Gas Market Settlement Risk Quantification

Engage Consulting Limited

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Executive Summary

This independent study has confirmed that four of the most significant settlements risks are being prioritised at industry level through existing UNC or SPAA workgroups. These include; theft of gas, shipperless sites, unregistered sites, and offtake meter errors.

Other key significant risks identified through the independent study that the Performance Assurance Workgroup (PAW) should consider include:

- Fair use of AQ corrections following a meter read rejection when the read falls outside acceptable tolerance levels;
- Incorrect asset details held on the supply point register, causing consumption calculations to be inaccurate.
- The use of estimated reads for Products 1 and 2. Following D+5 consumption on these sites will be adjusted when a check read has been completed triggering a re-reconciliation. A high value at risk is created due to the difference between estimated and actual consumption;
- MPRNs in EUC 03-08 without a site-specific winter annual ratio. These sites can have an inaccurate AQ and incorrect profile if their actual consumption profile differs from the average;

Engage recommend that the proposed performance assurance framework addresses these risks.

This study has however concluded that meter read frequency for MPRNs in product 4 and meter read failure do not present a significant risk to accurate settlement. The risk of inaccurate meter reads to final allocation is minimal as the settlement window is 36-48 months. 99.8% of MPRNs have a read accepted by Xoserve within this window.

Document Control

Authorities

Version	Issue Date	Author	Comments
0.1	16th January	Naomi Anderson	
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0.1	16th January	John Peters	

Associated Documents

Document	Issue Date	Author
Gas Market Settlements Risk Report Section 1- V0.2	8th December 2014	Naomi Anderson
Gas Market Settlement Risk Assessment Dynamic Model Design Specification	5th December 2014	Naomi Anderson
Gas Market Settlement Dynamic Model	19th December 2014	John Peters/Naomi Anderson

Gas Market Settlement Dynamic Model User Guide	19th December 2014	Naomi Anderson

Distribution

To be reviewed by Jon Dixon, Ofgem Project Manager and members of the Performance Assurance Workgroup (PAW) by 23rd January 2015.

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1 Background

This report is the third deliverable of the independent study, commissioned by Ofgem and the PAW. It quantifies and ranks in order of importance the settlement performance risks identified in Gas Market Settlements Risk Report Section 1. The risks documented in this report can be managed and mitigated through a performance assurance framework.

The Gas Market Settlements Risk Report Section 1 assessed the risks to accurate gas settlement following the implementation of Project Nexus in October 2015. All risks identified were categorised as a data input risk, settlements rules based risk or performance risk. The following performance risks have been quantified using the model and are evaluated in this report;

1. Offtake measurement errors;
2. Offtake measurement errors occurring and remaining undetected;
3. Inaccurate meter reading being accepted by Xoserve and subsequently used in the settlement allocation process or accurate reads being rejected which should be used in settlement;
4. Failure to obtain meter readings during the settlements window of 48 months;
5. The use of estimated reads on daily read sites which compromises accurate settlement and subsequent use of consumption adjustments;
6. Infrequent meter reading submissions for MPRNs in Product 4 having different read frequencies;
7. Incorrect asset data held on the supply point register;
8. Overuse of estimated reads at change of supply;
9. Failure to completed check reads in accordance with the Nexus rules on meters which derive a reading;
10. Shipperless sites, where a supply point exists within the supply point register with no registered shipper. To become shipperless these sites must have previously had a shipper. to initial allocation and reconciliation;
11. Lack of identification and accurate recording of theft of gas;
12. Lack of maintenance of AQs through the AQ correction process;
13. Lack of winter annual ratios used to determine an accurate profile and subsequent AQ;
14. Shippers approaching the retrospective updates process in an inconsistent way; and
15. Unregistered sites increasing unidentified gas.

A dynamic model was built to show how each performance risk affects shippers in an averaged sized LDZ. The model simulates the future gas settlement processes. The Gas Market Settlement Risk Assessment Dynamic Model Design Specification provides a description of the model structure. The Gas Market Settlement Dynamic Model User Guide provides information to how to update each risk.

