AUG Expert responses to issues raised by British Gas during the query period for the first draft 2017/18 AUG Statement, 14 March 2017.

Below are the issues raised by British Gas. Following each issue is the AUG Expert's response in italics. Note that only the points made by British Gas that require a response are shown here – their comments in full can be found in the original document. Should you need any clarification regarding these responses or have further questions, please contact the AUG Expert at AUGE.software@dnvgl.com.

Shrinkage

The assumption that the balancing number (almost the entire quantum of Unidentified Gas (UG)) contains only theft is not sound and is not supported by the evidence. As such, the allocation of the balancing number as though it is theft introduces a significant distortion of the market and is to the detriment of smaller (mostly-domestic) customers. There is sample bias in the Shrinkage study.

The following is an extract from "Energy UK Gas Retail Group Study into the effect of shrinkage on domestic customer" – Imperial College Consultancy October 2015.

> "The sample-based approach from the 2002 study to generate the leakage factors is likely generate a bias towards underestimation as the leakage rate distribution is skewed, with large amounts of leakage being caused be relatively few leaks in large systems; such leaks could be missed in small samples. "

In fact, Imperial College make a core recommendation to redo the study since there is significant concern regarding the accuracy of any conclusions drawn from it.

British Gas believe that the AUGE must take account of the probable error in the Shrinkage estimate and make an allowance for this element (and other non-theft elements) within the allocation of the balancing number. There is significantly more available evidence to suggest a probable under-estimate of Shrinkage than there is to support an assumption that the whole of the balancing number is theft.

It is accepted, based on observations made in the Energy UK Gas Retail Group Study, that the initial assumption that the Shrinkage model remains unbiased may no longer hold. This area will therefore be investigated and an allowance for Shrinkage error made in the overall UG calculations if this is found to be appropriate. It is noted that the study cited a figure of 20% as a likely level of under-estimation in the Shrinkage model.

It is important when carrying out such an analysis not to confuse uncertainty with bias: uncertainty in the output of the Shrinkage model reflects the typical level of unbiased error in the results (i.e. non-zero errors that sum to a value close to zero over time), whilst bias reflects a systematic shift from an average error of zero.

The UG calculations will only be amended if there is strong evidence for the existence of such bias. If this does exist, it will affect the UG calculation as follows:

- *If the shrinkage estimate is biased towards being consistently too low, the overall UG estimate will be too high. It needs to be reduced to account for the shrinkage bias before it is then split into its Directly Estimated and Balancing Factor components and the factors calculated.*
- *If the shrinkage estimate is biased towards being consistently too high, the overall UG estimate will be too low. It needs to be increased to account for the shrinkage bias before it is then split into its Directly Estimated and Balancing Factor components and the factors calculated.*

<u>The level of theft detection does not support the assumed level of theft within the market</u>

In 2013 there were 3,583 confirmed theft cases (after ECV valve) with an associated (estimated) energy value of 272.6GWh. In 2016 there were 3,165 confirmed cases with an associated (estimated) energy value of 133.4GWh. In 2016 the AUGE estimate for the balancing number (carried forward from previous year) was 5,816GWh giving a theft detection proportion of 2.29%. Given the additional licence obligations placed upon shippers by Ofgem it is reasonable to conclude that shippers are making every effort to detect theft. As such, the current detection levels do not support an assumption of theft at anywhere near the volume assumed by the AUGE. The logical conclusion must be that there are other (non-theft) elements contained within the balancing number. To allocate these elements as though they are theft introduces significant error and disproportionate detriment to EUC 1, 2 and 3 classifications.

The AUGE needs to demonstrate that this element is ALL theft or it cannot reasonably allocate it as though it is. British Gas believe that the AUGE need to adjust the AUGS to reflect the fact that the available evidence is more compelling that there are non-theft elements contained within the balancing number rather than it all being theft.

The quoted theft figures above do not take into account the fact that it takes approximately 8 years after the end of a given gas year before all the thefts from that year that will ever be detected will have been detected. This can be shown by an analysis of detected thefts and their time to detection for 15,000 theft records from 2008 to the present. For the gas year 2016 the detailed data supplied to us by Xoserve is incomplete (as it was supplied before the end of this gas year), and so the 2015 gas year is used in the analysis below, which amends the British Gas approach to take into account the proportion of thefts still to be detected.

At the time of writing only a proportion of the thefts active in 2015 that will go on to be detected will have been detected so far. When the expected proportion of thefts active in 2015 that will go on to be detected in the future is considered, the total expected detected theft figure for the year rises to 181GWh. The current best estimate of the Balancing Factor for that year is 4060GWh, as quoted in this year's AUGE statement. This gives an approximate theft detection rate of 4.5%. If this analysis is combined with a 20% allowance for Shrinkage error (as referenced above), the best estimate of the Balancing Factor becomes 3522GWh and the approximate theft detection rate is 5.1%. These figures are quite reasonable in the light of the "Tackling Gas Theft" requirements and do not suggest that a large proportion of the Balancing Factor is composed of something other than undetected theft.

