Review of Allocation of Unidentified Gas Statement on behalf of ICoSS

Version 1.0

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Executive Summary

ICoSS has commissioned Waters Wye Associates and Phidex consulting to analyse the AUGE report, concentrating on the methodology and the underlying data used to support it

As a result of this analysis the following conclusions have been drawn:

- It is clear that the AUGE has undertaken significant efforts in attempting to create a more robust methodology using significantly more industry data compared to the previous statement currently being applied.
- The approach outlined by the AUGE relies heavily on industry data and so requires that the data is robust and can be used to provide a realistic portrayal of the impact on the industry.
- There are significant issues with the data being used, which jeopardise the validity of any findings. In particular, Phidex has identified the following concerns:
    - Substantial numbers of sites failing validation and being excluded from the calculation due to invalid metered volumes, despite their being sufficient meter readings available. Such sites can have a significantly lower volume of gas apportioned as a result.
    - Significant increase in the amount of Unidentified Gas caused by downgrading of EUC bands for sites that fail validation.
- In both cases (even allowing for the fact that the majority of sites identified are in all likelihood being treated correctly) the potential for error is in the order of hundreds or even thousands of GWh.
- With regard to the theft apportionment methodology, we believe that the use of throughput as a proxy significantly overestimates the LSP proportion of theft. We have suggested an alternative methodology which achieves the aim of creating a robust theft apportionment methodology.
- The issue of iGT shrinkage is likely to be significant and needs to be determined.
- Several UNC modifications currently in development will impact the amount of permanent Unidentified Gas in the sector. With one exception, these modification are yet to be approved, but their end status is likely to be known in time for the finalisation of the AUGE statement in October and so should be included in the AUGE's calculations.

In summary whilst we believe significant progress has been made and a more robust methodology is achievable, there are still some substantial obstacles that need to be overcome and that no meaningful conclusions regarding the scale and origin of Unidentified Gas can be realistically drawn from the AUGE statement as it currently stands. We believe that such a goal can be achieved, but it will require significant effort in refining the industry data available and that a realistic appraisal of Unidentified Gas will not be available prior to October 2013, which means that no update to the current values can be achieved prior to April 2014.

Introduction

WWA has been requested by ICoSS to review the second draft of the 2012 Allocation of Unidentified Gas Statement ("AUGS") for 2013/14.

1. AUGE process

In summary, the gas settlement process eventually allocates all Unidentified Gas ("UG") to the Small Supply Point ("SSP") Non-Daily Metered ("NDM") sector, which is then corrected via Reconciliation by Difference ("RbD"). UNC Modification 0229 was developed to appoint an Allocation of Unidentified Gas Expert ("AUGE") to ascertain the amount of UG that should be allocated to the Large Supply Point ("LSP") NDM and the Daily Metered ("DM") sectors. The total amount of misallocated energy would be multiplied by the prevailing System Average Price ("SAP") to determine the total value of UG. Shippers who supply LSP NDM and DM customers would then be charged monthly in proportion of the energy they supply.

1.1 History of the AUGE process

The AUGE has undertaken an iterative and evolutionary approach to the improvement of the AUG methodology. In 2011 the approach was to employ a top down methodology that determined the amount of UG initially assigned to the LSP NDM and DM sector by subtracting the model bias caused by the initial over allocation to LSP NDM sites from the total RbD allocation. This methodology was settled on because it was deemed, at the time, to be the most accurate and practical means of estimating the total UG and the share across of UG across the LSP and SSP markets.

However, the AUGE stated that the methodology used in the 2011 AUGS could be more robust and less open to manipulation if the AUGE could devise an appropriate means to integrate true meter read and consumption data into the UG calculation.

During 2012 the AUGE has undertaken extensive analysis of the previous AUGS process, in order to pursue the formulation of an improved methodology to apportion UG between the LSP and SSP sectors. The AUGE's recently published second draft AUGS for 2013/14, which is the subject of this review, outlines its proposed new approach following the conclusion of this analysis.

