GL Noble Denton

Report Number: 12548	30th April 2012

2012 Allocation of Unidentified Gas Statement for 2013/14

Not Restricted	GL Noble Denton

Prepared for:

Uniform Network Code Committee

Prepared by:

Andy Gordon, Clive Whitehand, Tony Perchard

GL Industrial Services UK Ltd trading as GL Noble Denton

Holywell Park
Ashby Road
Loughborough Leicestershire
LE11 3GR
United Kingdom

Tel: +44 (0)1509 28 2000
Fax: +44 (0)1509 28 2141

E-mail: AUGE@gl-group.com

Website: www.gl-nobledenton.com

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1.0	Tony Perchard, Clive Whitehand	Taheer Hajat	30/04/2012

Previous issues of this document shall be destroyed or marked SUPERSEDED

Executive Summary

This document contains details of the methods developed by the Allocation of Unidentified Gas Expert (AUGE) for estimating the overall level of Unidentified Gas (UG) and splitting it between market sectors, the data requested to support this analysis, and the data received following such requests. Estimates of the total energy value of UG split by LDZ and source will be provided once the methods described in this document have been approved by the Uniform Network Code Committee (UNCC).

In addition to the above, this document describes how the AUGE has followed the published guidelines to date, and contains proposed future analyses for further development of the calculation methodology.

Following the approval and publication of the Allocation of Unidentified Gas statement (AUGS) covering April 2012-March 2013, this document is the first draft 2012 AUGS for the period April 2013 – March 2014.

The document is largely based on the methodology developed in 2011[20]. There are areas of the methodology that have or are being revisited and the progress of these activities will be covered in this draft. Some of the analysis is ongoing and the outcome will not be complete for this draft: these results will be covered in the second draft later in the year. The AUGE has also monitored network code modifications and assessed whether any of these impact the methodology or need incorporating (e.g. Mod 369 etc).

For each area of UG under consideration, the AUGE has provided details of the proposed method of estimating the level of UG from this source, and where necessary, the method of splitting this estimate between Larger Supply Point (LSP) and Smaller Supply Point (SSP) markets.

It should be noted that the latest calculation method is based on a technique of estimating the total level of UG, directly calculating its individual component parts where possible, and calculating the aggregate effect of the remaining causes (i.e. those that it is not possible to estimate directly in a robust manner) by subtraction as the Balancing Factor. The elements of UG included in the Balancing Factor are:

- Theft
- Errors in the Shrinkage Estimate
- Open Bypass Valves
- Meters “Passing Unregistered Gas”
- Unknown Sites
- Additional Common Cause Variation

Contents

1 Introduction

1.1 Background

The Great Britain gas industry can be segmented into two market sectors; Larger Supply Points (LSP) and Smaller Supply Points (SSP). These sectors are defined by the Annual Quantity (AQ) of gas offtaken from the system in a year. Larger Supply Points have an AQ of 73,201kWh and above, Smaller Supply Points have an AQ of up to 73,200kWh. Many processes within the gas industry differ between these two sectors.

The majority of gas consumed in Great Britain is metered and registered. However, some gas is lost from the system, or not registered, due to theft, leakage from gas pipes, consumption by unregistered supply points and other reasons. Of the gas that is not directly consumed/measured some can be, and is, modelled and some is not. The gas that is lost and not recorded is referred to as Unidentified Gas (UG).

Prior to April 2012 there was no methodology in place to determine the allocation of UG between the LSP and SSP market sectors; and UG was allocated entirely to the SSP market sector (an interim amount was allocated for 2011/12). Through the approval of Modification 229 (implemented in UNC section H 10 – Mechanism for correct apportionment of unidentified gas [7]) and the appointment of an Allocation of Unidentified Gas Expert (AUGE) a methodology has been defined to ensure that UG can be estimated and charged equitably to the relevant gas sectors.

Under the current Uniform Network Code (UNC) charges are made to Shippers for the volume of gas transported, which include commodity and energy charges. For LSPs the actual value charged is determined by the volume of gas transported as measured by the metering equipment. For SSPs, the commodity charge is derived by calculating the difference between the volumes of gas measured coming in to the network and the volume of gas measured by the LSPs. Each Shipper with an SSP portfolio is charged a proportion of the total SSP market in proportion to their Annual Quantity (AQ) value against the total SSP market AQ.

There had been several UNC modification proposals intended to resolve this issue (Mod 194 [3], 194a [4], 228 [5], 228a [5]), none of which have been accepted by the industry. A further modification, Mod 229 [7] provided for the appointment of an expert (the Allocation of Unidentified Gas Expert or AUGE) with responsibility for determining of the value of UG so that relevant quantities could be allocated to the correct market sectors.

GL Noble Denton was appointed to the role of AUGE in 2011 and developed a methodology to apportion UG fairly across both the LSP and SSP market sectors.

1.2 High Level Objectives

The AUGE's high level objectives are:

- To determine data required from industry bodies to evaluate UG
- To develop and update the methodology of calculating UG
- To publish the methodology in the AUGS (this document)
- To consult with the industry bodies and respond to questions / issues raised
- To prepare an AUG table containing UG totals and rates

1.3 Scope

This document contains the following:

- Summary of the previously approved methodology
- Description of areas of the methodology that are being developed further and proposed approach
- Summary of data requested, received and used, and associated assumptions
- Questions raised by the industry bodies during consultations and responses as appropriate (this is provided as a separate document)

The final AUGS Table and financial estimates will be included in this document lat6er in the year once the methodology has been re-approved.

1.4 Out of Scope

The AUGS is not concerned with issues regarding the deeming algorithm or the RbD mechanism.

1.5 Document status

This section provides a status summary of the Unidentified Gas methodology as contained in this version of the AUGS. Estimates of the energy value and financial value of UG have not been made at this stage, and will be provided when the methods detailed in this AUGS have been approved by the UNCC. Table 1 below shows the status of each element of UG:

TABLE 1: UNIDENTIFIED GAS ESTIMATE STATUS

Unidentified Gas Subject	Data Status	Methodology Status	AUGS Status
Unregistered Sites	Updated data provided every two months	Complete	Methodology described in 2011 AUGS [20]
Shipperless Sites	Updated data provided every two months	Complete	Methodology described in 2011 AUGS [20]
IGT CSEPs	Updated data provided every two months	Complete	Methodology described in 2011 AUGS [20]
Shrinkage Error	N/A	Complete	Methodology described in 2011 AUGS [20]
Shipper Responsible Theft	Theft data covering detections to end 2011 received	Based on method derived in 2011 with one adjustment	Discussion of method in 2011 AUGS [20] and summarised in this document with proposed change.
Metering errors (SSP supply point, NDM LSP Supply point, LDZ offtake metering)	Complete	Complete	Methodology described in 2011 AUGS [20]
Overall UG estimate using current methodology	Partially Received (please see section 5, Table 3)	Under Review	Methodology described in 2011 AUGS [20] but may be refined subject to further analysis
Overall UG estimate alternative method using consumptions	Initial sample received in 2011, larger sample requested in 2012 expect to receive data in June 2012.	In development	Alternative method described and data request documented in this draft

2 Compliance to Generic Terms of Reference

This section describes how GL Noble Denton has adhered to the Generic Terms of Reference described in section 5 of the AUGE Guidelines [1].

The AUGE will create the AUGS by developing appropriate, detailed methodologies and collecting necessary data.

The AUGE has provided further data requests to Xoserve to evaluate/develop an alternative consumption based methodology of calculating overall UG. In this draft the AUGE sets out other areas for improvement and these are described later in the document.

The decision as to the most appropriate methodologies and data will rest solely with the AUGE taking account of any issues raised during the development and compilation of the AUGS.

The proposed methodology and assessment of what constitutes UG in this draft has been decided solely by the AUGE based on information supplied by all parties. Comments raised by shippers relating to the 2011 AUGS for 2012/13 have been considered and responses issued, as detailed in Section 7 below. All views expressed have been considered, although all final decisions are the AUGE's own.

The AUGE will determine what data is required from Code Parties in order to ensure appropriate data supports the evaluation of Unidentified Gas.

The AUGE has assessed what data is required to support the chosen methodology and has requested information from relevant parties. For this draft, updated data sets have been requested from Xoserve which includes additional requests for consumption data.

The AUGE will determine what data is available from parties in order to ensure appropriate data supports the evaluation of Unidentified Gas.

The AUGE has determined data available following discussions with Xoserve, as much of the data required for this analysis is held by them.

The AUGE 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.

No questions have been raised for the preparation of this draft.

The AUGE will use the latest data available where appropriate.

The most recent data available has been requested and received where appropriate. Xoserve have set up several processes for producing reports containing new data on a regular basis. These will continue to be supplied to the AUGE to ensure that the latest data is used for each analysis where appropriate.

Where multiple data sources exist, the AUGE will evaluate the data to obtain the most statistically sound solution, will document the alternative options and provide an explanation for its decision.

AQ data is used in the calculation of allocation algorithm bias, and this is available from a number of different sources. These sources differ in their treatment of sites that fail AQ recalculation, SSP/LSP

threshold crossers, etc. The most appropriate data set was selected for this analysis and used for calculations, and details can be found in Section 6 of the 2011 AUGS for 2012/13 [20].

Where data is open to interpretation, the AUGE will evaluate the most appropriate methodology and provide an explanation for the use of this methodology.

This guideline has not needed to be applied.

Where the AUGE considers using data collected or derived through the use of sampling techniques, then the AUGE will consider the most appropriate sampling technique and/or the viability of the sampling technique used.

A sample of individual SSP site consumption data has been requested from Xoserve for the 2013/14 analysis. The most accurate results will be achieved with the largest amount of data, and so at present all available data has been requested. If it is not practicable for Xoserve to supply this volume of data, a smaller sample will be used, with the sampling technique to be used explicitly defined in the data request.

The AUGE will present the AUGS in draft form (the "Draft AUGS"), to Code Parties seeking views and will review all the issues identified submitted in response.

The AUGE has documented and reviewed all feedback resulting from the 2011 AUGS for 2012/13. Section 8 of this document contains a summary of the issues raised, with the full text of the comments from the Code Parties and the AUGE responses contained in separate documents published on the Joint Office of Transporters website.

The AUGE will consider any query raised by a Code Party with regard to the AUGS or the data derived, and will respond promptly with an explanation on the methodology used.

Responses were issued to all parties who submitted comments on the 2011 AUGS for 2012/13 and these are noted in Section 8. Separate documents provide the detail of all responses [24].

The AUGE will consider any relevant query that was raised during the creation of the previous AUGS and was identified as requiring a change to the AUGS, but was not incorporated into the immediately previous AUGS.

A method for directly estimating total UG from meter read data rather than from RbD and algorithm bias has been created and is currently being assessed pending consumption data.

The AUGE will provide the Draft and Final AUGS to the Gas Transporters for publication.

This draft is provided to the GTs for publication on 1st May 2012.

The AUGE's final determination shall be binding on Shippers except in the event of fraud, material breach, or where The Committee unanimously considers it is so clearly erroneous for it to be inapplicable.

This guideline has not needed to be applied at this stage.

The AUGE will undertake to ensure that all data that is provided to it by all parties will not be passed on to any other organisation or used for any purpose other than the creation of the methodology and the AUGS.

On receipt of data, the AUGE has stored the data on our secure project storage area with limited access by the consultants working on the project. The AUGE can confirm data used in the analysis has not and will not be passed on to any other organisation.

The AUGE 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.

Data is stored on our secure project storage area and access limited to those working on the project. Any data that contains market share or code party specific information has been and will be made anonymous to ensure the source of the information cannot be ascertained.

