



# **Analysis of Allocation of Unidentified Gas Statement for 2014/15 and Supporting Data**

**An assignment on behalf of ICoSS**

**by**

**Phidex Consulting Limited**

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## Contents

1. Executive Summary.....	3
2. Summary of Key Findings and Recommendations.....	4
3. Introduction .....	5
4. Data Processing.....	7
5. Re-Run of Tests from Phidex Detailed Analysis of AUGS 2013/14 .....	14
6. Comparison of AUGE calculated quantities with Xoserve actual RCS charges .....	22
7. Further tests to conduct .....	23
8. Summary of Findings by Phidex Consulting Ltd .....	23

Appendix 1	RCS_Document
Appendix 2	Phidex_AUG_Test1_201408
Appendix 3	Phidex_AUG_Test2_201408
Appendix 4	Phidex_AUG_Test4_201408

## **1. Executive Summary**

Following a review of the Allocation of Unidentified Gas Statement (AUGS) for 2013/14 on behalf of I&C Shippers and Suppliers (ICoSS) Group, entitled “Detailed Analysis of Allocation of Unidentified Gas Statement for 2013/14 and Supporting Data” in May 2013, Phidex Consulting Ltd (Phidex) was requested to perform a further review to ensure the matters raised were satisfactorily actioned.

The purpose of this assignment was to establish that there was a significant improvement in the accuracy of energy calculations in the most recent AUGS dataset, compared with the Feb 2013 version.

The Allocation of Unidentified Gas Expert (AUGE) had responded to the Phidex’s May 2013 analysis favourably and committed to resolve the queries identified and communicate the concerns about data provision to Xoserve in order to obtain the best available information on which its calculations could be carried out.

Xoserve has also been contacted by Phidex about the data provided to the AUGE and an analysis of the latest dataset would clarify if this recommended change had been implemented.

Phidex had requested an independent review of the AUGE calculation prior to being released in the form of Final AUGS Tables. The AUGE’s response to this was that it was not a decision which could be made under the scope of its responsibility. With sizeable changes to the AUGS Tables and potential anomalies still being identified, this piece adds weight to the case of an independent audit being required.

The analytical work was to be focussed on the root cause of anomalies found in the previous assignment to identify actual examples of mis-calculated energy rather than review the data for new root causes where error in the calculations could occur.

This document contains the methodology used by Phidex to identify actual cases of mis-calculated consumption and actual results of the analysis which would lead to inaccurate Unallocated Gas (UG) totals being charged back to shippers/suppliers. Where appropriate, working examples, including actual relevant AUGS data, has been included.

The AUGS dataset was sourced through ICoSS and its members and was provided in CSV format in July 2014.

Phidex would like to thank Gareth Evans and the members of ICoSS for this assignment.

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## **2. Summary of Key Findings and Recommendations**

- The findings of this assignment show that there is a disparity between the LSP volumes provided in the latest dataset by Xoserve to the AUGE and those volumes charged to shippers through the established Xoserve invoicing and reconciliation process. The worked example shows, for the same site and identical period, a shipper has received charges for different energy quantities than those contained in the AUGS 2014/15 calculations. The results of this means the AUGE will never apply the actual charged values for these sites in the AUGS calculations and the degree of variation on a meter by meter basis in the sample analysed is circa 10%.
- Enhancements have been seen in the data provided; many of the volumetric errors, identified in the original review within the data, provided by Xoserve have been improved and previous calculation errors by the AUGE have been mitigated. The data was provided in a more user friendly format and contained additional data fields to assist in the validation process.
- Calculation errors do still exist and examples found in the sample analysed; these include asset and calculation anomalies previously identified, but to a lesser extent.
- Because a sizeable proportion of data provided to the AUGE did not pass its own validation exercise, consumption quantities to apply to the AUGS Tables have been estimated. Analysis of MPRS which failed validation has shown the estimated value applied to the AUGS varies significantly from actual consumption. In the two LDZs analysed (about one tenth of the accounts in query with Phidex), the AUGE had understated energy by circa 127million kWh. With a SAP price of 2.36p/kWh, this sample erroneously increased the UG value by £3 million, which could be extrapolated through the rest of the data.
- In the 12 months since the AUGS Table for 2013/14 was published in Feb 2013 the total UG values have swung enormously. Firstly decreasing 45% between Feb 2013 and Oct 2013 and then increasing 36% between Oct 2013 and Jan 2014. Together with known errors identified from Phidex and others, there is a strong case for this process to be independently audited. This decision is not one the AUGE can make itself, but Phidex do highly recommended that this additional level of quality management is implemented for future AUGS Tables.

## 3. Introduction

### Background to the Assignment

Phidex Consulting Limited was established in 2011 to provide operational and software consultancy to the Gas and Electricity Supply Industry. Previously engaged by ICoSS to analyse the supporting data for the AUGS for 2013/14, four clear messages were delivered:

- 1) The Data provided by Xoserve and used by the AUGS was not the same data as used to charge and reconcile suppliers for their consumption measured at a meter point level.
- 2) Within the Xoserve dataset there were distinct errors which led to an inaccurate UG total.
- 3) The AUGS's own calculations contained errors which contributed to an inaccurate UG total.
- 4) The AUG methodology to deliver UG tables was not independently audited for accuracy prior to publication.

The result of the previous analysis was the UG table published in early 2013 was forecasted to contain errors leading to approximately £65 million of overcharged gas to the suppliers; circa 45% of the £141 million total value.

