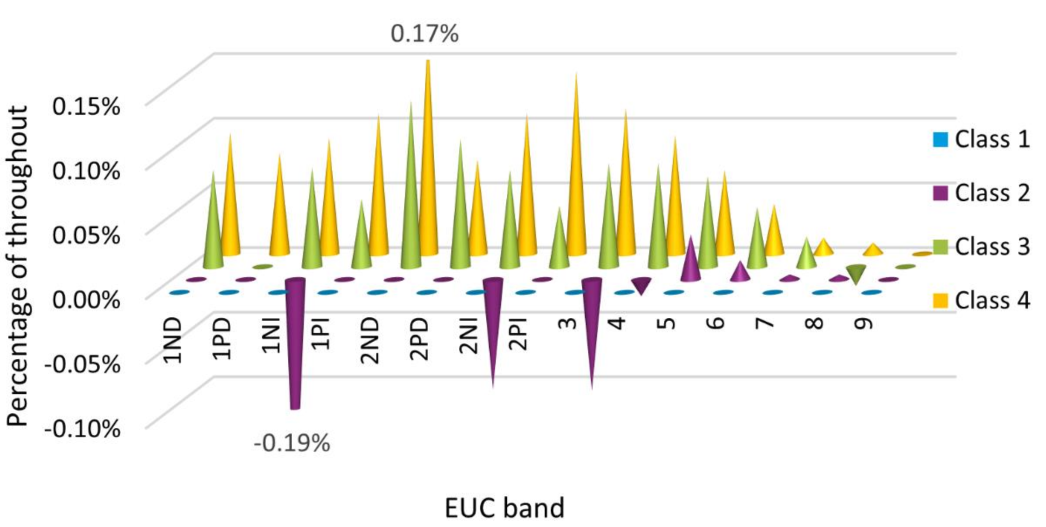
RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **323 GWh**.

This is broken down by Matrix Position as follows[28]:

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	30	197
	1PD	-	-	-0	8
	1NI	-	-0	2	8
	1PI	-	-	0	0
	2ND	-	-	0	10
	2PD	-	-	0	0
	2NI	-	-0	5	13
	2PI	-	-	0	0
	3	-	-0	6	12
	4	-	-0	6	10
	5	-	0	3	5
	6	-	0	2	4
	7	-	0	1	1
	8	0	0	-0	1
	9	0	-	-	0

The graph below shows UIG as a percentage of throughput for each Matrix Position[29].



NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 326 GWh (compared to this year's sum of 323 GWh). This slight decrease is mainly due to a reduction in our Consumption Forecast driven by the current trend of reducing AQs.

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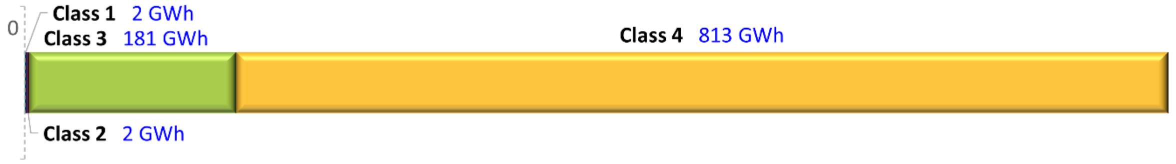
[28] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.
[29] Note this graph shows negatives for Matrix Positions with minimal throughput and these round to zero in terms of the GWh in the table above.

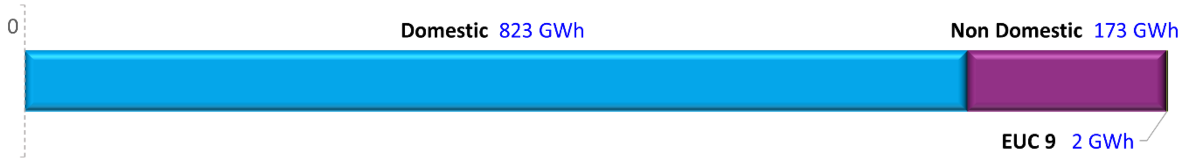
080 – AVERAGE TEMPERATURE ASSUMPTION

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates
Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
080 Average Temperature Assumption	1,021 GWh	**997GWh**

DESCRIPTION

SETTLEMENT CONTEXT

The Settlement calculations assume that meters measure gas volumes that are at a standard temperature of 15°C and a standard atmospheric pressure of 1013.25 hPa. Actual temperature conditions will in most cases be different to these assumptions.

There is a small number of meters that have correction equipment fitted and dynamically adjust for this according to the actual atmospheric pressure and temperature of the gas. They provide volumes that are consistent with the standard atmospheric pressure and temperature. These are typically high-capacity meters. The vast majority of meters do not have this correction equipment fitted.

In addition, there are some meters for which a location dependent Specific Correction Factor[30] is applied to the advance between two meter readings as part of the Settlement calculations. These factors are designed to adjust for variances between the average actual temperature of gas at the meter's location and the standard temperature of 15°C. They ensure that the volume

[30] Also known as Conversion Factor.

processed in Settlement is more consistent with this standard temperature. This occurs for Supply Meter Points that typically use over 732,000 kWh.

The remaining set of meters have a Standard Correction Factor applied to the advance between two meter readings as part of the Settlement calculations. This factor is also designed to adjust for variances between the average actual temperature of the gas and the standard temperature of 15°C. However, it assumes that the temperature of the gas for all meters to which it is applied is the temperature in the Thermal Regulations of 12.2°C. It ensures that the volume processed in Settlement is more consistent with the standard temperature of 15°C, but does not adjust for the fact that, for most meters, the average temperature of gas is not that in the Thermal Regulations.

The number of gas moles (the amount of gas) in a cubic metre is inversely proportional to the temperature. This means that the amount of gas is less per unit volume the higher the temperature and vice versa. Meters that do not have correction equipment fitted, over or under-record the amount of gas used when the actual gas temperature differs from that implicitly assumed in the Correction Factor that is applied for them in Settlement (Standard or Specific as appropriate). This over or under-recording of the amount of gas used creates UIG. There is no means for correcting for this in Settlement and so such UIG remains at the Line in the Sand.

DEFINITION

This contributor relates to meters that over or under-record the amount of gas consumed at Supply Meter Points because the temperature is not that implicitly assumed in the applicable Correction Factors applied in Settlement (Standard or Specific).

For the avoidance of doubt, this does not include cases where meters have correction equipment fitted as they dynamically adjust for temperature variances with the standard temperature of 15°C and provide measurement consistent with this.

UIG IMPACT

If the average temperature at the location of the meter is more than that implicitly assumed in the Correction Factor used in Settlement, the meter will over-record the amount of gas and create negative UIG.

If the average temperature at the location of the meter is less than that implicitly assumed in the Correction Factor used in Settlement, the meter will under-record the amount of gas and create positive UIG.

This excludes cases where the meter has correction equipment fitted.

There is no means for correcting for this in Settlement and so such UIG remains at the Line in the Sand.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is determined by:

- Identifying a flow-weighted[31] average temperature for internal meter locations for each LDZ and Matrix Position from the previous temperature studies (using the same for internal and external meters if the study did not break these down);
- Identifying a flow-weighted average temperature for external meter locations for each LDZ and Matrix Position from the previous temperature studies (using the same for internal and external meters if the study did not break these down);
- Calculating an Internal Meter Error Factor and an External Meter Error Factor, arising from the variances to 12.2°C (the temperature in the Thermal Regulations), for each LDZ and Matrix Position using the Ideal Gas Law;
- Allocating each Supply Meter Point to one of the following three categories based on the meter location code: Internal, External and Unknown;
- Determining the numbers of Supply Meter Points and the total AQ, for each LDZ, Matrix Position for:
    1. Meters that have any correction equipment fitted;
    2. Internal meters that do not have any correction equipment fitted;
    3. External meters that do not have any correction equipment fitted; and
    4. Unknown meter locations that do not have any correction equipment fitted.
- Splitting the unknown meter total AQ above, across the internal meter total AQ and the external meter total AQ in proportion to the internal meter number and the external meter number above, for each LDZ and Matrix Position;
- Determining the total AQ for internal meters as a proportion of the total AQ, and the total AQ for external meters as a proportion of the total AQ, for each LDZ and Matrix Position;
- Applying the AQ proportions to our Consumption Forecast for each LDZ and Matrix Position, to obtain a consumption forecast where the meter is internal; and a consumption forecast where the meter is external;
- Applying the Internal Meter Error Factor to the internal consumption forecast for each LDZ and Matrix Position; and the External Meter Error Factor to the external consumption forecast for each LDZ and Matrix Position; and
- Summing these two results for each LDZ and Matrix Position to derive an estimate of the UIG. Summing these across each LDZ to obtain the UIG by Matrix Position; and across Matrix Positions to get the overall UIG for this contributor.

[31] A weighted average is one that takes account of varying degrees of importance. As gas demand is not static and more is used in the winter, when compared to the summer, the temperature has to be weighted as per the flow profile.

MATRIX ALLOCATION

The UIG by Matrix Position is determined as part of the method for calculating the overall UIG for this contributor.

ASSUMPTIONS

- The flow-weighted average gas temperatures from the temperature studies are the most appropriate estimate of the temperature of gas for the purposes of calculating UIG;
- The relative proportion of internal and external meters does not change materially year-on-year; and
- The proportion of Supply Meter Points that have temperature correction equipment installed does not change materially year-on-year.

CALCULATION

INPUTS

- Flow-Weighted Gas Temperature studies from BG Technology;
- Meter Location report from the CDSP;
- Conversion Equipment Fitted report from the CDSP; and
- Our Consumption Forecast (as described in Section 4 of this Statement).

CALCULATION

The detailed calculation is described below.

Identify the temperature values to be used for each Matrix Position

1. Identify the flow-weighted average temperature for internal meters and for external meters for each LDZ Matrix Position using the relevant study (as per the table in the Temperature Studies section below). Where the relevant study doesn't distinguish between internal and external meters, use the single temperature provided for both internal and external meters.

Calculate internal and external temperature error factors for each LDZ and Matrix Position

2. Calculate the internal and external temperature error factor for each LDZ and Matrix Position as follows, using the temperatures for these positions determined in step 1:

$$\text{Temperature Error Factor} = \left(\frac{288.15}{(273.15 + \text{Temperature °C}) \times 1.0098}\right) - 1$$

3. Call these the Internal Meter Error Factor and External Meter Error Factor, respectively.

Determine internal and external meter numbers and total AQs for each LDZ and Matrix Position

4. Allocate each Supply Meter Point to one of three categories, based on its meter location based on the Internal/External split info below;
5. Determine the numbers of Supply Meter Points and the total AQ, for each LDZ, Matrix Position and:
    a. Meters that have any correction equipment fitted;

b. Internal meters that do not have any correction equipment fitted;
c. External meters that do not have any correction equipment fitted; and
d. Unknown meter locations that do not have any correction equipment fitted.

6. Split the unknown meter total AQ above, across the internal meter total AQ and the external meter total AQ in proportion to the internal meter number and the external meter number above, for each LDZ and Matrix Position; and
7. Determine the total AQ for internal meters as a proportion of the total AQ, and the total AQ for external meters as a proportion of the total AQ, for each LDZ and Matrix Position.

Apply the internal and external error factors to the appropriate consumption values to determine the error for each LDZ and Matrix Position

8. Apply the AQ proportions to our Consumption Forecast for each LDZ and Matrix Position, to obtain a consumption forecast where the meter is internal; and a consumption forecast where the meter is external; and
9. Apply the Internal Meter Error Factor to the internal consumption forecast for each LDZ and Matrix Position; and the External Meter Error Factor to the external consumption forecast for each LDZ and Matrix Position.

Determine UIG

10. Sum the two values in step 8 to get the error (UIG) for each LDZ and Matrix Position;
11. Sum the results of step 9 across LDZs to obtain the UIG by Matrix Position; and
12. Sum the results of step 10 across Matrix Positions to obtain the overall UIG for this contributor.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

RESULTS

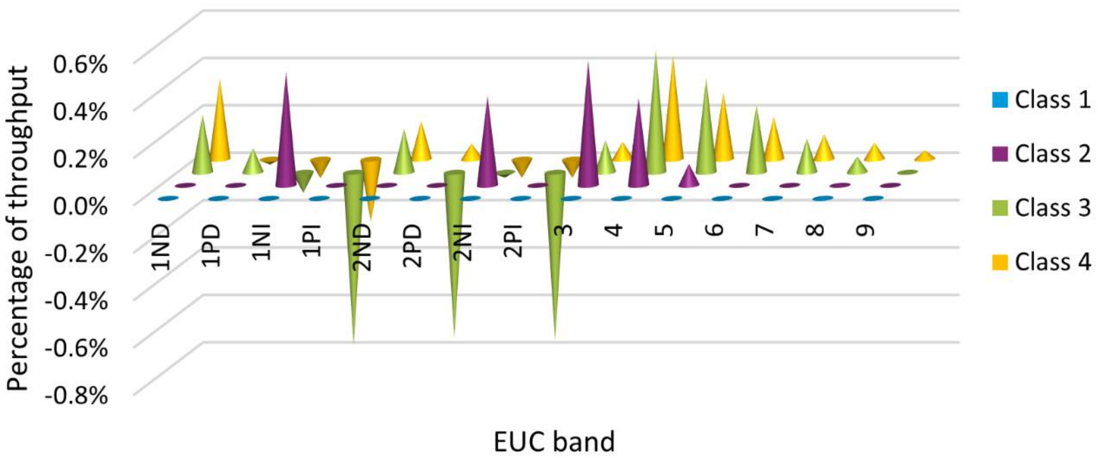
We have calculated the total estimated UIG associated with the average temperature assumption for the target Gas Year to be **997 GWh**.

This is broken down by Matrix Position as follows[32]:

		CLASS			
		1	2	3	4
EUC BAND	**1ND**	-	-	97	715
	1PD	-	-	4	-2
	1NI	-	0	-2	-7
	1PI	-	-	-0	-0
	2ND	-	-	0	9
	2PD	-	-	-0	0
	2NI	-	0	-2	-10
	2PI	-	-	-0	-0
	3	-	1	10	8
	4	-	1	41	46
	5	-	0	19	22
	6	-	-0	9	16
	7	-	-0	4	9
	8	1	0	1	7
	9	1	-	-	0

There are some Matrix Positions that create negative UIG. This is due to those positions having a higher proportion of meters that are internal, where the temperature of the gas is higher (on average) than the 12.2°C in the Thermal Regulations.

