

GL Noble Denton



Allocation of Unidentified Gas Statement

17th October 2011



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Outline

- Presentation of the AUGS
- Presentation of interim Unidentified Gas figures
- Q&A
- AOB

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Overview of Project Plan



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High Level Plan

Key Dates	Description	Data	Analysis
2nd March	Kick-off meeting with Xoserve		
9th March	Industry workshop	Provision of data	Analysis and development of methodology
4th May	First draft AUGS published		
16th May	UNCC Meeting GL Noble Denton present AUGS		
4th May - 15th June	First consultation period		
4th July	UNCC Meeting GL Noble Denton to present AUGS		
31st July (30th September 2011)	Second draft AUGS published		
3rd October - 31st October	Second consultation period		
17th October 2011	UNCC Meeting GL Noble Denton to present AUGS 2		Apply methodology
17th November 2011	Methodology submitted to UNCC for final approval		
25th November	Final version of AUGS published		
25th November	AUGS table published		
October 2011 - February 2012	Query process		

AUGS Second Draft

- Updated methodology, based on
 - Additional experience and insight
 - Responses from Shippers to first draft AUGS
 - Increased availability of data
- Interim Unidentified Gas figures supplied, subject to restrictions
 - No LSP DM/NDM split at this stage
 - Some data still unavailable
 - Data verification regime to be finalised
- Shipper comments on first draft AUGS and AUGE responses
 - In annexe document due to size

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Unidentified Gas – Calculation



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Unidentified Gas – Definition

Unidentified Gas is defined as consisting of:

- Unregistered and Shipperless sites
- Independent Gas Transporter CSEP setup and registration delays
- Shipper-responsible theft
- Metering bias
- Other
 - Shrinkage estimate error
 - Open bypass valves
 - Meters passing unregistered gas
 - Unknown sites

Unidentified Gas – Calculation

Calculated directly:

- Total Unidentified Gas (assigned to LSP market sector)
- Unregistered and Shipperless sites
- Independent Gas Transporter CSEP setup and registration delays
- Metering bias

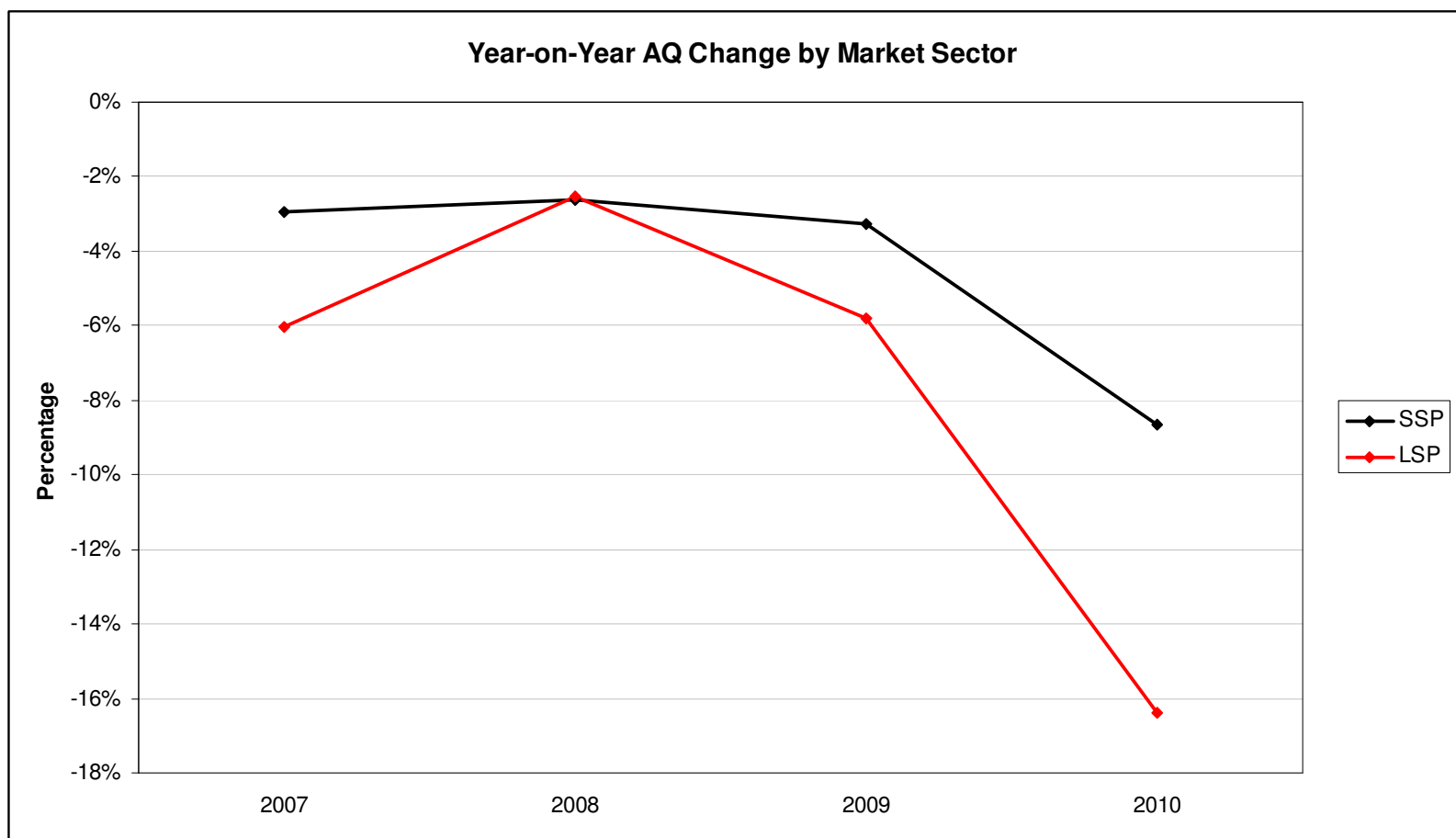
Calculated by subtraction

- Balancing Factor (equal to Theft plus Other)

Unidentified Gas – Location

- Allocation process assigns UG to both LSP and SSP sectors
- LSP-assigned UG
 - Consists of UG *arising* from both LSP and SSP sectors
 - Accounts for the majority of total UG
 - Can be calculated using available data
- SSP-assigned UG
 - Consists of UG *arising* from both LSP and SSP sectors
 - Is relatively small
 - Cannot be calculated using currently available data

Unidentified Gas – Allocation Bias due to AQ Change



Unidentified Gas – Effects of Allocation Bias

Existence of allocation bias means that

- Not all of RbD is Unidentified Gas
- Majority of Unidentified Gas is assigned to LSP sector