Allocation Weighting Factors

The terms of UNC Modification 0432 applied uniform Allocation Weighting Factors to all classifications. UNC Modification 0473 introduced the Allocation of Unidentified Gas Expert (AUGE) to vary the Allocation Weighting Factors only when it can be evidenced that there is a more appropriate allocation underpinned by available data.

The Allocation Scaling Adjustment introduced by UNC0432 was set to '1' for all classifications. Modification UNC0473 introduced a new "AUGE" with a remit to improve the accuracy of the Allocation Scaling Adjustment where this alteration could be evidenced. British Gas does not believe that there is sufficient evidence to underpin an assumption that the balancing factor contains only theft. In fact, indicators tend to suggest that it is highly improbable that theft is in this order of magnitude and highly probable that other factors (such as Shrinkage Error) account for a significant proportion of this number. There is not sufficient evidence to vary the Allocation Scaling Adjustment from the terms agreed under modification UNC0432.

The issues of Shrinkage error (which, if incorporated into calculations, will reduce the magnitude of the UG total and hence the Balancing Factor) and the magnitude of Theft have been dealt with above. This analysis has shown that it is quite reasonable for the Shrinkage Error-adjusted Balancing Factor to be largely composed of undetected theft. As such, there are sufficient grounds for moving away from a uniform scaling adjustment of 1 for all EUC/Product combinations.

- *The population of Smart Meters and AMR differs across Product Classes, and it is highly likely that theft rates are different between smart and dumb meters. In particular, index tampers account for 30% of theft from dumb meters and are impossible on Smart Meters, and it cannot be proven that all index tampers would be replaced with other methods of stealing. Indeed, given that the index tamper is the simplest and safest theft method and is very common, it is highly unlikely that all instances of it would be replaced with more dangerous and complex methods when a Smart Meter is installed.*
- *The installation of a Smart Meter necessarily involves engineers working at the site in question. Therefore, in order for a site owner who is stealing gas to prevent this being detected, they will have to remove the theft arrangement before the meter exchange takes place. This necessity to remove and hide the theft and the installation of a new meter that is harder to steal from is likely to mean that not all thefts simply resume as before.*
- *All respondents to our information request agreed that whilst more detailed information from Smart Meters and AMR may not result in additional thefts being detected, it will result in thefts being detected more quickly. Therefore, whilst the number of thefts may not reduce, it is universally agreed that the amount of gas stolen will go down because detected thefts will not last as long. This is a fundamental difference between smart and dumb meters, meaning that factors of 1 are not appropriate.*
- *The government's Department for Business, Energy & Industrial Strategy have estimated the relative levels of theft from Smart Meters and traditional meters as part of their Smart Meter Roll-Out Cost-Benefit Analysis. In this they state that the level of theft from Smart Meters due to quicker detection is likely to be 20-33% lower than that from traditional meters, although they purposely use a conservative figure of 10% in their cost benefit calculations. Whatever the final*

figure, this is a fundamental difference between Smart and traditional meters that can only be reflected in UG factors that are not uniform.

- *In addition to the Balancing Factor, around 10% of Unidentified Gas is still directly calculated from first principles and not calculated using a population split applied to an aggregate figure.*

All of these areas provide reasons for moving away from uniform factors of 1 for all EUCs and Product Classes.

Meter Type Misclassification

There are SMART / AMR meters misclassified as traditional meters within Product Class 4. This will distort the overall weighting factor.

We have been made aware that there are some SMART / AMR meters within the sample assumed to operate within Product Class 4 that are erroneously classified as 'traditional' meters. This 'meter type' misalignment of data will potentially cause a skew within the aggregated weighting factor applied to Product Class 4 sites.

Given the nature of this alignment we do not have accurate numbers as to the extent to which this affects the AUGS but would encourage the AUGE to investigate further and make an appropriate allowance.

It is true that there are many Smart Meters and AMR devices misclassified as traditional meters across the entire population. There is no mandatory meter type field in the asset data, and the presence of AMR or a Smart Meter is frequently omitted. The lack of a requirement to store this information and the informal method of doing it when it is recorded result in significant under-recording of these assets. This is illustrated by the fact that that despite there being a legal requirement for all EUC 04B and above sites to have AMR (and a confirmed compliance rate of at least 86%), as far as the asset data is concerned, out of approximately 27,000 such sites, only 57 have it. The Smart Meter population is likewise under-recorded. The confirmed number of Smart Meters in existence is 2.04m, but the asset data contains only around 700,000.

We are aware of these issues and therefore do not use the asset data in this way. Instead, penetration rates for AMR and Smart Meters are used to create an assumed population at the start of the 2017/18 UG year. These are currently set as follows:

- *All EUC 04B and above sites have AMR.*
- *Smart Meter rollout is assumed 20% complete.*

Additional information has become available since the publication of the first draft AUG Statement that indicates that the Smart Meter rollout is likely to be closer to 16% for domestics and only at the 20% level for non-domestics. This will be assessed further and if necessary, the percentage rollout figure will be updated for the next draft of the document.