The outcome of the AUGE's development of a new methodology, namely to use meter read and consumption data to determine the volume of UG on an LDZ-by-LDZ basis, should in principle give a more equitable solution to apportioning UG between the LSP and SSP markets. This is expressed in the following formula:

Total UG = Aggregate LDZ Load – DM Load – Shrinkage – (Metered SSP + Metered LSP)

Source: GL Noble Denton

1.2 Features of the AUGE process

It is important to note the following features of the AUGE process:

- *Settlement is unaffected:* The process developed does not attempt to adjust energy volumes allocated between Shippers; instead it attempts to determine the scale of the problem and then undertake financial adjustments to compensate.

- *Process is prospective:* Charges will be levied from 1 April , the intention being that those charges correct the misallocation for the period 2013/14. Therefore the AUGS values are an <u>estimate of the forward year's UG</u> using historic data, rather than attempting to correct cost allocation for historic UG. Although the new methodology now uses meter read and consumption data to calculate the UG total, it still represents a mismatch between years.
- *Energy reconciliation can occur for up to 4-5 years:* At present Shippers can adjust energy allocated to LSP NDM and DM Supply Points back to 01 April 2008, so energy that can be classified as UG when undertaking the AUGS calculation for the year 2013/14 may subsequently be allocated to a Supply Point and so no longer be UG. However, it should also be noted that UNC Modifications 0395 and 0398 are currently being considered by the UNCC, and each propose changes to the energy reconciliation period (from current 4-5 years to 2-3 years for 0395 and 3-4 years for 0398). With the rollout of smart meters in the domestic market, and the increasing prevalence of Automated Metering Reading (AMR) in the commercial market, there should be a decrease in the amount of UG. Although the advent of "smarter" meters will improve the availability of accurate meter reads, meter errors will still occur.
- *UG costs for the LSP NDM and DM sector are not reconciled:* The AUGE process does not correct the volume of UG allocated to the LSP NDM and DM sectors in the AUGS once it is determined, so any UG charges cannot be adjusted when levied.

The AUGE's attempt to improve the accuracy of the Allocation of UG ("AUG") is laudable. However some of the changes proposed have not been adequately justified, or rely overly on data of poor quality and have a significant material impact on the LSP/SSP split, as described in the rest of this document.

2. Analysis of 2012 AUGS Methodology

ICoSS has always acknowledged that from its start the AUGE has been required to undertake a difficult task: to create, through an iterative process, a methodology for allocating UG that is both robust and acceptable to all parties commercially affected by the outcome. In response to the need to improve the process used in 2011 for 2012/13, for 2013/14 the AUGE is proposing to use a new bottom-up methodology based upon actual meter read and consumption data.

The proposed utilisation and aggregation of meter read and consumption data from all LDZs is a welcome development as it means, in principle, that individual components of the LDZ can be accurately quantified and deducted from the overall LDZ load, to give a truer picture of the quantity of UG. However we note that the data used for the second draft AUGS 2012 remains incomplete, as it for example includes data from only 10 of the 13 LDZs. Without provisional results it is not possible to fully understand the materiality of the changes being proposed. Phidex Consulting (“Phidex”), experts in gas industry quantitative analysis, was retained by ICoSS to examine the quality of the AUGE’s partial dataset and validation algorithms used by the AUGE and its conclusions (from analysing data within the single NO LDZ) are summarised below.

Although some parties have argued that the materiality of the values should have no bearing on the final design of the methodology, if the result is to be a fair and acceptably accurate methodology in the AUG, then it is necessary to understand the data quality and impacts from its imperfections within the proposed methodology to understand whether the methodology is fit for purpose.

Therefore, whilst we are appreciative of the efforts made by the AUGE in attempting to arrive at a more robust methodology, we have concerns with:

(i) raw data quality;
(ii) the algorithms used by the AUGE to pre-process data; and
(iii) using throughput values to apportion theft between LSP and SSP sectors.

Concerns (i)-(ii) arise from results of tests performed by Phidex; the final major concern (iii) arises from WWA’s analysis of 2011 AUGS data and is covered in section 3.3 below.

It is our view that these concerns render the methodology unfit for purpose and in need of significant revisions in order to address the considerations expressed below.

3.1 Data Quality

In the final 2011 AUGS section 4.4 the AUGE noted the need for “*data of excellent quality*” and stated “*...the potential for missing and/or erroneous information...is high, and due to the volumes of data involved, these would be hard to detect. Data issues of this nature would damage the integrity of the estimates...*” (see Annex 1).