Based on available data

- Long-term RbD bias can be estimated
- Allocation bias can be estimated
- Total LSP-assigned UG can be estimated
 - This can then be split between market sectors

Unidentified Gas – Long Term RbD Bias

- Monthly RbD affected by random and non-random factors
 - Annual cycle
 - Retrospective corrections
 - Allocation bias
 - Random allocation error
- Individual monthly or annual values affected by these factors
- Determine long-term bias
- Assumption that process is steady

Unidentified Gas – Allocation Model Error

- Random Error
- Sample Bias
 - NDM Sample not representative of NDM as a whole
 - Parameter Values Biased (ALP, DAF)
- Data Inaccuracies
 - LDZ Demand, DM Demand, Shrinkage & Stock Change
- Meter 'Churn' (New & Isolated)
- **AQ Inaccuracies**
 - **AQ not representative of true consumption due to lag in data used for AQ calculation**

Unidentified Gas – Initial Allocation Error

$$D_t^{euc} = \frac{AQ_t^{euc} * ALP_t^{euc}}{365} \left[1 + DAF_t^{euc} * WCF_t^{LDZ} \right] * SF_t^{LDZ}$$

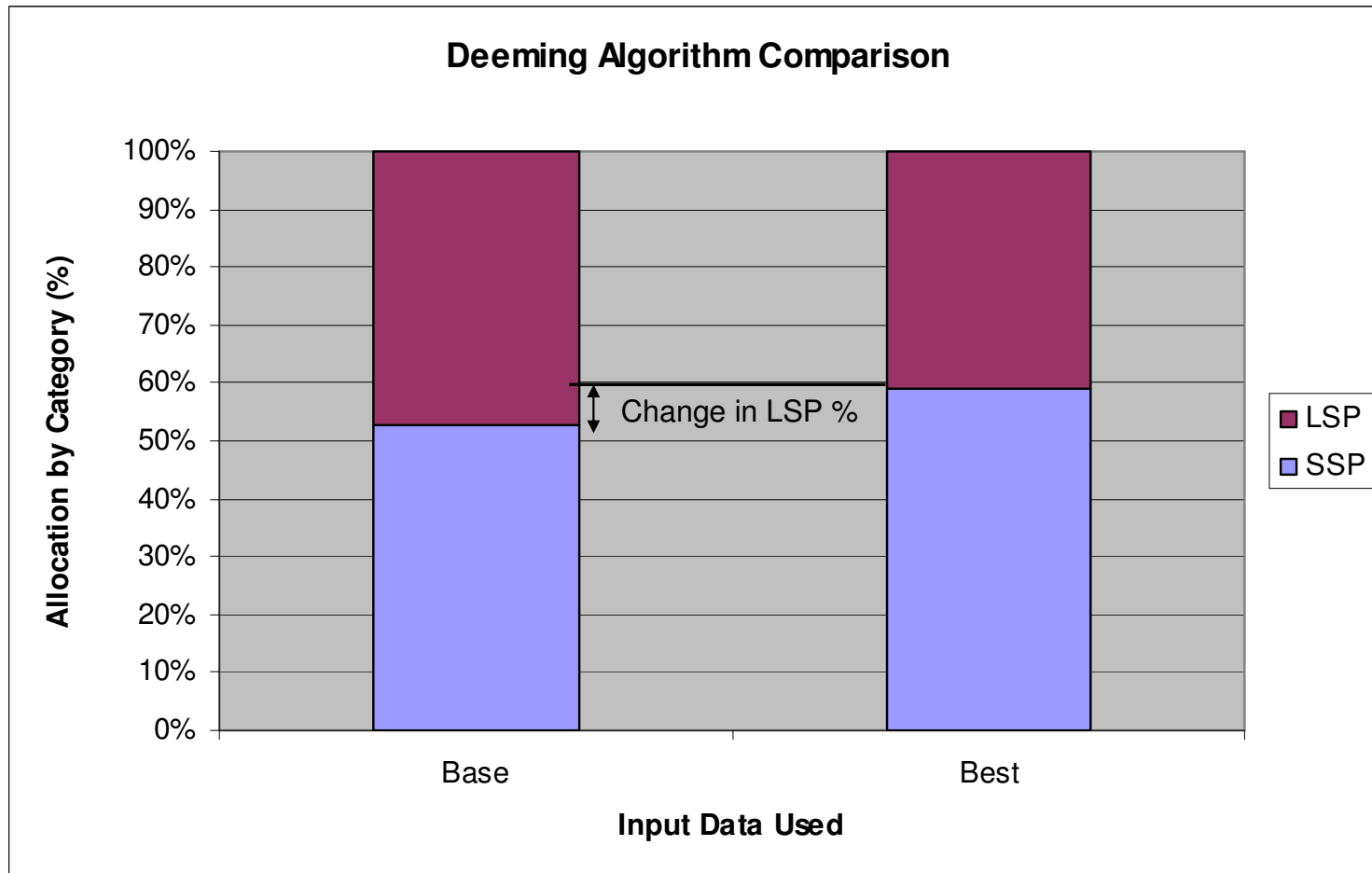
Diagram illustrating the components of the Unidentified Gas – Initial Allocation Error formula:

- Meter Churn** points to AQ_t^{euc} .
- AQ Inaccuracies** points to AQ_t^{euc} .
- Sample Bias** points to ALP_t^{euc} and DAF_t^{euc} .
- Data Errors** points to WCF_t^{LDZ} .
- Meter Churn and AQ Inaccuracies** points to WCF_t^{LDZ} via a dotted line labeled **PseudoSND**.
- Affected by all Factors** points to SF_t^{LDZ} .