3 Summary of Previous Analyses

This section summarises previous analyses and proposals for the Allocation of Unidentified Gas. This is not intended to repeat previous findings but recognise that a lot of work has been carried out previously to solve this problem.

Methodologies to apportion UG to the LSP/SSP markets have been proposed in a number of network code modifications, notably Mods 194 [3], 194A [4], 228 and 228A [5]. In addition Mods 115 and 115A [21] sought to correctly apportion NDM error.

Mod 194 proposed an RbD Allocation table which would apportion a percentage of UG to the SSP and Non-Daily Metered (NDM) LSP and Daily Metered (DM) LSP sectors.

Mod 194A was based on 194 and proposed assigning a fixed volume of UG to the NDM LSP and DM LSP sectors.

Neither proposal populated the tables, with the intention that this would be done via future modification amendments.

Mod 228 proposed to populate the RbD Allocation table defined in Mod 194 with a percentage of UG allocated to each market sector and a methodology to derive these values. Mod 228 also included a paper [18] from CEPA LLP reviewing the proposed methodology.

Mod 228A was based on Mod 228 and proposed fixed values instead of percentages, again with a methodology to derive these values.

None of the above modifications were approved and the rationale for this decision is documented in OFGEMs decision letter of 26th May 2010 [13].

In 2004 OFGEM carried out a study on theft in the GB Gas and Electricity Industry [15] followed up by a next steps document in April 2005 [8]. This showed quite a lot of variation year on year for alleged and proven theft cases. It was also noted that increases in allegations were partly attributed to increased detection activity by the Shippers. One common theme was lack of information regarding the levels of unknown theft and estimates on this vary significantly.

The 228/228A modification report [5] considered three options to calculate theft apportionment and proposed adoption of the third option:

- Estimates based on AQ proportions
- Corrected percentage of 'valid' theft energy
- Simple average between allegations and detected theft

However, it also attributed residual RbD error as being theft. The TPA Solutions report on Mod 228/228A [6] concluded that the hypothesis that reconciliation quantities comprise theft as proposed by Mod 228 did not stand up to scrutiny.

There have been several network code modifications considering theft. Mod 274 [10] proposed an independent agent to determine strategies to improve investigation/detection and prevention but was closed on 26th April 2011. Mods 231, 277 and 346 aimed to improve / consider issues with regard to incentives for detection of theft. On March 26th OFGEM published non-implementation letters [23] for all of them.

A further modification, Mod 399 [25] to provide transparency of theft detections is at the final report stage.

The 2011 AUGS for 2012/13 [20] provided a methodology to estimate UG and apportion between LSP and SSP sectors. The summary of the methodology and improvements is described in the rest of this document.

4 High Level Overview of Methodology

This section provides a high level overview of the methodology. For each of the areas of UG presented here a more detailed discussion of each and subsequent methodology (as appropriate) is described in Section 6 and/or in the 2011 AUGS for 2012/13 [Ref 20].

4.1 LDZ Load Components

Daily load (as measured or calculated at the Supply Meter Point) falls into thee relevant categories as far as the reconciliation process is concerned. These are:

Daily Metered (DM) Load

This is by definition metered and known on an ongoing daily basis.

Larger Supply Point Non Daily Metered (LSP NDM) Load

The deemed load is first calculated using the allocation algorithm on a daily basis. It is then corrected when genuine meter reads become available, with reciprocal corrections being made to the Smaller Supply Point load via Reconciliation by Difference (RbD). At present, the effect of RbD is usually to reduce LSP NDM load. This is evidenced by the fact that across the three calendar years from 2008 to 2010, 79% of RbD values were positive, and the average monthly reconciliation quantity (including both positive and negative values) was 44.2 GWh. Note that these figures will be revisited on receipt of updated RbD data.

Smaller Supply Point (SSP) Load

This is calculated using the same allocation process used for LSP NDM load on a daily basis. When actual LSP NDM readings become available, this is subject to RbD, the effect of which is usually to increase the SSP load as described above.

The sum of these three load components does not equal the gas intake into the LDZ due to the presence of two further factors, as follows:

Shrinkage

LDZ Shrinkage occurs between the LDZ offtake and the end consumer (but not at the Supply Meter Point - the LDZ shrinkage zone stops immediately before this point). It covers:

- Leakage (from pipelines, services, AGIs and interference damage)
- Own Use Gas
- Transporter-responsible theft

The majority of shrinkage is due to leakage, and the overall LDZ shrinkage quantity is calculated using the standard method defined in the Unified Network Code (UNC).

Unidentified Gas

UG occurs downstream of Shrinkage, i.e. at the Supply Meter Point. It potentially covers:

- Unregistered and shipperless sites
- Independent Gas Transporter CSEP setup and registration delays

- Errors in the Shrinkage estimate
- Shipper-responsible theft
- Meter errors – this includes LDZ offtakes, LSP consumer meters and SSP consumer meters

UG is currently unknown and hence must be estimated.

In addition to the above factors, there may also be a small element of Stock Change, which represents the difference between opening and closing stock on any given gas day. Given that aggregate UG is based on annual rather than daily consumptions, any adjustment due to stock change (which in this case would be the difference in stock between the start of the UG year and the end of the UG year) will be negligible. It has therefore been discounted from calculations.

4.2 Unidentified Gas Methodology

The method of calculating UG is described in detail in the 2011 AUGS for 2012/13 [20]. This 2012 AUGS for the 2013/14 formula year contains an overview of all methods, plus extended details where the methods have changed from the previous version.

The general principle of the UG calculation is to first estimate the total figure using the most appropriate method, and then to calculate the value of individual components that make up the UG total where this is possible. The difference between the calculated total and the sum of the directly estimated components is referred to as the Balancing Factor, and contains the remainder of UG, which cannot be calculated directly. The Balancing Factor is comprised of UG elements for which data is either unavailable or unreliable.

Given the data currently available, it is only possible to reliably estimate the volume of UG assigned to the LSP sector. As discussed in [20], the volume of UG assigned to the SSP sector is likely to be small, and largely composed of gas that was consumed by the SSP sector. RbD assigns this SSP-consumed gas to the correct market sector already, as it assigns all UG to SSP. Hence any inaccuracies introduced into the calculations from the omission of UG assigned to the SSP sector are likely to be small.

Despite the relatively small size of this error, the AUGE recognises that it is important to estimate UG as accurately as possible in all circumstances. This is one of the drivers for investigating an alternative UG methodology (described in detail in Section 4.3 below) that, if successful, would be capable of estimating the SSP-assigned element in addition to the LSP-assigned volume that the current method covers. Data has been requested from Xoserve to allow an investigation of the alternative methodology to take place, and it is estimated that this will be received in the first week of June.

Therefore, based on the current situation, the default method of calculating the UG total remains the one presented in the 2011 AUGS for 2012/13 [20] i.e. estimating total UG with LSP-assigned UG. Full details of this method can be found in Section 6 of the 2011 AUGS for 2012/13 [20]. The AUGE will conduct a thorough investigation of the alternative consumption-based method once data has been received from Xoserve, and this method is described in Section 4.3.

It is known that data for each of the five potential components of UG (unregistered and shipperless sites, IGT errors, shrinkage error, shipper-responsible theft and metering errors) is available, along with background data on RbD values, AQs, allocation algorithm coefficients, etc. The quality of this data varies from component to component, and the AUGE has therefore attempted to identify the best method of calculating the total level of UG and the split between its causes based on the quality of information available for each component.

It is assumed throughout this document that the default approach to calculating the UG total (i.e. estimating the overall UG total with the LSP-assigned UG total) will remain in force for the 2012 AUGS for 2013/14. If the analysis of the consumption based approach indicates that it is viable, this assumption will change in future drafts of the 2012 AUGS.

Based on this assumption, the proposed approach is to first assess the extent to which load estimates from the allocation algorithm are skewed towards the LSP sector. This natural bias in the models can be compared to the RbD average over time, and the remainder of RbD (i.e. that element not caused by bias) can be attributed to LSP-assigned UG. This procedure provides a total figure for LSP sector assigned UG. Elements of this UG total that have good quality data can then be estimated directly, with the remaining elements for which insufficient data exists to produce a robust estimate grouped together and calculated by subtraction as the Balancing Factor.

Full details of this approach to the analysis, including full descriptions of the calculation methods for RbD bias, model bias and each individual element of LSP UG, are provided in Section 6 and in the 2011 AUGS for 2012/13 [20]. Brief descriptions of each LSP UG element are given below.

a) Unregistered and Shipperless Sites

The AUGE believe these sites should be included in the UG calculations. The data required for this element consists of the historic number and AQ of sites either late registered or unregistered, split by cause and market sector. UG from this source is then calculated by assigning calculated consumption profiles to the validated AQ values from these sites. Unregistered and Shipperless sites that contribute to UG are split into the following sub-categories:

- Shipper Activity
- Orphaned Sites
- Unregistered <12 Months
- Shipperless PTS (Passed to Shipper)
- Shipperless SSrP (Shipper Specific Report)
- Without Shipper <12 Months

b) IGT Connected System Exit Point (CSEP) Setup and Registration Delays

IGT CSEP setup and registration delays should also be included in the UG calculation. UG from this source is due to networks owned by iGTs but not present in Xoserve's records, and also comes from unregistered sites on known CSEPs. The data required for this analysis consists of the number and composition of unknown networks (number of sites and AQ split by market sector), and the number and AQ of unregistered sites on known networks.

c) Shrinkage Error

Shrinkage errors affect the RbD calculation in that initial estimates of shrinkage are used during the allocation process, and the final shrinkage estimates may differ from these. In addition, the Shrinkage Model, which is used to estimate shrinkage values, may return output that differs from actual shrinkage, which is unknown.

The nature of the shrinkage calculation means that these issues only affect the SSP load and the shrinkage account, and they can be either positive or negative. Therefore neither constitutes UG as such (because UG is a physical quantity of gas that has been burnt in an unrecorded manner), but represent a separate issue that affects the RbD process and is, in part, dealt with within that process.

With reference to the difference between initial and final shrinkage estimates, the final shrinkage figures are only known at the end of the gas year, and hence any correction used before this point is based only on an anticipated shrinkage amendment – i.e. an estimate of the error. Whilst the shrinkage error is very small compared to the RbD volume, any estimate of it would necessarily be subject to a large degree of uncertainty. Given that under the current process, as described in Section N of the UNC, the SSP sector and the shrinkage account are reconciled based on final shrinkage quantities calculated after year end, this element is already adequately accounted for and should not be considered part of UG.

Shrinkage Model errors are very hard to quantify, given that actual shrinkage is unknown and that the models are built on the most accurate data available. This is therefore not an area that it is possible to calculate directly, but by default any effects of shrinkage model error are included in the Balancing Factor, and this is therefore where this element is captured.

d) Shipper-Responsible Theft

The AUGE propose that this element should be included in the UG calculation. Very little reliable data on theft exists, however, and whilst information for detected and alleged theft is available, theft by its nature is often undetected. Undetected theft levels are very difficult to quantify accurately, and theft estimates from different sources vary widely, from 0.006% of throughput (based on detected theft only) to around 10%. It is therefore very difficult to accurately estimate theft levels directly, and for this reason theft will be calculated by subtraction. It is part of the Balancing Factor, and considered over time, it forms the vast majority of that figure (based on an assumption that the shrinkage models are unbiased, so their contribution can be positive or negative and will sum to a value close to zero over time).

e) Meter Errors

Meter errors can affect RbD and/or UG depending on their source. Errors in LDZ offtake metering and DM supply metering affect RbD, whilst LSP NDM metering errors have the potential to contribute to UG. SSP metering errors have no effect on either figure as they are not used in the calculations. The AUGE have assessed this area and propose that the elements of metering error that actively contribute to UG are included in the analysis.