Based on its tests, the conclusion of Phidex is that the data being used by the AUGE ***is sufficiently poor to be unfit for purpose***, and that better quality datasets (to provide *inter alia* more accurate LSP metered consumptions) that have already been through a number of validation processes could be provided by Xoserve to the AUGE.

Phidex notes: "*The AUGE themselves state in a number of sections above that there are significant errors in the raw data provided. Corrections to the metered volumes do not include corrections to the meter reads available and that (see p36 of AUGS) processing data to obtain an accurate view of all corrections would be a significant undertaking.*" Phidex then goes on to say: "*Whilst Phidex agrees with the sentiment that the undertaking would be considerable, we firmly see it as being feasible if a true reflection of actual metered volume is the intended outcome*" and concludes "*applying algorithms to highlight and invalidate these erroneous charge lines and the subsequent use of estimated amounts leads to significant scope for error within the process and subsequently a final invalid UG amount charged out to the industry.*"

Phidex concludes: *"In the view of Phidex, the data used to calculate metered energy was not the same data as used by Xoserve to charge LSPs for metered consumption... If incorrect charges are raised then there are at least 3 further levels of validation, common in the supply chain. Firstly the shipper's billing engine is very unlikely to pass such large and obvious metered errors in the form of invoices. This is the role of the billing analyst and settlements teams within a shipper's organisation. The customers themselves are particularly good at identifying billing errors, especially if it is an overcharge. Here invoice queries and disputes would identify the anomaly. Finally there are a number of capable external consultancies which specialise in identifying errors in metered volumes and are tasked with resolving these through the well established query mechanism available; ConQuest and Xoserve's Contact Management Service. In conclusion there are better data sets available other than the ones provided to the AUGE which would deliver more accurate LSP metered values."* Such datasets seem to be available to the AUGE from Xoserve and ICoSS would seek further detail as to why they cannot be used.

3.2 AUGE Algorithms

Phidex performed four tests on the AUGE's data to test its validity and quality.

<u>Test 1</u>
Phidex set up a test is to identify where an LSP has failed consumption validation due to the total metered volume provided being incorrect, and the deemed consumption applied to the meter because of that error is also inaccurate and therefore contributing to incorrect UG figures. Phidex took a sample of LSP Meter points, examined the validation failures and the outcome of the subsequent estimation methodology.

In one specific case (MPR 13975686), Phidex found that the deemed consumption for this site over the 3 years by the AUGE – which is the average of the EUC band for that LDZ – would deem an average consumption of c136,000 kWh to b applied (total 408,000 kWh), where Phidex calculated the quantity over the 3 years to be 2,773,000 kWh.

Using a prototype report Phidex found a total of 761 similar MPRs which could be affected and lead to a material misstatement of UG within the NO LDZ. <u>This is likely to be a significant source of error and so needs to be examined in far greater detail before its full impact can be known.</u>

<u>Test 2</u>
Phidex examined cases where the AUGE had reclassified EUC categories based on the site failing the consumption calculation according to its AQ. This is to ensure that for sites failing the consumption test, then are assigned an appropriate default consumption based

on their EUC band. Phidex found that 384 sites had been banded down and only 27 banded up (most of which were from EUC 01B to EUC 02B i.e. from SSP to LSP sector).

A downward shift in AQ, if incorrect, would reduce the attributed consumed volume to the site and therefore erroneously increase the UG. Although an upward shift would have the reverse effect, this is done in few cases and almost exclusively in the very low consuming EUC bands so it will not offset the potential effect of the downward shifted sites, resulting in a potential skew of results.

Phidex estimate the resulting total downward shift in metered volume for the LSP sector is in the order of a Terawatt of usage in the single LDZ (albeit Phidex note this very high value is to indicate the significance of the activity, not to suggest this as an actual statement of an error). This is based on the numbers of MPRs which failed validation in the NO LDZ and which resulted in a downgrade of the EUC band. There were 158 MPRs downgraded to EUC Band 02 for 2009. This represents a total of 240 million kWh being taken from the original metered quantities. Some of these may be correct in being downgraded, but the Phidex analysis has shown many are invalid.