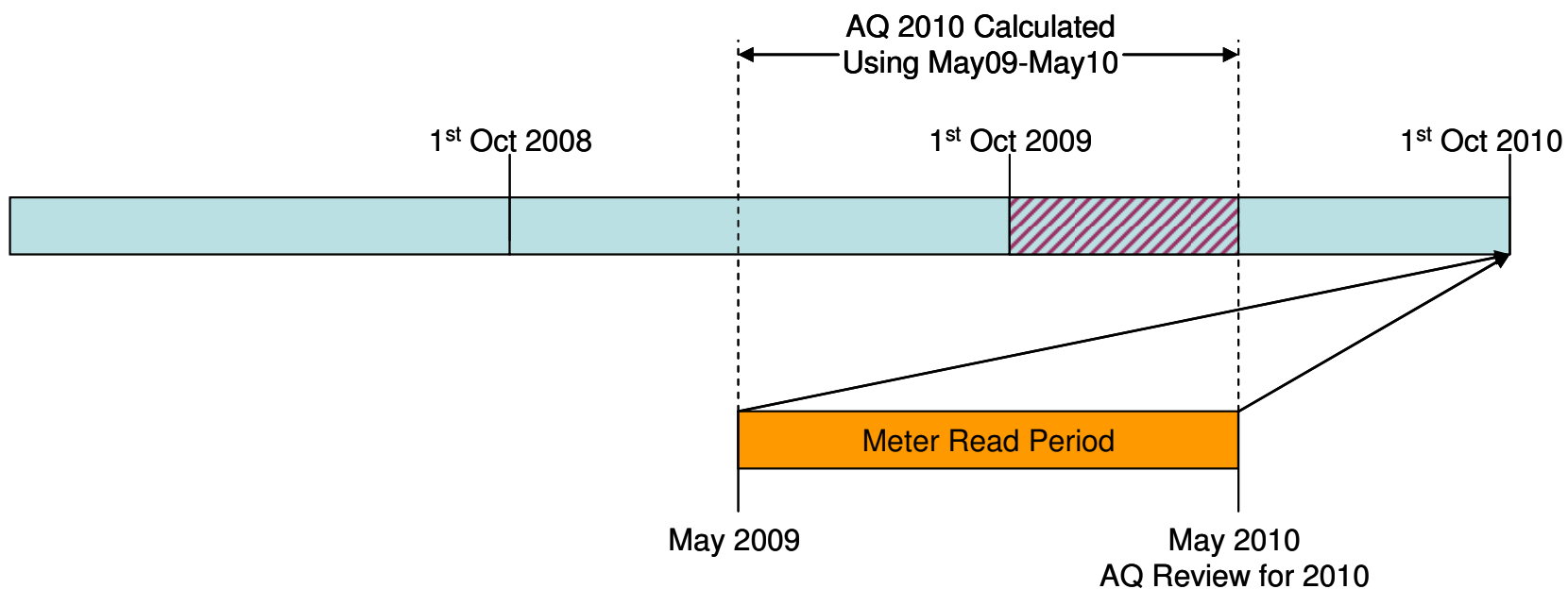
Unidentified Gas – Retrospective Allocation

- Like for like comparison of allocation using original and updated AQ
 - Sensitivity of algorithm to AQ
- Includes
 - WCF changes due to PseudoSND
 - EUC variation in sensitivity to AQ
- Excludes
 - Meters where AQ is not updated (~24% LSP)

Unidentified Gas – Model AQ Bias



Unidentified Gas – Annual AQ Review - LSP



Unidentified Gas – Model Bias Issues

- Interim results use AQ for following year
 - Plan to use Mod81 data (now received)
 - AQ change by EUC
- Scaling required
 - Only 76% of LSP AQs successfully updated
- Data issues
 - Wales South AQ vs Allocation

Unidentified Gas – Unregistered and Shipperless Sites

- Six categories that contribute to UG
 - Shipper Activity
 - Orphaned
 - Unregistered <12 Months
 - Shipperless (Passed to Shipper)
 - Shipperless (Shipper Specific Report)
 - Shipperless <12 Months
- Calculate separately for LSP and SSP

Unidentified Gas – Unregistered and Shipperless Sites

LDZ	Small Supply Point	Total AQ Value	Large Supply Point	Total AQ Value
EA	96	1,177,688	6	944,521
EM	90	1,229,066	5	601,301
LC	1	1	0	0
LO	0	0	1	314,280
LS	0	0	0	0
LT	0	0	0	0
NE	34	433,652	4	698,689
NO	41	705,623	3	891,670
NT	142	2,406,276	12	2,729,470
NW	108	1,481,265	9	1,795,433
SC	185	2,447,118	13	4,346,438
SE	196	2,965,091	22	4,427,406
SO	124	1,226,012	12	1,976,493
SW	45	806,546	5	2,417,886
WM	67	768,477	7	1,173,366
WN	33	599,440	2	255,271
WS	63	732,422	3	3,616,303
Total	1,225	16,978,677	104	26,188,527

- Supplied every two months
- Annual profile applied (current based on EUC 03B for interim figures)

Unidentified Gas – Unregistered and Shipperless Sites

Shipper Activity and Orphaned Sites

- Calculation the same for both
- Average AQ for each snapshot period calculated
- Time of year profile applied
- Proportion of sites with meter that are flowing gas estimated
 - Initial meter read data used
- Full calculation examples available
 - AUGS Section 6.7 (Worked Example)
 - Example Calculation spreadsheet

Unidentified Gas – Unregistered and Shipperless Sites

Unregistered <12 Months

- Calculation as for Shipper Activity/Orphaned sites
- No record of sites with meters for this category
- Estimate this from Shipper Activity/Orphaned sites data
- Remainder of calculation identical

Unidentified Gas – Unregistered and Shipperless Sites

Shipperless Sites

- Calculation of UG for PTS and SSrP identical
- All sites on report contributing to UG
- Time of year profile applied

Shipperless <12 Months

- Data still outstanding

Unidentified Gas – iGT CSEPs

Unidentified Gas arises from two sources

- Unknown projects
- Unregistered sites on known projects

YEAR	LDZ	Count of Unknown Projects	Sum of AQ	Count of Supply Points
2011	EA	67	7,451,635	492
2011	EM	72	10,586,818	636
2011	NE	10	1,420,436	107
2011	NO	11	3,347,678	77
2011	NT	63	10,259,669	745
2011	NW	54	7,440,332	465
2011	SC	33	21,653,184	322
2011	SE	13	1,027,380	60
2011	SO	17	1,461,043	130
2011	SW	15	2,274,788	179
2011	WM	48	9,193,761	485
2011	WN	2	156,392	8
2011	WS	8	369,759	23
Totals		413	76,642,875	3,729

Unidentified Gas – iGT CSEPs

Data Supplied

- Unknown projects summary
 - Number and sites and AQ
 - No split by market sector
- Registered sites on known CSEPs
 - Split by EUC
- Unregistered sites on known CSEPs
 - Split by EUC