The calculation processes detailed above will allow a reliable estimate of UG to be calculated based on the latest available data, which will in turn be used to populate the UG table, the format of which is given in Section 7. It also gives a sound basis for the year-on-year update of these figures, given appropriate provision of up-to-date information as requested.

4.3 Alternative Method

Given that SSP and LSP consumption data has not been available to the AUGE up to the present time, the default method of estimating total UG using LSP-assigned UG has been developed. This calculation can be stated as follows:

$$\begin{aligned} \textit{LSP Assigned UG} &= \textit{Alloc LSP} - \textit{Metered LSP} - \textit{Model Bias} \\ &= \textit{RbD} - \textit{Model Bias} \end{aligned} \qquad (4.1)$$

When data for both SSP and LSP (metered) consumptions and SSP and LSP allocations is made available, then as long as this data is of sufficient quality, a more rigorous approach can be used. In order to use this approach, it will be necessary to have enough data to **accurately** estimate total LDZ SSP and LSP metered consumptions and aggregate allocations.

The use of the scaling factor SF in the allocation algorithm ensures that the aggregated LDZ allocations are scaled up to the correct total and hence the overall model bias across market sectors is zero. Therefore, total UG can be estimated as follows:

$$\textit{Total UG} = (\textit{Alloc SSP} + \textit{Alloc LSP}) - (\textit{Metered SSP} + \textit{Metered LSP}) \qquad (4.2)$$

This can be alternatively stated as:

$$\textit{Total UG} = \textit{Aggregate LDZ Load} - \textit{DM Load} - \textit{Shrinkage} - (\textit{Metered SSP} + \textit{Metered LSP}) \qquad (4.3)$$

This is the case because the aggregate allocations are scaled to total LDZ load with DM and shrinkage removed.

Using the first version of this equation (4.2), this creates a requirement for the following data for each LDZ:

1. Allocated LSP loads.
2. Allocated SSP loads.
3. Metered LSP loads plus the number of sites for which metered data is available.
4. Metered SSP loads plus the number of sites for which metered data is available.
5. Total number of sites in the LDZ (including those in CSEPs) for the LSP sector.
6. Total number of sites in the LDZ (including those in CSEPs) for the SSP sector.

The calculations will be carried out at the Formula Year level of granularity. It is envisaged that aggregate-level data (at a monthly if not an annual level) will be available for data items #1-#3. If only monthly data is available for these, this can be aggregated up to the annual total.

Note that whilst the equation intrinsically uses *LSP Alloc – LSP Metered* (which is what RbD is defined as), it is not possible to use RbD figures in place of the raw LSP information. This is because RbD also contains a significant proportion of retrospective corrections, and so each month or year's figures do not represent the true difference between allocated and metered LSP load in that time period. Therefore the raw figures for LSP allocations and LSP meters loads must be used in the UG alternative method calculations.

The first task is therefore to assess the availability and quality of the above listed data items. All of the listed data has been requested from Xoserve for a single LDZ so that an assessment can be carried out. This data is currently awaited, and it is estimated that it will be available in early June 2012.

All available data for the test LDZ has been requested, but certain issues with the data mean that it is already known that it will not be possible for Xoserve to supply full information for 100% of the sites in the LDZ. This is due to the following known issues:

1. A minimum of ≈10% of both SSP and LSP sites fail AQ recalculation due to a lack of meter reads. Therefore, by definition, meter reads for such sites cannot be supplied.
2. Xoserve do not have access to meter read data for sites in CSEPs. Whilst this will only have a minimal impact on the LSP market sector (because only a limited number of LSP sites lie in CSEPs), a larger proportion of SSP sites are within CSEPs and so the effect on this market sector will be larger.

In addition, there may be further issues with data availability and/or quality that may further restrict the quantity of data that can be supplied. The impact of these two known issues, as well as any further unknown issues, is to reduce the available dataset from being one that covers the entire LDZ to being a sample. As described below, the larger the sample the more accurate results that can be obtained from it, and so the AUGE has placed a strong emphasis on obtaining the largest volume of consumption data possible.

Whilst data has not yet been received, it is likely to differ between LSP and SSP markets:

- LSP consumptions for fixed time periods are required for RbD calculations, and so these processed consumptions should be available. These have been requested.
- SSP meter reads are used only for AQ calculations. Processed consumptions for time periods with fixed start and end points may or may not be available for this market sector.

Xoserve necessarily have to estimate annual consumption from meter reads for each SSP site as part of the AQ recalculation process. This calculation requires the following steps:

1. Calculate consumption between meter read dates.
2. Scale consumption figures to cover time period of interest (formula year Y).
3. Adjust annual consumption estimate to Seasonal Normal. The result of this calculation is the AQ for the site in question.

The data required for the UG calculation is that from Step 2, for all SSP sites for which data is available in the LDZ. It is recognised that this is an intermediate step in the calculation and as such if it is not stored then data from Step 1, along with details of the calculation process for Step 2, are required as an alternative in order to allow Step 2 to be replicated by the AUGE. This data, dependent on availability, has been requested.

Subject to the supply of appropriate data, if these calculations were carried out for **all** sites in a given LDZ, this would result in a reliable estimate of metered load for that LDZ and provide a basis for calculating total UG directly. As described above, however, this data will never be available for all sites:

- A certain proportion of sites also fail AQ recalculation due to a lack of meter reads, and hence consumption data for these is unavailable. This is believed to apply to at least 10% of sites for each market sector.
- A further percentage of sites lie in CSEPs and hence meter read data for them is unavailable. These sites will lie largely in the SSP market sector.

Therefore, at best a sample of approximately 90% of the LSP population and if we let x= percentage of sites that lie in CSEPS, then 90-x% of the SSP population will be available for each LDZ. This means that the total LDZ metered loads for each market sector have to be estimated from a sample rather than calculated from the full population, and this introduces uncertainty into the results.

When carrying out this estimation of total metered load based on a sample, a 95% confidence interval for the aggregate load can be produced. This is based around the Central Limit Theorem, an extension of standard Confidence Interval calculation procedure, and a Finite Population Correction.

The statistical distribution of individual metered loads is unlikely to be Normal. Regardless of the statistical distribution of the values themselves, however, the Central Limit Theorem states that the mean of a series of samples of size n will be Normally distributed, with a mean of $\bar{x}$ and a Standard Error of $S/\sqrt{n}$, where $\bar{x}$ is the mean of the sample taken and S is the Standard Deviation.

If a relatively large sample (greater than 5% of the entire population) is taken, it is appropriate to apply a Finite Population Correction to the Standard Error: this reduces the Standard Error in relation to the size of the sample taken, so larger samples lead to greater confidence in the estimate of the population mean, and hence a narrower Confidence Interval. The Finite Population Correction is defined as follows:

$$FPC = \sqrt{(N-n)/(N-1)} \qquad (4.4)$$

where N is the population size

n is the sample size

This procedure gives a 95% Confidence Interval, which is a range of values between which we can be 95% sure that the true population mean (i.e. the average consumption for a site in that market sector) lies.

For large samples such as those that will be used in these calculations, the high and low limits of the Confidence Interval are given by the following formula (which includes the Finite Population Correction):

$$95\%\ CI = \bar{x} \pm 1.96 \times S/\sqrt{n} \times \sqrt{(N-n)/(N-1)} \qquad (4.5)$$

where $\bar{x}$ is the sample mean

S is the sample SD

N is the population size

n is the sample size

This equation provides limits for the market sector mean demand, between which we are 95% sure that the true population value lies. The aggregate market sector demand is simply N times the mean, and so from the mean Confidence Interval it is easy to calculate an equivalent for the aggregate, simply by multiplying both the low and the high estimates by N.

The risk associated with estimating metered demand from a sample in this way is that the width of the resultant Confidence Interval may dwarf UG in magnitude and prevent meaningful conclusions from being drawn. This situation can be identified by the 95% Confidence Interval for metered loads resulting in the possible range of total UG including negative values. If this is the case then the uncertainty in the metered demand estimates caused by the sampling fraction is too great to allow meaningful conclusions about the likely size of UG to the drawn.

If this is the case then, depending on the nature of the Confidence Intervals produced, it **may** be possible to draw weaker conclusions that would allow the backup approach to be used. This backup approach is defined in Section 6.1 of the 2011 AUGS for 2012/13 [20], and allows the SSP-assigned volume of UG to be defined as a simple percentage of the LSP-assigned UG volume. If the uncertainty in the data prevents a direct calculation of the UG total as described above, LSP-assigned UG will continue to be calculated in the same manner as for the 2012/13 AUGS. For the 2012/13 formula year, the SSP-assigned percentage of UG was set to zero due to there being insufficient evidence to set it at any other value. Should the direct total UG calculation fail, however, the data **may** provide enough information to set this percentage at a non-zero value.

This can be done by recognising the nature of the Normal distribution defined by the Confidence Interval for each market sector. Whilst the true population mean *can* fall anywhere within the Confidence Interval (and indeed 5% of the time will fall outside it), it does not do so with equal probability. Values at the extremes are less likely, whilst values in the middle (close to or equal to $\bar{x}$) are more likely. Therefore, by taking the position of the best estimate of the aggregate metered market sector loads into account (i.e. the middle of the Confidence Interval or $N\bar{x}$), weak conclusions about the *most likely* range for the population totals and hence the *most likely* range of values that total UG may take can be drawn. Such an analysis is not based on established statistical theory and hence it will be necessary to err on the side of caution in drawing any conclusions, but this approach would nevertheless allow a reasonable estimate of the likely magnitude of total UG (and hence the value of SSP-assigned UG expressed as a percentage of LSP-assigned UG) to be made.

Therefore, in the event that the Confidence Interval for total UG is too large to be of use, it is recommended that this approach is investigated in order to provide as much evidence as possible for the reasonable estimation of the percentage figure (which may as a result be set at zero or a fixed non-zero figure). This will provide a revised estimate of the total UG, which can then be used in calculations in the same way that the current total UG estimate (set at the moment to be the same as LSP-assigned UG) is used in the 2012/13 analysis.

4.4 Permanent and Temporary Unidentified Gas

Regardless of the calculation method used, certain elements of UG are permanent and others are temporary. The definitions of these terms are as follows:

Permanent UG is consumed in an unrecorded fashion and costs are never recovered.

Temporary UG is initially consumed in an unrecorded fashion, but volumes are later calculated directly or estimated and the cost is recovered via backbilling. RbD is credited as appropriate.

For all directly calculated elements of UG, the data supplied to the AUGE relates to all UG sources, both permanent and temporary. It is therefore necessary to split these into the correct category and only include permanent UG sources in the final calculations.

Table 2 below shows the permanent/temporary status of each element of the UG.

TABLE 2: PERMANENT AND TEMPORARY UG

Unidentified Gas Source	Type
iGT CSEPs	*Temporary* for LSP sites on CSEPs. *Permanent* for SSP sites on CSEPs.
Shipperless/Unregistered	
- Shipper Activity	*Temporary* if shipper carries out site works. *Temporary* if a third party carries out site works but asset meter read is the same as the shipper's opening meter read. *Permanent* otherwise.
- Orphaned	As for "Shipper Activity".
- Unregistered <12 Months	As for "Shipper Activity".
- Shipperless PTS	*Permanent*
- Shipperless SSrP	*Permanent*
- Without Shipper <12 Months	*Permanent*
Meter Errors	*Temporary* for detected errors that are corrected within the reconciliation period. *Permanent* otherwise.
Theft	*Temporary* for detected theft. *Permanent* for other theft.