In Feb 2013 the AUGS Table for 2013/14 was published (see below):

Unidentified Gas source	Aggregate Estimated cost of Unidentified Gas/£M	Unidentified Gas Costs/£M		
		Larger DM SPCs	Larger NDM SPCs	Smaller SPCs
iGT CSepts	16.22	0.00	0.00	16.22
Shipperless/Unregistered	16.48	0.00	13.96	2.52
- Shipper Activity	0.05	0.00	0.04	0.01
- Orphaned	3.07	0.00	2.82	0.26
- Unregistered <12 Months	4.85	0.00	4.46	0.39
- Shipperless PTS	0.99	0.00	0.58	0.41
- Shipperless SSrP	7.44	0.00	6.03	1.42
- Shipperless <12 Months	0.07	0.00	0.03	0.04
Meter Errors	0.41	0.00	0.41	0.00
Theft + Other	108.06	0.00	8.75	99.31
<b>Total (inc Independents)</b>	<b>141.17</b>	<b>0.00</b>	<b>23.12</b>	<b>118.05</b>

Following the Phidex work and a refresh and revision of data provided, the total UG value reduced by £63 million in the Interim AUGS Table for 2014/15, published Oct 2013. This was in line with the Phidex forecasted reduction (see below):

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



Unidentified Gas source	Aggregate Estimated cost of Unidentified Gas/£M	Unidentified Gas Costs/£M		
		Larger DM SPCs	Larger NDM SPCs	Smaller SPCs
iGT Cseps	6.89	0.00	0.00	6.89
Shipperless/Unregistered	17.34	0.00	14.84	2.49
- Shipper Activity	0.02	0.00	0.01	0.00
- Orphaned	1.45	0.00	1.26	0.19
- Unregistered <12 Months	8.08	0.00	7.79	0.29
- Shipperless PTS	0.60	0.00	0.35	0.25
- Shipperless SSrP	6.93	0.00	5.31	1.63
- Shipperless <12 Months	0.25	0.00	0.13	0.12
Meter Errors	0.51	0.00	0.51	0.00
Balancing Factor (Theft + Other)	53.42	0.00	13.20	40.21
Total (inc Independents)	78.15	0.00	28.55	49.60

In Jan 2014 the Final Table for AUGS 2014/15 was published, showing an increase of £28 million (36% increase).

Unidentified Gas source	Aggregate Estimated cost of Unidentified Gas/£M	Unidentified Gas Costs/£M		
		Larger DM SPCs	Larger NDM SPCs	Smaller SPCs
iGT CSEPs	6.80	0.00	0.00	6.80
Shipperless/Unregistered	9.83	0.00	7.56	2.27
- Shipper Activity	0.01	0.00	0.01	0.00
- Orphaned	0.78	0.00	0.67	0.11
- Unregistered <12 Months	1.33	0.00	1.16	0.17
- Shipperless PTS	0.59	0.00	0.34	0.25
- Shipperless SSrP	6.86	0.00	5.25	1.61
- Shipperless <12 Months	0.25	0.00	0.13	0.12
Meter Errors	0.50	0.00	0.50	0.00
Balancing Factor (Theft + Other)	89.19	0.00	22.71	66.49
Total (inc Independents)	106.33	0.00	30.78	75.56

### Scope of the Assignment

The current assignment on behalf of ICoSS is to review the Supporting data for AUGS 2014/15, produced in 2014, and assess if previous anomalies which were identified and communicated in 2013 have been rectified.

The methodology is to re-run the existing tests and compare the results to previous versions.

If new information should come to light in this process, then this will be included in the results.

### **4. Data Processing**

This section includes an updated review of the supporting data made available in 2014 and used to generate the Final AUGS table 2014/15. This has previously been an area of interest as its provision is key in validating the values which the resulting charges are based on. Ultimately these charges will be passed onto the end consumer and in many sectors in the gas supply industry, the AUG value will be transparently passed through to the customer as a distinct component of a supply invoice. The suppliers therefore have a duty of care to ensure the values have been scrutinised and satisfactorily validated.

#### **Provision of AUGE data**

Following the 2013 Phidex review, it can be reported that the sizeable supporting dataset has been made available in CSV format, as well as Oracle, which was the only format previously. This additional format will assist organisations who do not use Oracle.

#### **Restrictions on the use of data**

It was noted with some concern that the AUGE has stated the supporting data was to be provided only to a UNC signatory party and, as seen in the extract from AUGE doc ref: AUGS Data 2013 (dated 23 October 2013), that disclosure to other third parties is not allowed without expressed permission

See extract below:

Please note that this data is provided **only** for the purposes of your review of the interim AUGS table and must not be used for any other purpose. Nor should it be disclosed to any other party (that includes consultancies that you may wish to employ to carry out investigations) without our express permission.

Independent and expert input in analysing the AUG supporting data, which has previously been shown to contain numerous calculation errors and flaws in its methodology, is essential for many affected parties. This point is particularly relevant when considering these charge values, in tens of millions of pounds, will be passed on to their customers. I would be keen to understand more about the intent of the AUGE for this statement.

#### **Changes to AUGE provided data**

Following previous consultation periods, the latest dataset contained numerous new fields which assisted in providing transparency and understanding of the calculations. Due to the change in table structure, Phidex was required to re-write some of its code to import the data into its previously created AUGE Data Viewer Dashboard.

### Xoserve provided data

One of the key points made in both previous pieces of work on the Allocation of Unregistered Gas was the data provided to the AUGE, specifically the data for the LSP sector.

In this area the AUGE is provided volumes which are then converted to energy using assets details provided and calorific values. An issue highlighted by Phidex was that this data was inaccurate and led to incorrect energy calculations; therefore erroneous UG values.

The matter was taken on board by the AUGE and have since been assured that improvements to the data provision had been made, including reconciliation values. Please see two extracts from the AUGE responses in the 2013 consultation period:

**Response:**

At the time of the last analysis we had been given assurances that the data provided was consistent with the rest of the gas industry. If this is true, by association there would be questions raised about the validity of gas industry processes in general since many of these rely on the same asset data and meter read data that we are using.

