# Response to '30 September 2011 Allocation of Unidentified Gas Statement – Draft v2'

BRITISH GAS

October 2011

**Section 1: Introduction**

We thank the AUGE for providing the Allocation of Unidentified Gas Statement (AUGS), Version 2 for comment.

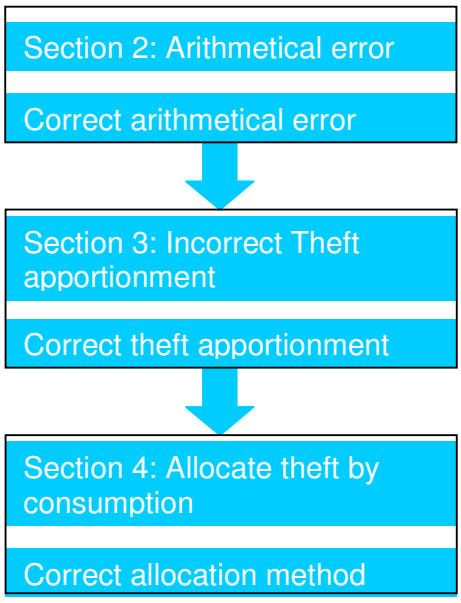
Whilst it is clear that the AUGE has made significant progress in attempting to calculate the total quantity of unidentified gas (UG) and the component parts, and has defined a methodology to allocate UG across the Small Supply Point (SSP) and Large Supply Point (LSP) sectors, we have identified some material errors in the document that require re-evaluation and correction. The most material issues are:

i) Simple arithmetic error(s) in the application of the AUGE's stated methodology for calculating the total quantity of UG. The impact of the error(s) is to understate the value of unidentified gas (by incorrectly calculating the "balancing factor") and consequently arriving at an incorrect allocation. A simple correction to the arithmetic will resolve this issue.

ii) In an ideal world theft should be apportioned in every instance by Shipper. In the absence of good data on this however an alternative approach is required. Whilst the AUGE has accepted this, the apportionment of theft (allocation ratio) between the SSP and LSP sectors is incorrect. The AUGE argues that the allocation of theft should be split between sectors in proportion to the estimated volume of theft occurring in each sector. Assuming that this is a reasonable approach, we provide evidence that the derived ratio cannot be correct and request that the AUGE re-evaluate the allocations.

iii) The AUGE has not considered allocating theft between sectors in proportion to overall consumption. In the absence of good data on theft we set out why the AUGE may choose this alternative approach and why this would be a significantly fairer method of apportioning volumes than the approach currently used. When the AUGE reviews and corrects the suggested allocation of theft, it will see that the evidence shows that theft (by volume) is more prevalent in the LSP sector. Allocating less theft than the LSP share of throughput (~26.45%) is therefore unacceptable as this would represent a continued bias in allocation approach.

The details supporting each of these points are set out in the following sections along with how we believe the calculation should be corrected. The diagram below explains how the following three sections build on one another.



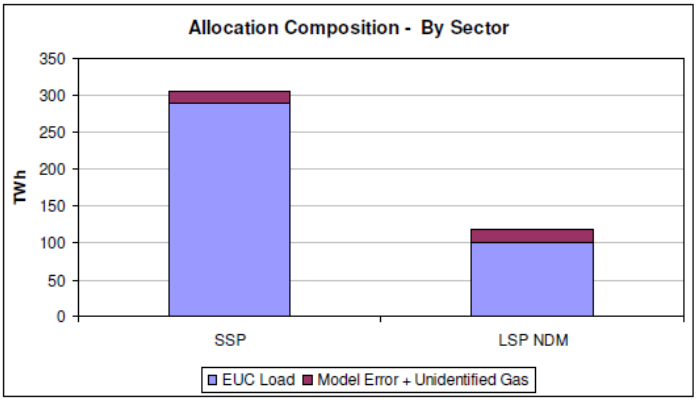
**Section 2: Arithmetical Error**

Whilst it is clear that the AUGE has made significant progress in calculating the component parts of UG and defining a methodology to allocate UG across sectors, the defined methodology has been incorrectly applied.

This is in effect a simple arithmetic error that can be easily remedied.

The figure below is taken directly from the AUGS (Section 4.2, Figure 2, page 11) and has been designed to represent the location of UG through the various stages of the allocation and reconciliation process. The chart below is the AUGE's representation of where UG (plus Model Error) is allocated prior to RbD (i.e. on initial allocation).

We observe that the size of 'UG plus Model Error' bars are not necessarily to scale across each sector but note that at this stage in the deeming allocation process UG has been allocated directly in proportion to the initial allocations in each sector, and that 'Model Error' has an equal and opposite effect in absolute size on each sector. We also note that in any given year model error may be positive or negative in any one sector (with the equal and opposite effect on the other sector). From comments contained within the AUGS we believe that the AUGE understand this.