The graph below shows UIG as a percentage of throughput for each Matrix Position:



[32] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 1,021 GWh (compared to this year's quantification of 997 GWh). This decrease is mainly due to a reduction in our Consumption Forecast driven by the current trend of reducing AQs.

FURTHER BACKGROUND

TEMPERATURE STUDIES

Two studies were carried out in the early 2000s by BG Technology[33]. These calculated the temperature of the gas flowing through meters. One study was for domestic Supply Meter Points (Domestic Meters Temperature Study (DMTS)), while the other was for Industrial and Commercial Supply Meter Points (Industrial and Commercial Temperature Study (ICTS)).

The DMTS was split into two groups – one for meters located internally and the other for meters located externally. The ICTS meter locations were predominantly external.

We were not provided with the raw data from either study but did have access to the flow-weighted results of the surveys published in the Statement for Gas Year 2020-2021.

We decided to undertake our calculations broken down by sub-EUC bands to reflect the implementation of Modification 0711[34]. This meant that we did not need to estimate the proportion of domestic and I&C Supply Meter Points in EUC bands 01 and 02, as had been the case with Statements for previous Gas Years before then.

The vast majority of the meters within the ICTS were located externally. Therefore, we decided to use the DMTS for internal meters for the commercial sub-EUC bands within EUC bands 01, 02 and 03, which was also the approach adopted for Statements for previous Gas Years.

[33] Subsequently part of DNV.
[34] UNC Modification 0711: "Update of AUG Table to reflect new EUC bands".

The table below shows which temperature study we used by Matrix Position.

CLASS					
		1	2	3	4
EUC BAND	01BND	ICTS (DM)	ICTS (DM)	DMTS	DMTS
	01BPD	ICTS (DM)	ICTS (DM)	DMTS	DMTS
	01BNI	ICTS (DM)	ICTS (DM)	ICTS(S) E DMTS I[1]	ICTS(S) E DMTS I
	01BPI	ICTS (DM)	ICTS (DM)	ICTS(S) E DMTS I	ICTS(S) E DMTS I
	02BND	ICTS (DM)	ICTS (DM)	DMTS	DMTS
	02BPD	ICTS (DM)	ICTS (DM)	DMTS	DMTS
	02BNI	ICTS (DM)	ICTS (DM)	ICTS(S) E DMTS I	ICTS(S) E DMTS I
	02BPI	ICTS (DM)	ICTS (DM)	ICTS(S) E DMTS I	ICTS(S) E DMTS I
	03B	ICTS (DM)	ICTS (DM)	ICTS(S) E DMTS I	ICTS(S) E DMTS I
	04B	ICTS (DM)	ICTS (DM)	ICTS (L)	ICTS (L)
	05B	ICTS (DM)	ICTS (DM)	ICTS (L)	ICTS (L)
	06B	ICTS (DM)	ICTS (DM)	ICTS (L)	ICTS (L)
	07B	ICTS (DM)	ICTS (DM)	ICTS (L)	ICTS (L)
	08B	ICTS (DM)	ICTS (DM)	ICTS (L)	ICTS (L)
	09B	ICTS (DM)	ICTS (DM)	ICTS (DM)	ICTS (DM)

The table below shows the flow-weighted average temperatures for each LDZ (in °C) contained within the studies that we use in our methodology.

DMTS	Internal	External	ICTS	Domestic (derived)	Small I&C	Large I&C	DM
EA	15.12	9.37	**EA**	9.4	9.6	10.1	11.1
EM	13.70	9.11	**EM**	10.1	10.1	10.9	12.1
NE	13.47	8.79	**NE**	9.4	9.3	9.9	11.2
NO	13.19	8.50	**NO**	9.0	8.8	9.4	10.5
NT	16.43	10.13	**NT**	12.8	13.3	13.4	14.8
NW	13.07	9.01	**NW**	9.7	9.7	10.4	11.4
SC	16.92	7.95	**SC**	8.3	8.4	8.8	9.9
SE	16.10	10.16	**SE**	10.7	11.2	11.5	13.0
SO	15.42	9.74	**SO**	9.7	9.7	10.6	11.8
SW	13.56	9.53	**SW**	10.1	10.1	11.0	12.1
WM	12.86	9.26	**WM**	8.9	8.9	10.0	10.7
WN	12.60	9.33	**WN**	9.0	9.0	9.9	10.7
WS	14.66	9.86	**WS**	10.6	10.4	11.3	12.6

INTERNAL/EXTERNAL SPLIT

There are 35 location codes contained within the CDSP's UK Link system. We split these into three categories: internal, external, and unknown. Below is our assessment of each location code.

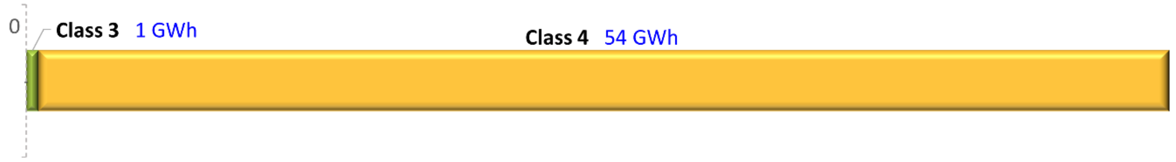
Code	Description	Assessment	Code	Description	Assessment
0	Unknown	Unknown	**18**	External WC	External
1	Cellar	Internal	**19**	Pantry	Internal
2	Under Stairs	Internal	**20**	Porch	External
3	Hall	Internal	**21**	Public Bar	Internal
4	Kitchen	Internal	**22**	Rear of Shop	Internal
5	Bathroom	Internal	**23**	Saloon Bar	Internal
6	Garage	External	**24**	Shed	External
7	Canteen	Internal	**25**	Shop Front	External
8	Cloakroom	Internal	**26**	Shop Window	Internal
9	Cupboard	Internal	**27**	Staff Room	Internal
10	Domestic Science	Internal	**28**	Store Room	Internal
11	Front Door	External	**29**	Toilet	Internal
12	Hall Cupboard	Internal	**30**	Under Counter	Internal
13	Kitchen Cupboard	Internal	**31**	Waiting Room	Internal
14	Kitchen under sink	Internal	**32**	Meter box (External)	External
15	Landing	Internal	**98**	Other	Unknown
16	Office	Internal	**99**	External	External
17	Office Cupboard	Internal			

From this assessment, we calculate the proportion of domestic Supply Meter Points with internal and external meters; and assume the Supply Meter Points in the unknown category follow the same internal to external location ratio.

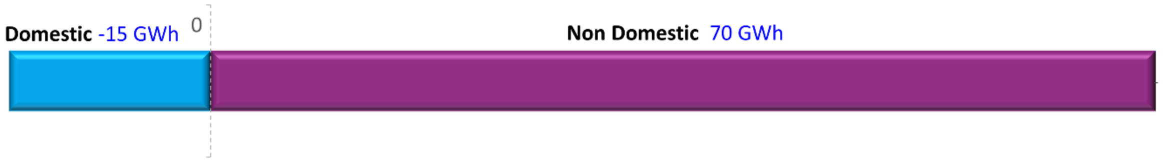
090 – NO READ AT THE LINE IN THE SAND

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates

Existing data inputs updated to reflect an additional year of industry data.

Enhanced validation of calculated energy values.

Reconciliation Percentages for each sub-EUC band were able to be calculated as the whole period being monitored was now after the introduction of the sub-EUC bands in October 2019 providing a much better allocation of UIG for this contributor.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
090 No Read at the Line in the Sand	162 GWh	**55 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Gas allocation is the process of attributing a daily amount of energy for each Supply Meter Point to the relevant Shipper. It is undertaken up to five days after the relevant Gas Day.

For Non-Daily Metered (NDM) Supply Meter Points, allocation is estimated based on a rolling AQ. For Daily Metered (DM) Supply Meter Points, it is normally based on actual meter reads. Where these are not available, it is estimated based on a recent read or, failing that, an AQ. So, by its very nature, the process for allocation relies on estimation.

For gas consumption to be settled correctly, the allocated energy that is based on estimates must subsequently be reconciled against the actual energy used. Accordingly, when a valid actual read is accepted by the CDSP for a Supply Meter Point, the energy used since the valid previous meter read is calculated and compared to the energy that was allocated over the same period. The difference is reconciled, with an adjustment made up or down for the relevant Shipper.

For reconciliation to take place, a meter read must be obtained, validated and accepted. When a read is accepted, the previous read is typically less than 12 months older than the accepted read. In some cases though, the previous read can be much further in the past.

Within Settlement there is the concept of the Line in the Sand. This is the point in time that Settlement is closed off for a Gas Day with no further reconciliations being permitted. The Line in the Sand falls three to four years after any given Gas Day[35].

In cases where a valid read is accepted and the previous read is prior to the Line in the Sand, the proportion of energy used since the Line in the Sand is determined and reconciled, but the portion prior to the Line in the Sand is not. Instead, this unreconciled portion remains as UIG.

DEFINITION

This contributor relates to consumption at a Supply Meter Point that is not reconciled to the relevant Shipper prior to the Line in the Sand, because a timely valid meter read is not accepted into Settlement.

This includes situations where:

- The Line in the Sand has passed for the date of the previous valid read accepted into Settlement for a Supply Meter Point and there has not been a subsequent valid read accepted into Settlement; and
- The Line in the Sand has passed for the date of the previous valid read accepted into Settlement for a Supply Meter Point and, since this Line in the Sand passed, a valid subsequent read has been accepted into Settlement.

UIG IMPACT

In situations where the Line in the Sand passes for a period of time before a valid subsequent read is accepted into Settlement, UIG is created. This is the difference between the allocated energy determined from AQs over this period of time and the actual energy used.

In cases where the allocated energy determined from AQs is understated, positive UIG is created. In cases where the energy determined from AQs is overstated, negative UIG is created.

METHODOLOGY

The methodology approach for this contributor is as follows:

- Determine how much consumption is likely to remain unreconciled to valid meter reads at the Line in the Sand for the target Gas Year;
- Determine how closely the consumption derived from AQs and used in allocation is reflective of the actual consumption, and establish an error percentage; and

[35] Close off occurs at the end of March for the 1st April – 31st March year ending three years earlier. This means that the Line in the Sand ranges from three years for each 31st March to four years for each 1st April.

- Apply the resulting error percentage to the residual unreconciled consumption forecast.

CALCULATION

INPUTS

- Different snapshots of Supply Meter Points with no Reads after April 2021 report from the CDSP;
- Different snapshots of Allocation and Allocation Reconciled (Reconciliation percentages) report from the CDSP;
- Our Consumption Forecast (as described in Section 4 of this Statement);
- Actual AQ Reports for the period April 2020 – March 2021; and
- No Read Read Rejection report from the CDSP.

ASSUMPTIONS

- There is no material change to the NDM allocation methodology before the target Gas Year;
- There is no change to read incentives for the target Gas Year;
- Read performance for the target Gas Year is equivalent to the years used in our trend analysis; and
- The energy calculated from the most recent read rejection pair reflects the likely consumption in the target Gas Year.

CALCULATION

The detailed calculation is described below.

<u>Determining Unreconciled Consumption Forecast</u>

Determine the Supply Meter Points without a reading approaching the Line in the Sand

1. Obtain details of Supply Meter Points without a reading since April 2021, which align with the CDSP Reconciliation percentage reports. For this proposed Final Statement these were snapshots taken in May 2023 and July 2023. Further snapshots of the portfolio from the CDSP were available, however equivalent Reconciliation Percentage reports were not.

Determine the rate at which unreconciled energy is being reconciled approaching the Line in the Sand

2. Using two snapshots of the Reconciliation Percentages report from the CDSP look at the movement of the amount reconciled for each EUC Band in each of the snapshots for the period April 2020 to March 2021. For this proposed Final Statement we were able to use snapshots taken in May 2023 and July 2023. Updated views were unfortunately not available from the CDSP in time for publication.
3. This data is not available at Class level and so the unreconciled energy for each month will need to be split by Class using the snapshots of the No Read portfolios obtained in May 2023 and July 2023.

4. Once the Unreconciled data is split by Class, the original allocation data will need to be split by Class to get the appropriate percentages for each Matrix Position. For this the actual AQ report from the months, April 2020 to March 2021 can be used.
5. Once the percentage of unreconciled energy is known for each month, April 2020 to March 2021 for each Matrix Position for each snapshot of data, then look at the difference in those percentages between snapshots. For this proposed Final Statement we looked at the change between May 2023 and July 2023 and worked out the rate of reconciliation per month.

Determine the percentage of unreconciled energy at the Line in the Sand

6. Obtain details of allocated energy and the amount of this that has since been reconciled to a valid meter reading as at July 2023 for each month since April 2020, for each EUC band in Class 3 and 4;
7. Determine the percentage of allocated energy for each month that has been reconciled to a valid meter read for each Class and EUC band;
8. Determine the unreconciled energy that will be reconciled over the following nine months (August 2023 – April 2024), for each EUC band Class, using the rate of reconciliation (above) and convert this to a percentage by dividing by the allocated energy;
9. Add the percentage that will be reconciled in the next nine months to the percentage that has already been reconciled to determine a reconciliation percentage by EUC band and Class at the Line in the Sand, for each month from April 2020 to March 2021; and
10. Convert the monthly reconciled percentages at the Line in the Sand to an annual percentage, by taking their allocation energy weighted average. Then determine the annual unreconciled percentage by subtracting this figure from 100.

Forecast the unreconciled energy at the Line in the Sand for the target Gas Year

11. For Class 3 and 4, apply the unreconciled percentages at the Line in the Sand to our Consumption Forecast for the target Gas Year, to determine the forecast unreconciled consumption at the Line in the Sand, for each Class and EUC band; and
12. For Class 1 and 2, determine the forecast unreconciled consumption for the target Gas Year as the sum of the AQs from the February 2024 snapshot of all Supply Meter Points that had not had a meter read since April 2021, considering only Supply Meter Points that had not had a read accepted since April 2020.