Preliminary calculations

- Composition of known CSEPs used to split unknown projects
 - LSP
 - SSP

Unidentified Gas – iGT CSEPs

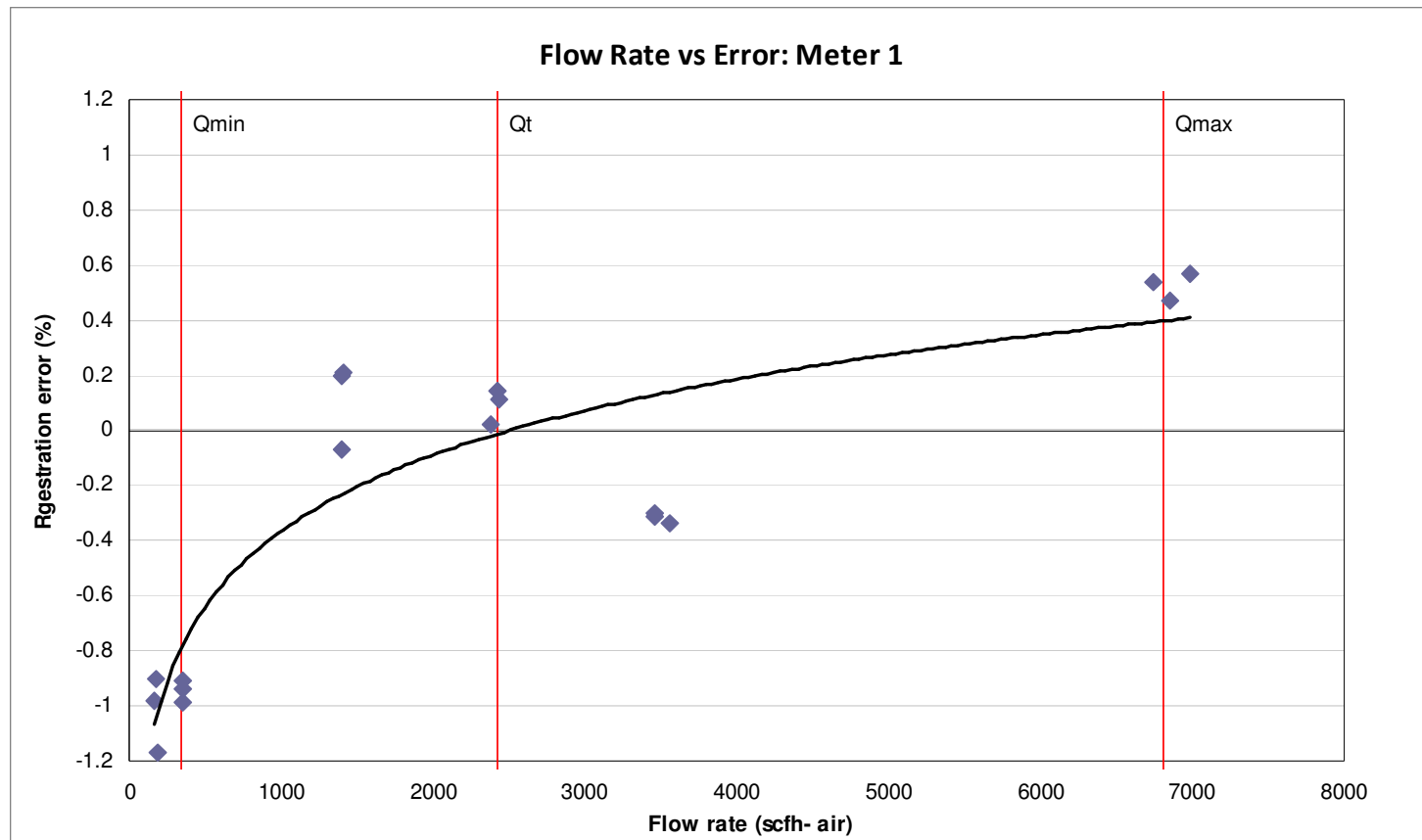
- Currently data exists for a single point in time
- This is applied to full year
- Additional data will be supplied by Xoserve
- Trend analysis and extrapolation

Unidentified Gas – Meter Error

- Contribute to UG only if there is an undetected and unresolved bias over time
 - Offtake and DM metering errors occur and are usually under-reads
 - RbD corrected when they are found
 - Assumption that all are found and corrected at some stage
 - Hence zero net contribution to UG over time
- SSP meter reads are not used in the allocation process
 - Hence SSP meter errors do not contribute to UG
- Potential error from NDM LSP meters remains

Unidentified Gas – Meter Error

Typical calibration curve for an NDM LSP RPD meter is as follows:



Unidentified Gas – Meter Error

- Meters consistently working at or around Q_{\min} will under-read and hence contribute to UG.
 - Average under-read assumed to be 1.5% (based on a selection of calibration graphs)
- Meters consistently working at or around Q_{\max} will over-read and hence reduce UG.
 - Average over-read assumed to be 0.5% (based on a selection of calibration graphs)
- Meter capacity and AQ information best data available
- Convert AQ to hourly rate and compare to meter capacity
 - Use thresholds of 1% Q_{\max} and 95% Q_{\max} to identify meters consistently under-reading and over-reading

Unidentified Gas – Balancing Factor

$$\begin{aligned}\text{LSP Assigned UG} &= \text{Average RbD} - \text{Algorithm Bias} \\ &= \text{Shipperless UG} + \text{iGT CSEPs UG} + \text{Meter Error UG} + \\ &\quad \text{Balancing Factor}\end{aligned}$$

- Shipperless, iGT CSEPs and Meter Error calculated directly
- Balancing Factor calculated by subtraction
- Balancing Factor is:
 - Theft
 - Shrinkage estimate error
 - Open bypass valves
 - Meters passing unregistered gas
 - Unknown sites