4.5 Additional Areas of Analysis

A number of areas have been identified where further work is required to improve the methodology. Following these analyses and investigations, modifications may be made to the current UG calculation methodology to improve this further. It may also be that results of this analysis may impact the way in which the alternative methodology is implemented if it is used.

4.5.1 New and Lost Meters

The current methodology for estimating UG uses the deeming algorithm to estimate model bias (the component of RbD due to errors in AQ). The estimate is made by applying the deeming algorithm with two different sets of AQ values (see Section 6.3 of the 2011 AUGS for 2012/13 [20] for further details). However, in each case the AQ values remain fixed for the whole gas year. In reality, the aggregate AQ used in the deeming algorithm changes from day to day as new meters are introduced and some meters are isolated. As it is the difference in the results of the deeming algorithm with the two different sets of AQ values which is of interest, it was assumed that the day to day variation will cancel out to a large degree.

However, an analysis will be carried out to assess the error that this assumption introduces. It may be the case that the methodology is updated to include this day to day AQ variation if a benefit is indentified.

Data to allow for this day to day variation in AQ was not available for the development of the initial methodology in 2011. Some data has now been provided by Xoserve, but updated information for the latest gas year is required.

4.5.2 Weather Correction Factor

Feedback from the 2011 AUGS for 2012/13 consultation suggested that it is important to understand how UG is allocated by the deeming algorithm and in particular, how it affects the value of the Weather Correction Factor (WCF). Further analysis will therefore be carried out and this may result in an update to the current methodology. To aid in this analysis, EWCF (Estimated Weather Correction Factor) data has been requested from Xoserve.

4.5.3 Seasonal Normal CWV

The 2011 AUGS for 2012/13 [20] noted that the definition of SNCWV (Seasonal Normal Composite Weather Variable) was updated in 2010. As AQs are calculated by adjusting metered consumption back to seasonal normal using the SNCWV, any changes in SNCWV will have a knock-on effect on AQ even if the consumption remains unchanged. Mod254 was also implemented in 2010. This allows for the use of forecast data in the definition of SNCWV. These two effects can be assessed together as they both just change the value of the SNCWV used to estimate AQ.

An analysis will be performed to estimate the effect of the changes to AQ as a result of the updates to SNCWV. It is also anticipated that the current methodology will be updated to back-out this effect so that the estimate of model bias is not affected by the SNCWV definition change. See section 6.3.1 for more details and initial analysis.

4.5.4 Meters with AQ of 1

During the analysis of theft data, it became apparent that there are a significant number of meters with an AQ value of 1. This will not only affect theft estimates, but any process which relies on the AQ (including the estimation of model bias). Further analysis will be performed to understand the issues of AQ=1 including

- How meters are assigned an AQ of 1
- How could the number of these meters be reduced and thus minimise their impact on UG estimation?
- What is the impact on the estimation of UG which arises from meters with AQ=1?
- Can a correction be applied to account for meters with AQ=1?

5 Data Used

This section describes the data requested, received and used to derive the methodology to calculate UG. As a general point it should be noted that during analysis it became apparent that the data available was not always on a comparable basis. The AUGE has therefore taken care to ensure that all datasets include all components of NDM consumption, i.e. CSEPs and Scottish Independents are included throughout.

There were a variety of issues with obtaining data in 2011. This was partly to do with the way the industry currently manages various processes. For example, the AUGE could not obtain a history of data relating to shipperless/unregistered sites over time as only snapshots can be produced. However, Xoserve now provides regular snapshots so that trends can be identified over time.

Section 5.1 below gives a summary of the data items requested for the 2013/14 analysis and their current status. The subsequent sections give more details about the data items for each individual element of the analysis.

5.1 Summary

TABLE 3: DATA STATUS SUMMARY

Analysis Area	Dataset Requested	Status
Long Term RbD Bias	RbD quantities	Updated data Outstanding
	CSEP RbD quantities	Updated data Outstanding
Allocation Algorithm Error	Mod81 data	Updated data Received
	Algorithm data (ALPs, DAFs, WCFs, SFs)	Updated data Outstanding
	CSEP AQ data	Updated data Outstanding
	Non-CSEP AQ data	Received
	Proportions of SSP and LSP sites successfully recalculated in AQ review	Updated data Outstanding
Unregistered and Shipperless Sites	Asset and Shipper meter reads for new LSP sites	Updated data Outstanding
	Asset meter reads for orphaned sites	Updated data Outstanding
	Gas Safety Visit data	Updated data Outstanding
	Snapshot files	Received on an ongoing basis
iGT CSEPs	Known CSEP data	Updated data Outstanding
	Snapshot files	Received on an ongoing basis
Theft	Detected and alleged theft for 2011	Received (to end 2011)
	AQs before, during and after theft	Received (to end 2011)
Meter Error	Meter capacity report	Received
Direct Total UG Calculation	Allocated SSP and LSP loads	Outstanding
	Metered SSP and LSP loads	Outstanding
New Analysis	New and lost sites	Updated data Outstanding
	EWCF	Outstanding
	SNCWV Adjustment Factors by EUC	Received
	Updated AQ=1 information	Updated data to be requested

5.2 Long Term RbD Bias

Both standard and CSEP monthly RbD values split by LDZ have been requested. The AUGE currently holds this data running to September 2010, and so this data needs to be updated to bring it up to date.

5.3 Allocation Algorithm Error

The AUGE has requested the following information that is required to update the allocation algorithm error analysis.

1. AQ data broken down by EUC in order to allow calculations to be performed using the deeming algorithm. Separate datasets are required for loads within CSEPs and loads outside CSEPs.
2. Mod81 data. This provides a more detailed picture of AQ changes between gas years resulting from the AQ review and allows like-for-like tracking of AQs from year to year based only on those sites whose AQs were successfully recalculated. This data also provides all the required information on SSP/LSP threshold crossers that is used in the analysis.
3. New/Lost Meters. In order to be able to calculate correct aggregate AQs by EUC for each gas day, the AUGE has requested a complete set of data for meters which are new or have been lost. This data include dates added/lost, AQ and EUC. This data is required at aggregate level by EUC by gas day. The current dataset runs to the end of December 2011 and so needs to be brought up to date.
4. Allocation Algorithm Data. This includes ALPS, DAFs, WCFs and SF, and allows the AUGE to replicate results from the allocation algorithm, which is necessary in order for algorithm bias to be calculated. Data is split by day, LDZ, and EUC and currently runs to September 2010. Therefore this dataset needs to be brought up to date.

5.4 IGT CSEP Setup and Registration Delays

Data for iGT CSEP setup and registration delays consists of two elements, as follows:

- Unrecognised projects summary, including
  - number of unknown projects by LDZ
  - count of supply points and aggregate AQ of unknown projects by LDZ

  This data is supplied by Xoserve in two-monthly snapshot files on an ongoing basis.

- Known CSEP Data
  This file contains data for both registered sites on known CSEPs and unregistered sites on known CSEPs. The current version is accurate as of April 2011 and needs to be updated for 2012.

5.5 Unregistered/Shipperless Sites

The following information has been requested concerning Unregistered/Shipperless sites. In each case both the number of sites and their aggregate AQ was requested. All data is required to be split by LDZ, and also between “Small AQ” and “Large AQ” categories.

Xoserve have created a regular report to ensure that new data is collated and sent to the AUGE every two months. This report covers the following categories of Unregistered and Shipperless sites:

- Shipper Activity
  These are new sites created more than 12 months previously, that a Shipper has declared an interest in (such as by creating the MPRN), but are nevertheless not registered to any Shipper. This data is split into sites believed to have a meter and those believed to have no meter.

- Orphaned
  These are new sites created more than 12 months previously, that no Shipper is currently declaring an interest in. This data is split into sites believed to have a meter and those believed to have no meter.

- Shipperless sites PTS (Passed to Shipper)
  These are sites where a meter has been removed and 12 months after removal the network provider visits the site to remove or make the service secure, but find a meter connected to the service and flowing gas. If it is the same meter as allegedly removed 12 months ago it is passed to the shipper concerned to resolve.

- Shipperless sites SSrP (Shipper Specific rePort)
  Similar to Shipperless (Passed to Shipper) sites, these are sites where a site visit finds a new meter fitted, in which case it is reported to all Shippers.

- No Activity
  These are sites currently being processed. They will end up in one of the other categories.

- Legitimately Unregistered
  These are sites believed to have no meter and hence are not capable of flowing gas.

- Created <12 months
  These are new sites that have been in existence less than 12 months and are not registered with a Shipper. Action is not taken on such sites until they have been in existence for 12 months.

This data is supplied by Xoserve in two-monthly snapshot files on an ongoing basis (latest data set received on 25th April 2012).

In addition, the following information has been requested:

- A summary of the remaining Shipperless sites, i.e. those that have been without a Shipper for less than 12 months and hence do not yet appear in the “Shipperless PTS” or “Shipperless SSP” lists. This data comes from the records of Gas Safety Visits.

- Asset meter reads for orphaned sites to determine the proportion which have been flowing gas prior to becoming registered. The current dataset runs to 19/08/11 and hence needs to be brought up to date.

- Asset and shipper details for a sample of confirmed sites. The current dataset contains data up to 20/10/11 and is used to calculate the proportion of UG from Unregistered sites that cannot be backbilled. This needs to be brought up to date.

5.6 Meter Errors

Data for meter error calculations consists of meter capacity, AQ and NDM/DM classification records for all LSP sites. The dataset used in the 2012/13 analysis is accurate as of September 2011 and so a new version applicable to the present time is required.

This dataset has been supplied.

5.7 Theft

The following data concerning theft has been requested and received:

- A list containing records of each occurrence of alleged and confirmed theft, presented with each occurrence as an individual record. For each record, the following details were provided:
    - Date
    - LDZ
    - Shipper
    - Market sector (LSP band/SSP) based on *current* AQ value
    - Transporter or shipper responsible
    - Estimated volume (kWh) – where the theft allocation has been pursued

Data from 2006 to 2011 Theft of Gas summaries has been received. A further updated will be provided later in the year to cover theft detections up to the end of June 2012.

Note that the meter AQs provided are the current (latest) AQs and not necessarily the AQs that were in force at the time the theft occurred or was detected.

Historical AQs for each site have also been provided from 2000 onwards. The data includes a dummy MPR reference, start date, end data and AQ value.

5.8 Industry Initiatives under Review

In the 2011 AUGS for 2012/13 [20] the AUGE identified a number of industry initiatives that may have an impact on UG going forward. An update on the status of these is described below.

Mod 369: Re-establishment of Supply Meter Points – Measures to Address Shipperless Sites

This Modification Proposal [2] sought to modify the existing provisions of the Uniform Network Code regarding Reestablishment of Supply Meter Points to ensure Supply Point Registration where gas is consumed at a Supply Point which has been subject to Effective Supply Point Withdrawal but the original Supply Meter remains connected (or has been reconnected) and is capable of flowing gas. If adopted, this Mod would have resulted in the removal of the "Shipperless Sites (Passed To Shipper)" category from the Unregistered/Shipperless element of the UG calculation. It does not apply to sites where a new meter has been installed and hence the remainder of the calculation would remain the same and as described in this document.