If the total amount downgraded in NO alone is over 1 TWh this could be multiplied by 10 to cover all LDZs. It is likely that the majority of these reclassifications are valid as the meter point is part of a much larger supply point and if treated on its own then it should be downgraded. The exposure to the industry might therefore be just one tenth of this value, but that is still a Terawatt incorrectly added to the UG total. For a more accurate figure, we recommend full analysis of this anomaly type by the AUGE is required.

<u>Test 3</u>
Phidex has identified possible inconsistencies in the dataset and of apparent manual intervention in the methodology applied by the AUGE.

On p89 the text next to POSITIVE_VOLUME references “possible correction after meter rollover”. It could be inferred that a correction has occurred after identifying an incorrect index roll-over. Further information is required to validate this.

In the case of MPR 13975325 Phidex is led to assume that the situation of “positive volume calculated after possibly correcting for meter index rollover” must have occurred here i.e. an erroneous large value has been identified, analysed and discarded from the calculation manually. Phidex manually calculated the consumption for the period to be circa 100,000 kWh, but the AUGE calculated volume to be in the order of 1,000 kWh (i.e. 100 times lower than expected).

The result of this is that the FY_MR_CON value of approximately 1,000 kWh is used instead of the actual quantity of 100,000 kWh, providing further evidence of an erroneous addition to the UG values.

The AUGE needs to provide the estimated values used in the case of failed validation sites, thereby explicitly illustrating how the total Metered Volume value is derived for the LDZ. This would reduce the ambiguity in the numbers and enable thorough validation of the methodology used.

<u>Test 4</u>
For MPR 13976581 Phidex note that calculated consumption has occurred without validation failure for all three years, meaning that according to the methodology the

calculated quantity taken from the meter reads will be used to determine the energy consumed at this site. The site has been marked down from an EUC of 04 into 01 due to the domestic AQ; this appears to be correct, but irrelevant if the validation checks pass.

The meter reads used to create the FY_MR_CON values total of 1,805 kWh for the 3 year period. This would be consumption allocated to this MPR in the final UG calculations.

However using reads and assets available to correctly calculate the consumption over the 3 year period, Phidex calculated the consumption should be 183,826 kWh; this is in line with the metered volume (measured in single cubic feet) but 100 times more than the values displayed in the AUGS supporting data for this MPR.

Only a small sample of the potential numbers of MPRs affected by the above issue could be analysed by Phidex, therefore the following figures require validation by manual analysis and should be used as a guide to the potential significance of the error.

A report that sought to identify SSP MPRs in the dataset displaying a similar trend was run to gain an understanding on the significance of the calculation flaw discovered. An exception list with many hundreds of sites in the NO LDZ region alone were identified as having similar calculation errors. This would deliver a total of over 40 million kWh of Metered Gas which may have been omitted from the overall volume of metered gas computed for this LDZ for just the year 2010. Across all 13 LDZs that would equate to approximately half a terawatt of omitted energy.

Test Summary

Phidex recommends that there is more detailed analysis of exception reports from the 4 tests it performed. This would give a much clearer understanding of potential error using the proposed methodology. Further analysis of the dataset is should also be undertaken to identify instances where the quantities allocated by the AUGE for both LSP and SSP sectors were incorrect (thus resulting in an inaccurate UG value).

3.3 Use of Throughput Values to Allocate Theft Volumes

Changing to throughput, rather using either reported theft volumes or correct theft volumes (referred to here as Consumption + plus Theft) relies on a number of assumptions regarding the behaviour at theft sites, in particular assuming similar duration and rate of theft irrespective of the size and nature of the site. We have assessed this assumptions, detailed below, and believe that there may be a more appropriate method for ascertaining the levels of theft from each market sector.

Background
The proposed approach in the AUGS 2012 to the allocation of undetected theft, i.e. via market throughput, has been justified by the need to:

- Create better incentives across the entire market to detect and act on theft. The AUGS 2012 states that this approach would incentivise better theft prevention and detection behaviour, as to do so would reduce the level of UG, which will result in a lower Balancing Factor figure and therefore lower UG in both sectors;
- Prevent parties from manipulating the UG allocation process either by different detection rates or theft detection strategies; and instead