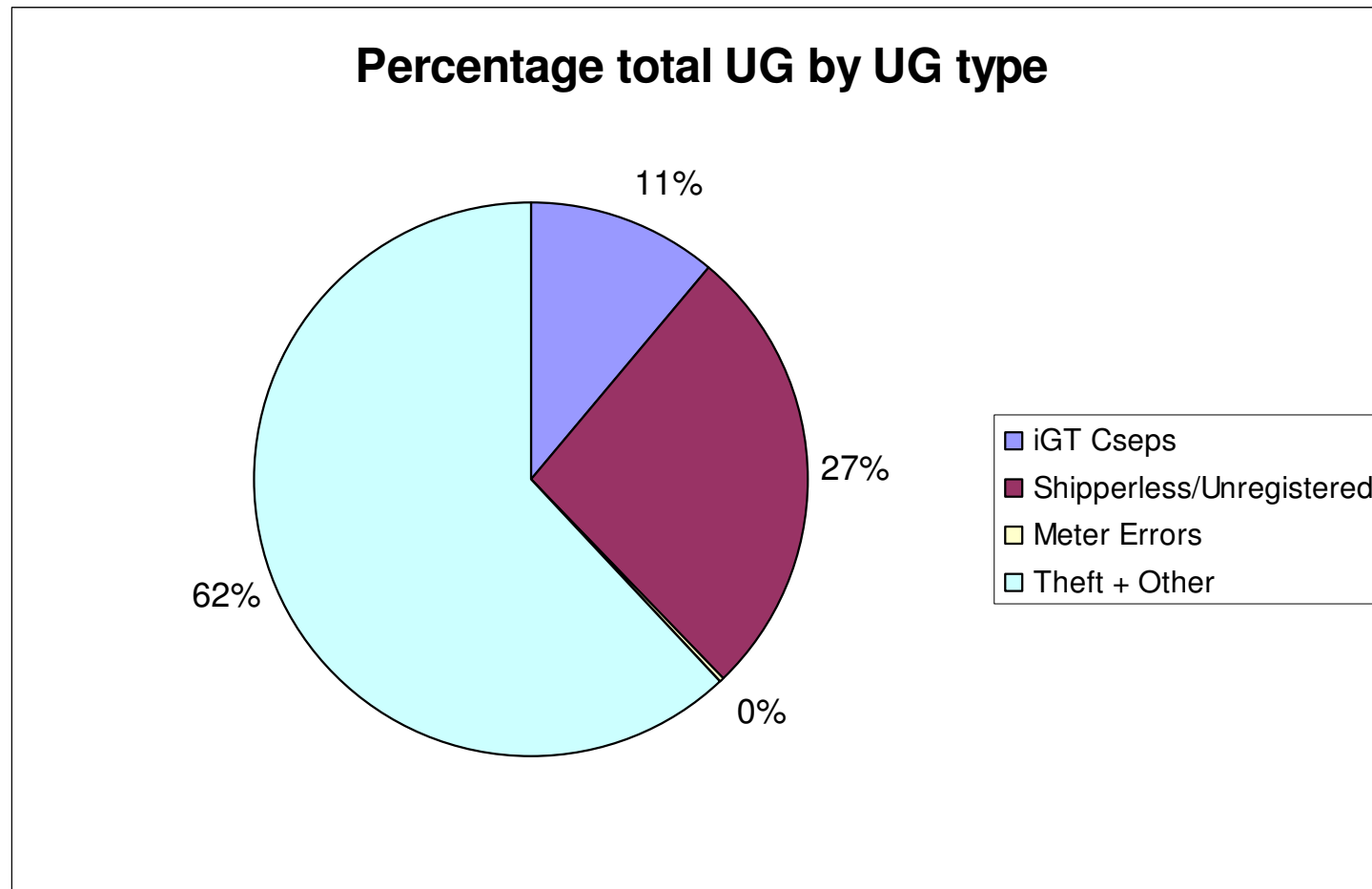
Unidentified Gas – Balancing Factor

- Balancing factor is, over time, nearly all theft
 - Shrinkage error will sum to zero over time unless shrinkage models are biased
 - Other elements are small or negligible
- Balancing volume therefore split between market sectors using relative theft levels, based on analysis of both detected and alleged thefts:
 - SSP 92.1%
 - LSP 7.9%

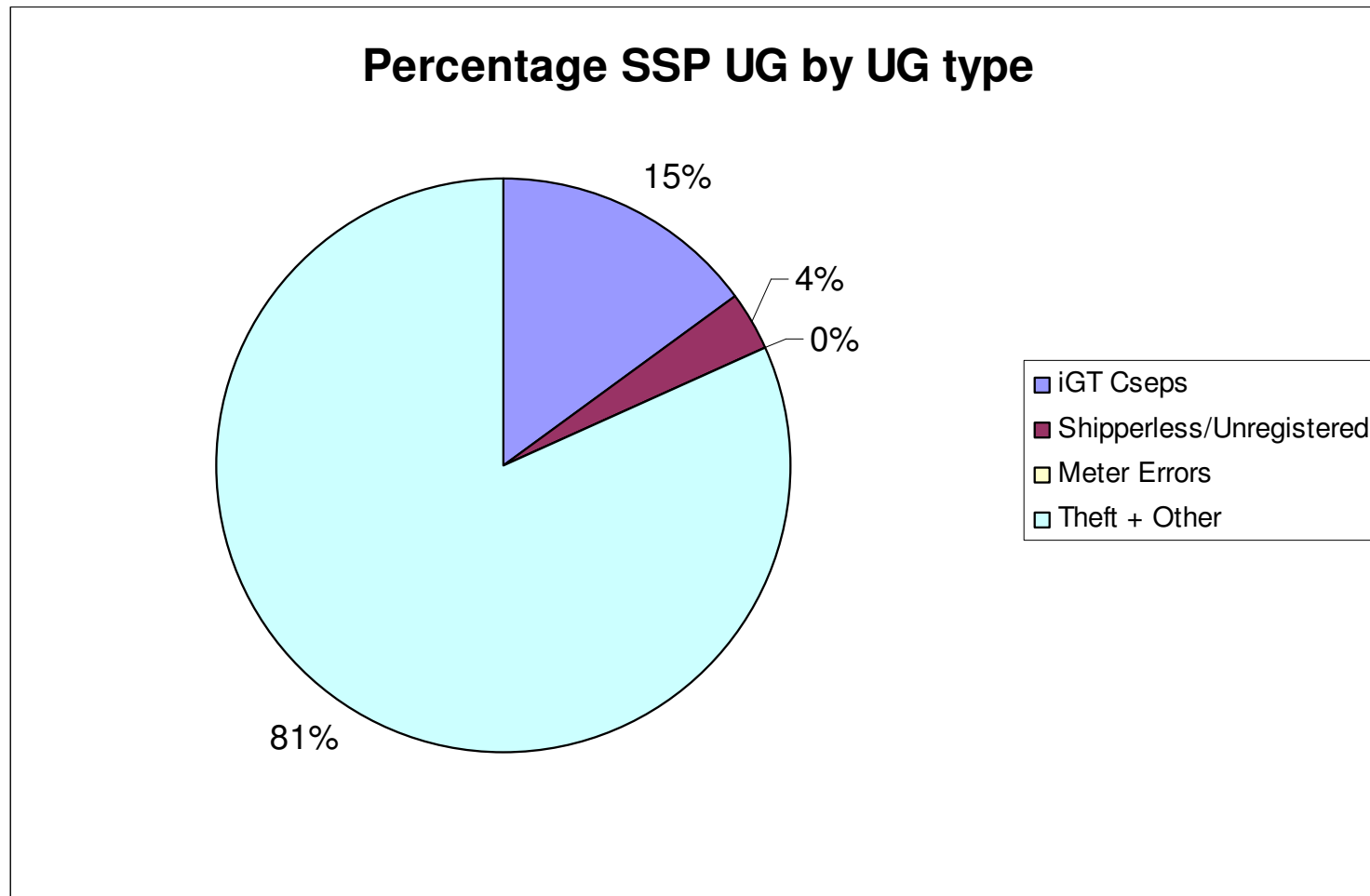
Unidentified Gas – Interim Figures

Overall Summary by type	SSP GWh	LSP GWh	Total GWh
iGT Cseps	693	48	741
Shipperless/Unregistered	166	1614	1780
Meter Errors	0	17	17
Theft + Other	3797	326	4123
Total (inc Independents)	4656	2005	6661