To reiterate, at this stage UG is allocated in proportion to the overall volume of allocation to each sector. Whilst this is acknowledged by the AUGE:

*"The nature of the calculation means that the Unidentified Gas component is split across EUCs by volume ratio"*

(Section 4.2, paragraph 1, pg 10)

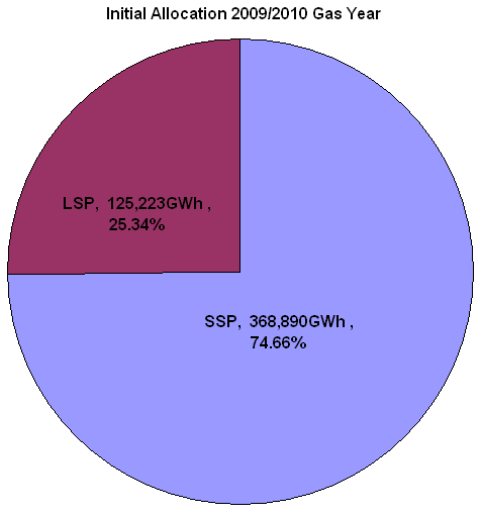
It is clear that the chart above is unlikely to accurately represent the proportions of UG plus Model Error allocation. We acknowledge the AUGE may not have intended the figure to be a to-scale representation of the UG quantities, but it is essential to understand that UG is allocated initially in direct proportion to the total volume allocations to each sector. Hence, if there is an initial allocation of, for example, 75% of total volume to the SSP sector and 25% to the LSP sector, then at this point UG would also be apportioned in the same ratio, i.e. 75% to the SSP sector and 25% to the LSP sector. This is necessarily true as an outcome of how the deeming algorithm works and is true regardless of the value of 'Model Error'.

This can be demonstrated using actual data. For example, in the Gas Year 2009/10 the initial allocation split was:

**SSP**
368,890GWh (74.66% of NDM allocation)

**LSP**
125,223GWh (25.34% of NDM allocation)

(Source: Ofgem data request – aggregate consumption, 03/03/2011)




By definition, and as recognised by the AUGE, UG is allocated by the same proportions initially. As such any representative figure should clearly show that (in this example) 74.66% of total UG is allocated to the SSP sector and 25.34% is allocated to the LSP sector.

For the AUGE's "Allocation Composition – by Sector" (Figure 2) represented above, to be accurate it would need to take this into account.

UG and 'Model Error' must be calculated and applied separately to preserve the integrity of the calculation. Once the total value of UG is derived (which is equal to the volume of UG initially allocated to the SSP sector plus the volume UG initially allocated to the LSP sector) and a methodology for allocation determined, then the volume of unidentified gas that should be transferred to the SSP sector is equal to the SSP total correct (fair) allocation minus the sum the SSP sector has already been allocated on initial allocation. The remainder is allocated to the LSP sector.

The methodology within the AUGS states:

*"The proposed approach is to first assess the extent to which load estimates from the allocation algorithm are skewed towards the LSP sector. This phenomenon has been observed to exist and is caused by the drivers discussed in Section 4.2 above. 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 Unidentified Gas.* ***This provides a total figure for LSP sector assigned Unidentified Gas.*** *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. This part of the UG figure is referred to as the Balancing Factor."*

(Section 4.2, paragraph 2, pg 11, bold is our emphasis)

We agree that under the above proposed methodology the residual volume of gas provides a total figure for LSP sector assigned (allocated) UG on initial allocation. This should then be added to the SSP sector assigned unidentified gas on initial allocation to arrive at the total quantity of unidentified gas. Furthermore, once we know the value of LSP assigned UG, because we also know in any given year the percentage of gas initially allocated to the LSP sector and that this is the same as the percentage of UG assigned to the LSP sector, we can calculate the total volume UG assigned to both sectors and the amount already allocated to the SSP sector.

Using our example above from the 2009/10 gas year, LSP assigned unidentified gas represents 25.34% of the total UG. This understanding is critical to the correct application of the AUGS methodology to correctly apportion UG across sectors.

Since the LSP sector assigned UG element of total UG has been calculated, it is possible to calculate the total UG:

**Calculation 1:**

Total UG = $\frac{\text{LSP Sector Assigned UG Quantity}}{\text{LSP Allocation Proportion}}$

From the AUGS worked example methodology we can identify a value for LSP Sector Assigned UG Quantity as:

RbD Bias – Algorithm Bias = LSP Sector Assigned UG Quantity

i.e. 9,862.4GWh – 3,205.5GWh = 6,656.9GWh

So,
(1) LSP UG Quantity = 6,656.8GWh (taken directly from the AUGS as detailed above)
(2) LSP Allocation Proportion = 25.34% (actual 2009/10 gas year data)

Hence, 6,656.8GWh represents 25.34% of total UG.