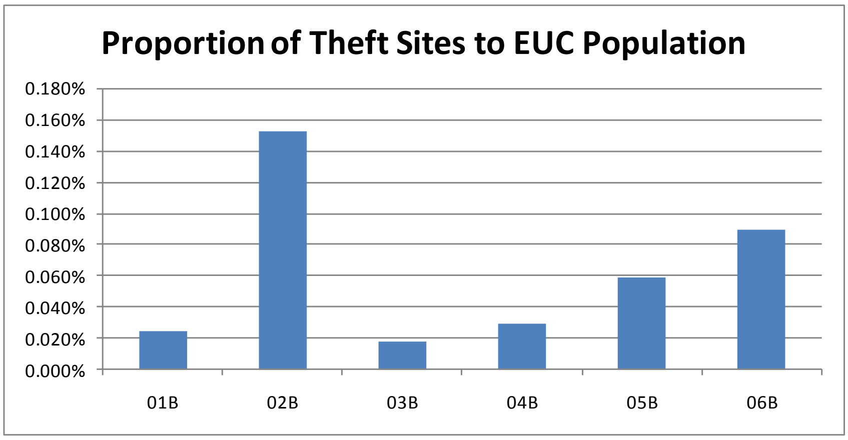
- Provide a simple and transparent approach to theft allocation

The AUGE identifies only one negative issue: "*The throughput method carries a fundamental assumption that the rates of theft in each market sector and the volumes stolen as a percentage of the market sector total are similar – in other words, the prevalence of theft does not differ by market sector and so throughput can be used as an effective method of splitting total theft.*"

Analysis of throughput method
We consider these to be in fact two such significant assumptions that they should be justified by some evidence. The two independent assumptions are:

1. that the rate of theft i.e. the number of theft sites as a proportion of the total sites in each sector is the same; and
2. that the volume stolen for each theft is proportional to the average AQ of each sector.

Qualitative arguments suggest that undetected theft is more likely to occur within the SSP sector. The assumptions do not take account of the commercial drivers regarding theft detection. Margins are slimmer in the LSP sector and this provides an incentive to higher detection rates, and the greater prevalence of accurate readings from the LSP sector leads to fewer opportunities for undetected theft. There is a fixed cost to detecting each theft, so the materiality benefit of finding larger theft sites is greater, and commercially this would steer theft detection resources towards the higher consumption sites in the LSP sector. Without taking commercial drivers into account we are at a loss to explain the shape of detected theft by EUC group (based on Table 17 of the second draft AUGS):



Source: GL Noble Denton

As the AUGE notes, the proportion of sites with detected theft is so small per unit of population at the larger consumption EUCs that these are going to show material shifts in percentage theft owing to a single detected site e.g. the percentage for EUC 06B is derived owing to a single site being identified; given the number of sites in the population for EUC 06B there would be no possible percentage value for EUC 06B between 0.085% and zero. Similarly EUC 05B contains only 2 theft sites, so it is clear that an additional theft site in this EUC group would make its theft site rate almost identical to that for 06B, and one less theft site would give it a rate almost identical to 04B. The small population size and low incidence rate of detected theft thus makes these results statistically insignificant.

More importantly, the volume of theft gas per identified site appears remarkably consistent and independent of site AQ for the LSP groups (02B-06B). According to the 2011 AUGS data for theft, when volumes of theft gas are categorised by EUC the average theft volume per site is in the range 50-90 MWh for groups 02B to 05B (and only 11 MWh for 06B although this average is formed from only two sample points). For 01B the average theft per site is nearly 24 MWh, but this is 0.95 x the average Adjusted AQ; for 02B the average theft per site of nearly 74 MWh is only 0.58 x the average Adjusted AQ and for larger consuming groups the AQ multiplier is commensurately lower.

This data undermines the thesis that theft gas may be assumed to be proportional to throughput. On the contrary it suggests thefts of large volumes from a single site do not take place (possibly because such behaviour would be easily spotted) and instead theft of broadly similar volume per site takes place at many sites around the network independent of their site AQ. The time duration of each theft is again on average similar across all EUC groups, and in the range 1.1-1.5 years (group 06B at 0.5 years has only two sample points so cannot be considered statistically valid).