However, as noted above we have received updated consumption data and are looking to obtain additional asset data which we believe will go a long way to address your concerns.

We note that Modifications 455 and 457 have been raised with the aim of improving the quality of asset data as this is clearly a wide ranging root cause issue. The AUGE welcomes such initiatives by the industry to improve raw data, as this not only improves the AUG process and results but also every aspect of the gas metering and billing processes.

With regards to the monetary value, there are a number of improvements to the methodology that will be included in the next statement. Some of these result in a decrease in UG, some result in an increase in UG. At this time we do not wish to comment on the resulting level of UG as work is ongoing to update the methodology as necessary and re-run consumption calculations as appropriate. We do believe however, that the resulting AUG table will be a more accurate estimate than previous versions.



### **Response:**

When we initially raised the issue with Xoserve we were assured that the data we had was up to date and correct and had no reason to believe otherwise.

As noted in the responses above, we have now received updated data from Xoserve which we are assured has the most up to date data and correct consumptions. We have challenged Xoserve strongly with regard to the data mismatches raised during consultation to ensure that the data we do receive is indeed fit for purpose.

Note that any consumption corrections made by Shippers since March 31<sup>st</sup> 2013 will not be included in the new data set as this is the cut off point that we requested. Any verification of the data provided by Xoserve to that held by Shippers should allow for this.

We would also like to remind Code Parties that the decision of what data to use rests with the AUGE.

The analysis of the new set of data has seen changes made to metered volumes provided by Xoserve, however there is evidence that the reconciled volumes and associated energy values used by Xoserve to charge the shippers for their supply consumption is not the same data as has been provided to the AUGE.

### **Xoserve RCS file**

This section provides full details of the correct data source which Phidex believes should be used, and a working example of how the volumes in the recent AUGE dataset differs from that which has been provided by Xoserve to the shipper.

On a monthly basis Xoserve issue .REC invoices for reconciled LSP energy amounts. The supporting file for this 'thin' file is the .RCS file which contains meter by meter, granular data of the reads, dates and assets used and results in chargeable volumes and energy volumes as well as the monetary detail which makes up the reconciliation invoice. For instances where there has been re-reconciliation or a query on the chargeable period, identifier codes are provided to assist in the understanding/validation of the charge.

As the monetary values are included there is a need to split reconciliation periods at certain dates. Two such dates in each year occur at 1<sup>st</sup> April and 1<sup>st</sup> October. This means that even if a chargeable period spans one of those dates, Xoserve will always charge up to that cut-off date and then from that date onwards. The result of this is that there is always a clear energy period for the two 6 month period in a gas year; 1<sup>st</sup> Oct to 31<sup>st</sup> Mar and 1<sup>st</sup> Apr to 30<sup>th</sup> Sep.

The header detail for an Xoserve RCS file is included in this document as Appendix 1.

Below is an extract showing the Actual chargeable volumes consumed in a given period.

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



NMR_VOLUME_CONSUMED	M	N	12	0	Difference between previous and present meter reading multiplied by read units and then by correction factor and then (where appropriate) converted to Cubic Metres.
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Below is an extract showing the Actual charged energy amounts in a given period with the period start date (End dates are found in a different field).

RVE_ACTUAL_ENERGY	M	N	12	0	The LDZ Profile Allocation table provides details of allocated energy for an LDZ/EUC combination. The allocated energy at variance level is calculated across the start and end period dates for a specific meter. From this the Actual Energy is derived.
RVE_START_DATE	M	D	8	0	The start date of a period when all the supporting information in the reconciliation variance table has remained constant. Start date must be within a meter reading period, except in the case of supply point transfers, where the start date will be from the transfer date.

If the AUGS was provided this .RCS file data, which is produced by Xoserve for all invoiced LSPs on a monthly basis, the effort and risk associated with validating and determining the correct energy quantities would be vastly reduced in that sector and align to the charges currently accepted by the supplier (pending further reconciliation).

### Examples of De-coded AUGS MPRs

In this section we aim to illustrate that the data used by the AUGS and provided by Xoserve is not identical to the corresponding values provided by Xoserve to the shippers. Phidex has been provided data from a Shipper and given permission to analyse for the purpose of assessing the accuracy of AUGS data. With this data a reasonable sample of AUGS MPRs have been decoded so that the actual MPR has been identified. This has enabled the AUGS volumes and energy quantities for a formula year to be compared to actual energy charges.

Phidex understands and accepts the responsibility of handling this data and has only performed this function for the purpose for which it was intended, i.e. to validate the accuracy of the AUGS.

Permission has been given by the Shipper in question to disclose the energy and volumes in a de-coded MPR to highlight the accuracy of the AUGS dataset with aim of clarifying, for certain, that the data in the AUGS dataset is not the same data as is provided to the Shippers by Xoserve on a monthly basis.

The remaining de-coded MPRs which have had their AUGS energy compared to actual charged energy is summarised later in this document. The granular details of this analysis has been returned to the shipper to make available to Xoserve or the AUGS if there is further need to clarify the point being made. For the purpose of data security the details of the full analysis has not been included in this document.

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



### Example 1: AUGE MPR ID 13988934, Formula year 2009

To ensure the MPR had been correctly decoded, it was necessary to match the meter reads and dates in both AUGE data and Xoserve provided data:

AUGE MPR 13988934 has been decoded by Phidex and is available to Xoserve upon request.