<u>Determining the AQ Error Percentage</u>

Determine the percentage error due to AQ trend changes

13. Obtain a snapshot of the number of Supply Meter Points and the total AQ for each LDZ and Matrix Position, for every month since October 2020;
14. From the resulting dataset, determine a percentage error for AQs used in allocation (and not subsequently reconciled to a valid meter read), by LDZ and EUC band as:

$$100 * \frac{\text{recent average AQ} - \text{original average AQ}}{\text{original average AQ}}$$

Determine the percentage error due to read rejections

15. Obtain all the Shipper rejected reads (along with the rejection reason) for Supply Meter Points without a read since April 2021, as at February 2024;

For each sub-EUC band[36]:

16. Calculate the new average AQ for the set of Supply Meter Points with multiple reads that were rejected due to the same reason (using reads rejected for this reason as close to a year apart as possible);
17. Determine the percentage error on the original AQs as:

$$100 * \frac{\text{new average AQ} - \text{original average AQ}}{\text{original average AQ}}$$

18. Determine the proportion of Supply Meter Points that had multiple reads that were rejected for the same reason, from the set that had one or more rejections (of any type);
19. Apply this proportion to the total AQs for Supply Meter Points that had no read rejections (on the basis that a proportion of these are likely to encounter this issue when a read is finally obtained and submitted for them);
20. Apply the percentage error from above to all: original AQs for Supply Meter Points with multiple reads that were rejected for the same reason; and the proportion of the total AQ for Supply Meter Points without a read rejected at all, as determined above. This gives a revised total AQ;

    Determine the aggregate percentage error (for each sub-EUC band) as:

$$100 * \frac{\text{revised total AQ} - \text{orginal total AQ}}{\text{original total AQ}}$$

21. If there is more than one new AQ calculated owing to multiple read rejection reasons, then use the most recent new AQ.

Determine the overall percentage error

22. Determine the overall error percentage for each LDZ and sub-EUC band by summing the error percentages for the Read Rejections and for the AQ trend changes.

<u>Determining the UIG</u>

Apply the overall percentage error to the forecast unreconciled consumption

23. Apply the error percentages determined to the forecast unreconciled consumption to determine the error (UIG) in the target Gas Year.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

[36] When the number of sites in EUC bands 3-8 and across the LDZs is low then combine EUCs/LDZs together to get an overall average for these EUC bands/LDZs.

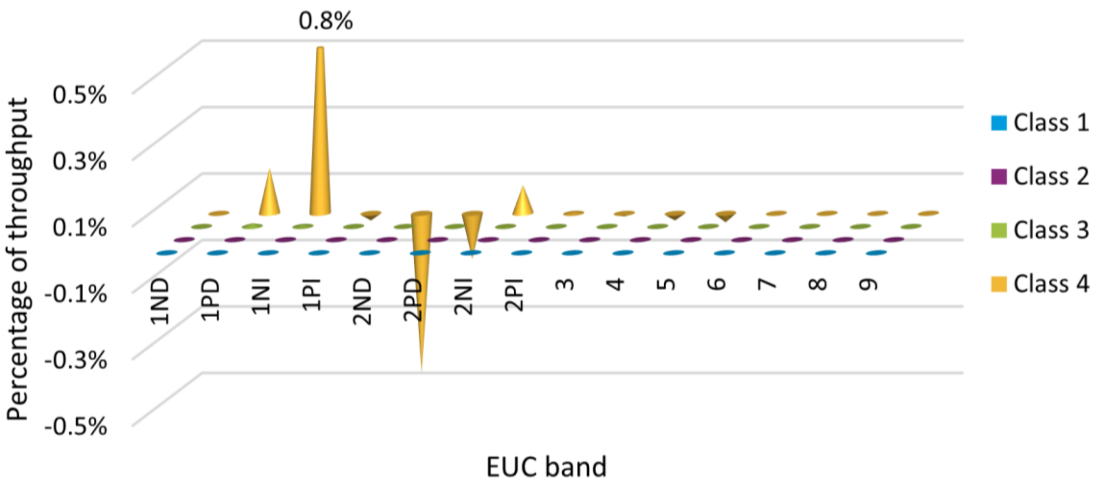
RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **55 GWh**.

This is allocated across Matrix Positions[37] as follows:

	CLASS			
EUC BAND	1	2	3	4
1ND	-	-	-0	-3
1PD	-	-	0	15
1NI	-	-	0	65
1PI	-	-	-	-0
2ND	-	-	-0	-27
2PD	-	-	-	-0
2NI	-	-	0	10
2PI	-	-	-	0
3	-	-	-0	-1
4	-	-	-	-2
5	-	-	-	-2
6	-	-	-	-1
7	-	-	-	0
8	-	-	-	-
9	-	-	-	-

The graph below shows UIG as a percentage of throughput for each Matrix Position:



NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 162 GWh (compared to this year's quantification of 55 GWh). This decrease is due to average AQs

[37] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

reducing, as is the current trend, and the increased amount of AQ that has already been reconciled, particularly in the higher EUC bands, compared to the same time last year. This means our estimate of the amount still to be reconciled at Line in the Sand is reduced.

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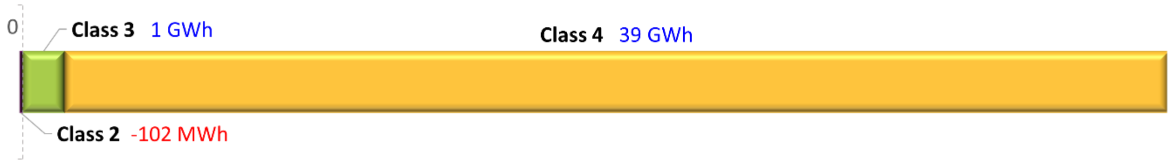
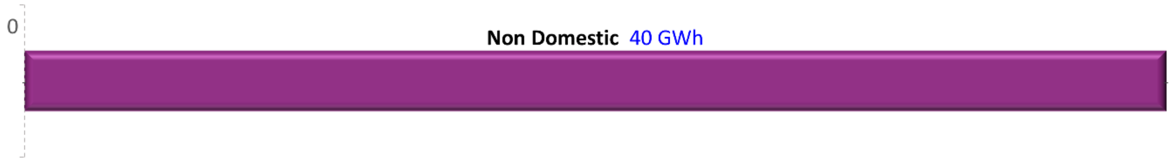
100 – INCORRECT CORRECTION FACTORS

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates
Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
100 Incorrect Correction Factors	53 GWh	**40 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Meters are designed to measure at a standard pressure of 1 atmosphere (1013.25 hPa) at Mean Sea Level and a standard temperature of 15°C. Any variances from this results in an inaccuracy in the measurement.

There is a small number of meters that have correction equipment fitted and dynamically adjust for this according to the actual atmospheric pressure and temperature of the gas. They provide volumes that are consistent with the standard atmospheric pressure and temperature. These are typically high-capacity meters. The vast majority of meters do not have this correction equipment fitted.

In addition, there are some meters for which a location dependent Specific Correction Factor[38] is applied to the advance between two meter readings as part of the Settlement calculations. These factors are designed to adjust for variances from standard pressure and the standard temperature of gas, and take into consideration the meter's location, the inlet pressure, and the compressibility. They ensure that the volume processed in Settlement is more consistent with

[38] Also known as Conversion Factor.

the standard pressure and temperature. This occurs for Supply Meter Points that typically use over 732,000 kWh.

The remaining set of meters have a Standard Correction Factor applied to the advance between two meter readings as part of the Settlement calculations. This factor is also designed to adjust for variances from the standard pressure and standard temperature of gas, but it is not location specific and so does not achieve this as well as Specific Correction Factors.

Some Supply Meter Points are large enough to require either meters with correction equipment fitted or the application of Specific Correction Factors in Settlement. However, some of these are settled on the basis of Standard Correction Factors. In other cases, an incorrect Specific Correction Factor is applied in Settlement. In both situations, the consequential inaccuracy in the measurements results in UIG.

DEFINITION

This contributor relates to meters that over or under-record the amount of gas consumed at Supply Meter Points with AQs greater than 732,000 kWh as a result of the Correction Factor being incorrect.

For the purposes of quantifying UIG associated with this, only the following cases are considered:

- The Supply Meter Point has an AQ of more than 732,000 kWh;
- The meter does not have correction equipment fitted; and
- A Standard Correction Factor is used in Settlement; or a Specific Correction Factor is used in Settlement that is less than the lowest value possible in GB[39].

For the avoidance of doubt, this contributor does not consider errors arising from other types of incorrect Specific Correction Factors. Nor does it consider any errors that occur due to variances from the standard atmospheric pressure or temperature of the gas (assuming a correct Correction Factor is applied). These are considered as part of the Average Pressure Assumption (070) and Average Temperature Assumption (080) contributors, respectively.

UIG IMPACT

If the Correction Factor used in Settlement is lower than it should be, the measured volume will be less than the amount of gas consumed. This will create positive UIG.

Conversely, if the Correction Factor used in Settlement is higher than it should be, the measured volume will be more than the amount of gas consumed. This will create negative UIG.

METHODOLOGY

UIG FORECAST

The UIG associated with this contributor for the target Gas Year is established by:

[39] A Correction Factor of 0.995088 corresponds to a Mean Sea Level altitude (assuming a typical inlet pressure of 21 mbar and compressibility of 1).

- Determining an average Specific Correction Factor for Supply Meter Points with an AQ greater than 732,000 kWh that use a Specific Correction Factor and do not have a meter with correction equipment fitted, for each LDZ and Matrix Position;
- Determining a Correction Error Factor^{LM}[40] for each LDZ and Matrix Position as the difference between the average Specific Correction Factor and the Standard Correction Factor;
- Determining the proportion of Supply Meter Points with an AQ greater than 732,000 kWh that use a Specific Correction Factor and do not have meters with correction equipment fitted, for each LDZ and Matrix Position;
- Determining the error due to incorrect use of Standard Correction Factors, for each LDZ and Matrix Position as the product of: the proportion (determined above), the Correction Error Factor^{LM} (determined above) and our Consumption Forecast for these Matrix Positions (described in Section 4 of this Statement);
- Determining a Correction Error Factor^{SP}[41] as the difference between the lowest feasible Correction Factor (0.995088) and the actual Specific Correction Factor, for each Supply Meter Point:
    - With an AQ greater than 732,000 kWh;
    - That does not have a meter with correction equipment fitted; and
    - Has a Specific Correction Factor less than the value of 0.995088; and
- Determining the error due to unfeasibly low Specific Correction Factors, for each LDZ and Matrix Position as: the sum across Supply Meter Points, of the product of: the Correction Error Factor^{SP} (determined above) and the AQ associated with the Supply Meter Point.

MATRIX ALLOCATION

- The UIG by Matrix Position is determined as part of the method for calculating the overall UIG for this contributor.

ASSUMPTIONS

- The Specific Correction Factors are correct for all Supply Meter Points with an AQ greater than 732,000 kWh which are not unfeasibly low (i.e. are less than 0.995088);
- The proportion of Supply Meter Points with correction equipment fitted will not change before the target Gas Year;
- The proportion of Supply Meter Points using the Standard Correction Factor will not change before the target Gas Year;
- The number of Supply Meter Points that will update their Correction Factors before the end of the target Gas Year is negligible;
- The Supply Meter Points with unfeasibly low Specific Correction Factors (less than 0.995088) will not have these factors updated before the target Gas Year; and

[40] This represents the difference between the average Correction Factor for the Matrix Position and the Standard Correction Factor actually applied.
[41] This represents the difference between the Specific Correction Factor for the Supply Meter Point and the lowest feasible Correction Factor.

- The AQ of Supply Meter Points with an unfeasibly low Specific Correction Factor is a reasonable estimate of consumption for the target Gas Year.

CALCULATION

INPUTS

- Correction Factors report from the CDSP;
- Conversion Equipment Fitted report from the CDSP; and
- Our Consumption Forecast (as described in Section 4 of this Statement).

CALCULATION

The detailed calculation is described below.

Determine average Specific and Standard Correction Factors for each LDZ and Matrix Position

1. Identify all Supply Meter Points with an AQ greater than 732,000 kWh that have a Standard Correction Factor and do not have a meter with correction equipment fitted;
2. Identify all Supply Meter Points with an AQ greater than 732,000 kWh that have a Specific Correction Factor and do not have a meter with correction equipment fitted;
3. Identify all Supply Meter Points with an AQ greater than 732,000 kWh that have a meter with correction equipment fitted; and
4. Determine an average Specific Correction Factor for those Supply Meter Points in step 2, for each LDZ and Matrix Position. Where there are no Supply Meter Points upon which to base an average for a LDZ and Matrix Position, use the national average for the Matrix Position; where there are still no Supply Meter Points upon which to base an average, use the national Class average.

Calculate Altitude-Adjusted Standard Correction Factor for each LDZ

5. For each LDZ, calculate the Altitude-Adjusted Standard Correction Factor based on the average altitude within that LDZ and an assumed pressure of 21 mbar (using the Thermal Regulations).

Calculate the Correction Error Factor^{LM} for each LDZ and Matrix Position

6. Determine Correction Error Factor^{LM} as the Average Specific Correction Factor (from step 4) less the Altitude-Adjusted Standard Correction Factor (from step 5), for each LDZ and Matrix Position.

Determine the error due to the incorrect use of Standard Correction Factors, for each LDZ and Matrix Position

7. Determine the AQ proportion of Supply Meter Points with an AQ greater than 732,000 kWh that use a Specific Correction Factor and do not have meters with correction equipment fitted (from steps 1, 2 and 3), for each LDZ and Matrix Position; and
8. Determine the error for each LDZ and Matrix Position as the product of: the proportion (from step 7), the Correction Error Factor^{LM} (from step 6) and our Consumption Forecast for these Matrix Positions.

Identify Supply Meter Points with an unfeasibly low Specific Correction Factor

9. Identify all Supply Meter Points with an AQ greater than 732,000 kWh that have a Specific Correction Factor below 0.995088 and do not have a meter with correction equipment fitted.