EUC	01B	02B	03B	04B	05B	06B
Average Theft Duration (years)	1.5	1.3	1.1	1.4	1.1	0.5
Average Theft Volume (MWh)	22.7	73.9	83.9	51.3	87.1	11.8
Average Adjusted AQ (MWh)	23.7	127.8	463.6	1134.2	7273.3	18498.0
Theft Volume / AQ	0.96	0.58	0.18	0.05	0.01	0.00

Although we note the drawbacks with the Consumption + Theft method, and the undeniable attraction of the simplicity of the Throughput method, the AUGE’s own data clearly does not support the unadjusted Throughput method of allocation.

Alternative Approach to theft calculation
We would suggest instead that a single theft figure per LSP theft site is adopted of (say) 74 MWh (based on the average of groups 02B-05B above) and a figure of 23 MWh is adopted per theft site in group 01B.

In the interests of simplicity, and notwithstanding its belief as stated last year and restated above that commercial drivers would lead to lower theft rates and higher theft detection rates in the LSP sector, we acknowledge it is also reasonable to assume that human behaviour is consistent across all EUC groups.

Taking this assumption therefore the proportion of sites in each EUC group that are theft sites is the same and it becomes possible to solve for this proportion relatively easily using the formula:

Total Theft Gas (MWh) = % of theft sites x (Total # SSP sites x 23MWh + Total # NDM LSP sites x 74MWh)

This retains some of the drawbacks of the Consumption + Theft method, in that it continues to rely to an extent on correct classification of sites into SSP and LSP, and it could provide perverse incentives over time for shippers to seek out and report sites with low theft rates as a means of demonstrating the average theft per site for SSP or LSP sites used above is too large.

However it does not make any assumption about the rate of detected compared with undetected theft in each sector as, like the Throughput method, it assumes the same overall rate of theft in each sector. Also we believe that the role of the AUGE is to find the method of allocation for theft gas which most reasonably fits the facts and not to provide behavioural incentives. The data used by the AUGE was not collected with the aim of allocating theft gas, therefore it may be reasonably assumed to be an unbiased sample and reflect true behaviour over a number of years (the sample provided by the AUGE was of over 4,500 sites over 4 years).

Conclusion

Notwithstanding its suggestion above, we do have concerns with the conclusion of the AUGE following the statistical test for the forecast proportion theft based on throughput for the LSP sector in 2012/13 of 23.2% compared with the average result from the Consumption + Theft method of 21.5%. Would a similar conclusion have been reached in 2007, with the Throughput proportion at 27.9% and the Consumption + Theft method providing 19.2%? The closeness of the percentages appears to us to be coincidental rather than statistically meaningful, particularly given the data which the AUGE has chosen to include and/or ignore, and this seems to further undermine the conclusion that the simple Throughput method can be used to allocate theft gas with confidence.

The methodology proposes re-classifying sites from SSP to LSP where the level of theft detected in the current year is greater than 73,200kWh. Under the proposed Throughput methodology these sites would be assigned to the LSP split. We remain concerned at this element of the methodology. The values given were initially presented in GWh and subsequently understood to be in MWh – an overstatement of 1000 times. We note that Appendix K contains the list of newly-classified LSP meter points, and that the AUGE has indicated the step change of 8-12% in the LSP theft split difference as a result.

We would comment that the above proposed approach for theft allocation should not result in such a significant shift in percentage allocation based on the reallocation of theft sites from SSP to LSP. This further reinforces the proposal outlined above as a robust approach to theft allocation between SSP and LSP sectors.

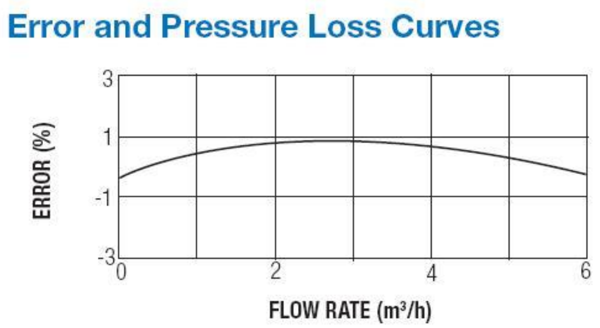
4. Unidentified Gas Sources

4.1 Meter Errors

We note that the focus of the AUGE for the 2012 AUGS has been on theft allocation and the element of Unidentified Gas which may arise from meter inaccuracy is deemed second order. However this does not take into consideration that smaller meters are likely to be less accurate in their measurement tolerance. This is because the commercial justification for accuracy at relatively low consumptions does not financially justify such significant investment in metering technology or maintenance. Therefore, there is potential structural bias in the metered consumption based on meter reads dependent on the degree of swing and flow characteristics of meters at low consumption sites.