Therefore utilising the AUGS methodology:

LSP Sector Assigned UG Quantity / LSP Allocation Proportion = TOTAL UG Quantity

6,656.8GWh / 0.2534 = 26,269.93GWh

This is the correct application of the AUGS methodology. Within the AUGS the AUGE, whilst acknowledging correctly the derivation of LSP Sector Assigned UG, goes on to incorrectly treat this figure as though it represents total market UG. This is however a material error in the AUGS that requires correction.

This arithmetical error is compounded by a further related error. Within the AUGS, the AUGE writes:

*"The AUGE proposes to estimate the LSP element of Unidentified Gas only.* ***It is not necessary to calculate the magnitude of SSP sector Unidentified Gas*** *due to the fact that RbD assigns it to the correct market sector already, and hence no action is required regardless of its magnitude. SSP elements of Unidentified Gas are calculated only where it is necessary to calculate the total UG for a particular component part and then split this between the market sectors."*

(Section 4.2, paragraph 1, pg 12, bold is our emphasis)

This statement is incorrect. It is necessary to calculate the magnitude of the SSP sector UG for the following two reasons:

i) It is fundamental to the principle of deriving theft (and factors classed by the AUGE as "other") as the balancing number as described by the AUGE:

*"Given this lack of information about theft levels it is very difficult to make a robust direct calculation of the amount of Unidentified Gas that can be attributed to this source. Any such calculation requires an assumption to be made about unknown theft …*

*Therefore the decision has been taken to calculate theft by subtraction as part of the Balancing Factor. The result of this approach is that the theft estimate is far*

*more robust due to the fact that it is dependent on factors that have good quality data associated with them and can therefore be estimated far more accurately. By ensuring that all sources of UG are included in the calculation, the elimination of the other elements leaves theft as the source of the remainder."*

(Section 6.6, paragraph 5, pg 43)

The calculation of theft by subtraction (the balancing number) is only possible if the starting figure represents total UG (LSP assigned UG + SSP assigned UG) otherwise it is not the balancing number and the logic fails.

The AUGE has used a starting figure of LSP assigned UG in error, mistaking this for total UG, and subtracted from it the market-wide (LSP + SSP) directly measured components. It has then treated the residual or balancing number as theft. This has no mathematical integrity and is a false application of the AUGS proposed methodology. This is a significant mistake that introduces substantial inaccuracy to the eventual outcome of the AUGS. Again, this needs to be corrected before the AUGS is completed.

ii) After calculating the balancing factor correctly, it remains necessary to understand the amount of UG already assigned to the SSP sector so that any under or over allocation can be evaluated in order to ensure the correct apportionment of unidentified gas between sectors. Without understanding how much UG the SSP sector has already been assigned it is not possible to calculate any adjustment required.

Before recalculating the numbers using the AUGE's methodology (less the arithmetical mistake) we have examined where in the AUGS the above error actually occurred in the calculation. The mistake is made through a culmination of statements in the AUGS which whilst essentially true, do not reflect the full picture and this eventually led to the actual mistake occurring and being reflected in the calculation.

The AUGS states:

*"The Unidentified Gas 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.*
2. *Algorithm bias is then calculated using the techniques and formulae described in detail in Section 6.2 above.*
3. *The difference between these two figures is the total Unidentified Gas 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.*
4. *The next stage of the process is to calculate the directly estimated components of Unidentified Gas. 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.*
6. *Shipperless and Unregistered sites are split into six categories. In the tables in Section 7, the components are shown in grey, and the combined sum of these in black.*
7. *For meter errors, sites with an average hourly consumption (calculated from the AQ) of 1% or less of their Qmax value are considered to be consistently operating in the "under-read" area. Sites with an average hourly consumption of 95% or more of their Qmax 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.*

8. *The sum of the directly measured UG components calculated in #5-#7 above is listed in the tables in Section 7 as "Total Directly Measured". 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.*
9. *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 6.6 above."*

(Section 6.9, pg 48)

The AUGS also states:

"*It is important to note that the RbD quantity, whilst containing a large element of Unidentified Gas, also contains a significant component of model error.*"

(Section 4.2, pg 11)

It is important to note that the model error could be positive or negative and would depend entirely on the relative consumption behaviour of the LSP and SSP sector as captured by meter reads and used in the AQ Review. The AQ Review captures expected consumption based on historic data; if current year relative consumption between SSP and LSP sectors differs slightly from previous captured experience this will create the "Model Error". It is highly unlikely over time that this Model Error will always be in the same direction.