Calculate the Correction Error Factor^{SP} for each supply meter point

10. For each Supply Meter Point identified in step 9, determine Correction Error Factor^{SP} as: 0.995088 less its Specific Correction Factor.

Determine the error due to unfeasibly low Specific Correction Factors, for each LDZ and Matrix Position

11. Determine the error associated with each Supply Meter Point determined in step 9 as the product of: the Correction Error Factor^{SP} (from step 10) and the AQ for the Supply Meter Point; and
12. Sum the Supply Meter Point errors (from step 11) for each LDZ and Matrix Position.

Determine the UIG at the Line in the Sand for each Matrix Position

13. Sum the values in steps 8 and 12 to obtain error (UIG) for each LDZ and Matrix Position;
14. Sum the results of step 13 across LDZs to obtain the UIG by Matrix Position; and
15. Sum the results of step 14 across Matrix Positions to obtain the overall UIG for this contributor.

OUTPUT

Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

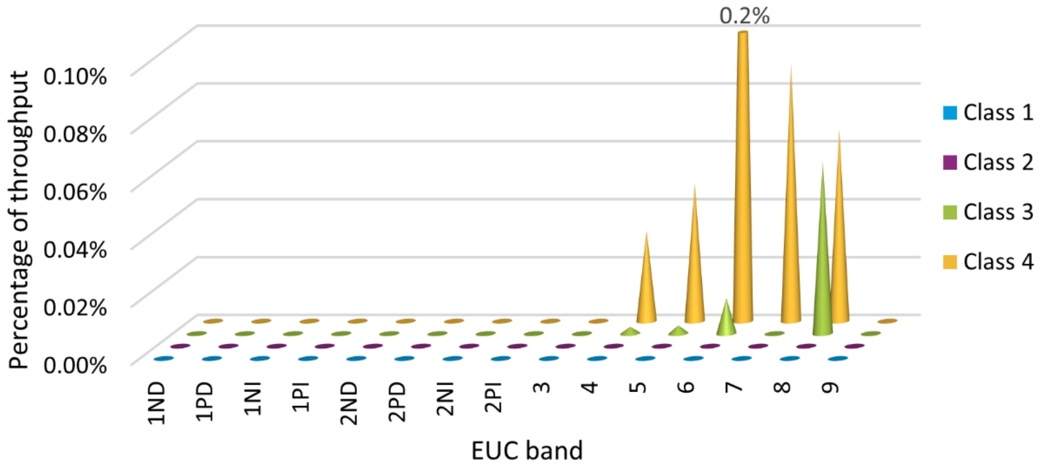
RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **40 GWh**, comprising 40 GWh due to incorrect (but feasible) Correction Factors and 0.4 GWh due to unfeasibly low Correction Factors.

This is allocated across Matrix Positions as follows[42]:

		CLASS			
		1	2	3	4
EUC BAND	1ND	-	-	-	-
	1PD	-	-	-	-
	1NI	-	-	-	-
	1PI	-	-	-	-
	2ND	-	-	-	-
	2PD	-	-	-	-
	2NI	-	-	-	-
	2PI	-	-	-	-
	3	-	-	-	-
	4	-	-0	0	3
	5	-	-	0	4
	6	-	-0	0	18
	7	-	-	-	7
	8	-	-	1	6
	9	-	-	-	-

The graph below shows UIG as a percentage of throughput for each Matrix Position:



[42] Note that due to rounding the sub-EUC band values in aggregate may not equal main EUC band values. Some values are negative but round to zero. Dashes are where the Matrix Position is forecast to be empty.

NOTABLE OBSERVATIONS

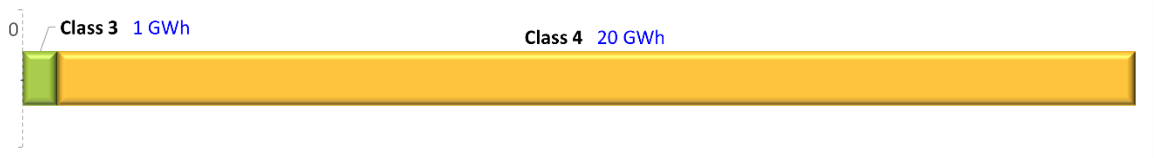
COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 53 GWh (compared to this year's quantification of 40 GWh). There was a decrease due to the decrease in average correction factors for some LDZ Matrix Positions coupled with a small decrease due to the change in our Consumption Forecast, resulting in a reduced amount of UIG compared to last year.

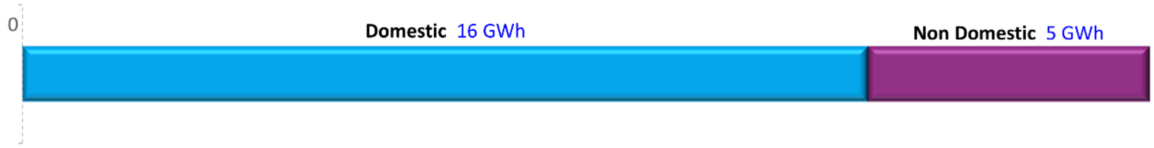
160 – ISOLATED SITES

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates
Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
160 Isolated Sites	19 GWh	**21 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

Any Supply Meter Point with a status set to "isolated" in the UK Link central industry database is excluded from allocation as part of standard Settlement processes. The isolation flag indicates the presence of equipment fitted to the Supply Meter Point to prevent gas from flowing. In such cases, the site remains registered to a Shipper but they are not allocated any energy.

If the site is recorded as isolated, but for any reason gas is consumed, this consumption will not be directly allocated to a Shipper but will instead contribute to UIG.

DEFINITION

The cases considered as part of this Contributor are Supply Meter Points that:

- Have a Shipper currently registered;
- Have an isolation flag set within UK Link; and
- Are consuming gas.

This contributor does not consider cases where the Supply Meter Point has never been, or is no longer registered to, a Shipper. This is considered in the Unregistered Sites (020) and Shipperless Sites (025) contributors respectively.

Any consumption that is due to theft is considered within Theft of Gas (010).

UIG IMPACT

Gas consumed at Isolated Sites creates positive UIG. If this is not identified and accounted for, this UIG remains at the Line in the Sand.

METHODOLOGY

The overall approach is to:

- Identify the Isolated Sites and associated AQ that have an isolated date before April 2021 and do not have a theft record within the TRAS/GTDIS or TOG dataset;
- Identify the pre-April 2021 Isolated Sites and associated AQ that are advancing, non-advancing and those with insufficient reads using the accepted and rejected read files;
- Identify within those groups of sites which have meters attached in the CDSP data and which don't have meters attached;
- Calculate the proportion and associated AQ of pre-April 2021 Isolated Sites with insufficient reads that are likely to be advancing, in the group with meters attached and those without; and
- Calculate the UIG by adding the AQ of the pre-April 2021 Advancing Isolated Sites to the proportion of AQ of the Isolated Sites with insufficient reads that are likely to be advancing.

UPDATES CONSIDERED FOR THIS YEAR'S METHODOLOGY

Building on the first year's analysis we identified three potential improvements to the methodology last year to better forecast UIG at Line in the Sand from this contributor. One was implemented (and repeated this year), but there were two remaining to be reconsidered this year:

- Determining the likely future status of the currently Isolated Sites; and
- Determining the appropriate AQ of the currently Isolated Sites to be used in forecasting UIG.

Last year these two were noted for future consideration because there was insufficient data available at the time to progress them.

As part of this year's analysis these two areas were explored again.

<u>Determining the likely future status of the currently Isolated Sites</u>

Once again, we are not able to progress this as there is insufficient data to build up a robust view of what the isolated portfolio will look like by the Line in the Sand. Two years' data is not enough to do this.

The size of the portfolio we have assessed (i.e. those sites with an isolated date of April for year minus 3) has remained relatively static over the past two to three years of preparing the Statement and so can be considered as a suitable proxy for the target Gas Year.

Determining the appropriate AQ of the currently Isolated Sites to use to forecast UIG

This year we obtained additional data from the CDSP to form a view on whether there is a more suitable AQ to use in forecasting UIG for this contributor. However, results were inconclusive as data is still insufficient in most Matrix Positions.

Isolated Sites by their nature have an inconsistent and incomplete consumption history and so the AQ immediately after an isolation flag is removed may not be reflective of reality. An improved AQ would be available only after a full year of usage.

In the data we analysed, the AQs of these sites were highly variable with no obvious patterns or trends emerging leading us to conclude that the prevailing AQ was as good a view as any. The small relative scale of this contributor means that changes to methodology have a minimal impact on overall UIG and Weighting Factors.

We have therefore not changed our methodology in this area.

CALCULATION

INPUTS

- Isolated Sites report from CDSP;
- Isolated Meter Reads from CDSP; and
- Isolated Meter Read rejections from CDSP.

ASSUMPTIONS

- Isolated Sites with reads showing advancement have consumed since the date of isolation;
- Isolated Sites with insufficient reads with a meter attached advance in the same proportion as those that can be determined with a meter attached, and those without a meter attached advance in the same proportion as those that can be determined without a meter attached;
- The portfolio of Isolated Sites will not undergo significant characteristic change in the coming years; and
- Supply Meter Points that are no longer isolated by the Line in the Sand are in fact reconciled properly for any energy used during the period when the isolation status was set.

CALCULATION

The detailed calculation is described below.

Identify the pre–April 2021 Isolated Sites

1. For each Matrix Position identify the Supply Meter Points and calculate the total AQ for sites isolated before April 2021; and
2. Cross reference this data with the theft of gas master dataset and remove any that had theft of gas past the isolation date.

Identify reads and calculate the advancing proportions

3. Obtain all the isolated meter reads and meter read rejections for Isolated Sites in isolation pre-April 2021, as at August 2023;
4. Identify the count of Isolated Sites, associated AQ and whether they are:
    a. Advancing (25% or more of read periods since isolation showed a meter advance);
    b. Non-Advancing (no read advance or fewer than 25% of read periods showing consumption); and
    c. Those with insufficient reads to determine whether they are advancing.
5. From the Isolated Sites data identified in step 4, calculate for each Matrix Position the:
    a. Sum of the AQ of Advancing Isolated Sites for sites with and separately without a meter attached;
    b. Sum of the AQ of Non-Advancing Isolated Sites for sites with and separately without a meter attached; and
    c. Sum of the AQ of Isolated Sites with insufficient reads for sites with and separately without a meter attached to identify if the site is advancing.
6. Calculate the pre-April 2021 "Isolated Sites Advancing Proportion" for each Matrix Position and each meter status by dividing the sum of the Advancing Sites AQ (step 5a) by the sum of Advancing and Non-Advancing AQ (steps 5a and 5b); and
7. Calculate percentage of sites with reads which have a meter attached for each Matrix Position to calculate a view of the insufficient reads AQ which don't have a meter attached however it is suspected that they might do, by multiplying these proportions by the Insufficient Reads AQ where no meter is recorded in step 5c; and
8. Calculate the pre-April 2021 "Insufficient Reads Advancing AQ" for each Matrix Position by multiplying the sum of the Isolated Sites with insufficient reads AQ (steps 5c and 7) by the Isolated Sites Advancing proportion (step 6) for both sites with a meter attached and for those without a meter attached.

Determine the UIG

9. For each Matrix Position, extrapolate UIG by adding the sum of the AQ for Advancing Isolated Sites (step 5a) to the Insufficient Reads Advancing AQ (step 8).

OUTPUT

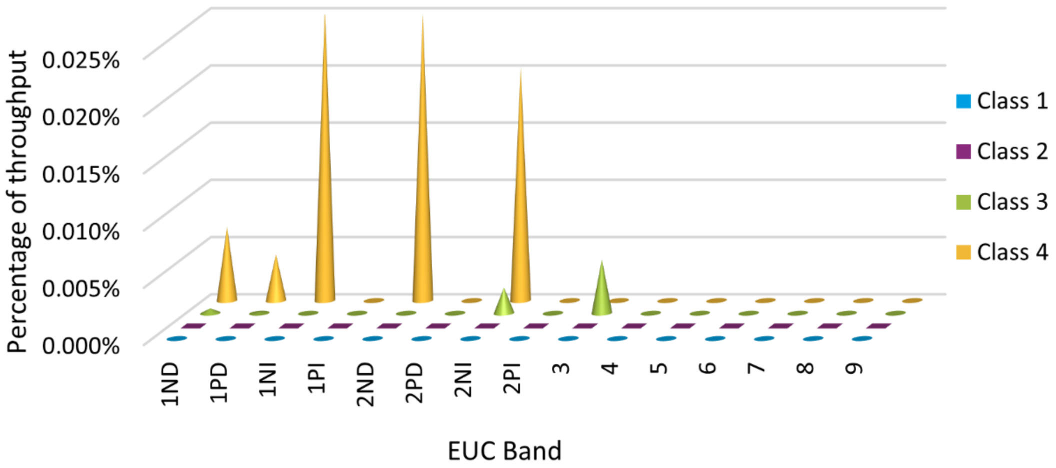
Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **21 GWh**. This is broken down by Matrix Position as follows[43]:

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

The graph below shows UIG as a percentage of throughput for each Matrix Position.



NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 19 GWh (compared to this year's quantification of **21 GWh**). The small increase is a result of an increase in the number of aged Isolated Sites which were observed to be consuming gas.

[43] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

FUTURE CONSIDERATIONS

As noted above, we examined the potential for improvement in the following two areas:

<u>Forecasting the number of Isolated Sites by Line in the Sand</u>

By examining past movements between snapshots of data, it should be possible to model a likely future state of the current snapshot of Isolated Sites. However, because this is only the third time Isolated Sites have been assessed, the snapshot data available to us spans only two years. This will be considered for next year's Statement if available.

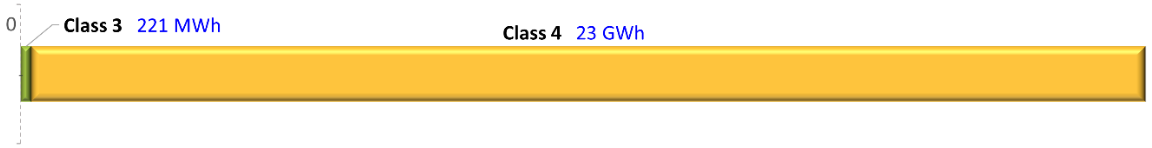
<u>Increasing the accuracy of Isolated Sites AQ</u>

We requested the appropriate data from the CDSP to enable determination of a more appropriate AQ to use in the calculations of UIG for these Isolated Sites which are consuming. While some data was available this year it remained sufficiently incomplete to justify making any changes to our approach. This enhancement will be reconsidered in future initial assessments.