According to Government data, around 25% of domestic meters sent for testing each year fail to meet the regulatory tolerance or otherwise fail to deliver consistent readings[1]. It is noted that the meters sent for testing are a very small sample of installed meters, so this figure cannot necessarily be used to read across to the accuracy of all installed meters, since by definition meters removed for testing are likely to be those where a dispute exists.

Diaphragm meters have an inherent error curve over their measurement range. Given the typical swing between winter and summer of a low consuming site, We question whether there is a structural error in meter reads i.e. if a meter under records actual consumption at higher flows, and higher flows predominate in terms of their share of total consumption across a year, then there may be a bias for SSP sites to understate their true consumption based on meter reads. The error may be assumed to be less at LSP sites owing to tighter tolerances on larger meters (driven by the larger financial/commercial impact of correct measurement) and the typically lower swing exhibited at higher AQ sites.



Source: GE/Dresser Specification sheet for residential NP 12/110 Gas Meter

We believe more investigation should be done in this area to confirm whether or not there is a material element of Unidentified Gas arising here.

4.2 Shipperless and Unregistered sites

The AUGS 2012 states (p47) that shipperless and unregistered sites are to be treated as shrinkage, and therefore the theft from these sites do not form part of UG but instead form part of Transporter-responsible theft. We support the proposal to keep these sites out of the UG equation and expect that such sites are incorporated into revised shrinkage

1 See http://www.bis.gov.uk/nmo/gas-and-electricity-meters/gas-meters-introduction/Gas-meter-accuracy-and-billing-disputes

estimates. Furthermore we note that the current information used by the AUGE, unlike the information used to determine UG as a whole, aggregates sites up to Supply Point level. For consistency, the quantification of the allocation of UG gas due to shipperless and unregistered sites should be conducted in the same was as for UG as a whole – by using a single meter point relationship.

In addition we agree with the AUGE that several UNC modifications (specifically 0410/0410A, 0424, 0425) will impact Unidentified Gas values. Though we appreciate that there is no certainty that these modifications will be implemented, with the exception of 0424, all will be either be implemented or rejected by the time that the finalised AUGS will be implemented. As all of these modifications will have a material impact on shipperless and unregistered site volumes their impact needs to be fully evaluated in time for the finalised AUGS.

4.3 iGT CSEPS

We agrees with the view of the AUGE (p27) that the information deficit from iGT CSEPS remains a material source of uncertainty in the estimates making up UG and that this could be avoided by iGTs providing the same meter read and consumption data as the rest of the industry (or alternatively having a meter at each CSEP to determine the total amount of gas going to each independent connected system. Considering the significant bias towards SSPs some form of correction reflecting this should be factored into losses arising from such networks

The shrinkage due to iGTs should also be estimated. As we have highlighted earlier, the likely total is not inconsiderable, due to the number of sites supplied by iGTs (well over 1million supply points). We believe that all components of the shrinkage methodology applied to the DNs also needs to be applied to the iGT network, including own use gas, theft and leakage, though we acknowledge that owing to the more modern characteristics of these networks shrinkage rates will be lower. The easiest mechanism to do this, and one we advocate, is to apply an uplift to current UG volumes assigned to iGTs. Considering the significant bias towards SSPs some form of correction reflecting this should be factored into losses arising from such networks

5. Conclusions

The above analysis shows a number of significant shortcomings with the methodology as currently designed and applied. We would like the AUGE to specifically acknowledge and address the following considerations.