This modification was approved by the UNCC modification panel on 16th February 2012 however, OFGEM decided not to implement the modification and a non-implementation decision letter was published on 26th March 2012 [23]. This is unfortunate as the modification would have resulted in a significant reduction in UG attributed to Shipperless sites. These will therefore remain in permanent UG for this draft of the AUGS.

Mod 254 (implemented in TPD [14] section H 1.5.2): Facilitating the use of forecast data in the UNC

This modification proposal [16] has already been implemented and relates to the basis for calculating seasonal normal CWV.

The definition for Seasonal Normal Composite Weather Variable (SNCWV) was updated in 2010. As AQs are calculated by adjusting metered consumption back to seasonal normal using the SNCWV, this will have a knock-on effect on AQ values. At the same time, Mod254 [16] also came into force which further adjusts the SNCWV for future forecast values. The effect of these changes will be assessed and the current methodology updated as required. See section 6.3.1 for more details.

6 Methodology

This section describes in detail the methodology for each aspect of UG where the calculation method has changed since the analysis carried out in 2011. Where methods have remained the same, details can be found in Section 6 of the 2011 AUGS for 2012/13 [20].

As described in previous section, the default method is based around an assessment of the long-term bias of RbD, which represents the element of UG assigned to the LSP market by the allocation algorithm, along with any allocation algorithm bias. Hence the element of UG assigned to the LSP market is the difference between long-term RbD bias and long-term model bias.

Avg LSP UG = Avg RbD Bias – Avg Model Bias *(6.1)*

Note that in this context, UG *assigned* to the LSP sector is different from UG *arising* from the LSP sector. The nature of the allocation algorithm means that the UG assigned to the LSP sector (which is the quantity being estimated with the analysis) is a mixture of UG that arises from the LSP sector and UG that arises from the SSP sector. Therefore, once the total of UG assigned to the LSP sector has been calculated, it is split into that arising from LSP and that arising from SSP.

The UG arising from SSP is already assigned correctly to the SSP sector by the RbD process, and so the important element is the UG arising from LSP. This is the volume that is currently wrongly assigned to the SSP sector and is hence being paid for by the wrong market sector. The UG *assigned* to the SSP sector is small and is discussed in detail in the 2011 AUGS for 2012/13 [20].

6.1 Analysis of UG Assigned to SSP and LSP Market Sectors

No changes are proposed initially to this element of the analysis carried out in 2011. Full details can be found in the 2011 AUGS for 2012/13 [20]. However, the areas of further analysis described in section 4.5 may lead to an update to this methodology in future versions of the AUGS.

It should be noted that dependent on the results of the assessment of the alternative method for calculating the UG total directly using consumption data, this part of the analysis may be superseded. The potential options are as follows:

1. Direct calculation of total UG from consumption data is successful. In this case the total UG figure will be available and the long-term RbD bias (described in Section 6.2 below), model bias (Section 6.3) and the analysis of UG assigned to SSP and LSP market sectors all become obsolete.
2. Direct calculation of total UG from consumption data is unsuccessful, but sufficient data exists to allow an estimate of the SSP-assigned UG total as a percentage of the LSP-assigned UG total to be made. In this case the analysis described in Section 6.1 of [20] is superseded and the result replaced with the percentage figure from the new analysis.
3. No useful information can be obtained from consumption data. In this case the analysis of UG assigned to SSP and LSP market sectors from the 2012/13 AUGS remains in place, with the percentage of SSP-assigned UG set to zero.

The outcome of this analysis is dependent on the AUGE receiving the required data from Xoserve, and results will be reported in future AUGS drafts.

6.2 Long-Term RbD Bias

As described in Section 6.1 above, this element of the UG calculation *may* be superseded by the consumption analysis. Potential options are as listed in Section 6.1

If this element remains in place the method will remain unchanged, although calculations will be updated with the latest available data.

6.3 Allocation Algorithm Error

It is anticipated that this part of the methodology will remain largely unchanged from the analysis carried out in 2011 and the details are described in the 2011 AUGS for 2012/13 [20]. However, the results of the analysis described in section 4.5 may result in some refinements to the approach to improve accuracy. On receipt of updated data and subject to the outcome of the consumption analysis the figures generated by this method will be revised later in the year.

At this point in time, some analysis has been performed to assess the impact of the change to the definition of SNCWV. This is described in section 6.3.1. Future versions of this document will include any updates to the methodology resulting from the analyses described in section 4.5 (i.e. new and lost meters, WCF, SNCWV definition/Mod254 and sites with AQ=1).

6.3.1 Change to Definition of SNCWV

The definition for Seasonal Normal Composite Weather Variable (SNCWV) was updated in 2010. As AQs are calculated by adjusting metered consumption back to seasonal normal using the SNCWV, this will have a knock-on effect on AQ values. At the same time Mod254 [16] also came into force which further adjusts the SNCWV for future forecast values.

To assess the impact of the change in definition of SNCWV, Xoserve provided factors for each EUC. These can be used to adjust the AQ calculated using the old SNCWV definition to the AQ which would result from the new definition. These factors are generally less than 1 i.e. some of the AQ reduction seen between 2009 and 2010 was due to the SNCWV change. It is important to have these factors split by EUC as some EUC bands are more temperature sensitive than others and therefore will be affected more by this change.

The methodology used in the 2011 AUGS for 2012/13 was based upon using the AQ change from the Mod81 report to estimate a trend (bias) in allocations resulting from errors in AQ. Prior to 2010, the Mod81 AQ values are all based upon the old SNCWV definition. Post 2010, the Mod81 AQ values will all be based upon the new SNCWV definition. However, in the 2010 Mod81 report, the 'previous AQ' values are based on the old SNCWV definition whilst the 'current AQ' values are based on the new SNCWV definition. This inconsistency means that some of the change in AQ observed for 2010 is due solely to the SNCWV definition change (including Mod254 implementation).

For the 2012 AUGS for 2013/14, this effect will be removed using the factors provided by Xoserve. Figure 1 below has been generated to show the size of the correction resulting from this change (denoted by the arrows). As expected, the effect on LSP is less than on SSP due to its lower temperature sensitivity. Note that for the 2012 AUGS, the 2011 Mod81 report should be available.

A process similar to the one proposed here should be used in any future years if changes are made to the SNCWV definition.

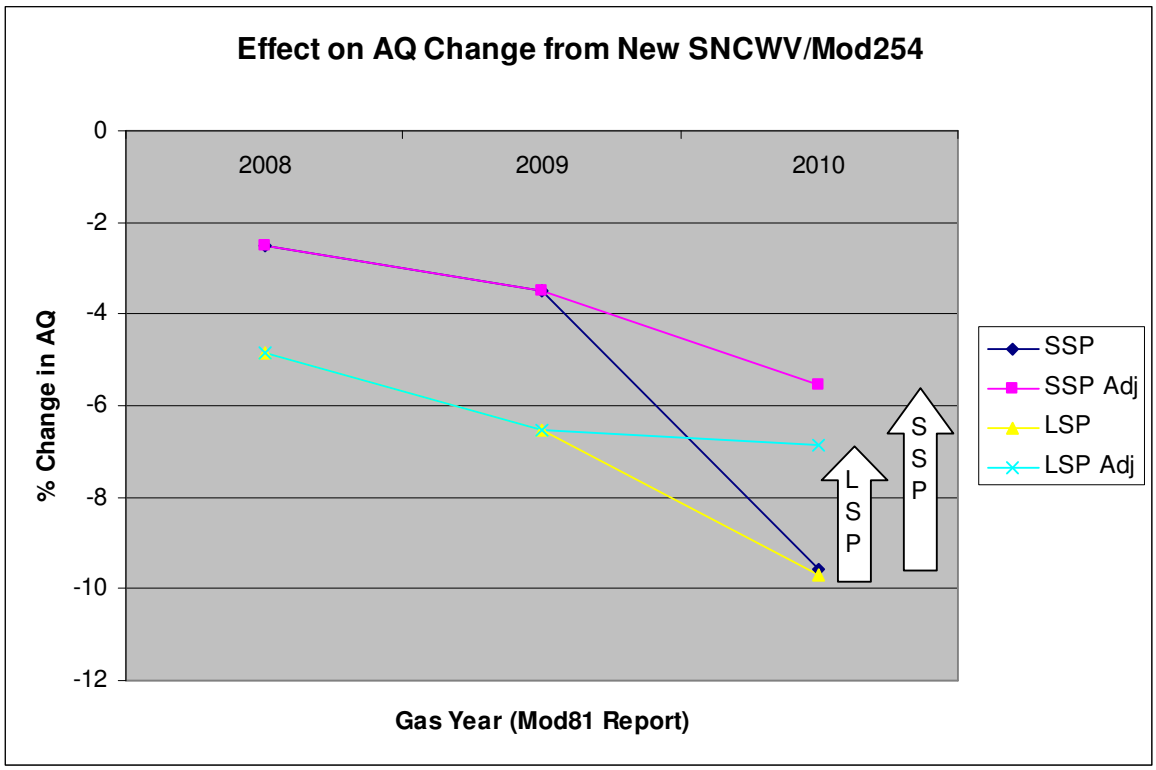

Figure 1 *– Mod254 and new Seasonal Normal CWV impact on AQ changes*

6.4 Shrinkage Error

Shrinkage Error is not strictly a component of UG, and hence no attempt is made to estimate it directly. Any residual effects of Shrinkage on the UG estimate (such as long-term bias in the shrinkage models), should they exist, are automatically included in the UG calculation via the Balancing Factor.

Full details of the AUGE's assessment of Shrinkage can be found in Section 6.4 of the 2011 AUGS for 2012/13 [20].

6.5 Unregistered and Shipperless Sites

The analysis for this element of the UG calculation remains the same as described in the 2011 AUGS for 2012/13 [20]. The figures will be updated based on the latest data when the UG estimates for 2013/14 are produced in future drafts of this document.

6.6 IGT CSEPS

The analysis for this element of the UG calculation remains the same as described in the 2011 AUGS for 2012/13 [20]. The figures will be updated based on the latest data when the UG estimates for 2013/14 are produced in future drafts of this document.

6.7 Metering Errors

The analysis for this element of the UG calculation remains the same as described in the 2011 AUGS for 2012/13 [20]. The figures will be updated based on the latest data when the UG estimates for 2013/14 are produced in future drafts of this document.

6.8 Shipper Responsible Theft

6.8.1 Introduction

The proposed methodology to estimate the split of theft between market sectors is based on the 2011 AUGS for 2012/13 [20] section 6.7. Updated theft data has been provided by Xoserve to include detections up to the end of 2011 and the effects of this data is summarised in this section. A summary of the method is also provided.

During the query process a number of issues were raised:

1) The use of pre-theft AQs rather than current AQs
2) The effect of detected theft records with AQ=1
3) The use of average AQ
4) Theft detection rates

Responses to the queries were provided in a response document published to the Joint Office of Transporters website in March [24].

6.8.2 Summary of methodology

The method used to calculate the split of theft of gas between market sectors is summarised in the following steps. The derivation of pre-theft AQ is also shown for completeness.

1. Validate theft data
    a. Correct records with reversed start/end dates
    b. Removal of records with partial information (if they can't be corrected)
    c. Query/confirm unusually large thefts with Xoserve
2. Calculate and assign the amount of detected theft for a given record in each year (or part year) that it occurred
3. Identify the prevailing AQ prior to the estimated theft start date
    a. Where AQ=1 use previous AQ
    b. If no previous AQ available that is not equal to 1 use current AQ (which may also be 1)
4. Assign to market sector
5. Aggregate the detected theft by sector by year
6. Calculate the average theft percentage based on 2008-2010 (in the 2011 AUGS for 2012/13 the average was based on theft occurrences between 2007-2009)

There was a query raised [24] concerning theft detections where (current) AQ=1 and theft per annum greater than 73,200kWh. As noted above the method uses pre-theft AQ where possible or failing that searches for the previous AQ<>1 ultimately defaulting to current AQ. For the period 2007-2009 that was used to estimate the split for the gas year 2012-13 there were no records where the theft start date fell between 1/1/2007 and 31/12/2009 with pre-theft AQ=1 and theft per annum >73,200kWh.