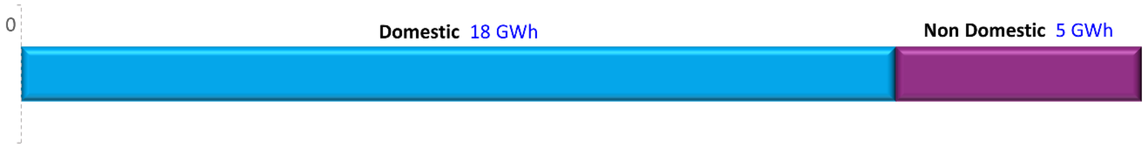
200 – DEAD SITES

DASHBOARD

UIG split by Class



UIG split by Sector



Gas Year 2024 – 2025 Updates

Data inputs updated to reflect an additional year of industry data.

UIG	Gas Year 2023-2024	Gas Year 2024-2025
200 Dead Sites	19 GWh	**23 GWh**

DESCRIPTION

SETTLEMENT CONTEXT

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 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.

DEFINITION

The cases considered as part of this Contributor are Supply Meter Points that:

- Have a Shipper currently registered;
- Have a Dead flag set within UK Link; and
- Are consuming gas.

This contributor does not consider cases where the Supply Meter Point has never been, or is no longer registered to, a Shipper. These are considered in the Unregistered Sites (020) and Shipperless Sites (025) contributors respectively.

Any consumption that is due to theft is considered within Theft of Gas (010).

UIG IMPACT

Gas consumed at Dead Sites creates positive UIG. If this is not identified and accounted for, this UIG remains at the Line in the Sand.

METHODOLOGY

The overall approach is to:

- Identify the Dead Sites and associated AQ that have a status update before April 2021 and do not have a theft record within the TRAS or TOG dataset;
- Identify the pre–April 2021 Dead Sites and associated AQ that are advancing, non-advancing and those with insufficient reads using the rejected read file;
- Calculate the proportion and associated AQ of pre-April 2021 Dead Sites with insufficient reads that are likely to be advancing; and
- Calculate the UIG by adding the AQ of the pre-April 2021 Advancing Dead Sites to the proportion of AQ of the Dead Sites with insufficient reads that are likely to be advancing.

CALCULATION

INPUTS

- Dead Sites report from CDSP; and
- Dead Sites Meter Read rejections from CDSP.

ASSUMPTIONS

- Dead Sites with reads showing advancement have consumed since the date of Dead status update;
- Dead Sites with insufficient reads advance in the same proportion as those that can be determined;
- The portfolio of Dead Sites will not undergo significant characteristic change in the coming years; and
- Supply Meter Points that are no longer Dead by the Line in the Sand are in fact reconciled properly for any energy used during the period when the Dead status was set.

CALCULATION

The detailed calculation is described below.

Identify the pre-April 2021 Dead Sites

1. For each Matrix Position identify the Supply Meter Points and calculate the total AQ for sites Dead before April 2021; and
2. Cross reference this data with the theft of gas master dataset and remove any that had theft of gas past the Dead status date.

Identify reads and calculate the advancing proportions

3. Obtain all the Dead sites meter read rejections for Dead Sites with a Dead status update pre-April 2021, as at October 2023;
4. Identify the count of Dead Sites, associated AQ and whether they are:
    a. Advancing (25% or more of read periods since isolation showed a meter advance);
    b. Non-advancing (no read advance or fewer than 25% of read periods showing consumption); and
    c. Those with insufficient reads to determine whether they are advancing.
5. From the Dead Sites data identified in step 4, calculate for each Matrix Position the
    a. Sum of the AQ of Advancing Dead Sites;
    b. Sum of the AQ of Non-Advancing Dead Sites; and
    c. Sum of the AQ of Dead Sites with insufficient reads to identify if the site is advancing.
6. Calculate the pre-April 2021 “Dead Sites Advancing Proportion” for each Matrix Position by dividing the sum of the Advancing Sites AQ (step 5a) by the sum of Advancing and Non-advancing AQ (steps 5a and 5b); and
7. Calculate the pre-April 2021 “Insufficient Reads Advancing AQ” for each Matrix Position by multiplying the sum of the Dead Sites with insufficient reads AQ (step 5c) by the Dead Sites Advancing proportion (step 6).

Determine the UIG

8. For each Matrix Position, extrapolate UIG by adding the sum of the AQ for Advancing Dead Sites (step 5a) to the Insufficient Reads Advancing AQ (step 7).

OUTPUT

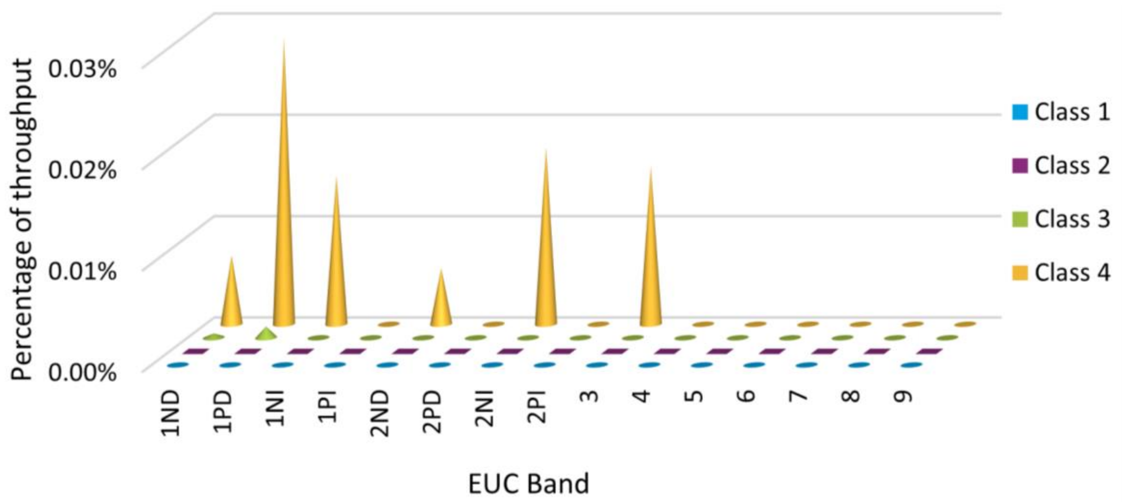
Forecast UIG values for the target Gas Year, at the Line in the Sand, for this contributor, by Matrix Position.

RESULTS

The forecast UIG for this contributor, at the Line in the Sand, for the target Gas Year is: **23 GWh**. This is broken down by Matrix Position as follows[44]:

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

The graph below shows UIG as a percentage of throughput for each Matrix Position.



NOTABLE OBSERVATIONS

COMPARISON TO STATEMENT FOR GAS YEAR 2023-2024

The Statement for Gas Year 2023-2024 quantified the UIG for this contributor to be 19 GWh (compared to this year's quantification of 23 GWh). The increase can be explained by a slight increase in aged Dead Sites which were observed to be consuming gas.

[44] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

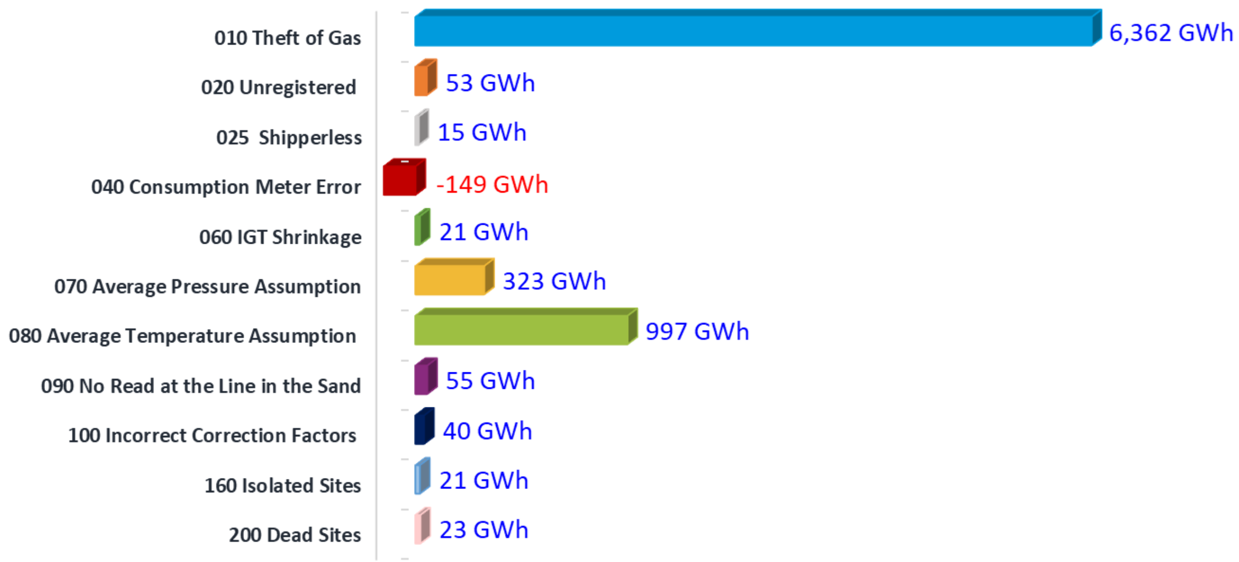
7 Results

TOTAL UIG FOR 2024-2025

We quantified total UIG to be **7,761 GWh** at the Line in the Sand for the target Gas Year. This compares to 8,497 GWh in last year's Statement for Gas Year 2023-2024.

UIG BY CONTRIBUTOR

This is broken down across 11 contributors as follows:



(Theft of Gas bar not to scale.)

The table below shows the same contributors ordered by contribution to total UIG, with a comparison to last year's output[45]:

Contributor	2023-2024 Gas Year UIG Volume	Change	2024-2025 Gas Year UIG Volume
Theft of Gas	6,823 GWh	↓	6,362 GWh
Average Temperature Assumption	1,021 GWh	↓	997 GWh
Average Pressure Assumption	326 GWh	↓	323 GWh
No Read at the Line in the Sand	162 GWh	↓	55 GWh
Unregistered Sites	53 GWh	→	53 GWh
Incorrect Correction Factors	53 GWh	↓	40 GWh
Dead Sites	19 GWh	↑	23 GWh
Isolated Sites	19 GWh	↑	21 GWh
IGT Shrinkage	19 GWh	↑	21 GWh
Shipperless Sites	17 GWh	↓	15 GWh
Consumption Meter Error	-15 GWh	↓	-149 GWh
Total	**8,497 GWh**	↓	**7,761 GWh**

UIG BY MATRIX POSITION

The 7,761 GWh of UIG we have quantified across the eleven contributors is allocated between Matrix Positions as shown in the table[46] below.

		CLASS			
		1	2	3	4
EUC BAND	**1ND**	-	-	382	3,155
	1PD	-	-	48	1,343
	1NI	0	0	94	741
	1PI	-	-	0	5
	2ND	-	-	1	117
	2PD	-	-	0	10
	2NI	0	0	159	458
	2PI	-	-	0	0
	3	0	1	71	149
	4	0	4	91	161
	5	0	4	50	109
	6	0	18	30	130
	7	1	32	26	112
	8	11	53	18	136
	9	37	0	0	2

[45] Movement in UIG noted in the table (Gas Year 2023-2024 vs the target Gas Year) is based on a tolerance threshold of more than 1% and 1 GWh change.
[46] Note that due to rounding the individual Matrix Position values in aggregate may not equal total value. Zeros are rounded values. Dashes are where the Matrix Position is forecast to be empty.

COMPARISON TO OBSERVED LEVELS OF UIG

We compared our results with a forecast of UIG for the target Gas Year, based on observed levels of UIG since June 2017. This was for benchmarking purposes only. The method we used to do this is described below along with our assessment of the comparison.

INPUTS

The following datasets were used to forecast total UIG at the Line in the Sand in the target Gas Year:

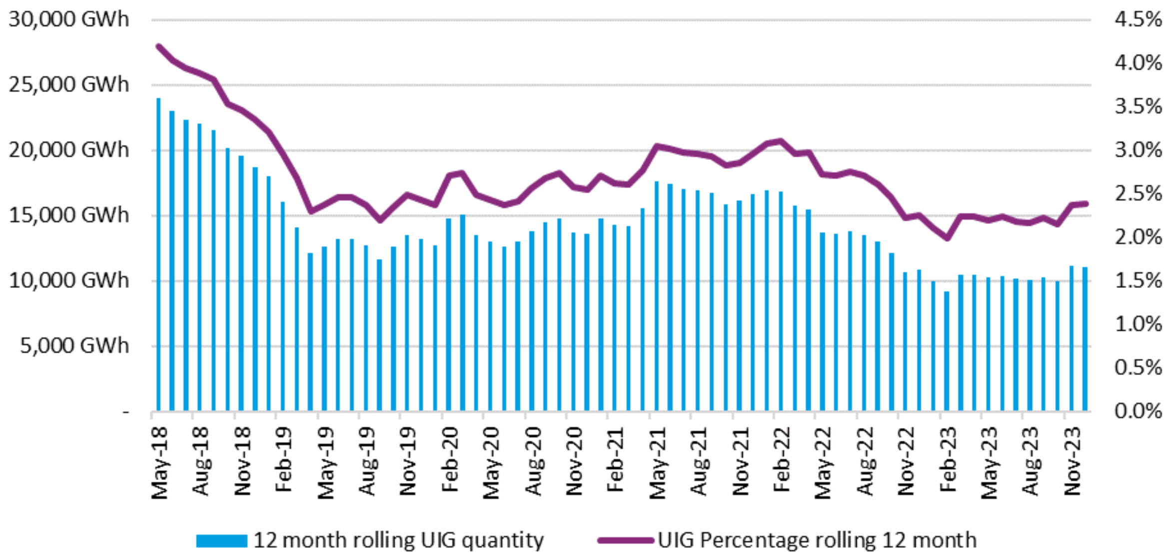
- UIG values at allocation from the Throughput report from the CDSP;
- UGR values from the Monthly Reconciliation and Offline Adjustment reports from the CDSP (updated to end of February 2024);
- Total throughput values from the Throughput report from the CDSP; and
- Our Consumption Forecast (as described in Section 4 of this Statement).