Table showing meter reads for actual MPR \*\*\*\*\*:

Meter Point Reference	Actual Visit Date	Read Reason Code	Meter Serial Number	Meter Reading
*****	24/02/2009	CYLM	E10127	651612
*****	25/03/2009	CYLM	E10127	654470
*****	27/04/2009	CYLM	E10127	656308
*****	21/05/2009	CYLM	E10127	657313
*****	23/06/2009	CYLM	E10127	657991
*****	27/07/2009	CYLM	E10127	658111
*****	21/08/2009	CYLM	E10127	658189
*****	24/09/2009	CYLM	E10127	658605
*****	26/10/2009	CYLM	E10127	659856
*****	13/11/2009	FDRR	E10127	6612845
*****	24/11/2009	CYLM	E10127	6618166
*****	14/12/2009	CYLM	E10127	6641999
*****	22/01/2010	CYLM	E10127	6723361
*****	19/02/2010	CYLM	E10127	6781155
*****	30/03/2010	CYFM	E10127	6840268
*****	29/04/2010	CYFM	E10127	6864577
*****	27/05/2010	CYFM	E10127	6879766
*****	29/06/2010	CYFM	E10127	6884611
*****	29/07/2010	CYFM	E10127	6885808

This table shows the dials for the reads increasing from 6 to 7 in 2009 and matching (where available) the reads and dates below in the AUGE dataset. This is evidence of the AUGE MPR being correctly decoded.

In earlier AUGE datasets, prior to them receiving an improved dataset, the total quantity for FY2009 was 12,403,595. This is due to the number of the dials changing over the period of time. Please see screenshot, highlighted in red shows the erroneous FY consumption (FY\_MR\_CON) value of 12,403,995 kWh and the inconsistent reads available with erroneous metered volumes, highlighted in blue.

The erroneous metered quantity led the site to fail its validation and AUGE then applied the EUC of 04B (equiv. 1,229,461 kWh) as default. The Values of the EUC bands change from LDZ to LDZ in the

# Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



AUGE methodology, for the purpose of simplicity Phidex may have used averages or rounded figures, close in value to those applied by the AUGE.

Screenshot of Phidex AUGE Dashboard Viewer showing results for AUGE MPR 13988934:

**AUGE Results**

MPR_ID	LDZ	EUC	F_YEAR	FY_MR_CON	FY_AQ_CON	METE	POSITIV	AQ	YEAR_F	EUC_CAL
13988934	NO	04B	2009	12403555	1110114	Y	Y	N		1 04B
13988934	NO	04B	2010	0	1055949	Y	N	N		1 04B
13988934	NO	04B	2011	0	963262	Y	N	N		1 04B

**Meter Reads**

MPR_ID	METER_REA	IMP	METER_REA	METERED_V	ROL	AQ	METER_REA	SSP_LSP	EUC
13988934	27/08/2008	Y	633906	1204261	0	1709798	M	LSP	04B
13988934	16/09/2008	Y	62724	-5841136	0	1709798	M	LSP	04B
13988934	09/10/2008	Y	62759	358	0	1172673	M	LSP	04B
13988934	23/06/2009	Y	657991	6087081	0	1172673	M	LSP	04B
13988934	27/07/2009	Y	658111	1227	0	1172673	M	LSP	04B
13988934	21/08/2009	Y	658189	798	0	1172673	M	LSP	04B
13988934	24/09/2009	Y	658605	4254	0	1172673	M	LSP	04B
13988934	24/11/2009	Y	6618166	60944855	0	1172673	M	LSP	04B
13988934	14/12/2009	Y	6641999	243726	0	1172673	M	LSP	04B
13988934	22/01/2010	Y	6723361	832040	0	1172673	M	LSP	04B
13988934	19/02/2010	Y	6781155	591025	0	1172673	M	LSP	04B
13988934	30/03/2010	Y	6840268	604513	0	1172673	M	LSP	04B
13988934	29/04/2010	Y	6864577	24859	0	1172673	M	LSP	04B
13988934	27/05/2010	Y	6879766	155729	0	1172673	M	LSP	04B
13988934	29/06/2010	Y	6884611	43547	0	1172673	M	LSP	04B

Since the last Phidex review, to address this matter and demonstrate the point, Phidex has met with Xoserve and provided examples where the data provided to the AUGE contained errors. This included the identification of the existing Xoserve data files which contain the correct calculations. This has led to new metered volumes being made available.

2014 AUGE data now contains the below quantities for AUGE MPR 13988934:

Screenshot of AUGE quantities for MPR 13988934 in FY 2009:

MPR_ID	LDZ	EUC	F_YEAR	CONSUMPTI ON	OLD_AQ	NEW_AQ	METER_REA DS	POSITIVE_V OLUME	AQ_CHECK
13988934	NO	04B	2009	922,578	1,123,421	933,444	Y	Y	Y

Here the 3 validation tests performed by the AUGE have all passed, meaning the Xoserve provided volume is used in the final UG calculations. The calculated energy for this site in FY 2009 is 922,578 kWh.

The below table shows the acutal energy charge for the FY 2009 with data taken for MPR

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



RCS data for Actual MPR \*\*\*\*\*; Sum for FY 2009 = 1,034,880 kWh:

Meter Point Reference Number	Start Read Date	End Read Date	Start Meter Read	End Meter Read	Allocation(kWh)	Consumption (kWh)	Consumption (cm)	RVE Start Date	RVE End Date	RVE Consumption(kWh)	Sum energy FY 2009
*****	09-Oct-08	23-Jun-09	62759	657991	502,048	648,225		09-Oct-08	31-Jan-09	351,765	
*****	09-Oct-08	23-Jun-09	62759	657991	256,702	648,225		01-Feb-09	31-Mar-09	179,860	
*****	09-Oct-08	23-Jun-09	62759	657991	166,415	648,225	57,733	01-Apr-09	23-Jun-09	116,600	1,034,880
*****	23-Jun-09	27-Jul-09	657991	658111	33,823	23,694	2,113	23-Jun-09	27-Jul-09	23,694	
*****	27-Jul-09	21-Aug-09	658111	658189	22,594	15,826	1,438	27-Jul-09	21-Aug-09	15,826	
*****	21-Aug-09	24-Sep-09	658189	658605	43,985	30,820	2,754	21-Aug-09	24-Sep-09	30,820	
*****	24-Sep-09	24-Nov-09	658605	6618166	10,435	121,655		24-Sep-09	30-Sep-09	7,311	
*****	24-Sep-09	24-Nov-09	658605	6618166	163,202	121,655	10,858	01-Oct-09	24-Nov-09	114,344	
*****	24-Nov-09	14-Dec-09	6618166	6641999	93,197	76,978	6,897	24-Nov-09	14-Dec-09	76,978	
*****	14-Dec-09	22-Jan-10	6641999	6723361	226,550	263,493	23,547	14-Dec-09	22-Jan-10	263,493	
*****	22-Jan-10	19-Feb-10	6723361	6781155	159,003	186,620	16,726	22-Jan-10	19-Feb-10	186,620	
*****	19-Feb-10	30-Mar-10	6781155	6840268	181,893	190,937	17,108	19-Feb-10	30-Mar-10	190,937	
*****	30-Mar-10	29-Apr-10	6840268	6864577	9,956	78,367		30-Mar-10	31-Mar-10	8,257	
*****	30-Mar-10	29-Apr-10	6840268	6864577	84,538	78,367	7,035	01-Apr-10	29-Apr-10	70,110	

Please note the meter reads match those available in previous tables. The RVE energy is available for FY 2009 between RVE start date 01-Apr-09 and RVE end date 31-Mar-10.

This example shows that there is still a significant discrepancy in the Xoserve report used to provide data to the AUGS in 2013.

Despite a new dataset being provided and assurances that the anomalies have been corrected, it can be seen that the data used in this AUG table is still not identical to the data used to charge the shippers on the RCS file.

This case sees the AUGS understating energy for the FY by 11%; further analysis later in this document shows this degree of variance is consistent throughout all decoded LSP MPRs.

### Data Quality and Requirement for Independent Review

In the 2013 assignment Phidex noted that there were numerous errors in the AUG calculations which came from a number of root causes, including data provision, methodology and errors in the calculation code. We recommended that an independent review is undertaken prior to the finalisation of future AUG Tables to provide a secondary level of data cleansing, much in the way that Phidex has performed to date. A formalised independent and unbiased review will ensure the AUGS tables are tested and audited and that any costs of this are shared amongst all interested parties. Currently there is no guarantee of an independent review, any review which is undertaken is arranged through individual organisations where the output could be duplicated with other work or swayed in the favour of one particular sector.

It is duly noted that the AUGS responded to this point in 2013 saying that the inclusion of an independent review was not part of its scope and should be discussed at UNC level. Phidex therefore recommends that this is carried forward through ICoSS and any other organisation which has raised the issue.

Aside from an independent review, there is still the outstanding matter of data (and calculation) quality. Some of the matters raised by ICoSS and other shippers were stand-out, significant and

should have been picked up by the AUGE as part of their business as usual practices. The AUGE commented on Phidex's enquiry about a granular review of their calculations prior to publication. The AUGE response to queries arising from 1<sup>st</sup> Draft 2013 AUGS, below, disappointingly reads that this is not a practical solution:

We also note that Phidex looked at a subset of data and compared it to existing LSP data sets. Given the size of the data set it is not practical to manually examine and validate data and consumptions associated with each MPR, and there will always be certain combinations of data that do not give the expected results. We estimate that if someone spent on average 2 minutes looking at data associated with each meter, a team of 10 people would take 24 years (working 8 hour days) to examine them all.

Phidex is keen to point out that an effective, intelligence led review of calculations would not take a single FTE 240 years to complete as we hope we have demonstrated in the assignment we have carried out to date. This most recent piece of work identifies further examples of anomalies identified and communicated to the AUGE previously. In a relatively short period of time Phidex has reviewed a new dataset and consistently found anomalies. These instances are what we aim to remove from finalised future tables.

In summary, based on the swing in Total UG values in just one year from the £141m value in Feb 2013, to £78m in Oct 2013 (45% reduction) and £106m in Jan 2014 (36% increase), an independent and qualified review should be strongly considered by all parties, especially considering these values will likely be charged onto the end consumers. Further, Phidex believes this is a wholly feasible proposition.

## **5. Re-Run of Tests from Phidex Detailed Analysis of AUGS 2013/14**

The objective of this assignment was to re-run the previously generated tests, on the 2014 data, to see if the queries raised had been rectified and to what level of inaccuracy still exists in the latest tables.

Phidex imported all the new data, but due to time restrictions on this assignment, the detailed analysis was carried out at MPR level only on NO and EA LDZs. Previous work has shown there is no particular distinction between LDZs, so the latest results set can be extrapolated throughout all LDZs.

### **Test 1**

Test to identify instances where LSP calculations have defaulted to EUC band values for a FY Year due to validation failure of the AQ comparison.

Phidex re-ran the test where the resulting exception list of potential anomalies on the latest AUG dataset saw a decrease of about 90%. This is a positive outcome, showing that the new data contains fewer potential anomalies.



# Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



Test 1 exception list		
	2013 Data	2014 Data
NO	155	16
EA	287	29
<b>total</b>	<b>442</b>	<b>45</b>

## Test 1 Example analysis: MPR 13976159

MPR failed validation in all years, leading to EUC band value of approx. 450,000 kWh being applied.