The AUGS methodology states

> *"3. The difference between these two figures is the total Unidentified Gas 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."*

(Section 6.9, pg 48)

We agree with this statement but would also point out that this figure could equal the UG arisen from the LSP sector exactly, be greater than the UG arisen from the LSP sector or be less than the UG arisen from the LSP sector. These scenarios can arise because UG is also assigned to the SSP sector on initial allocation by the deeming algorithm in proportion to its overall initial allocation (i.e. approximately 75% of all unidentified gas on initial allocation is assigned to the SSP sector). Hence each sector can either have been allocated too much, too little or the correct amount of UG on initial allocation. If the AUGE determined that UG were to be allocated in proportion to total sector consumption (the starting point) any adjustments to initial assignment of UG between sectors would be a small fractional adjustment to the original assignment of UG.

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

(Section 6.9, pg 48)

Stages 5 – 7 size and apportion individually the directly measured components leading us to stage 8.

> *"8. The sum of the directly measured UG components calculated in #5-#7 above is listed in the tables in Section 7 as "Total Directly Measured".* ***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."*

(Section 6.9, pg 48)

This is where the arithmetical error is actually introduced into the calculation. Subtracting the SSP and LSP elements of directly measured UG from the LSP assigned UG figure instead of the total UG figure results in the Balancing Factor being calculated incorrectly. Consequently, unless corrected, it is not representative of theft (+ other). In effect the AUGE has subtracted the total directly measured UG elements of the whole market (SSP + LSP) from just 25.35% of the total UG, and then declared that the residual element represents theft (and factors termed as "other" by the AUGE) for the whole market. This is incorrect.

In order for the Balancing Factor to represent theft (and factors termed as "other" by the AUGE), the directly measured UG elements for the whole market (SSP + LSP) must be subtracted from the total UG for the whole market (SSP + LSP). The residual in this case would be theft (and factors termed as "other" by the AUGE) for the whole market (SSP + LSP).

We note that considerable time and effort has clearly gone it to scaling and apportioning the directly estimated components of UG.

When the AUGE's calculation is applied without the mistakes the numbers are corrected as follows:

**Calculation 2:**

From corrected **Calculation 1**:
Total UG (SSP + LSP) = 26,269.93GWh (1)

From AUGS summation of results for all LDZs:
Total Directly Measured UG Elements (SSP + LSP) = 2,537.59GWh (2)

**Corrected "Balancing Factor"**

Balancing Factor = (1) – (2) = 23,732.34GWh

If we now use the AUGS methodology to allocate across sectors (assuming "theft" is allocated 92.1:7.9, SSP:LSP as per AUGS):

**Total Directly Measured UG Elements**

SSP 858.68GWh
LSP 1,678.91GWh

**Balancing Factor**

SSP 21,857.48GWh
LSP 1,874.86GWh

**Total**

SSP 22,716.16GWh
LSP 3,553.77GWh

This is the corrected sector volume assignment based on the AUGE's assessment of the scale and sector apportionment of the component parts but correcting for the arithmetical errors in the AUGS.

Notwithstanding this, we would once again state that our preferred approach for the calculation of total UG is based on read data from both the LSP and SSP sectors, referred to in the AUGS as the 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)"*

(section 4.4, pg 14)

We acknowledge there are difficulties acquiring the data necessary to complete this approach in the first AUGE year, but we would welcome a commitment from the AUGE now to ensuring that this approach is taken in subsequent years. The AUGE's methodology and calculation, when corrected, provides a reasonable approximation to this approach and therefore is suitable for use this year.

**Section 3: Incorrect Apportionment of Theft between Sectors**

**Shipper-responsible Theft**

The correctly calculated Balancing Factor, at 23,732GWh (representing ~4.8% of NDM throughput in the 2009/10 gas year) falls within the range of theft referred to in the AUGS. However, given the scale of the number it is important that it is allocated fairly. We note that it represents "theft plus other factors" and that "other factors" should be apportioned relative to throughput. It may not therefore be appropriate to apportion the whole of the balancing factor as though it were theft.

Since the balancing factor represents ~90% of total UG, the allocation of this value must be robust. We do not believe that the calculation of the allocation of theft (and other factors) is sufficiently well developed. In particular we believe we can demonstrate that the AUGE has understated the proportion of theft that should be allocated to the LSP sector and overstated the same for the SSP sector. We request that the AUGE re-evaluates and amends their assessment.

Our evidence is set out in the remainder of section 3 (and including 3.1 and 3.2).