CALCULATION

We combined the UIG allocation values with the UGR values to calculate a best view of the current UIG position by supply month for each month since June 2017. We converted this to a percentage UIG for each month by dividing by the throughput.

We then determined a 12-month rolling average percentage of the best view of UIG.

RESULTS



The graph shown above provides the output of the analysis. Over the latest two full Gas Years, the average 12 month rolling UIG percentage is **2.53%**.

We considered the fact that more recent months were less reconciled than earlier months and the prevalence of negative UIG at allocation stage over the last year and undertook sensitivity analysis on this by looking at earlier months that were further through their reconciliation process. This did not change the average 12-month rolling UIG percentage materially. From this we concluded that 2.53% was an appropriate value to use for benchmarking purposes.

Using this 2.53% and our Consumption Forecast, we calculated a benchmark UIG for the target Gas Year as 11,066 GWh.

COMPARISON OF RESULTS TO BENCHMARK

Our quantification of UIG, based on the current eleven contributors, is **70.1%** of the benchmark UIG we forecast for the target Gas Year. This suggests that there is a proportion of UIG that is yet to have its cause identified or, despite identification, cannot be quantified due to the limited availability of reliable data – as discussed under our Unfound UIG investigation in Section 5.

8 Weighting Factor Determination

WEIGHTING FACTOR CALCULATION

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.

We then scaled these factors around the average of all Matrix Positions and multiplied them by 100. We did this to normalise the factors, without altering their relative values, so that the value will be comparable year-on-year. This approach means that:

- A Matrix Position with an average UIG to throughput ratio has a Weighting Factor of 100;
- A Matrix Position with a higher-than-average UIG to throughput ratio has a Weighting Factor greater than 100; and
- A Matrix Position with a lower-than-average UIG to throughput ratio has a Weighting Factor lower than 100.

Within the matrix, some positions had zero consumption in our Consumption Forecast; other positions had a consumption based on a forecast of a very small number of Supply Meter Points. For these positions, we determined the factors would not be statistically sound or are zero and that they required adjustment on a case-by-case basis. We also equalised the relevant factors in accordance with UNC Modification 0840 – Equalisation of prepayment and non-prepayment AUG factors.

Accordingly, we made the following updates to the AUG Table:

- For each of the following Class and EUC band Matrix Position combinations (considered separately), we quantified UIG at the Matrix Position level and then combined the UIG and total throughput in order to calculate a single Weighting Factor for the respective combinations:
  - Class 1; all EUC bands except 1ND, 1PD, 2ND and 2PD;
  - Class 2; we combined 1NI with 1PI and 2NI with 2PI;
  - We combined Class 3 1ND with 1PD, 1NI with 1PI, 2ND with 2PD, and 2PI with 2NI; and
  - We combined Class 4 1ND with 1PD, 1NI with 1PI, 2ND with 2PD, and 2PI with 2NI.
- For Class 1 and Class 2 EUC bands 1ND, 1PD, 1PI and 2ND, 2PD, 2PI Matrix Positions, we used the Weighting Factor from Class 3.

We then normalised the factors once more by scaling them around the revised average of all Matrix Positions and multiplying by 100.

SMOOTHING

We judged it unreasonable for adjacent Matrix Positions, representing Supply Meter Points with similar characteristics, to have significantly different Weighting Factors. We therefore smoothed Weighting Factors across these positions.

We assessed various methods to undertake this smoothing and judged that the method that provided the most reasonable results was to set these Weighting Factors to the average of the relevant Matrix Position and the average of the surrounding Matrix Positions.

We considered that adjacent Matrix Positions in Class 2, 3 and 4 and EUC bands 03 to 09 represent Supply Meter Points with similar characteristics and so applied the smoothing algorithm to these.

Again, we normalised the factors by scaling them around the revised average of all Matrix Positions and multiplying by 100.

9 Proposed Final AUG Table

The proposed Final AUG Table for the 2024-2025 Gas Year is shown below:

		CLASS			
		1	2	3	4
EUC BAND	1ND	51.51	51.51	51.51	107.23
	1PD	51.51	51.51	51.51	107.23
	1NI	5.87	396.20	226.73	450.82
	1PI	5.87	396.20	226.73	450.82
	2ND	66.54	66.54	66.54	116.62
	2PD	66.54	66.54	66.54	116.62
	2NI	5.87	130.40	123.64	199.05
	2PI	5.87	130.40	123.64	199.05
	3	5.87	60.12	60.34	69.60
	4	5.87	59.90	63.63	71.80
	5	5.87	66.17	62.08	68.88
	6	5.87	70.74	59.38	67.86
	7	5.87	73.23	62.12	68.81
	8	5.87	59.71	59.58	58.17
	9	5.87	28.27	26.24	29.45

These numbers have been normalised around an average of 100 so that they are comparable year-on-year. This does not impact the relative proportions in any way. For this reason, whilst the relative numbers are comparable with Statements for previous Gas Years, the absolute numbers are not.

PROPOSED FINAL AUG TABLE BEFORE EQUALISATION

The implementation of UNC Modification 0840 requires the equalisation of the following pairs of Categories of System Exit Points when producing the Weighting Factors.

- 1ND & 1PD;
- 2ND & 2PD;
- 1NI & 1PI; and
- 2NI & 2PI.

There is also a requirement to publish a version of the Weighting Factors *without* the equalisation of the prescribed groups of sub-EUC bands. The below table shows what the proposed Final Weighting Factors would have looked like without the implementation of Modification 0840. Please note that sub-EUC bands 1NI and 1PI, 2ND and 2PD, 2NI and 2PI were already being combined before the Modification and so are shown as combined. It is **for information only** and is not to be used.

EUC BAND	CLASS	1	2	3	4
	1ND	50.81	50.81	50.81	79.10
	1PD	57.98	57.98	57.98	652.54
	1NI	5.87	396.20	226.73	450.82
	1PI	5.87	396.20	226.73	450.82
	2ND	66.54	66.54	66.54	116.62
	2PD	66.54	66.54	66.54	116.62
	2NI	5.87	130.40	123.64	199.05
	2PI	5.87	130.40	123.64	199.05
	3	5.87	60.12	60.34	69.60
	4	5.87	59.90	63.63	71.80
	5	5.87	66.17	62.08	68.88
	6	5.87	70.74	59.38	67.86
	7	5.87	73.23	62.12	68.81
	8	5.87	59.71	59.58	58.17
	9	5.87	28.27	26.24	29.45

***NOTE**: This pre-equalisation view of the Weighting Factors is provided as a requirement of the AUGE framework document **for information only.** It is not to be used to inform Shipper operations and will not be implemented.*

YEAR-ON-YEAR COMPARISON OF FACTORS

Whilst the absolute factors cannot be usefully compared, the relative values can be. We used the Weighting Factors, our calculated UIG and our Consumption Forecast to determine UIG as a percentage of throughput. The value for each Matrix Position for Gas Years 2023-2024 and 2024-2025 are provided below.

2023-2024 UIG as % of throughput

EUC BAND	CLASS 2023-2024	1	2	3	4
	1ND	0.0%	0.0%	1.1%	2.1%
	1PD	0.0%	0.0%	1.1%	2.1%
	1NI	0.0%	16.2%	3.0%	11.8%
	1PI	0.0%	0.0%	3.0%	11.8%
	2ND	0.0%	0.0%	1.4%	2.8%
	2PD	0.0%	0.0%	1.4%	2.8%
	2NI	0.0%	5.6%	1.6%	5.7%
	2PI	0.0%	0.0%	1.6%	5.7%
	3	0.1%	1.1%	0.9%	1.0%
	4	0.1%	1.1%	1.1%	1.2%
	5	0.1%	1.3%	1.1%	1.2%
	6	0.1%	1.3%	1.1%	1.2%
	7	0.1%	1.3%	1.1%	1.3%
	8	0.1%	1.1%	1.1%	1.1%
	9	0.1%	0.6%	0.5%	0.5%

2024-2025 UIG as % of throughput

EUC BAND	CLASS 2024-2025	1	2	3	4
	1ND	0.0%	0.0%	1.0%	2.1%
	1PD	0.0%	0.0%	1.0%	2.1%
	1NI	0.1%	7.6%	4.3%	8.6%
	1PI	0.0%	0.0%	4.3%	8.6%
	2ND	0.0%	0.0%	1.3%	2.2%
	2PD	0.0%	0.0%	1.3%	2.2%
	2NI	0.1%	2.5%	2.4%	3.8%
	2PI	0.0%	0.0%	2.4%	3.8%
	3	0.1%	1.2%	1.2%	1.3%
	4	0.1%	1.1%	1.2%	1.4%
	5	0.1%	1.3%	1.2%	1.3%
	6	0.1%	1.4%	1.1%	1.3%
	7	0.1%	1.4%	1.2%	1.3%
	8	0.1%	1.1%	1.1%	1.1%
	9	0.1%	0.5%	0.5%	0.6%

By comparing the percentage values above for the current Gas Year and the target Gas Year, the differences give a reasonable representation of those Matrix Positions where Weighting Factors have seen movement:

		CLASS			
		1	2	3	4
EUC BAND	1ND	0.0%	0.0%	-0.1%	-0.1%
	1PD	0.0%	0.0%	-0.1%	-0.1%
	1NI	0.1%	-8.6%	1.4%	-3.2%
	1PI	0.0%	0.0%	1.4%	-3.2%
	2ND	0.0%	0.0%	-0.1%	-0.6%
	2PD	0.0%	0.0%	-0.1%	-0.6%
	2NI	0.1%	-3.1%	0.7%	-1.9%
	2PI	0.0%	0.0%	0.7%	-1.9%
	3	0.0%	0.1%	0.2%	0.3%
	4	0.0%	0.0%	0.1%	0.2%
	5	0.0%	0.0%	0.1%	0.1%
	6	0.0%	0.1%	0.1%	0.1%
	7	0.0%	0.1%	0.1%	0.0%
	8	0.0%	0.0%	0.1%	0.0%
	9	0.0%	0.0%	0.0%	0.0%

COMMENTARY

Although the relationship between the contributors in deriving the Weighting Factors is complex, we give some commentary on the main reasons for the shifts shown in the comparison table above.

- Due to the relative stability of methodology and contributors, compared to previous years, changes have been driven predominantly by revised datasets. There has been minimal change compared to the Weighting Factors derived for the Gas Year 2023-2024.
- Like last year, practically **all movements in Weighting Factors are attributable to changes to theft data**, due to the high relative proportion of all UIG coming from this contributor. There has also been a reduction in the consumption forecast which has not been uniform across the Matrix Positions:
    - Class 4 for EUCs 1NI,1PI, 2NI and 2PI have seen a downwards shift, whereas there has also been a small increase in relative UIG for Class 3 in the same EUC bands. This is due to movements in the theft proportions mainly due to the shift in the 10-year rolling theft dataset (gaining an extra year of recent data and losing the earliest year). There has also been quite a reduction in forecast volume associated with these Class 3 Matrix Positions due to a general reduction in Class 3 sites seen in recent months. Because the number of thefts in these Matrix Positions is relatively small, but with quite significant volume for each theft, it tends to be more volatile year-on-year with the shift in data than other Matrix Positions; and
- For No Read at the Line in the Sand, the refreshed data included a proportionally smaller number of industrial sites with no accepted read. This had a minor impact by pushing relatively less UIG towards 2NI and 2PI.

10 Glossary

AQ – Annual Quantity. The estimated annual seasonal normal consumption of a Supply Meter Point based on historical consumption.

AUGE – Allocation of Unidentified Gas Expert. The party appointed by the CDSP to develop an AUGS and calculate a table of Weighting Factors, which are used to share out daily Unidentified Gas.

AUGS or Statement – Allocation of Unidentified Gas Statement. The document describing the process followed by the AUGE to determine the AUG Table of Weighting Factors.

AUG Table – The table containing the Weighting Factors for each Matrix Position.

AMR – Automated Meter Reading. Equipment attached or built into a meter to provide at least half-hourly reads and remote access to such data, which is not a Smart Meter. Used predominantly at non-domestic premises.

Back Billing – A charge made to reflect an adjustment to the energy values in a previous Settlement period.

CDSP – Central Data Services Provider (Xoserve). The party appointed by the Transporters to operate central gas industry functions including Settlement and Supply Point Administration and the billing of Shippers for these services.

Class – Categories into which gas end consumers are divided based on their AQ, the frequency of reads provided and Settlement arrangements. Often referred to as "Product Class".

CMS – Contact Management System. A secure two-way communication system used by the CDSP and industry parties for operational and invoicing contacts.

Consumption Forecast – Our estimate of gas consumption in the 2024-2025 Gas Year.

Consumption Adjustment – Process used to manually adjust recorded consumption volumes in the CDSP System where a Supply Meter Point's reads are not reflective of actual consumption (e.g. meter error; by-pass operation)

Correction Factor – Used to convert measured gas volumes (m^3) to volumes in Standard Cubic Metres. This takes account of differences in temperature and pressure at the meter. See also Standard Correction Factor.

CV – Calorific Value. The amount in energy (MJ) in a cubic meter of gas as defined in the UNC.

DESNZ - Department for Energy, Sustainability and Net Zero. The government department responsible for the energy industry.

DSC – Data Services Contract. The contract between industry parties and the CDSP.

ECV – Emergency Control Valve. An isolation valve that denotes the point where the network connects the Supply Meter Point.

Energy UK or **EUK** - The trade association for the GB energy industry with over 100 members spanning every aspect of the energy sector.

ETTOS – Energy Theft Tip-Off Service. A service allowing tip-offs regarding suspected energy theft, received from the general public, to be sent to the relevant Supplier, Transporter or IGT for investigation.

EUC Band – End User Category Band. A category of Supply Meter Points based on factors such as AQ.