Screenshot showing AQ failing validation for FYs 2009, 2010 & 2011:

The screenshot shows the 'AUGE Data Viewer - Dashboard' interface. The MPR field is set to '13976159'. Below the dashboard, the 'AUGE Results' table is displayed with the following data:

MPR_ID	LDZ	EUC	F_YEAR	CONSUMPTI	OLD_AQ	NEW_AQ	MET	POS	AQ_C	YEAR_FRA
13976159	NO	03B	2009	3,359,417	507,091	3,391,865	Y	Y	N	
13976159	NO	03B	2010	3,945,224	507,091	3,770,481	Y	Y	N	
13976159	NO	03B	2011	0	507,091	0	N	N	N	
*				0	0	0				

The table also shows a status bar at the bottom indicating 'Record: 1 of 3' and 'Filtered'.

Reads available for this MPR are as follows:

MPR_ID	METER_READ_DATE	IMP_IND	METER_READ_VAL
13976159	25-Feb-09	Y	26884
13976159	24-Mar-09	Y	35249
13976159	24-Apr-09	Y	44154
13976159	27-May-09	Y	51330
13976159	23-Jun-09	Y	56247
13976159	28-Jul-09	Y	62712
13976159	24-Aug-09	Y	67627
13976159	28-Sep-09	Y	75049
13976159	27-Oct-09	Y	81702
13976159	23-Nov-09	Y	88920
13976159	17-Dec-09	Y	97844
13976159	26-Jan-10	Y	16653
13976159	24-Feb-10	Y	29408
13976159	24-Mar-10	Y	39588
13976159	26-Apr-10	Y	48520
13976159	25-May-10	Y	54824

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



13976159	28-Jun-10	Y	61654
13976159	27-Jul-10	Y	68050
13976159	26-Aug-10	Y	75450
13976159	27-Sep-10	Y	83071
13976159	26-Oct-10	Y	90627
13976159	24-Nov-10	Y	833
13976159	16-Dec-10	Y	11822
13976159	01-Jan-11	Y	23056
13976159	27-Jan-11	Y	33384
13976159	24-Feb-11	Y	46282
13976159	25-Mar-11	Y	59161
13976159	26-Apr-11	Y	70137
13976159	26-May-11	Y	79641
13976159	27-May-11	Y	79641
13976159	28-Jun-11	Y	87318

With the following reads, dates and assets the resulting calculations are the correct values to apply:

start date	start read	end date	end read	Imp?	CF	RF	Consumption Calculation
24/03/2009	35249	24/03/2010	139588	2.83	1.03013	1	3,337,488
24/03/2010	139588	25/03/2011	259161	2.83	1.03013	1	3,824,778
25/03/2011	259161	29/03/2012	373732	2.83	1.03013	1	3,664,779
							10,827,045

The actual consumption of 10.8m kWh for the 3 years 2009 – 2011, compared to the 1.35m kWh proposed by the AUGS calculations is a significant understatement of usage and will sway the total UG value.

Of the 45 sites in LDZs NO and EA with potential anomalies, 30 were analysed.

The results showed that the total energy value calculated by Phidex was circa 169m kWh. The quantity used by AUGS (defaults to the EUC value due to validation failure) had a total energy value of circa 42m kWh.

The difference of 127m kWh variance is significant enough to warrant a granular analysis of selected individual MPRs which have failed validation. Extrapolation throughout all the LDZs where a total of 325 distinct MPRs had this type of failed validation could swing the results in either direction, but remains to be shown as invalid consumption applied to the UG total pot.

Full results of 30 examples for Test 1 available on Appendix 2.

### Test 2

Test to identify instances where the EUC band has been down-graded due to validation failure.

In the previous analysis it was noted that the vast majority of sites which experienced a change to the EUC band saw the band being downgraded. This trend has continued in the latest dataset where



# Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



circa 7,000 MPRs have been downgraded over all LSP sites and in all LDZs (does not include downgraded sites to EUC Band 01B); the total number of upgraded EUC bands in the entire dataset was just 22. There is a concern that an almost exclusive downgrading of EUC bands will lead to an erroneously high total UG value.

## Test 2 Example analysis: MPR 13975644

MPR 13975644 failed all validation in FY 2010 which can be attributed to a Meter exchange which could not be correctly computed with the existing data provided. Due to validation failure, AUGE will apply the value associated to the EUC band 02B; approx. 136,000 kWh.

Screenshot showing validation failure in 2010 in all 3 tests:

The screenshot shows the 'AUGE Data Viewer - Dashboard' interface. At the top, there is a search bar with 'MPR 13975644' entered. Below this is the 'AUGE Results' section, which contains a table with the following data:

MPR_ID	LDZ	EUC	F_YEAR	CONSUMPTI	OLD_AQ	NEW_AQ	MET	POST	AQ_C	YEAR_FRA
13975644	NO	01B	2009	52,505	60,329	53,174	Y	Y	Y	
13975644	NO	02B	2010	0	78,045	0	N	N	N	
13975644	NO	01B	2011	65,108	64,934	68,642	Y	Y	Y	
*				0	0	0				

At the bottom of the screenshot, there is a navigation bar showing 'Record: 14 of 3 of 3' and a 'Filtered' status.

Reads available for this MPR are as follows:

MPR_ID	METER_READ_DATE	IMP_IND	METER_READ_VAL
13975644	25-Jan-10	Y	3,932
13975644	22-Feb-10	Y	4,134
13975644	24-Mar-10	Y	4,320
13975644	27-Apr-10	Y	4,504
13975644	25-May-10	Y	4,636
13975644	23-Jun-10	Y	4,752
13975644	23-Jul-10	Y	4,841
13975644	24-Aug-10	Y	4,973
13975644	23-Sep-10	Y	5,121
13975644	12-Jan-11	Y	6,030
13975644	24-Jan-11	N	324
13975644	28-Feb-11	N	1,244
13975644	24-Mar-11	N	1,858
13975644	26-Apr-11	N	2,498
13975644	25-May-11	N	2,998
13975644	22-Jul-11	N	3,635
13975644	01-Sep-11	N	4,082

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



13975644	26-Sep-11	N	4,350
13975644	01-Nov-11	N	4,791
13975644	01-Dec-11	N	5,263

The coloured section shows where the meter exchange took place; the Final read for the exchanged meter being 6030 (12/01/11) – No Open exchange read is provided.