The methodology proposed in the AUGS to allocate the 23,732.34GWh across sectors is as follows:

*"This approach allows a total figure for theft to be calculated, but does not address the issue of splitting this between the SSP and the LSP markets. Analysis of detailed theft data from 2006 to 2010 shows that the proportion of detected thefts that arise from the SSP market is very similar to the proportion of alleged thefts that arise from this market sector. It is therefore reasonable to assume that this figure is an accurate representation of the split between market sectors in terms of the relative frequency of thefts. This data shows that 95.4% of occurrences of theft come from the SSP sector. LSP thefts typically involve larger volumes of gas, however, and taking this into account, the proportion of theft volume that arises from the SSP sector is 92.1%.*

*This value can be used to split the calculated total theft volume between the SSP and LSP markets."*

(Section 6.6, paragraphs 6, 7, page 43)

Accepting the AUGE's estimate of the proportion of theft incidents by sector, we note that LSP represents ~1.5% of total NDM number of sites but 4.6% of the total incidences of theft. This would indicate that theft is more prevalent on LSP sites than SSP sites.

The AUGE's proposed approach of apportionment assumes that the effort applied to allegations and detections of theft is uniform across sectors and that there is no bias contained within the data used.

We believe there are a number of reasons why theft allegations for LSP sites are under-reported in comparison to SSP sites, including the following:

i) It is more difficult for somebody to spot the signs of LSP theft. Some of the reasons for this include: meters are often inaccessible; there is no standard consumption pattern against which to detect variations (contrast domestic usage) and so on. This does not apply to converting from an allegation into detection because at this point a specialist theft expert is assigned who has greater skill and resources available to them to fully investigate the issue.

ii) SSP suppliers bear all of the cost of theft in the industry currently so there is no financial incentive for LSP suppliers to detect the theft on their portfolios, leading to lower than average investment in theft detection capabilities.

iii) Theft allegations and detections are reported against sectors by Xoserve by their current AQ value. Inevitably, some LSP thefts will be mis-reported as SSP thefts simply because the AQ value will artificially fall below the 73,200 kWh threshold.

Our conclusion is therefore that the proportion of LSP theft incidents is higher than the proportion of allegations suggested in the AUGS.

As identified by the AUGE in this AUGS the current methodology of allocation and reconciliation is unfair as the SSP sector pays for all UG (excluding the token interim arrangement) and this by definition includes theft. As such there are differing levels of incentive for different shipper types to identify and detect theft. An SSP-only shipper pays for theft and an LSP-only shipper does not; as such the detection and allegation rates will reflect this. We ask the AUGE to demonstrate that this effect has been taken into account when reviewing the statistics.

In addition we also point out that the current classification into LSP and SSP sectors is derived from the AQ value. The AQ is calculated using actual read data and therefore will (by definition) not include un-metered consumption. Theft is un-metered consumption. This means that some LSP theft will be recorded incorrectly by Xoserve as SSP theft. This is because when the un-metered theft consumption is added to the metered consumption the new AQ value will cross the LSP threshold. The impact of this could be to materially understate the number of LSP allegation and detections and overstate the number of SSP allegations and detections.

We are also concerned by the following statement:

*"LSP thefts typically involve larger volumes of gas, however, and taking this into account, the proportion of theft volume that arises from the SSP sector is 92.1%."*

(Section 6.6, page 43)

There is no data to show how this adjustment has been made, but we derive from the statement that the AUGE believes that on average LSP sites that are stealing gas steal 77.9% more gas than the average SSP site stealing gas. The calculation is as follows:

**Calculation 3**

We need to express the average volume of an LSP theft as a multiple of the average volume of an SSP theft.

From the AUGS:

Of the total number of sites stealing gas, 4.6% are LSP and 95.4% are SSP

Of the total volume of gas stolen, 7.9% is stolen by LSP and 92.1% by SSP

Let:

n = total number of sites stealing gas (combined LSP and SSP)

V = total volume of theft across all sites

L = average volume of theft by an LSP site that is stealing gas

S = average volume of theft by an SSP site that is stealing gas

Then:

$$(4.6/100) \times n \times L = (7.9/100) \times V$$

$$\Rightarrow (4.6/7.9) \times L = V/n \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

And:

$$(95.4/100) \times n \times S = (92.1/100) \times V$$

$$\Rightarrow (95.4/92.1) \times S = V/n \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Hence, from equations (1) and (2):

$$(4.6/7.9) \times L = (95.4/92.1) \times S$$

$$\Rightarrow L = (95.4/92.1) \times (7.9/4.6) \times S$$

$$L = 1.779 \times S$$

i.e. on average an LSP site stealing gas steals 77.9% more gas than the average SSP site that steals gas.