Fiscal Theft – A type of theft restricted to pre-payment meters, where the meter is interfered with so that no payment is made to the Supplier, but gas is still recorded by that meter as being consumed. Fiscal theft does not contribute to UIG at Line in the Sand.

Gas Year – 1st October to 30th September.

GDN - Gas Distribution Network. A regional operator of one or more LDZs.

GSR – Gas Safety (Installation and Use) Regulations 1998 (GSIUR).

GTDIS – Gas Theft Detection Incentive Scheme; replacement/update to the TRAS arrangements.

IGT – Independent Gas Transporter.

IGTAD – Independent Gas Transporters Arrangements Document. The document which sets out the rights and obligations between GDNs and IGTs in relation to the connections between their respective networks and is the basis of implementation of certain provisions of the UNC in relation to CSEPs.

INA – Independent Networks Association. The trade body for Independent Gas Transporters and Independent Distribution Network Operators.

IST – In-Service Testing. A national sampling scheme for gas and electricity meters run by the OPSS, designed to ensure that only meters that operate within the prescribed limits of accuracy are used for consumer billing.

LDZ – Local Distribution Zone. A pipeline system owned or operated by a GDN, covering a defined area for which the total gas input and consumption demand can be measured each day. There are 18 of these, which between them cover the total land area of Great Britain.

Line in the Sand – Gas Settlement Cut-Off (defined more fully in the No Read at the Line in the Sand (090) contributor). It is the point in time that Settlement is closed off for a Gas Day with no further reconciliations being made. It is three to four years after the Gas Day.

Matrix Position – A sub-EUC band and Class cell within the AUG Table.

Modification – A proposal for a change in the UNC, overseen by the UNC Modification Panel.

Must Read – A read procured by a Transporter when the Shipper has not obtained a valid read.

National Grid Transmission – The owner and operator of the NTS.

NDM – Non-Daily Metered. A Supply Point in Class 3 or 4, provisionally settled by a profile rather than actual meter readings.

NTS – National Transmission System. The network owned and operated by National Grid NTS which is connected to the LDZs owned or operated by the GDNs.

Ofgem – The regulator for Gas and Electricity energy markets in Great Britain.

OPSS – Office for Product Safety and Standards. Part of **DESNZ** - Department for Energy, Sustainability and Net Zero.

PE – Polyethylene. A material that most modern gas pipes are made of.

Pre-Payment Meter – A meter where payment for the gas consumed is made on a pay as you go basis.

PTS – Passed to Shipper.

REC – Retail Energy Code. The industry code designed to govern the new switching arrangements, as well as amalgamating and updating the governance of existing gas and electricity retail arrangements.

RECCo – Retail Energy Code Company. The organisation that owns and manages the Retail Energy Code.

Seasonal Normal – Gas demand expected under normal weather conditions for the relevant time of year.

Settlement – The combined term for the nomination, allocation and reconciliation processes.

Shipper – An industry party which has title to and causes gas to be delivered to Supply Meter Points on the network and which is liable for certain charges in relation to the Transporters' provision of this service and for related services provided by the CDSP.

Shipperless Site – A Supply Meter Point that is currently unregistered but was previously registered to a Shipper.

Shrinkage – Gas lost from the network as a result of leakage, own use gas or theft.

Smart Meter – A meter which allows the remote provision of meter reads in accordance with the Smart Metering Equipment Technical Specifications.

Specific Correction Factor – A specific correction for a Supply Meter Point with an AQ greater than 732,000 kWh calculated based on the thermal regulations, the altitude, the inlet pressure and the compressibility.

SSrP – Shipper Specific rePort.

Standard Atmosphere – A pressure of 1.01325 bar.

Standard Correction Factor – The correction factor applied to all sites with a rolling AQ of less than 732,000 kWh (1.02264).

Standard Cubic Meter – Is a cubic meter of gas at a temperature of 15C and at a pressure of one Standard Atmosphere.

Sub-EUC Band – The EUC bands including the 8 bands in EUC 01 and 02 which were implemented in October 2019 as a result of DSC Change Proposal XRN4665 (*"Creation of New End User Categories"*).

Supplier – An industry party which provides gas to end consumers and bills them for this. This is often, but not always, the same party which acts as the Shipper and provides the gas to the Supplier at the ECV. The two functions are performed under different licences issued by Ofgem.

Supply Meter Point – A metered exit point from an LDZ or IGT network that supplies gas to an end consumer.

Supply Point Register – A register of all Supply Meter Points and Supply Point premises that is maintained by the CDSP.

Target Gas Year – The Gas Year that the Weighting Factors will be applicable. For this Statement it is the Gas Year 2024-2025.

TEM – Theft Estimation Methodology. Model and supporting methodology for prediction of energy theft, put in place under Retail Energy Code governance to justify the level of investment in theft detection activities undertaken by RECCo.

Thermal Regulations – The Gas (Calculation of Thermal Energy) Regulations 1996.

Throughput – The amount of gas that flows within a defined period.

Throughput Extremes – The minimum and maximum capacity of a meter.

TOG – Theft of Gas. A regime provided by the CDSP that utilises a contact management system (CMS) to address theft. It mandates an investigation by the Shipper or GDN to determine the amount of theft and the period over which it took place, and includes an adjustment being made in Settlement such that the stolen gas is attributed to the correct Shipper.

Transporter – National Grid Transmission or a GDN.

TRAS – Theft Risk Assessment Service. A service placing a requirement on Suppliers to submit defined data items for the purposes of assessing the risk of energy theft at consumer premises to help target theft investigations.

UGR – Unidentified Gas Reconciliation. The equal and opposite value of all direct reconciliations that arise as meters are read and the amount of UIG is revised.

UIG – Unidentified Gas. Explained in more detail in the Introduction section.

UNC – Uniform Network Code. A legal and contractual framework to supply and transport gas in Great Britain.

Unregistered Site - A Supply Meter Point that has never been registered to a Shipper.

Weighting Factors – The factors contained within the AUG Table and used to share UIG between Classes and EUC bands.

Appendix 1 – Compliance with the Generic Terms of Reference

This table below details the way we have complied with the Generic Terms of Reference contained within Section 5 of the AUGE Framework document.

AUGE Framework Document Requirement	Evidence of Fulfilment
The AUG Expert will create the AUG Statement and AUG Table by developing appropriate, detailed methodologies and collecting necessary data.	We created a detailed, bottom-up holistic methodology, as described in Section 4 of this Statement, for the estimation of UIG at the Line in the Sand in the target Gas Year and collected the necessary data.
The decision as to the most appropriate methodologies and data will rest solely with the AUG Expert taking account of any issues raised during the development and compilation of the AUG Statement and AUG Table.	We, at our sole discretion, decided the appropriate methodologies for all contributors and other aspects of determining UIG. These are detailed further in Sections 5 and 6 of this AUG Statement. (There is also some additional historical methodology rationale in previous years' Statements.)
The AUG Expert will determine what data is required from Code Parties (and other parties as appropriate) in order to ensure it has sufficient data to support the evaluation of Unidentified Gas.	We determined the data required from Code Parties, where this was deemed necessary by us, in our sole view.
The AUG Expert will determine what data is necessary from parties in order to ensure it has appropriate data to support the evaluation of Unidentified Gas.	See above.
The AUG Expert will determine what relevant questions should be submitted to Code Parties in order to ensure appropriate methodologies and data are used in the evaluation of unidentified error.	We have asked a number of questions of Code Parties (and others), for example, in relation to validating AMR populations, theft investigation practices, availability of additional theft data, and average IGT mains length.
The AUG Expert will use the latest data available where appropriate.	In all cases where data has been requested from the CDSP or any other industry party, we have ensured that the data provided is the most up to date available. Updated datasets have been requested and validated where required.

AUGE Framework Document Requirement	Evidence of Fulfilment
Where multiple data sources exist the AUG Expert will evaluate the data to obtain the most statistically sound solution, will document the alternative options and provide an explanation for its decision.	Where we encountered multiple data sources, we evaluated that data to obtain the most statistically sound outcomes and have provided an explanation of this process within this AUG Statement.
Where data is open to interpretation the AUG Expert will evaluate the most appropriate methodology and provide an explanation for the use of this methodology.	Where data was open to interpretation, we evaluated that data to obtain the most statistically sound methodologies and have provided an explanation of this process within this AUG Statement.
Where the AUG Expert considers using data collected or derived through the use of sampling techniques, then the AUG Expert will consider the most appropriate sampling technique and/or the viability of the sampling technique used.	In cases where data has been collected or derived through sampling techniques, we have considered the most appropriate in each case, along with the viability of this.
The AUG Expert will present at a meeting the AUG Statement, including the AUG Table, in draft form (the "proposed AUG Statement"), to Code Parties seeking views and will review all the issues identified submitted in response.	We presented the draft AUG Statement to industry at the AUG Sub-Committee meeting on 12 January 2024 and our response to the AUG Statement consultation at the AUG Sub-Committee meeting on 16 February 2024. We will present the proposed Final AUG Statement (incorporating amendments since consultation on the draft Statement) on 15 March 2024.
For the avoidance of doubt, allocation factors for prepayment and non-prepayment End User Categories (EUC) in the same sector and Product Class will be equal. This will be achieved through the AUG Expert equalising the allocation factors for the listed pairs of Categories of System Exit Points at the end of the process: **1ND & 1PD** **2ND & 2PD** **1NI & 1PI** **2NI & 2PI** **For the avoidance of doubt, within the proposed AUG Statement, the AUG Expert will also include a table prior to the equalisation of the allocation factors for the list pairs of Categories of System Exit Points (detailed above), being applied.**	Factors have been equalised in line with requirements and this Statement includes a table prior to the equalisation of the allocation factors for the list pairs of Categories of System Exit Points.

AUGE Framework Document Requirement	Evidence of Fulfilment
The AUG Expert will provide the AUG Statement, including the AUG Table, to the Gas Transporters for publication who will then provide the AUG Statement and Table to the CDSP.	The final AUG Statement for Gas Year 2024-2025 will be provided to the Gas Transporters by 31 March 2024.
The AUG Expert will ensure that all data that is provided to it by parties will not be passed on to any other organisation or used for any purpose other than the creation of the methodology and the AUG Statement and Table.	All data received from any external party in relation to our role as AUGE has not been shared with any other party, nor used for any purpose other than that of the creation of the methodology and the AUG Statement and Table.
The AUG Expert shall ensure that all data provided by Code Parties will be held confidentially, and where any data, as provided or derived from that provided, is published then it shall be in a form where the source of the information cannot be reasonably ascertained.	Engage Consulting's policies in relation to protecting information ensure that all AUG data is kept secure. As AUGE we have treated all confidential data appropriately and only used this for the purpose provided.
The AUG Expert will act with all due skill, care and diligence when performing of its duties as the AUG Expert and shall be impartial when undertaking the function of the AUG Expert, ensuring that any values derived will be equitable in their treatment of Code Parties.	We have performed our duties as AUGE with a high level of skill, care and diligence and in a completely impartial manner, seeking to allocate UIG to the Matrix Positions contained in the AUG Table on as equitable a basis as possible. To ensure an impartial approach, we have also maintained a record of all our contacts with external parties in relation to the AUGE service.
The AUG Expert will compile the methodology and AUG Statement and AUG Table in accordance with this Framework.	Our Quality Assurance processes have ensured that all the work that we have undertaken in our role as AUGE has been conducted in accordance with the AUGE Framework. Our AUGE team includes a Quality Lead independent of our Service Delivery Lead and Subject Matter Experts. We maintain Director-level oversight of delivery and quality.

Appendix 2 – List of Data Sources

Report Name	Report Description	Source	Frequency	Use
Accepted Reads for Isolated Sites	Details of the accepted meter reads for Supply Meter Points with a live isolation status	CDSP	Annual	Isolated Sites (160)
Reconciliation percentages	Historical allocation energy and allocation reconciled energy by month for each EUC band	CDSP	3x a year	No Read at the Line in the Sand (090)
AMR History	A report of all the Supply Meter Points with AMRs previously installed	CDSP	Annual	Theft of Gas (010)
AMR Snapshot	Details of all the Supply Meter Points with an AMR device	CDSP	Annual	Theft of Gas (010)
Annual Load Profile	Annual Load Profiles for Gas Year 2023-2024	CDSP	Annual	Shipperless Sites (025) Unregistered Sites (020) Consumption Forecast
AQ Snapshot	The number of Supply Meter Points and associated AQ for each Matrix Position for each LDZ	CDSP	Monthly	Consumption Forecast
Average Main Length	The average length of main for IGT Supply Meter Points	INA	n/a	IGT Shrinkage (060)
Calorific Values (CV)	The daily CV used in Settlement for each LDZ	Public Domain (National Gas data portal)	Annual	IGT Shrinkage (060)
Connection Details for Orphaned Sites	A report of Supply Meter Points that used to appear on the Orphaned Sites report but which have since been registered to a Shipper	CDSP	Monthly	Unregistered Sites (020)

Connection Details for Shipperless Sites	A report of the Supply Meter Points that used to appear on either the SSrP report or the PTS report, but which have since been registered to a Shipper	CDSP	Monthly	Shipperless Sites (025)
Conversion Equipment Fitted	A report of the Supply Meter Points that have volume conversion equipment fitted and their associated AQ	CDSP	Annual	Average Pressure Assumption (070) Average Temperature Assumption (080) Incorrect Correction Factors (100)
Correction Factor	Correction factors for all Supply Meter Points with an AQ greater than 732,000 kWh	CDSP	Annual	Average Pressure Assumption (070) Incorrect Correction Factors (100)
Dead Sites	A report of the Supply Meter Points that have been identified as Dead	CDSP	2x a year	Dead Sites (200)
Embedded AMR	Details of all the Supply Meter Points with an embedded AMR device	CDSP	Annual	Theft of Gas (010)
Flow Weighted Gas Temperatures	Gas Temperature Data from DMTS and ICTS	DNV (BG Technologies)	n/a	Average Temperature Assumption (080)
IGT Sites	A snapshot of the number of Supply Meter Points Connected to IGTs	CDSP	Annual	IGT Shrinkage (060)
In-Service Testing (IST) Results	In-service testing results of domestic sized meters	DESNZ (OPSS)	Annual	Consumption Meter Errors (040)