Screenshot showing confirmation that assets were changed from imperial units of 100 to metric units of 1 on 12/01/2011:

MPR_ID	LDZ	METER_INST	IMI	NUM	UNITS
13975644	NO	09/01/1996	Y	4	100
13975644	NO	12/01/2011	N	5	1

The correct calculation for FY 2010 is as follows:

start date	start read	end date	end read	Imp?	CF	RF	Consumption Calculation
24/03/2010	4320	12/01/2011	6030	2.83	1.02264	1	54,300
17/12/2010	0	24/03/2011	1858	1	1.02264	1	20,848
							75,148

The results of this example shows the AUGS incorrectly overstated the energy for FY 2010 at approx 136,000 kWh, the correct calculation is 75,148 kWh.

Of the 43 sites reviewed the actual calculations were 21.8m kWh, where the deemed value applied to the UG total was just 5.9m kWh. This 15.9m kWh variance, when extrapolated throughout all the sites with failed validation will have a significant impact on the total UG values.

The root cause of this particular example is the inability to calculate over a meter exchange. Similar instances were found when the round the clock flag was present. These are common occurrences, when in the EA LDZ region alone, of the 1.8m MPRs, 244K MPRs (13%) had experienced a meter exchange. The ability to correctly calculate these scenarios is paramount to an accurate total UG pot.

Of course, the UK Gas Market deals with these routinely through shipper involvement, where the correct charges are found in the RCS data. This is a strong case to use this proposed dataset.

Full results of 43 examples for Test 2 available on Appendix 3.

### Test 3

(Redundant in 2013 exercise; not repeated in this analysis.)

# Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



## Test 4

Test to highlight calculation errors in the SSP sector which resulted in large occurrences of sites being underbilled by a factor of 100.

The notification of this test was acknowledged by the AUGS in 2013, where a calculation bug was corrected and I am pleased to report that the matter has been largely resolved.

Table showing significant decrease in potential examples of Test 4 anomalies, where the occurrence rate is just 1.6% of the previous dataset:

Test 4 exception list		
	Old Data	New Data
NO	1649	22
EA	1464	29
<b>total</b>	<b>3113</b>	<b>51</b>

Of the 51 cases on the exception list analysed there were a small number where the matter still persisted. Although largely eradicated, I would recommend analysis into the remaining examples to fully understand and resolve the root cause within the data and calculation methodology.

## Test 4 Example analysis: MPR 13976860

In this example FY2009 had a lower than expected consumption value calculated despite passing all validation checks. The below screenshot for 2009 shows a calculated value of 4,446 kWh.

Screenshot showing 2009 passed all validation, meaning consumption (4,446) is applied:

MPR_ID	LDZ	EUC	F_YEAR	CONSUMPTI	OLD_AQ	NEW_AQ	MET	POSTI	AQ_C	YEAR_FRA
13976860	NO	04W01	2009	4,446	430,595	4,463	Y	Y	Y	
13976860	NO	03W01	2010	0	430,595	0	N	N	N	
13976860	NO	03B	2011	204,700	413,357	214,610	Y	Y	Y	
*				0	0	0				

Meter reads for MPR 13976860:

MPR_ID	METER_READ_DATE	IMP_IND	METER_READ_VAL	METERED_VOL
13976860	26-Mar-09	Y	25150	2,073.00
13976860	27-Apr-09	Y	26359	1,686.00
13976860	27-May-09	Y	27368	1,195.00

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



13976860	25-Jun-09	Y	28202	748.00
13976860	28-Jul-09	Y	29063	621.00
13976860	25-Aug-09	Y	29794	485.00
13976860	24-Sep-09	Y	30613	769.00
13976860	27-Oct-09	Y	31681	893.00
13976860	24-Nov-09	Y	32761	1,020.00
13976860	15-Dec-09	Y	33801	1,044.00
13976860	23-Feb-10	Y	37608	4,223.00
13976860	26-Mar-10	Y	39073	1,552.00

Energy calculated by Phidex:

start date	start read	end date	end read	Imp?	CF	RF	Consumption Calculation
26/03/2009	25150	26/03/2010	39073	2.83	1.02264	1	442,116

Here you can see the actual consumption for FY 2009 is almost exactly 100 times the AUGS value calculated.

Although largely resolved, as the last analysis valued this anomaly at £50m, these few examples identified in the 2 LDZs reviewed still showed an understated total volume (i.e. overstated UG amount) of over £50,000.

The examples of errors found in Test 4 can be found in Appendix 4.

### Test 5

Presence of erroneous asset details.

One of the points raised by Phidex in 2013 was that the assets used to calculate energy did not exist and it was accepted by AUGS that some work needed to be done in that area.

Below shows the asset tables comparing the 2013 dataset with that of 2014 (NO LDZ only). The assets highlighted in yellow are not available in the UK Gas Market:

NO: 2013 Dataset:-

Imp_Ind	Units	MPR count
N	0.01	678
N	0.1	6574
N	1	732547
N	10	270
N	100	1598
N	1000	1209
N	10000	247
Y	0.01	2

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



Y	0.1	29
Y	1	1290
Y	10	5397
Y	100	548948
Y	1000	511
Y	10000	1495

Example of erroneous assets are metric assets reading in one hundredths and tenths of cubic meters, also imperial and metric assets reading in ten thousands.