Having received detections up to the end of 2011 there is now a more detailed picture of theft detections for 2010 and some additional detections for previous years. The period used to estimate the market sector split is rolled forward by one year.

In doing so, there are a few theft records where theft is estimated to have started between 1/1/2008 and 31/12/2010 where pre-theft AQ=1 and theft per annum is greater than 73,200kWh.

The AUGE proposes that theft records with pre-theft AQ=1 and an estimated theft per annum greater than 73,200 kWh are classed as LSP. This has a relatively small effect on the overall split of theft between SSP and LSP increasing the percentage assigned to LSP by 1.18%.

However, the number of theft occurrences in the years used to calculate the split between market sectors with AQ=1 is greatly reduced when using pre-theft AQ (649) rather than current AQ (1422). As a point of clarification, a theft record can contain theft over multiple years and hence one record can have an AQ=1 applying to 2008, 2009 and 2010 and the multiple occurrence of these are reflected in the figures in brackets.

Using pre-theft AQ results in some sites with current AQ in SSP being allocated to LSP and vice versa. For the period used to base the theft split for this AUGS (2008-2010) the difference in LSP theft is just over 200,000kWh.

Figure 2 shows the detected theft by year of occurrence over the period 2000-2010 for all market sectors compared to the effect of the thefts detected in 2011.

Note that the level of theft estimated to have occurred in 2010 has increased significantly whilst the level of detected thefts in 2011 is quite small compared to previous years. This is as expected since there is a lag between theft occurrence and subsequent theft detection.

There have been theft detections that are estimated to have occurred in previous years and the effect of these can also be seen.

The 2012 AUGS for 2013/14 figures for the market sector split will be based on theft occurrences estimated between 2008-2010 (since 2011 is incomplete).

Figure 3 shows how the theft detection has varied over time and the impact of 2011 data.

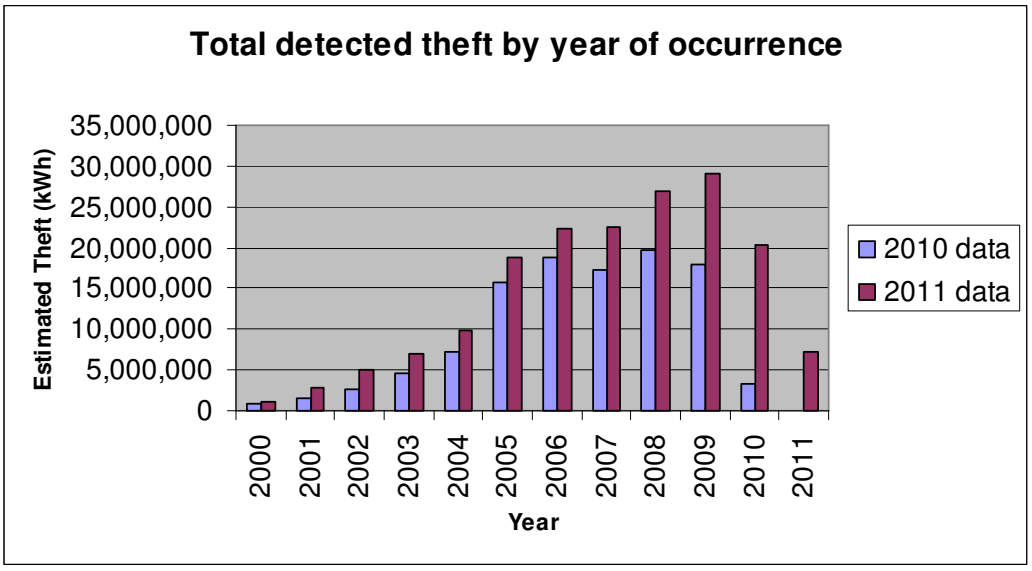

Figure 2 *– Detected theft by year of occurrence showing impact of 2011 data*

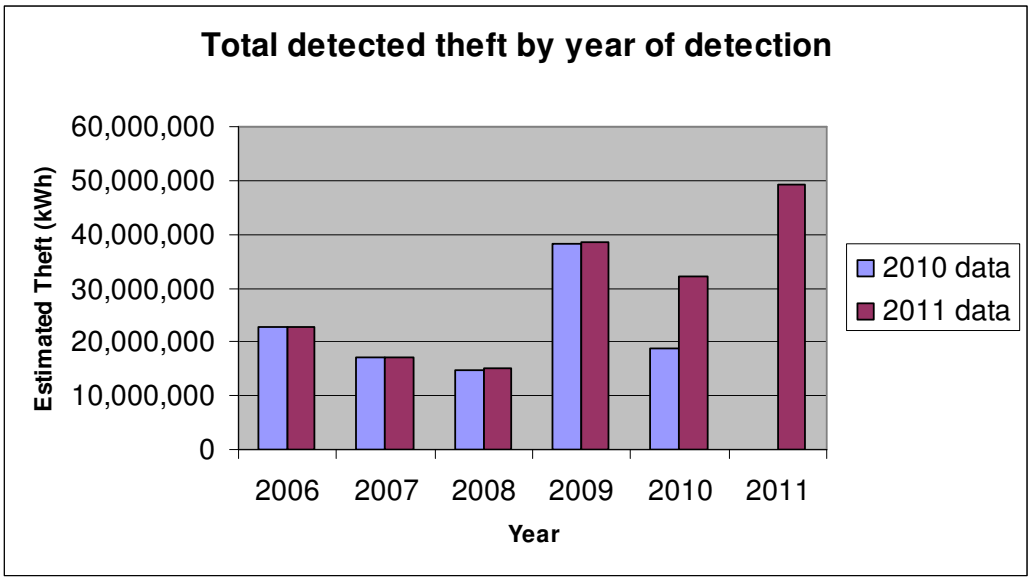

Figure 3 *– Detected theft by year of detection*

Looking at the data in more detail, the level of LSP detected theft has significantly increased.

However, this is attributable to one theft record with a very large level of detected theft over a long period of time. The AUGE has verified this as being correct with Xoserve.

The question then arises as to whether this is a one off or an underlying trend and whether it should be included in the calculation of the split in theft or not.

If the theft had been estimated to have occurred in one year and was unrepresentative of all other years then there would be a case to remove it as not forming part of the overall trend.

However, the theft is estimated to have occurred over several years and therefore it is part of a long term trend. This is illustrated in figure 4. The effect of this detection dominates the LSP theft detection from 2001 to 2010.

Figure 5 shows the effect of SSP thefts detected in 2011 on previous years showing increased levels of theft occurrences from 2002 to 2010 with 2010 being most significant.

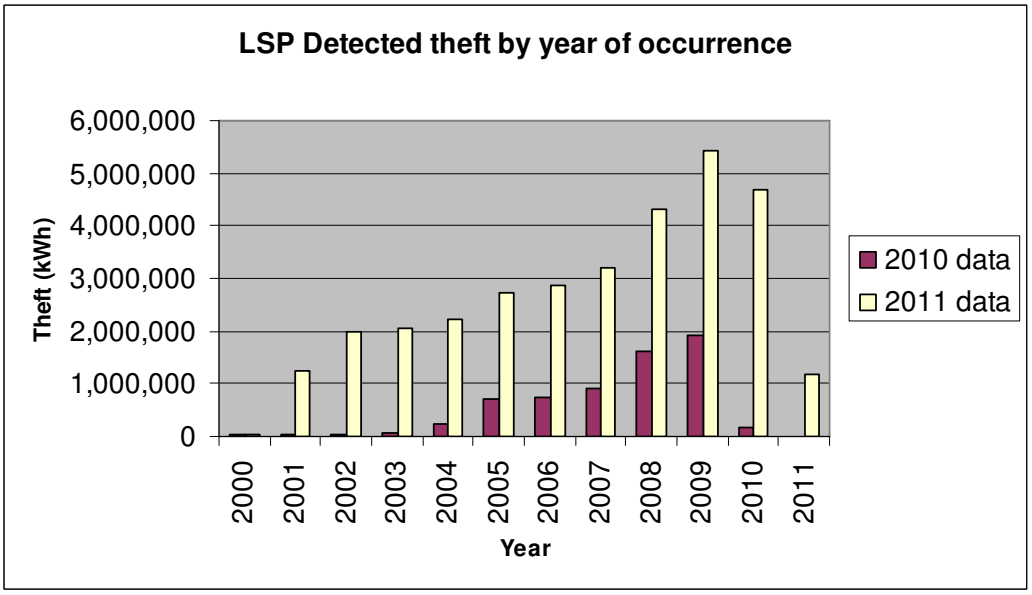

Figure 4 *– LSP Detected theft by year of occurrence showing impact of 2011 data*

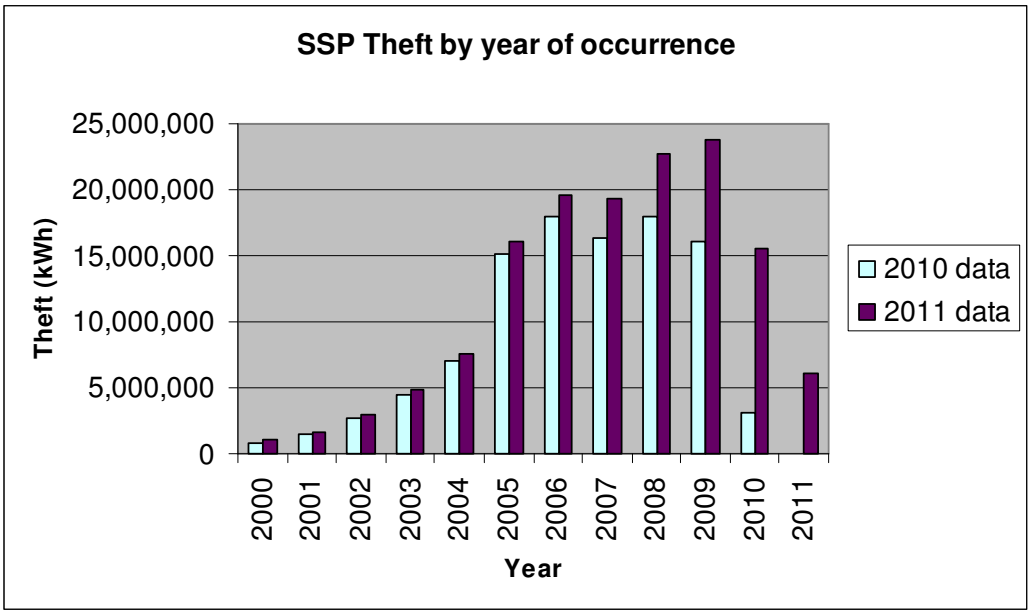

Figure 5 *– SSP Detected theft by year of occurrence showing impact of 2011 data*

Figures 6 and 7 show the levels of theft detection year on year (that are confirmed as valid) from 2006 to the end of 2011 for both LSP and SSP sectors. Note that the LSP detection for 2011 is dominated by the single theft record described above. These are provided for illustration to show how the split of theft of gas based on current detection rates would be susceptible to detections of theft that occurred over multiple years.