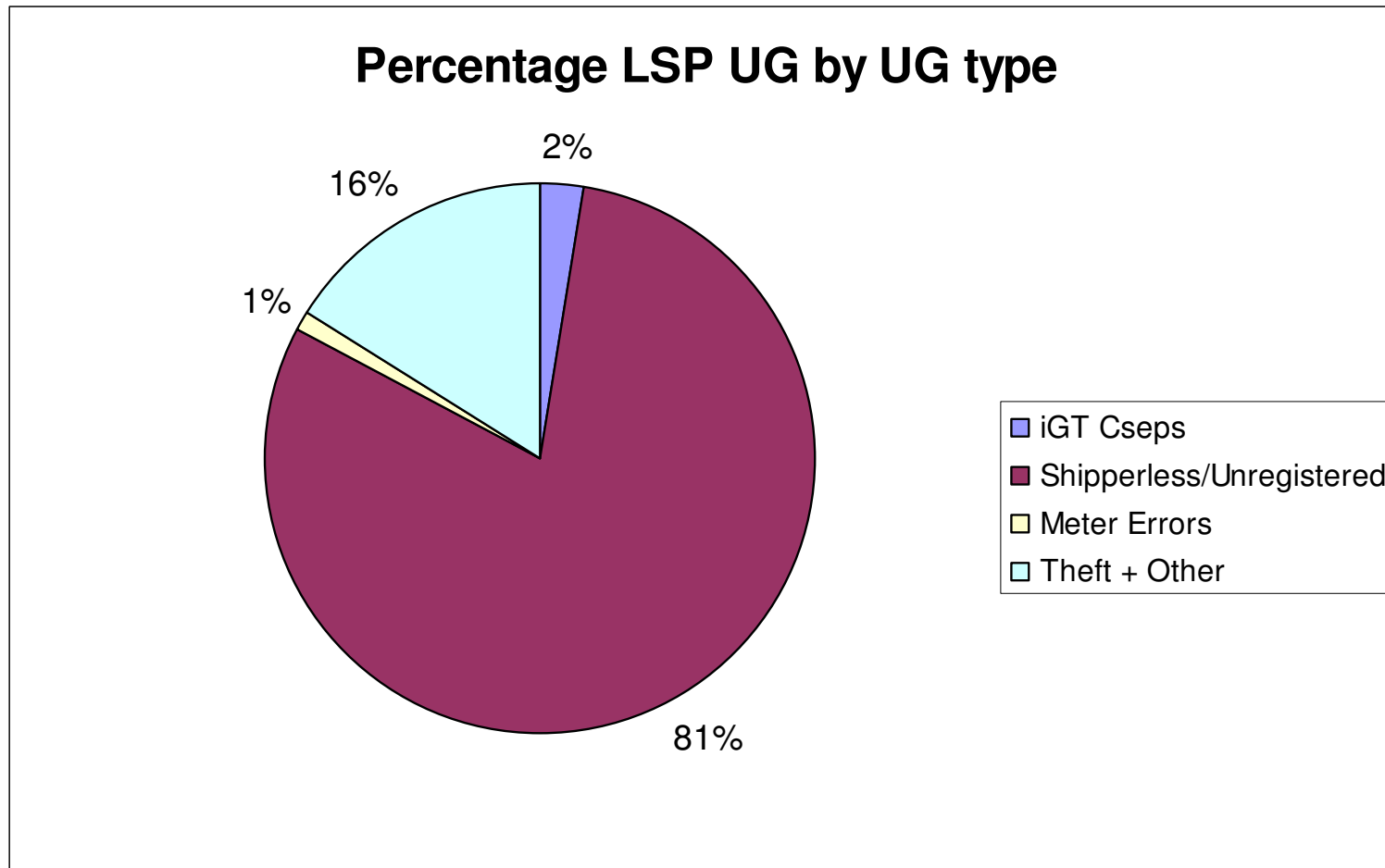
Unidentified Gas percentage split by type