NO: 2014 Dataset:-

Imp_Ind	Units	MPR count
N	0	66
N	1	776,705
N	5	5
N	6	12
N	10	2
N	14	1
N	100	43
N	212	1
Y	0	1
Y	1	1,153
Y	10	548
Y	100	577,913
Y	1000	23
Y	10000	496

The updated asset table still shows a small number of spurious assets, however the majority of the issues have been resolved.

Where the erroneous assets have been applied to the calculations (e.g. Imperial units of 10,000 cubic feet) the validation carried out by the AUGS has failed, see example below.

### Test 5 example analysis: MPR 14022965

Screenshot showing assets in 10,000 Cubic feet:

Asset Details

MPR_ID	LDZ	METER_INST	IMI	NUM	UNITS
14022965	NO	05/11/2007	Y	4	10000
*					

Screenshot showing consumption calculations failing validation of the AQ for all 3 formula years:

AUGE Data Viewer - Dashboard

MPR: 14022965

AUGE Results

MPR_ID	LDZ	EUC	F_YEAR	CONSUMPTI	OLD_AQ	NEW_AQ	MET	POSI	AQ_C	YEAR_FRA
14022965	NO	01B	2009	1,718,965	20,274	1,737,247	Y	Y	N	
14022965	NO	01B	2010	1,533,447	20,274	1,450,292	Y	Y	N	
14022965	NO	01B	2011	1,308,092	20,274	1,383,647	Y	Y	N	
*				0	0	0				

Record: 1 of 3 | Filtered | Search

The significance of erroneous assets which remain are resulting incorrect metered volumes from Xoserve, causing the AUGS to apply a default EUC value. Previous tests show this estimate to be inaccurate.

It is worth noting that these invalid assets would not be accepted in the Xoserve charging mechanism to shippers. This supports the assumption that the Xoserve data used for the AUGS process is not from the same Xoserve reconciliation invoicing database/report.

## 6. Comparison of AUGS calculated quantities with Xoserve actual RCS charges

It was mentioned earlier in this document that Phidex has been able to decode a sample of the AUGS MPRs. For the avoidance of doubt, this has been done solely for the purpose of validating the AUGS calculations and ensuring the correct and best data has been provided to perform this task.

The results compared FY calculations from the AUGS with actual RVE reconciled energy charges issued to shippers by Xoserve, where the energy charges have been cleansed through a shipper involved process over a period of upto 5 years and apportioned into formula years.

The analysis covered 42 distinct MPRs and 87 calculations for formula years (i.e. an average of just over 2 FYs per MPR). There was an energy difference in each of the cases with the exception of one, where the energy value was 0 kWh.

If the AUGS validation exercise passed, the calculated consumption was compared to the Xoserve RCS data, where any of the AUGS validation exercises failed then the value attributed to the EUC band was compared.

The AUGS both overstated and understated energy with an average discrepancy of 10.2% (either positive or negative).

This result showed that with either calculated values or applied values, due to the Xoserve volumes not passing AUGS validation, the values used to determine energy for the UG Total was different to the charges accepted and paid by the shippers, and subsequently charged out to the customer. This is in every case except 0 kWh charges.

As this data is shipper specific it has not been included in the appendix, with the exception of the worked example in Example 1. Phidex has provided the results of this analysis to the shipper in question. Any queries relating to this particular exercise should be directed to the relevant shipper and contacted through ICoSS.

## **7. Further tests to conduct**

In the recent Phidex analysis, as well as reviewing previous examples of anomalies found, new root causes of calculation discrepancies have been identified.

As these centre around the calculations based on Xoserve provided metered volumes for the LSP sector, we anticipate that these will be resolved if the proposal to use RCS supporting data values is taken up.

Examples such as sites with spurious meter exchanges (specifically from metric to imperial) and large negative volumes have been identified and would warrant further review.

## **8. Summary of Findings by Phidex Consulting Ltd**

### **Data**

There have been improvements in the data provided by Xoserve to the AUGS; this includes corrections to volume calculations and additional information around meter exchanges. This is welcomed as it greatly assists in the understanding of the calculations in a validation process.

The volumes provided by Xoserve to the AUGS do not correlate with what the shipper is charged for the same period and with the same reads. It is unclear if this is because the Xoserve volumes are different, or if the AUGS applied different calculations to generate consumption quantities.

### **Consumption Validation Tests**

## Detailed Analysis of AUGS for 2013/14

An assignment on behalf of ICoSS



The AUGE calculations have seen a significant improvement. Test 4 of the 2013 analysis was estimated to be worth up to £50 million. A small number of examples were found in the 2014 data, however these were few and far between and only found having analysed a number of potential cases which turned out to be false positives.

The small number of existing cases did highlight the fact that a thorough and granular cleanse of the data prior to final publication was not carried out.

The AUGE has not changed its methodology; this is because the volumes provided to them by Xoserve were not deemed to be accurate enough, we believe this is a correct assumption. Because of this the AUGE estimated a large number of LSP consumption amounts. This value remained at about 15% of all calculations. It has been shown that in 30 examples a total understated energy value of 127m kWh was identified. This value was just one tenth of the examples available to test.

Asset anomalies still exist where calculations are being performed against assets which do not exist in the UK Gas Market. This fact highlights that the AUGE is not familiar with assets which are available, that Xoserve are providing spurious data and a sense check is not being performed on the most basic components of energy calculation despite the individual cases failing the validation process.

The total AUGS value is very large and has a notable impact on each supplier and many consumers, who have to cover the costs. The values have fluctuated enormously in the 12 months since Feb 2013, during which time both Xoserve and the AUGE have committed to improving data quality issues identified. Phidex strongly recommends an expert and independent review of all calculations prior to future publications of tables to provide the Industry with a level of comfort that the charges being faced are accurate and transparent.