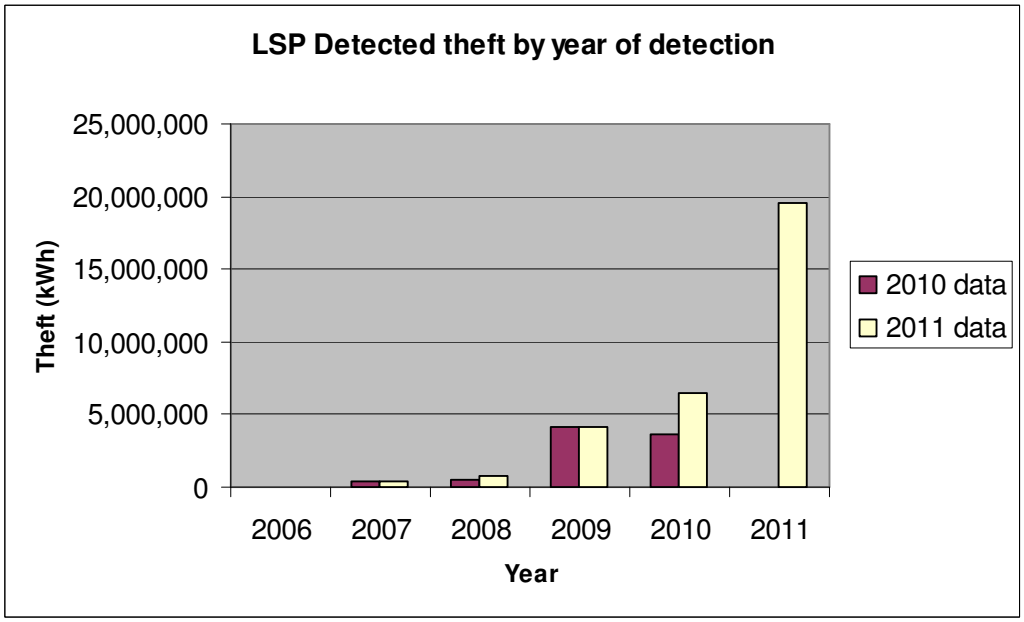

Figure 6 *– LSP Thefts by year of detection*

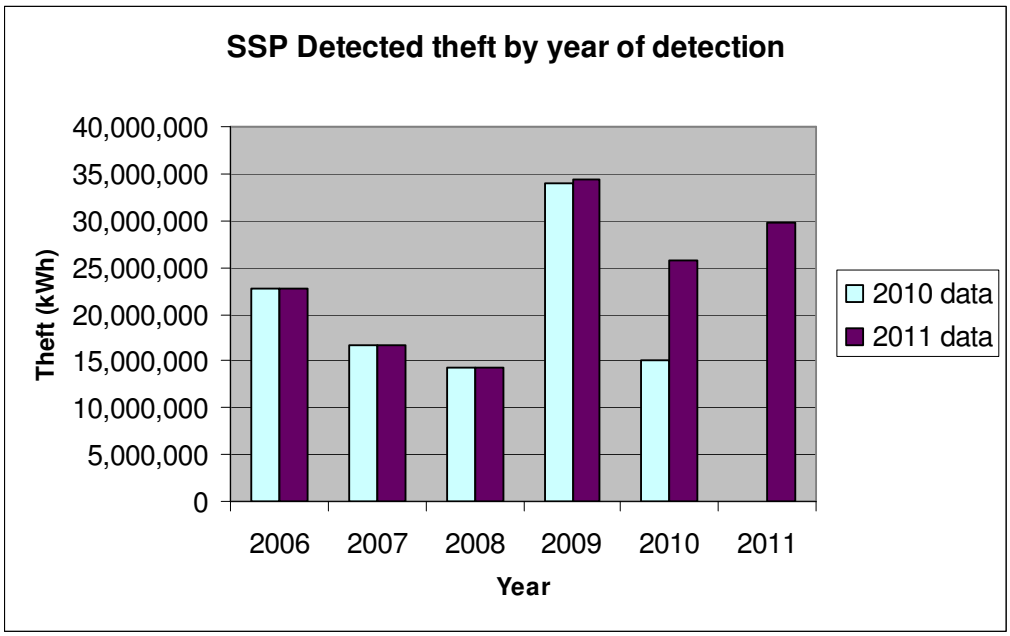

Figure 7 *– SSP Thefts by year of detection*

Using data to the end of 2011 and the methodology summarised above Table 4 shows the split of detected theft between LSP and SSP sectors that would be used to apportion the Theft + Other UG in the final AUGS table.

The LSP portion of the theft has increased significantly (primarily due to the large long term LSP detected theft record described above).

A further set of theft data to include detections up to end of June 2012 will be added to the data set and the market sector split refined before the final figures are published.

TABLE 4 - Summary of market sector split between LSP and SSP theft detections

	2008	**2009**	**2010**	**Average**
LSP %	17.2	20.3	23.8	**20.4**
SSP %	82.8	79.7	76.2	**79.6**

6.9 DM LSP market sector

In the 2011 AUGS for 2012/13, the UG attributed to DM LSP sites was concluded to be negligible. This is based on the following assumptions:

- There is no theft from DM sites.
- Any Unregistered DM sites are backbilled.
- DM sites do not become Shipperless.
- There are no unknown DM sites.

In addition, it is known that DM sites on unknown CSEPs will be backbilled because this applies to all LSP sites on CSEPs.

This leaves only Meter Error for DM sites, and as described in the Worked Example in Section 6.10 below, current data indicates that there is little or no over-read on DM sites due to meters working at the very low end of their range.

Updated data received during the preparation of the 2012 AUGS for 2013/14 will be reviewed to confirm whether these assumptions still hold or not. At the time of this draft DM LSP UG is concluded to be negligible.

6.10 Worked Example

In order to illustrate how the above techniques are applied in practice, the following worked example is provided for an unspecified LDZ (referred to as XX LDZ). This shows how each element of UG is calculated and how it contributes to the final total. The values used throughout this example are for illustrative purposes only and do not relate to real figures from any LDZ. Note that this example is based on the default calculation for the UG total, and is based on the time period covered in the last AUGS. This will be updated when data for the current AUGS is supplied by Xoserve and calculations for 2013/14 are made (for example latest theft split percentages are used for illustration purposes).

The UG calculation takes places in stages, as follows:

1. Calculation of average RbD bias. This is currently calculated over the formula years 2007 to 2009 due to availability of allocation algorithm data and the need for consistency in time periods between data sources. Average RbD bias for XX LDZ during this time period is 800.0 GWh per annum.

2. Algorithm bias is then calculated using the techniques and formulae described in detail in the 2011 AUGS for 2012/13 [20]. For XX LDZ for the same time period, algorithm bias due to AQ change is calculated as 300.0 GWh per annum.

3. The difference between these two figures is the total UG assigned to the LSP sector by the allocation process. Note that although this gas has been *assigned* to the LSP sector, it can *arise* from both SSP and LSP, and the split between the market sector source of the UG in question is calculated later in the process. LSP assigned UG for XX LDZ is therefore calculated as follows:

   LSP Assigned UG = 800.0 GWh – 300.0 GWh = 500.0 GWh per annum.

4. The next stage of the process is to calculate the directly estimated components of UG. This is done separately for SSP and LSP, thereby giving a breakdown by market sector as well at the total for each component.

5. The iGT CSEPs calculation is based on data provided by Xoserve in the Unknown Projects Summary, along with information about live and unregistered sites on known CSEPs. Figures are as follows for XX LDZ:

   Unknown Projects = 100
   Supply Point Count = 1305
   AQ Total = 18.0 GWh

   From known CSEPs in XX LDZ:

   SSP Supply Point proportion = 99.5%
   LSP Supply Point proportion = 0.5%
   SSP AQ proportion = 84.0%
   LSP AQ proportion = 16.0%

   These figures are used to split the unknown project supply point count and aggregate AQ by market sector:

   For unknown projects:

   SSP Supply Points = 1299
   LSP Supply Points = 6
   SSP AQ = 15.0 GWh
   LSP AQ = 3.0 GWh

   Data regarding unregistered sites on known CSEPs is supplied by Xoserve and is as follows:

   SSP Supply Points = 3000
   LSP Supply Points = 10
   SSP AQ = 45.0 GWh
   LSP AQ = 0.1 GWh

   Total UG from this source is the combination of these two, plus a proportion of 10 unknown projects with unknown LDZ smeared across all LDZs:

   SSP Supply Points = 4400
   LSP Supply Points = 16
   SSP UG = 62.0 GWh
   LSP UG = 3.5 GWh

   Note that the LSP UG calculated here is temporary in nature and is not taken further into the final UG calculations. The SSP UG is permanent and is taken forwards.

6. Shipperless and Unregistered sites are split into six categories. Calculations for each category are very similar, so a single typical example - LSP Shipper Activity Sites - is given here.

   Site count and AQ data is supplied in the two-monthly snapshot files. Figures for XX LDZ are:

Snapshot 1 AQ: 2.6 GWh
Snapshot 2 AQ: 3.2 GWh
Snapshot 3 AQ: 3.0 GWh
Snapshot 4 AQ: 3.0 GWh
Snapshot 5 AQ: 3.0 GWh
Snapshot 6 AQ: 3.0 GWh
Snapshot 7 AQ: 3.0 GWh

Note that at the current time only 3 snapshots exist. Xoserve cannot produce them retrospectively and so the oldest snapshot has been repeated so that a full year is covered.

The gas consumed between snapshot x and snapshot y is calculated as the average AQ across these two snapshots, multiplied by the appropriate factor from Table 7 to reflect the time of year:

Snapshots 1-2: Average AQ = 2.9 GWh
Time of year factor = 0.065
Percentage of orphaned/shipper activity sites with non-zero opening reads = 36.8%
Percentage of occurrences that are not backbilled = 31.25%
Permanent UG = 2.9 GWh * 0.065 * 36.8% * 31.25% = 21,678 KWh

Similar calculations for the remaining snapshots give the following consumptions:

Snapshot 1-2: 21,678 KWh
Snapshot 2-3: 24,955 KWh
Snapshot 3-4: 65,205 KWh
Snapshot 4-5: 96,600 KWh
Snapshot 5-6: 86,250 KWh
Snapshot 6-7: 50,370 KWh
Total: 0.35 GWh

Calculations for each other category of Shipperless or Unregistered site are similar.

7. For meter errors, sites with an average hourly consumption (calculated from the AQ) of 1% or less of their Q_{max} value are considered to be consistently operating in the “under-read” area. Sites with an average hourly consumption of 95% or more of their Q_{max} value are considered to be consistently operating in the “over-read” area. The average levels of under-read and over-read are taken from calibration curves, an example of which is given in Figure 16.

   Average under-read: 1.5%
   Average over-read: 0.5%

   Total sites in under-read zone for XX LDZ: 5000
   Aggregate under-read: 2.0 GWh

   Total sites in over-read zone for XX LDZ: 5
   Aggregate over-read: 0.1 GWh

   Net contribution to UG: 2.0 GWh – 0.1 GWh = 1.9 GWh

   By its nature, meter error does not apply to SSP sites, and so this value of UG is all attributed to the LSP sector. Analysis of DM sites shows that there is very little, if any, meter under-read due to meters

operating outside their optimal range. Therefore, the full 1.9 GWh is applied to the NDM LSP market.