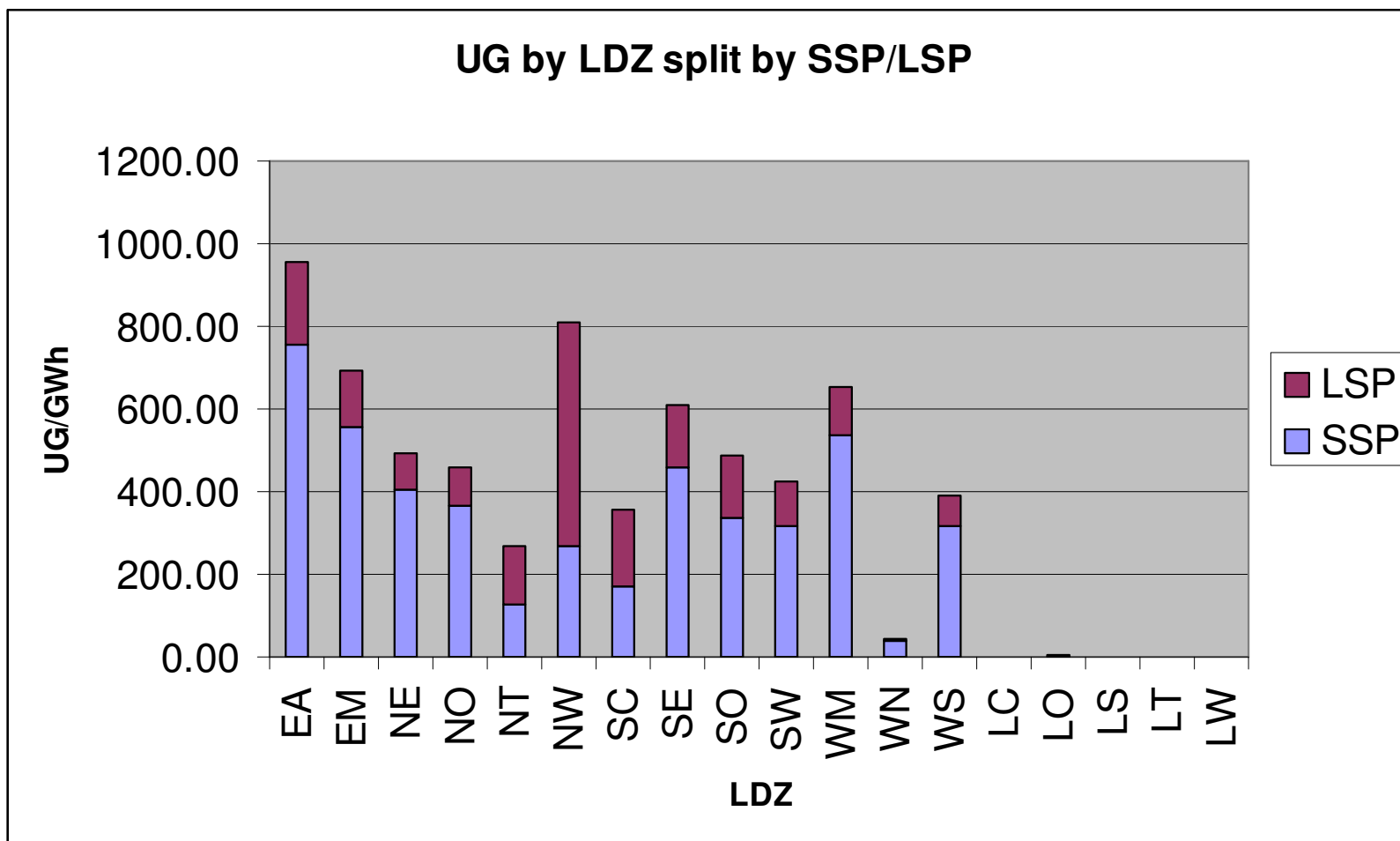
Unidentified Gas percentage split by type SSP



Unidentified Gas percentage split by type LSP



Unidentified Gas – SSP/LSP split by LDZ



Unidentified Gas – Interim Figures

	EA		EM		NE	
	SSP	LSP	SSP	LSP	SSP	LSP
iGT CSEPs	56.38	3.00	163.45	5.64	15.41	0.65
Shipperless/Unregistered	11.87	134.73	13.56	98.75	8.82	53.04
- Shipper Activity	0.08	1.14	0.11	0.21	0.08	0.12
- Orphaned	3.23	41.30	2.87	35.70	1.79	18.21
- Unregistered <12 Months	3.03	41.75	4.05	50.80	3.58	22.25
- Shipperless PTS	1.31	0.96	1.37	0.72	0.42	0.78
- Shipperless SSrP	4.22	49.57	5.15	11.32	2.94	11.68
- Shipperless <12 Months	0.00	0.00	0.00	0.00	0.00	0.00
Meter Errors	0.00	1.75	0.00	2.49	0.00	1.47
Total Directly Measured	68.25	139.47	177.01	106.87	24.23	55.16
Theft + Other	689.44	59.14	377.34	32.37	378.69	32.48
Total	757.69	198.61	554.35	139.24	402.92	87.64

RbD Bias	1166.0	1039.8	712.2
Algorithm Bias	209.7	346.2	221.6
Unidentified Gas (LSP Assigned)	956.3	693.6	490.6
Aggregate Theft + Other	748.6	409.7	411.2

Unidentified Gas – Interim Figures

	NO		NT		NW	
	SSP	LSP	SSP	LSP	SSP	LSP
iGT CSEPs	32.42	2.84	48.16	9.46	59.59	9.48
Shipperless/Unregistered	5.72	65.77	21.64	123.06	16.37	514.22
- Shipper Activity	0.05	0.03	0.21	0.77	0.10	0.60
- Orphaned	1.60	32.78	6.44	37.77	4.52	63.15
- Unregistered <12 Months	2.17	29.45	4.04	71.97	5.10	431.33
- Shipperless PTS	0.57	0.63	2.55	3.18	1.46	1.46
- Shipperless SSrP	1.33	2.88	8.39	9.38	5.19	17.69
- Shipperless <12 Months	0.00	0.00	0.00	0.00	0.00	0.00
Meter Errors	0.00	-4.04	0.00	2.49	0.00	2.71
Total Directly Measured	38.14	64.58	69.80	135.02	75.96	526.41
Theft + Other	329.62	28.27	58.38	5.01	193.18	16.57
Total	367.76	92.85	128.18	140.03	269.14	542.98

RbD Bias	610.4	466.3	1259.2
Algorithm Bias	149.8	198.1	447.1
Unidentified Gas (LSP Assigned)	460.6	268.2	812.1
Aggregate Theft + Other	357.9	63.4	209.8

Unidentified Gas – Interim Figures

	SC		SE		SO	
	SSP	LSP	SSP	LSP	SSP	LSP
iGT CSEPs	110.36	5.59	26.81	4.52	23.64	1.57
Shipperless/Unregistered	14.25	177.04	34.26	110.22	11.81	126.16
- Shipper Activity	0.21	0.55	0.22	0.91	0.15	0.39
- Orphaned	3.04	31.77	4.54	30.12	1.63	19.09
- Unregistered <12 Months	5.37	101.31	8.89	30.31	3.79	51.30
- Shipperless PTS	2.50	4.44	3.01	4.24	1.33	2.24
- Shipperless SSrP	3.12	38.97	17.60	44.63	4.92	53.14
- Shipperless <12 Months	0.00	0.00	0.00	0.00	0.00	0.00
Meter Errors	0.00	1.92	0.00	2.39	0.00	1.50
Total Directly Measured	124.61	184.55	61.08	117.12	35.45	129.23
Theft + Other	45.04	3.86	397.61	34.11	299.19	25.66
Total	169.66	188.41	458.69	151.23	334.64	154.90

RbD Bias	706.8	974.1	675.8
Algorithm Bias	348.8	364.1	186.2
Unidentified Gas (LSP Assigned)	358.1	609.9	489.5
Aggregate Theft + Other	48.9	431.7	324.9