We believe that this cannot be true and that the conversion of the number of LSP sites stealing as a percentage of the whole into volume of theft for the LSP sector leads to a much higher allocation to the LSP sector and a smaller allocation to the SSP sector.

To arrive at this we calculate a minimum possible allocation of theft attributed to the LSP sector and determine a maximum likely outcome.

An LSP site is defined as a site with an AQ greater than 73,200KWh.

Hence the lowest consuming LSP site must have an AQ greater than 73,200 KWh. The average LSP consumption is much higher than this at 375,950KWh.

(Mod81 Xoserve data as at 1st October 2010).

**Section 3.1: Calculation of minimum proportion of theft attributed to the LSP sector**

From our own analysis, we estimate the average (mode) SSP AQ is approximately 13,000 KWh, although Xoserve will be able to confirm the exact number. If we assume SSP theft occurs typically at average (mode) consumption sites then we can see that the smallest LSP site consumes 5.56 times as much as this; the average (mode) LSP site will consume a significantly higher ratio.

Hence, we conclude that as a minimum an LSP site stealing gas is likely to steal 5.56 times more gas than the average SSP site that steals gas.

Given the above facts we cannot reconcile the adjustment made by the AUGE to adjust 95.4% to 92.1% as this bears no relation to relative consumption.

Hence, where:

L = average volume of theft by an LSP site that is stealing gas
S = average volume of theft by an SSP site that is stealing gas

Then:

$L \geq 5.56 \times S$

We can now calculate the minimum apportionment of theft (allocation ratio) that should be used in the AUGS, under the same assumption used in the AUGS about the relative frequency of thefts as follows:

Calculation 4

We now calculate the minimum proportion (by volume) of LSP theft (as a proportion of total theft.

From the AUGS:

Of the total number of sites stealing gas, 4.6% are LSP and 95.4% are SSP
Of the total volume of gas stolen, 7.9% is stolen by LSP and 92.1% by SSP

Let:

n = total number of sites stealing gas (combined LSP and SSP)
V = total volume of theft across all sites
$V_1$ = total volume of LSP theft
$V_2$ = total volume of SSP theft
L = average volume of theft by an LSP site that is stealing gas
S = average volume of theft by an SSP site that is stealing gas

We know that: $L \geq 5.56 \times S$
Hence the minimum value of $L = 5.56 \times S$

Using $L = 5.56 \times S$, we can therefore calculate the minimum value for the proportion of LSP theft:

From the above we calculate:

$V = V_1 + V_2$
$= [(4.6/100) \times n \times L] + [(95.4/100) \times n \times S]$
$= n \times \{[(4.6/100) \times 5.56 \times S] + [(95.4/100) \times S]\}$
$= nS \times [(4.6/100) \times 5.56 + (95.4/100)]$
$= 1.20976 \times nS$ …… (1)

$V_1 = [(4.6/100) \times n \times L]$
$= n \times [(4.6/100) \times 5.56 \times S]$
$=0.25576 \times nS$ …… (2)

Minimum proportion of LSP theft = $V_1/V$
$= (2)/(1)$
$= 0.2114$

Hence, LSP sites account for a <u>minimum</u> of **21.14%** of total theft in the industry. This is well within the conclusions drawn from our own practical experience of theft detection which suggests that LSP theft could be greater than LSP market share of consumption.

**Section 3.2: Determination of maximum proportion of theft attributed to the LSP sector**

We now examine the likely allocation of theft between sectors simply using data provided by Xoserve and the AUGS at face value.

Figure 3.2.1 below sets out the published data from Xoserve and the AUGS in the first 5 columns and the last column is the calculation of the allocation split of theft between sectors derived from these data.

Here, rather than assuming that a theft by an LSP site is automatically proportional to the lowest annual consumption that an LSP site can have, i.e. 73,201KWh (and compared to an SSP site theft proportional to average SSP consumption) as we did in calculating the minimum possible allocation to the LSP sector, we have assumed that the average theft at an SSP site and at an LSP site is related to their respective average consumption levels.

Figure 3.2.1

| | Source: Xoserve, 1st October 2010 | | | | Source: AUGS | Source: calculated |
|---|---|---|---|---|---|---|
| | MPR count | % of total MPRs | Total AQ (GWh) | % of total AQ | % Theft detections | Implied % of total theft volume* |
| LSP | 313,478 | 1.46 | 117,852 | 26.45 | 4.6 | 54.00 |
| SSP | 21,218,707 | 98.54 | 327,730 | 73.55 | 95.4 | 46.00 |
| Total | 21,532,185 | 100.00 | 445,582 | 100.00 | 100.0 | 100.00 |

* The % allocation of theft volume between sectors is calculated in exactly the same way as per calculations 3 and 4 using the data in the first 5 columns of the table, but assuming that for SSP and LSP sites alike, the relative size of the average single theft in each sector is in proportion to the average site AQ (consumption) for each sector.