- We are appreciative of the efforts in attempting to calculate a more accurate estimate Unidentified Gas.We acknowledge the considerable work undertaken by the AUGE given the volume of the data, and the attempts that have been made by the AUGE to obtain and make the raw data fit for purpose
- However we continue to have concerns about the quality of the data used, specifically in the context of the findings of Phidex when analysing the raw data used by the AUGE and comparing this with alternative datasets available from Xoserve
- We conclude that the data being used by the AUGE is not fit for purpose and further work needs to be done on the algorithms in order to provide input data of sufficient quality that it can be relied upon to deliver the necessary accuracy for the methodology to work
- We note that Phidex have identified a number of concerns over the failure to recognise a number of standard industry approaches to data cleansing which if not taken into account lead to volumes being mistreated e.g. consideration of USRV's and Energy Adjustments
- We do not support the simplistic throughput method for the allocation of theft gas between LSP and SSP sectors. Based on its analysis of theft data provided for the 2011 AUGS we have shown there is very poor correlation between throughput and theft volumes and this approach cannot be supported.

- We would propose an alternative theft allocation approach based on the number of LSP and SSP sites, assigning an average fixed theft volume to each of the LSP and SSP sectors based on detected gas theft volumes, and solving for the appropriate theft percentage which would apply across the industry (i.e. assuming the proportion of theft sites is the same in both LSP and SSP sectors). We believe this is an improvement over the Consumption + Theft method, albeit we acknowledges it perforce retains some of the drawbacks; however it appears relatively robust to changes in theft site allocation between the LSP and SSP sectors and would not be affected by theft detection rates

In summary it is necessary therefore to revisit both the approaches to dataset selection and pre-processing, and the theft allocation approach within the methodology, before this approach can be regarded as sufficiently robust to be used for the purpose of the 2012 AUGS.

Finalising the document in its current form runs the considerable risk of crystallising significant error in the UG calculation process.

Annex 1 - *Extract from AUGS 2011*

4.4 Alternative Method
An alternative method for estimating Unidentified Gas is to calculate a figure for the actual aggregate SSP load (not including UG) based on SSP meter read data, in addition to calculating aggregate actual NDM LSP load in a similar manner. This would allow UG to be calculated by subtraction because under this scenario it becomes the difference between the calculated LDZ load (with DM and shrinkage removed) and the aggregate of the SSP and LSP actuals:

UG = LDZ LoadADJ – (SSPACT + LSPACT)

The main drawbacks of this approach are concerned with the volume of data required in order to use it and the associated requirement for this data to be of excellent quality. In order to calculate actual SSP load correctly, SSP meter reads (or consumptions calculated from meter reads) would be required for either all sites of this type or for a large sample of them. If all sites are to be used in the analysis, this entails the collection and analysis of a very large amount of data. Using a sample would mitigate this to an extent, although for results to be robust a large sample would still be required, and the process of multiplying up sample results to represent the full population would introduce inaccuracies that would go some way to cancelling out the benefits of this approach.

The potential for missing and/or erroneous information within such a large dataset (whether the full or the sample approach is taken) is high, and due to the volumes of data involved, these would be hard to detect. Data issues of this nature would damage the integrity of the estimates, and could lead to results being less reliable than those from the AUGE's proposed approach. This would lead to a situation where no improvements in accuracy were achieved despite a large increase in complexity.

In addition, this approach only produces an estimate of total Unidentified Gas. As described in Section 4.3 above, it is the LSP element of Unidentified Gas that is important, because SSP Unidentified Gas has already been placed in the correct market sector by the current process. Under this alternative methodology, therefore, processes similar to those described in Section 4.3 will still be required in order to split the total UG estimate between market sectors. This split would be based on the same data as used for the AUGE's proposed method, and would return results of a similar quality. This therefore once again could lead to a situation where no improvement in accuracy has been made despite the increased complexity of the calculations.

Despite these reservations, the AUGE recognises that this method may produce better results than the current proposed algorithms if SSP and NDM LSP load or meter read data can be retrieved reliably for all loads and is of a high quality throughout. In addition, the AUGE has carried out sensitivity analysis of worked UG allocation scenarios, and these have shown that small quantities of LSP UG may be assigned to the SSP market during the allocation process, and the currently available data does not allow these to be estimated. Use of both SSP and LSP actual meter reads may allow an estimate of this quantity to be made.

Enquiries have therefore been made with Xoserve concerning the availability and supply of this data, and a response is awaited. When information from Xoserve has been supplied, it will be assessed by the AUGE and a decision taken as to the best calculation method to use for future years. For the current year, however, given the lack of data and concerns *about the impact of any data quality issues, this approach remains the alternative, and it will only be implemented for this year if insoluble issues arise with the proposed methodology*.