Theft Prevalence Threshold

The assumption regarding the lower threshold for theft within SMART / AMR is incorrect and is not supported by the available evidence.

Data directly from Compass shows that since 2010 there have been 38,893 thefts detected. Out of these 7,806 are listed as index tampers. Therefore the proportion of thefts that occur through the tampering of the meter index is approx 20%.

When you break this down by fuel, the proportion is 17% for electricity and 29% for gas.

Therefore the lower level for SMART / AMR theft detection is 71% since index tamper is the only form of theft that cannot be exercised against a SMART / AMR meter and all other examples of theft have been identified on SMART /AMR sites. BG theft evidence suggests that even if index tamper is removed as an available theft method then another theft method will likely be utilised since the propensity to steal is not device-dependent.

There is certainly no evidence to reinforce a lower theft detection level of 0 (zero). In fact, a significant number of thefts have already been detected on SMART / AMR sites therefore a lower level of 0 (zero) is simply not possible.

In addition, SMART / AMR offer new alternative methods of theft not available on standard traditional meters. It is technically possible for the consumption meter read data to be intercepted or corrupted upon remote request.

The 29% figure for index tampers on traditional meters does not affect either the upper or the lower bound, neither of which is possible to achieve in practice. The figure is instead used to determine where the propensity to theft lies between these limits, taking into account the fact that in reality neither can be approached.

In order to justify a lower bound of 71% it would have to be argued that:

- *All other methods of theft take place on Smart Meters at exactly the level they do on traditional meters.*
- *When a traditional meter is replaced with a Smart Meter at a site where theft is taking place, that theft is always successfully hidden from the engineer and immediately begins again on the Smart Meter once it has been installed. The exception to this is where the original theft was by index tamper, which is never replaced with an alternative theft method and the theft stops.*
- *Information from Smart Meters and AMR does not result in any more theft detections, or result in thefts being detected more quickly than on traditional meters.*

The AUG Statement acknowledges that neither the upper or lower bound is realistic, and this remains the case: the true figure lies between the two and we are trying to use whatever information is available in order to estimate where it lies as accurately as possible. The index tamper percentage is part of this evidence, but does not affect either the lower or upper bound directly – it just provides evidence for where the true value lies between them. The logic used for the current placement is as follows:

- *29% of thefts are by index tamper, and these cannot take place on a Smart Meter. This provides an initial placement of the best estimate at 71% of the range between the lower and upper bound.*
- *Some of these will be replaced by an alternative theft method, whilst others will not. This raises the estimate above 71%.*
- *The meter replacement process requires anyone stealing gas to successfully remove and conceal the theft before starting it again on the new meter if the theft is to continue. This will not always happen due to either detection of the theft or unwillingness of the site owner to start a new theft. This will move the best estimate back down towards, and potentially past, the 71% point.*
- *It was universally acknowledged by all respondents to our information request that data from Smart Meters will help thefts be detected more quickly. This reduces the value of each theft, and as the AUG analysis deals in GWh stolen and not the number of thefts, this reduces the best estimate further. As stated above, the Department for Business, Energy & Industrial Strategy study puts the level of theft from Smart Meters due to quicker detection at around 20-33% lower than that from traditional meters, although they purposely use a conservative figure of 10% in their cost benefit calculations.*

It is recognised that after the initial step where a definite estimate of 71% can be established, the values associated with the other steps are less clear, with the only quantitative data coming from the government cost benefit study. The current lack of further data to support such calculations is due to the following factors:

- *The Smart Meter rollout is still at a very early stage. There is only a relatively small population in place, and any thefts from these will have only just begun and not necessarily have entered the time period when they are most commonly detected.*
- *The low quality of the asset data prevents many MPRNs being identified as having a Smart Meter or AMR even when they do, further artificially lowering any estimate of theft from these meters.*
- *Historic data shows that it takes up to 8 years after the end of a given year for all thefts that are active in that year that are going to be detected to actually be detected. Therefore, until such a time period has elapsed for a stable Smart Meter population, theft from this source will continue to be under-estimated.*

The 50% figure (midpoint between the upper and lower bounds) used in the split-of-theft calculations is therefore reasonable given the above analysis, and is consistent with a combination of the "index tamper" effect and the best estimate of the "quicker detection" effect from the government study. There is certainly no evidence to favour any different figure above it.

Neither extreme is possible in practice and hence values very close to these extremes are also highly unlikely. We need to choose a figure that is reasonable and justifiable given the above analysis, and the 50% used satisfies these criteria at this stage.

We are committed to improving the accuracy of the calculations, however, and we are aware that more detailed information will be available in this area as time goes on: from TRAS, from a more mature Smart Meter population, and with the implementation of project Nexus. All such data will be used to improve this area of calculation as soon as it is available.