We can see that by making identical assumptions about the size of SSP theft and LSP theft per site the allocation of theft is as follows:

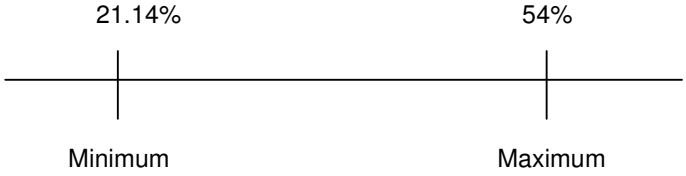
LSP allocation 54%
SSP allocation 46%

As stated previously the LSP sector accounts for a significant proportion of theft: LSP make up 1.46% of sites but account for 26.45% of volume; LSP thefts account for 4.6% of thefts which would suggest they account for more than 26.45% of the volume of gas theft.

To create this allocation we have treated the LSP data in an identical way to the SSP data.

**Section 3.3: Likely allocation of theft between sectors**

From sections 3.1 and 3.2 we can see that based on the AUGE's analysis of number of thefts across each sector, theft allocation to the LSP sector in all probability sits in the range:




And, that if the arguments earlier in Section 3 hold true then the number of thefts for LSP sites will be relatively underreported and this range will shift to the right.

We would expect the AUGE to logically assess the possible outcomes and select the most likely outcome within this range of possibilities. If this is not possible in the time available for this year's methodology, it is clear that the AUGE could not reasonably arrive at a value lower than 21.14% and that the value is likely to be nearer 54% than 21.14%. As a minimum therefore the AUGE should ensure that the value used is no lower than the LSP market share of total consumption, i.e. 26.45% based on Xoserve data for 1st October 2010. A lower allocation is not feasible based on the evidence.

**Section 4: A justifiable alternative is to allocate theft (and other factors) between sectors in proportion to overall consumption**

The balancing factor (corrected) is 23,732GWh which represents 4.8% of NDM throughput. Although this lies within the range of possible outcomes in the AUGS it also contains other factors as acknowledged in the AUGS; other factors could include measurement errors, for example. Other factors should not be allocated in proportion to the occurrence of theft but rather in proportion to throughput.

Furthermore, the division of theft into sector is not a precise calculation (because the data is not robust) so allocation by sector in the way suggested in the AUGS may be incorrect. Given the scale of the balancing factor this introduces significant risk of incorrect allocation.

It can be easily argued that the division of theft by sector is set arbitrarily by AQ threshold. AQ threshold is currently set at 73,200 KWh but could easily have been set at a different figure. Under the current AUGS the value at which AQ threshold is set determines the proportion of theft allocated to each customer sector. Hence allocation of the cost of theft to customer sector is arbitrary: customers cannot select which sector they are in.. This would have the affect of penalising some customers that don't steal to a greater extent than others, i.e. the cost of theft is not borne evenly by those that don't steal.

The only relevant split in relation to theft is between those that steal and those that don't steal.

Ideally the cost of theft would be borne by individual suppliers whose customers were responsible for the theft, incentivising suppliers to reduce theft (e.g. through detection). Unfortunately theft cannot yet be accurately determined at supplier level as insufficient information exists to do this. The following quotations taken from a report by Frontier Economics support this:

> *"… in our view, the most efficient and fair option would be to allocate theft according to its incidence by shipper. In this case, the full costs and all of the benefits of any investment in theft detection would fall on individual shippers, and so shippers would be incentivised to invest in detection up to efficient levels. However given the impossibility of determining the true levels of theft by shipper, this option must be ruled out as impractical."*
>
> *"Customers cannot readily switch between sectors. If there is more theft in one sector customers who are within that sector purely because of the volume they consume will be unduly discriminated against."*
>
> *"The second best, but most practical, option in this case is to socialise fully the costs across sectors. While this will not, by itself, result in an efficient outcome, it will be fairer and more practical than the alternative of allocating within sectors."*
>
> (Allocation of Unidentified Gas: Phase II, frontier economics, September 2011)

Given the shortfalls in the data an alternative approach therefore is to allocate the cost of theft evenly across sectors, i.e. apportion by throughput.

This way of dealing with theft is in line with how theft is allocated in the electricity market which sets a precedent for taking this approach.

A further benefit of this approach is that it will ensure that the 'other factors' that make up part of the Balancing Factor are allocated appropriately.

We believe that in focussing on LSP and SSP allocations, the AUGE has overlooked a potentially more appropriate allocation of theft. We request that the AUGE consider the appropriateness of their proposed allocation approach alongside the merits of allocation in proportion to throughput. We would particularly like the AUGE to consider whether the

supporting data is of sufficient quality and robustness to take the approach set out in the AUGS.