8. Detected theft is calculated directly from the Theft dataset provided by Xoserve. The most recent year available (calendar year 2011) is excluded from the analysis due to the fact that thefts that were active in this period are often not detected for up to 1-2 years, and so a number of thefts from this year will be missing from the dataset. Therefore, data from thefts that were active during the time period 2008-2010 (regardless of when that theft was detected) is used and averaged to give annual detected theft figures for the SSP and LSP sectors. Market sectors are assigned based on the AQ prevailing just before the theft was estimated to occur as these are less likely to be affected by the theft volume.

   SSP detected theft = 4.5 GWh
   LSP detected theft = 0.5 GWh

   UG arising from detected theft is temporary and so is not taken further into the final permanent UG calculations.

9. The sum of the directly measured UG components calculated in #5-#8 above gives the figure for total directly measured permanent UG. The SSP and LSP elements are summed and deducted from the total LSP assigned UG figure (calculated in #3 above) to give the total for the Balancing Factor. At this stage the Balancing Factor is a single figure, the sum of SSP and LSP elements.

   Balancing Factor = 500.0 GWh – Total Directly Measured = 350.0 GWh

10. All elements of the Balancing Factor other than Theft are either small or will sum to zero over time. Therefore it is reasonable to split the Balancing Factor volume between the SSP and LSP market sectors using the percentage split for Theft, as defined in Section 6.7 above.

    SSP proportion = 79.6%
    LSP proportion = 20.4%

    For XX LDZ for a single year:

    RbD Bias = 800.0 GWh
    Algorithm Bias = 300.0 GWh
    LSP Assigned Unidentified Gas = 500.0 GWh
    Directly Measured UG = 150.0 GWh
    Aggregate Balancing Factor = 350.0 GWh

    SSP Balancing Factor = 350.0 * 0.796 = 278.6 GWh
    LSP Balancing Factor = 350.0 * 0.204 = 71.4 GWh

11. Finally, total UG from each sector is calculated by summing the components, values for all of which have now been populated:

    SSP UG = 62.0 GWh + 15.0 GWh + 278.6GWh = 355.6 GWh
    LSP UG = 85.0 GWh + 1.9 GWh + 71.4 GWh = 158.3 GWh

These calculations are then repeated for each LDZ.

7 Unidentified Gas Estimates

This section is reserved for a set of tables containing the best estimates of UG calculated using the methods described in Section 6 above and in the 2011 AUGS for 2012/13 [20]. These values will be calculated using the appropriate methods and most recent data that is available once the methodology for the latest AUGS has been approved by the UNCC. Estimates will be presented on an LDZ by LDZ basis, with each LDZ's figures split into SSP and LSP market sectors, and also by each category of UG. The Scottish Independents will also be included, although their contribution to the overall UG figure has been negligible up to this point. These tables will therefore give a full breakdown of UG by source in each LDZ.

An example (unpopulated) table is shown below. The top section shows the breakdown of UG by category, with different columns for the SSP and LSP market sectors. The individual components of the Shipperless/Unregistered category are shown in grey, with the total for the category in black. The LDZ UG totals for the SSP and LSP sectors are in the bottom line of the top section of the table, shown in bold. The lower section of the table shows four LDZ-wide figures (i.e. covering both SSP and LSP sectors) that are used in the calculation of the market sector-specific values in the top section. These are RbD bias, allocation algorithm bias, LSP Assigned UG Total (SSP + LSP) and Aggregate Theft + Other (i.e. the Balancing Factor). All units are GWh.

TABLE 5: UNIDENTIFIED GAS SUMMARY (GWh) – EXAMPLE TABLE

	XX LDZ		
	SSP	NDM LSP	DM LSP
iGT CSEPs	0.00	0.00	0.00
Shipperless/Unregistered	0.00	0.00	0.00
- Shipper Activity	0.00	0.00	0.00
- Orphaned	0.00	0.00	0.00
- Unregistered <12 Months	0.00	0.00	0.00
- Shipperless PTS	0.00	0.00	0.00
- Shipperless SSrP	0.00	0.00	0.00
- Without Shipper <12 Months	0.00	0.00	0.00
Meter Errors	0.00	0.00	0.00
Total Directly Measured	0.00	0.00	0.00
Theft + Other	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**

RbD Bias	0.0
Algorithm Bias	0.0
Unidentified Gas (LSP Assigned)	0.0
Aggregate Theft + Other	0.0

Note that the most recent year cannot be guaranteed to be the same as the previous year and there will also be LDZ-to-LDZ fluctuations in these figures.

7.1 Estimation of SAP price

The estimation of SAP price will be based on the methods used for the AUGS year 2012-13. The SAP price for 2013/14 will be estimated using SAP price data obtained later in 2012.

This 2013/14 SAP price is only used to provide a common basis for the estimating the overall cost of UG in the coming gas year. In practice the SAP price actually used will be the daily average SAP price over the reconciliation billing period in question and the shipper's relevant aggregate AQ share. This is described in the TPD [14] section E 10.5.

7.2 Final AUGS Table

To be populated on final draft AUGS approval.

8 Consultation Questions and Answers

This section captures a history of the questions raised by the Industry Bodies during the consultation periods and the AUGE responses. These currently relate to the previous AUGS, but a log of questions related to the current AUGS will be added once the first consultation period of the current year has finished. The questions have been assessed against the AUGE Guidelines [1] and responses provided as appropriate. All questions and answers have also been published on the Joint Office website.

Due to the in-depth nature of the questions raised and the detailed responses required, it is not appropriate to publish full transcripts in this document. Instead, this section contains a summary of the organisations that provided questions. The questions themselves and their associated responses can be found in external documents "AUGS Query Responses 30_09_2011" [23], "AUGS2 Query Responses 14_11_2011" [19], and "AUGS Query Responses 19_03_2012" [24].

Note that all responses contained in these documents relate to the UG calculations at the time they were written, rather than reflecting the process as it currently stands. Therefore, wherever information differs between the responses and the latest AUGS, this is because the UG analysis has evolved and information in the response documents has been superseded. The information supplied in the latest version of the AUGS is always the most up-to-date.

Table 6 below contains a list of organisations that responded to the first draft of the 2011 AUGS for 2012/13.

TABLE 6: RESPONSES TO THE FIRST DRAFT OF THE AUGS

Organisation Name	Date of Communication
National Grid Transmission	06/05/2011
Corona Energy	23/05/2011
E.On	23/05/2011
Centrica	15/06/2011
EDF Energy	16/06/2011
GDF Suez	16/06/2011
Gazprom	17/06/2011
ScottishPower	17/06/2011

Table 7 below contains a list of organisations that responded to the second draft of the 2011 AUGS for 2012/13.

TABLE 7: RESPONSES TO THE SECOND DRAFT OF THE AUGS

Organisation Name	Date of Communication
Npower	31/10/2011
ICoSS	31/10/2011
Total Gas and Power	31/10/2011
ScottishPower	31/10/2011
Centrica	31/10/2011

Table 8 below contains a list of organisations that responded to the final version of the 2011 AUGS for 2012/13.

TABLE 8: RESPONSES TO THE FINAL DRAFT OF THE AUGS

Organisation Name	Date of Communication
Centrica	20/02/2012
Inexus	08/03/2012
Shell Gas Direct	08/03/2012

9 Contact Details

Questions can be raised with the AUGE at AUGE@gl-group.com

10 References

[1] Guidelines for the Appointment of an Allocation of Unidentified Gas Expert and the provision of the Allocation of Unidentified Gas Statement V3.0, 24th February 2011

[2] Mod 369 Re-establishment of Supply Meter Points – measure to address shipperless sites

[3] Mod 194 Framework for correct apportionment of NDM error

[4] Mod 194a Framework for correct apportionment of LSP unidentified gas

[5] Mod 228/228A Correct apportionment of NDM Error – Energy

[6] UNC Modification Proposals 228 and 228A Correct Apportionment of NDM Error – Energy. An Assessment by TPA Solutions Ltd, January 2010

[7] Mod 229 Mechanism for Correct Apportionment of Unidentified Gas implemented in UNC Section E 10 v3.54 26th April 2011,

[8] Theft of Electricity and Gas "Next Steps", OFGEM, January 2005

[9] Reducing Supplier Disincentives to Detect and Investigate Gas Theft – Uniform Network Code Proposal UNC231V and other Changes, OFGEM, December 2010

[10] Mod 0274 Creation of a National Revenue Protection Service, Version 1.0, 11th November 2009, Eon

[11] Mod 277 Modification Report "Creation of Incentives for the Detection of Theft of Gas (Supplier Energy Theft Scheme)" Version 2.0, 20th January 2011, Joint Office of Gas Transporters

[12] Mod 346 An Alternative to the Supplier Energy Theft Scheme Based on Throughput Version 2.0, 20th January 2011, Centrica

[13] Uniform Network Code (UNC) 194, 194A, 228, 228A and 229: These proposals deal with the identification and apportionment of costs of Unidentified Gas, OFGEM, 26th May 2010

[14] Uniform Network Code (UNC) Transportation Principal Document

[15] Theft of Electricity and Gas, Discussion Document, OFGEM, April 2004

[16] Mod 254 Facilitating the use of forecast data in the UNC section H 1.5

[17] AUGS Draft 1 Query Responses, September 2011

[18] Correct Apportionment of Unallocated Gas Volumes and Mod 228, CEPA LLP

[19] AUGS Draft 2 Query Responses, November 2011

[20] AUGS Final (Version 4), December 2011, GL Noble Denton

[21] Modification 115 and 115A Correct Apportionment of NDM error

[22] Mod 369 UNCC voting record 16th February 2012

[23] Mod 369 OFGEM decision letter 26th March 2012

[24] 2011 AUGS for 2012/13 Query Responses 19_03_2012, March 2012

Glossary

AGI	Above Ground Installation
ALP	Annual Load Profile (deeming algorithm parameter)
AQ	Annual Quantity. An estimate of annual consumption under seasonal normal conditions
AUGE	Allocation of Unidentified Gas Expert
AUGS	Allocation of Unidentified Gas Statement
Balancing Factor	An aggregate of the combined unidentified gas of various items calculated by subtraction. This includes theft, errors in the Shrinkage estimate, open bypass valves, meters "Passing Unregistered Gas", unknown sites, and additional Common Cause variation.
CSEP	Connected System Exit Point
CV	Calorific Value
CWV	Composite Weather Variable
DAF	Daily Adjustment Factor (deeming algorithm parameter)
DM	Daily Metered
ECV	Emergency Control Valve
EUC	End User Category
EWCF	Estimated Weather Correction Factor (deeming algorithm parameter. Alternative to WCF based on CWV rather than demand)
IGT	Independent Gas Transporter
LSP	Larger Supply Point
MAM	Meter Asset Manager
MEG	Monoethylene Glycol
Model Error	The statistical error associated with any modelling or estimation process. It an inherent part of any statistical model and does not imply that the model itself is inadequate or incorrect.
MPRN	Meter Point Reference Number
NDM	Non Daily Metered
OUG	Own Use Gas
PseudoSND	Seasonal Normal Demand calculated using AQ values rather than being based on historic metered demands
RbD	Reconciliation by Difference
SF	Scaling Factor (deeming algorithm parameter)
SNCWV	Seasonal Normal Composite Weather Variable
SND	Seasonal Normal Demand
SSP	Smaller Supply Point
TPD	Transportation Principle Document
UIP	Utility Infrastructure Provider
UNC	Uniform Network Code

UG	Unidentified Gas
WCF	Weather Correction Factor (deeming algorithm parameter)
WSENS	Weather Sensitivity (deeming algorithm parameter used in EWCF definition. Sensitivity of an EUC to difference in CWV from seasonal normal)