Isolated Sites	A report of the Supply Meter Points that have been identified as Isolated	CDSP	3x a year	Isolated Sites (160)
Isolated AQ Report	A report of Supply Meter Points that used to appear on the Isolated Sites report but which have since been re-connected	CDSP	Annual	Isolated Sites (160)
Leakage Rates	Leakage rates from the NLT	Public Domain	n/a	IGT Shrinkage (060)
Legitimate Unregistered Sites Details	A report of Supply Meter Points that have legitimately never been registered to a Shipper	CDSP	Monthly	Unregistered Sites (020)
Less Than 12 months report	A report of Unregistered Sites which have been unregistered for less than 12 months	CDSP	Monthly	Unregistered Sites (020)
Meter Location	Snapshot providing the number of Supply Meter Points and Associated AQ split by meter location and by LDZ Matrix Position	CDSP	Annual Snapshot	Average Temperature Assumption (080)
Meter Type	Details of the meter types and installation year for each LDZ Matrix Position	CDSP	Annual	Theft of Gas (010) Consumption Meter Errors (040)
Monthly Reconciliation	Monthly report of direct reconciliations since June 2017	CDSP	Monthly	Comparison to Observed Levels of UIG
Offline Adjustment	Summary of offline adjustments provided by supply month and reconciliation month	CDSP	2x a year	Comparison to Observed Levels of UIG
Orphaned Sites	A report of Supply Meter Points that have been unregistered for at least 12 months, have never been registered to a Shipper and where there has been an indication of meter activity	CDSP	Monthly	Unregistered Sites (020)

Post Code and Elevation Data	The altitude of each postcode in Great Britain	Open Data[47]	n/a	Average Pressure Assumption (070)
Pressure Data	Historical Pressure information by Weather Station	CDSP	n/a	Average Pressure Assumption (070)
Rejected Reads for Isolated Sites	Details of the rejected meter reads for Supply Meter Points with a live isolation status	CDSP	Annual	Isolated Sites (160)
Rejected Reads for Dead Sites	Details of the rejected meter reads for Supply Meter Points with a status of Dead	CDSP	Annual	Dead Sites (200)
Rejected Reads for Sites with No Read	Details of the read rejections carried out on the Supply Meter Points with no Reads after April 2020 report	CDSP	Annual	No Read at the Line in the Sand (090)
Shipperless AQ Report	A report of the AQ changes for Shipperless Sites that are now connected	CDSP	Annual	Shipperless Sites (025)
Shipperless Sites PTS	A report of the Supply Meter Points that have been identified as Shipperless Sites on a GSR visit where the meter is the same as that previously in place	CDSP	Monthly Snapshot	Shipperless Sites (025)
Shipperless Sites SSrP	A report of the Supply Meter Points that have been identified as Shipperless Sites on a GSR visit where the meter is different to that previously in place	CDSP	Monthly Snapshot	Shipperless Sites (025)
Smart Meter Data	Smart Meter Installation data by quarter from DESNZ	Public Domain (DESNZ)	n/a	Consumption Forecast Consumption Meter Errors (040)

[47] Attribution: Contains OS data © Crown copyright and database right 2017; Contains Royal Mail data © Royal Mail copyright and database right 2017; Contains National Statistics data © Crown copyright and database right 2017.

Supply Meter Points with no Reads after April 2021	Details of the Supply Meter Point ID, their AQ and the last read for Supply Meter Points with no actual read after April 2021	CDSP	Quarterly Snapshots	No Read at the Line in the Sand (090)
Theft Data	A report of the thefts from Smart and Traditional meters provided by a sub-set of EUK members	EUK	n/a	Theft of Gas (010)
TRAS/GTDIS Theft Information	The data outcome file from TRAS/GTDIS, verified and enhanced by the CDSP with meter type data	REC Co/ CDSP (via CDSP)	Annual	Theft of Gas (010)
Throughput	Daily Total throughput, DM allocation, NDM allocation and UIG by LDZ and EUC	CDSP	Monthly	Comparison to Observed Levels of UIG
TOG Theft Information	Details of theft provided to Xoserve within CMS	CDSP	2x a year	Theft of Gas (010)
Unregistered AQ Report	A report of the AQ changes for Unregistered Sites that are now connected	CDSP	Annual	Unregistered Sites (020)

Appendix 3 – Actual Annual Quantities and Supply Meter Points

The tables below provide the sum of the AQs and the number of Supply Meter Points broken down by Matrix Position for two points in time (November 2022 and November 2023). These have been included as reference points against which our Consumption Forecast can be compared.

Aggregate AQ (GWh) – February 2023:

	CLASS			
EUC BAND	1	2	3	4
1ND	-	-	50,411	219,873
1PD	-	-	630	14,663
1NI	0	0	2,115	8,779
1PI	-	-	1	38
2ND	-	-	188	5,673
2PD	-	-	3	182
2NI	-	3	6,870	13,359
2PI	-	-	1	6
3	1	28	6,991	12,029
4	2	241	7,859	12,957
5	27	205	4,793	9,547
6	350	1,132	3,393	9,417
7	770	2,280	3,266	8,325
8	4,860	4,217	1,781	10,051
9	51,707	422	259	1,275
				480,979

Aggregate AQ (GWh) – February 2024:

	CLASS			
EUC BAND	1	2	3	4
1ND	-	-	37,488	209,814
1PD	-	-	4,111	11,683
1NI	0	0	2,116	8,920
1PI	-	-	1	35
2ND	-	-	112	5,431
2PD	-	-	1	179
2NI	0	7	6,721	12,963
2PI	-	-	2	6
3	1	65	6,735	11,399
4	4	273	7,107	12,131
5	33	295	4,090	9,316
6	269	1,225	2,807	9,727
7	1,256	2,234	2,283	9,227
8	5,697	4,101	1,156	9,589
9	44,388	389	60	865
				446,315

Total Supply Meter Points – February 2023:

	CLASS			
EUC BAND	1	2	3	4
1ND	-	-	4,540,285	17,933,379
1PD	-	-	62,300	1,678,177
1NI	3	10	80,890	430,490
1PI	-	-	37	3,222
2ND	-	-	1,738	50,067
2PD	-	-	25	1,619
2NI	-	16	45,673	95,665
2PI	-	-	5	53
3	1	50	15,670	26,877
4	1	189	6,580	10,922
5	7	54	1,418	2,805
6	33	111	382	1,040
7	35	108	158	395
8	103	104	44	254
9	353	4	4	18
				24,991,374

Total Supply Meter Points – February 2024:

	CLASS			
EUC BAND	1	2	3	4
1ND	-	-	3,533,691	18,722,777
1PD	-	-	522,924	1,551,984
1NI	7	14	87,317	451,023
1PI	-	-	108	3,452
2ND	-	-	1,031	47,251
2PD	-	-	13	1,610
2NI	2	35	44,666	92,752
2PI	-	-	9	54
3	1	123	15,121	25,426
4	3	216	6,013	10,228
5	8	77	1,200	2,720
6	26	121	314	1,063
7	56	103	112	437
8	127	98	30	247
9	310	5	1	11
				25,124,917

Appendix 4 – Future Considerations

In this Appendix we have collated for reference a list of suggestions and considerations for potential UIG contributors, or refinements to methodologies for existing contributors. Some considerations arise during our own investigation and analysis. Others are proposed by industry stakeholders during consultation or stakeholder meetings.

At the start of each AUGE year, entries on this list will be reassessed, regardless of the outcome of previous assessments. Previous considerations that have been incorporated into our ongoing methodologies are removed from the list.

Contributor	Future Considerations
010 Theft of Gas	Our experience and discussion with industry parties indicates that the approach to detecting theft varies greatly between Shippers. On this basis, overlaying Shipper identities to theft datasets would validate this view and allow us to predict the likelihood of theft being detected according to the trend of market share among Shippers. This is not possible using only anonymised datasets. To progress this we would need the Shipper identifier to be provided within the theft datasets.
010 Theft of Gas	Consider any iterations or updates made to the RECCo Theft Estimation Methodology.
025 Shipperless Sites	We progressed the potential inclusion of Shipperless Sites awaiting their GSR visit in our data and analysis for the 2022-2023 Gas Year. To progress this further we will need up to date GSR visit outcome data that has to date been unavailable.
040 Consumption Meter Errors	We will consider the potential impact of flow rates on Consumption Meter errors. To progress this we would require Shippers to provide us with within day consumption information for high consuming Supply Meter Points. This may not be available.

Contributor	Future Considerations
050 LDZ Meter Errors	The analysis we undertook under the Consumption Meter Errors (040) contributor found an inherent bias in the accuracy of domestic diaphragm and ultrasonic meter types and concluded that this is the source of material UIG. It is possible that an inherent bias exists for LDZ meters. If it does, the UIG associated with this could be significant. For example, a hypothetical bias of a modest 0.10%, would result in circa 500 GWh of UIG per annum. However, we were unable to find any data of studies that informed this. To progress this would require in-field testing of LDZ meters and the results provided to us. Note this contributor has been discounted as insignificant to our overall UIG model; but new information on inherent bias at LDZ meters would be a reason to reconsider its inclusion.
060 IGT Shrinkage	We have considered the impact of gas lost in the purging of new mains and services; own use gas; and network theft of gas, on IGT shrinkage. Whilst the impact of the first two of these is almost certainly minimal in comparison to overall IGT shrinkage, the impact of network theft might not be. To progress this we would require IGTs to provide us with records of theft from their networks. This may not currently exist.
060 IGT Shrinkage	Contact Independent Networks Association to discuss assumptions and approach. This will be progressed for 2025-2026 Gas Year.
070 Average Pressure Assumption	Our pressure calculation is based on a small number of weather stations and an average altitude. Accuracy could be increased by using a larger set of weather data. To progress this the additional pressure data would need to be purchased and provided to us.
080 Average Temperature Assumption	Our calculation uses temperature studies that are almost 20 years old and little information is provided on how common the dataset is used. An updated study could be commissioned to get some more up to date information. To progress this would require a temperature study which has been proposed under our innovation service.

Contributor	Future Considerations
090 No Read at the Line in the Sand	Further enhancements to our calculation include more accurately calculating the AQ at risk. Because of the dataset available to us, our method only tracked the sites with no read for a limited amount of time. If these sites are tracked for an extended period, the accuracy of our estimation of AQ at risk will increase. This will occur as we continue to request this data as part of the annual data request process.
090 No Read at the Line in the Sand	Understanding in more detail the causes of missing meter reads would require close investigation and probably access to Shipper systems but could lead to a more accurate estimation of UIG, or a new source of data to be used in future methodologies. To progress this we would need to have access to data from Shipper systems or be provided with information about why Supply Meter points do not have a read for an extended period of time.
090 No Read at the Line in the Sand	Our investigation into Must Reads provided very limited results. Therefore, we would suggest a more detailed review into why Must Reads for monthly read sites were not being completed before the Line in the Sand. To progress we would require information on failed Must Reads. Output from UNC Review Group 0812R could be considered.
100 Incorrect Correction Factors	Our Correction Factor calculations are based on applying averages and assumed deviation from those averages. We did not identify on an individual basis those Supply Meter Points with incorrect Correction Factors set. We will investigate the possibility of reviewing the exact values applied at each Supply Meter Point. Additionally, the industry could consider organising an audit of all Correction Factors. To progress this would currently require work under the innovation service as it is outside of the scope of the core AUGE activity.
130 Consumption Adjustments	We will consider UIG attracted by Consumption Adjustment Errors, in line with our initial assessment procedure, for subsequent years. Assessment for the 2024-2025 Gas Year did not score this contributor highly enough to warrant investigation. This potential contributor will remain on our list for assessment for Gas Year 2025-2026.

Contributor	Future Considerations
160 Isolated Sites	Some sites in our Isolated Sites dataset may usefully be excluded with further validation. We will consider investigating additional ways to validate the Isolated Sites data to improve the accuracy of the output from this contributor. To do this we will require further site-specific data, for example vacancy status, electricity reads etc.
160 Isolated Sites	We use available AQ data to forecast the future state of the Isolated Sites dataset. There may be ways to improve the accuracy of this forecast by looking for alternative data to validate the AQ values used. We did attempt to look at this further for the 2024-2025 Statement, however, were not able to get enough reliable data. This will be looked at again next year to assess whether additional data is available to improve the accuracy of AQ assumptions for Isolated Sites. This is likely to require historical read data for sites in the relevant dataset.
180 Unfound	Continue to consider this contributor as the gap between observed levels of UIG and our calculations continues to grow and industry interest is high.
210 Shrinkage Error	Follow development of Modification 0843 and continue to assess this contributor.
UIG Calculation	Our calculation of UIG provides a single value for each contributor. A confidence rating could be added to our UIG calculation to display how certain we are with the calculated UIG value. To progress this would require further research and analysis into feasibility and options for approach.
UIG Calculation	Further validation of our outputs may give stakeholders additional confidence in their accuracy. We will consider the appropriateness and practicality of further 'top down' validation of the UIG we calculate.
Validation of our estimates of UIG with observed actual levels for previous years	As UIG data from Gas Years 2021-2022 & 2022-2023 continues to mature we will consider using this actual data to inform our future UIG estimates.
Consumption Forecast	Explore different ways to predict future gas consumption building on adjustments made to the forecast methodology this year. Consider further suggested data sources.

Contributor	Future Considerations
Overarching approach and methodology principles	Consider the broader impact of methodology principles, Terms of Reference, priorities and desired outcomes that shape the AUGE's output, especially in the context of allocating Unfound UIG.

Appendix 5 – Changes Made After Consultation on the Draft Statement

Below is a record of the material updates made since consultation on the draft Weighting Factors for 2024 - 2025.

Area	Update
Changes incorporated in the proposed final AUG Statement (published 1 March 2024)	
Consumption forecast	Change in approach to forecasting consumption in some Matrix Positions to temper the impact of recent AQ reductions on future view.
Updated datasets	Updated datasets and data validation for Theft, No Read at the Line in the Sand, Consumption Meter Error.
Changes incorporated in the final AUG Statement (published by 31st March 2024)	
TBC	

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