**Section 5: Statement of outcomes**

Figure 5.1 below re-states the different outcomes.

The first outcome relates to Section 2 and the correction of the arithmetical error contained in the AUGS and is a simple re-statement assuming all other factors remain the same.

The Min Case and Max Case outcomes are as above plus recalculation as per Section 3, providing a logical range of values for the apportionment of Theft and other factors.

The final outcome includes correction of arithmetical error but apportions theft by consumption as per Section 4 of this document. In this instance consumption is calculated post Algorithm Error correction to ensure the correct apportionment.

In each instance the directly measured components have been held as per the allocation contained within the AUGS.

**Figure 5.1:**

| | | Section 2 | Section 3 | | Section 4 |
|---|---|---|---|---|---|
| All figures in GWh | | AUGS | Min Case | Max Case | Theft per Consumption* |
| Directly Measured Components | SSP | 858.68 | 858.68 | 858.68 | 858.68 |
| | LSP | 1,678.91 | 1,678.91 | 1,678.91 | 1,678.91 |
| | Total | 2,537.59 | 2,537.59 | 2,537.59 | 2,537.59 |
| Balancing Number | SSP | 21,857.48 | 18,715.32 | 10,916.88 | 17,871.82 |
| | LSP | 1,874.86 | 5,017.02 | 12,815.46 | 5,860.52 |
| | Total | 23,732.34 | 23,732.34 | 23,732.34 | 23,732.34 |
| **Total** | **SSP** | **22,716.16** | **19,574.00** | **11,775.56** | **18,730.50** |
| | **LSP** | **3,553.77** | **6,695.93** | **14,494.37** | **7,539.43** |

*Consumption post Algorithm Error correction

**Section 6: Additional Comments**

**Section 4.2, Page 10, Figure 1.**

The chart is incorrect. It shows a 16% reduction in LSP AQ in the 2010 AQ Review, but the actual LSP reduction was 9.8%, with SSPs reducing 9.1%. The figures for the other years are incorrect too.

(Mod81 Xoserve data as at 1st October 2010,09,08,07)

This is not material to the AUGE's calculations but it incorrectly implies there was a huge difference in AQ reductions between LSPs and SSPs.

**5.4 page 17**

Outstanding data item

The AUGE has requested a summary of shipperless sites less than 12 months old. We conclude that Xoserve providing this would not be possible as a shipperless site cannot be established until such time as the safety visit has been done. The safety visit is not conducted until 12 months has been reached therefore a shipperless site cannot be identified earlier than this.

If data is available an alternative option might be:

- Obtain data from the networks on the total number of safety visits made
- What % have a meter found to be still on site.
- Obtain data from Xoserve on the number of sites withdrawn from less than 12 months.
- Apply the % to the withdrawn sites to calculate the proportion which are likely to flow through to shipperless.

As has been suggested by the AUGE, we believe that UG from shipperless less than 12 months does need to be factored in.

**Section 6**

**Section 6.2**

The conclusions about EWCF (Estimated Weather Correction Factor) differing from WCF (Weather Correction Factor) particularly in the last 3 months of the gas year are not conclusive. The last 3 months of the year are July, August and September, summer months where domestic gas usage is low. We expect the relationship between CWV and demand to be strained. The impacts are relatively low because little gas is used.

WN LDZ is not a suitable example as there are relatively few gas users in north Wales.

**6.4.1**

To calculate UG in this area the AUGE has only included sites believed to have a meter. However on the basis that "you don't know what you don't know" the AUGE has assumed that no meters are on site in the "not believed to have a meter" category. Before applying this assumption to what is currently >8k sites we feel further validation is required.

The September Unregistered pack indicates that in the Orphaned sector not believed to have a meter an aggregated AQ of 527Gwh relates to LSP sites. A significant volume if just a small % actually do have a meter.

Validation could take a number of forms

- A % of site visits to validate the assumption
- Assess volumes flowing through from the not believed to have a meter to the believed to have a meter category

- Apply a similar exercise to the believed to have a meter category. i.e. of those not believed to have a meter, how many undergo registration with a non zero opening read indicating gas usage

The AUGE states that based on data provided by Xoserve, their analysis shows that 36.8% of sites believed to have a meter have non-zero opening reads indicating gas usage. We find this surprisingly low and would like to have sight of the data/analysis.

**6.4.4**

As these sites are in a "not believed to have a meter" status the AUGE has made the assumption they do not contribute to unidentified gas. Given there are nearly 30k sites (as reported at the July 2011 forum) we feel further validation is required by way of a % of visits to site to check the actual position.