Unidentified Gas – Interim Figures

	SW		WM		WN	
	SSP	LSP	SSP	LSP	SSP	LSP
iGT CSEPs	69.13	1.00	57.62	2.96	6.41	0.16
Shipperless/Unregistered	9.68	88.09	10.32	71.71	2.42	2.70
- Shipper Activity	0.13	0.68	0.08	0.27	0.07	0.00
- Orphaned	2.24	24.25	2.41	23.01	0.25	1.43
- Unregistered <12 Months	5.31	54.01	3.35	43.54	0.92	1.25
- Shipperless PTS	0.66	0.98	0.80	0.90	0.67	0.02
- Shipperless SSrP	1.33	8.18	3.67	4.00	0.51	0.00
- Shipperless <12 Months	0.00	0.00	0.00	0.00	0.00	0.00
Meter Errors	0.00	1.63	0.00	2.22	0.00	0.22
Total Directly Measured	78.81	90.73	67.94	76.89	8.82	3.08
Theft + Other	236.34	20.27	470.57	40.36	29.06	2.49
Total	315.15	111.00	538.51	117.25	37.88	5.57

RbD Bias	598.2	1149.4	84.6
Algorithm Bias	172.1	493.6	41.2
Unidentified Gas (LSP Assigned)	426.1	655.8	43.5
Aggregate Theft + Other	256.6	510.9	31.6

Unidentified Gas – Interim Figures

	WS	
	SSP	LSP
iGT CSEPs	23.87	1.22
Shipperless/Unregistered	4.71	47.99
- Shipper Activity	0.02	0.22
- Orphaned	0.85	14.30
- Unregistered <12 Months	1.28	28.15
- Shipperless PTS	0.67	3.72
- Shipperless SSrP	1.89	1.60
- Shipperless <12 Months	0.00	0.00
Meter Errors	0.00	0.59
Total Directly Measured	28.58	49.80
Theft + Other	289.32	24.82
Total	317.90	74.61

RbD Bias	419.6
Algorithm Bias	27.0
Unidentified Gas (LSP Assigned)	392.5
Aggregate Theft + Other	314.1

Unidentified Gas – Interim Figures

	LC		LO		LS	
	SSP	LSP	SSP	LSP	SSP	LSP
iGT CSEPs	0.00	0.00	0.00	0.00	0.00	0.00
Shipperless/Unregistered	0.02	0.00	0.03	0.31	0.18	0.11
- Shipper Activity	0.00	0.00	0.00	0.00	0.00	0.01
- Orphaned	0.01	0.00	0.01	0.00	0.01	0.00
- Unregistered <12 Months	0.00	0.00	0.01	0.00	0.17	0.00
- Shipperless PTS	0.00	0.00	0.00	0.31	0.00	0.00
- Shipperless SSrP	0.00	0.00	0.01	0.00	0.00	0.09
- Shipperless <12 Months	0.00	0.00	0.00	0.00	0.00	0.00
Meter Errors	0.00	0.00	0.00	0.00	0.00	0.00
Total Directly Measured	0.02	0.00	0.03	0.31	0.18	0.11
Theft + Other	-0.01	0.00	1.98	0.17	0.11	0.01
Total	0.00	0.00	2.00	0.48	0.29	0.12

RbD Bias	-0.9	3.0	0.0
Algorithm Bias	-0.7	0.5	-0.4
Unidentified Gas (LSP Assigned)	0.0	2.5	0.4
Aggregate Theft + Other	0.0	2.1	0.1

Unidentified Gas – Interim Figures

	LT		LW	
	SSP	LSP	SSP	LSP
iGT CSEPs	0.00	0.00	0.00	0.00
Shipperless/Unregistered	0.00	0.00	0.00	0.00
- Shipper Activity	0.00	0.00	0.00	0.00
- Orphaned	0.00	0.00	0.00	0.00
- Unregistered <12 Months	0.00	0.00	0.00	0.00
- Shipperless PTS	0.00	0.00	0.00	0.00
- Shipperless SSrP	0.00	0.00	0.00	0.00
- Shipperless <12 Months	0.00	0.00	0.00	0.00
Meter Errors	0.00	0.00	0.00	0.00
Total Directly Measured	0.00	0.00	0.00	0.00
Theft + Other	0.56	0.05	1.17	0.10
Total	0.56	0.05	1.17	0.10

RbD Bias	0.8	1.8
Algorithm Bias	0.2	0.5
Unidentified Gas (LSP Assigned)	0.6	1.3
Aggregate Theft + Other	0.6	1.3

Unidentified Gas – Next Steps

- Supply of outstanding data items
- Agreement of final methodology
- Production of final Unidentified Gas figures
 - DM/NDM split of LSP Unidentified Gas
 - Inclusion of “Shipperless <12 Months” category
 - Extrapolation of figures to 2012/13 formula year
 - Review/check of EA LDZ (2x total UG vs other LDZs)
 - Review/check NT, WN (.5x total UG vs other LDZs)
 - Review/check LSP UG for NT, NW, SC (high compared to other LDZs)
- Assessment of SSP and LSP meter read data quality with reference to alternative approach

Unidentified Gas – Additional Information

- Worked example calculation in second draft AUGS
- Full spreadsheet-based Unregistered and Shipperless Sites calculation for a single LDZ available
- All calculation spreadsheets used by the AUGE available with supporting documentation

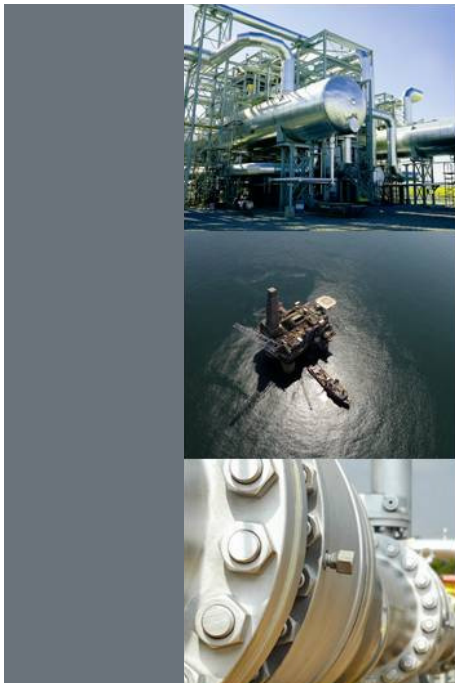
Summary – Q/A

- Areas of concern?
- Areas where further explanation is required?
- Comments or questions?
- The AUGE can be contacted via **AUGE@gl-group.com**

GL Noble Denton



Thank you for your attention



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