For each risk evaluated using the model, we have assessed the 1 in 20 worst case scenario wherever possible using data available at industry level. The model evaluates initial allocation and final reconciliation in an averaged sized LDZ, with seven shippers. The value at risk is then quantified at initial allocation (D+5) and final reconciliation (after line in the sand a maximum of M+48). To do this the value at risk is assessed for a single day and then annualised. This report then ranks the risks in order of severity using the default data and probability distributions set out in the User Guide.

Where there is an equal and opposite effect, only one side has been considered as the potential settlement risk. For example, the change of shipper process involves both an advantaged and disadvantaged shipper when the estimated read does not reflect true consumption. The model therefore only evaluates the effect on the disadvantaged shipper.

The value at risk is the sum of the net value to each shippers of an error occurring. Where some shippers have a positive financial allocation and others a negative allocation the value is the total impact to correct allocation irrespective of whether it is a positive or negative impact.

The model has not considered the time value of money and cash flow implications of settlement processes.

2 Table of Risks

The table below shows the product categories and value at risk for each of the risks documented in Section 1.

Ranking	Risks		Products affected				EUC affected									Range of risk to allocation	Range of risk to reconcilation
			P1	P2	P3	P4	1	2	3	4	5	6	7	8	9		
1	11	Theft of Gas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£195,739,000	£215,231,000
2	12	Use of AQ Correction Process	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	£32,218,000	£32,836,000
3	5	Use of Estimated Read for Product 1 and 2	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	£23,555,000	£47,000
4	1	LDZ Allocation Error - Corrected	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£21,152,000	-
5	7	Incorrect asset data on the supply point register	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£13,987,000	£14,073,000
6	13	Use of WAR for EUC 3 and Above	×	×	×	✓	×	×	✓	✓	✓	✓	✓	✓	×	£8,908,000	-
7	2	LDZ Allocation Error - no correction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£7,051,000	£7,051,000
8	15	Unregistered Sites	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£2,481,000	£621,000
9	10	Shipperless Sites	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£2,326,000	-
10	3	Meter Read Validation Failure	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	£1,439,000	-
11	9	Late Check Reads	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	£1,437,000	£467,000
12	6	Read Submission Frequency for Product 4	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	£1,350,000	-
13	8	Change of Shipper	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	£408,000	£410,000
14	4	Failure to Obtain a Meter Reading	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	£79,000	£79,000
15	14	Approach to Retrospective Updates	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	-	£5,000

3 Assessment of Risks

3.1 Significant Risks

The top five risks in the table are most significant and we recommend that the most effort be placed on ensuring these risks are mitigated through regulation or performance assurance targets. Appendix A shows the VAR split by shipper and product category for the top nine risks

3.1.1 Theft of Gas

The theft of gas has been widely recognised as an industry issue and work is underway to implement a Theft of Gas Risk Assessment service in January 2016. Engage anticipate further changes will be implemented through the SPAA change board to incentivise theft detection.

Following Project Nexus go-live the volume of gas consumed through theft is unlikely to be identified correctly and in most cases will be picked up through unidentified gas and allocated to shippers according to their consumption.

Theft estimates across the industry vary significantly with the exact undetected level of gas theft being difficult to quantify. The 2015/2016 interim AUGE table, published on 15th October 2015 determines that theft could be up to 5,505 GWh for the year April 2015 to March 2016. This would result in an estimated cost of £11,740,000 nationally. The 2015 / 2016 AUGE statement identifies that theft estimates vary between 0.006% and 10%.

We have therefore used 10% as the 1 in 20 worst-case estimate. In the model, shippers 1-3, fail to identify instances of theft where they are the registered shipper to a property and as a result, the volume of energy is picked up through unidentified gas. The dynamic model uses the AQ as an approximation for consumption to share the unidentified gas among all shippers in the LDZ.

The value at risk to initial allocation is £195,739,000 and to final allocation is £215,231,000. This higher VAR at final allocation is due to market share changes over the 12 months, which affect how unidentified gas is shared among the shippers in the LDZ.

The dynamic model supports prioritising changes through SPAA to incentivise theft detection and to evaluate the amount of theft more accurately. As an interim measure, a performance target could be implemented based on report of theft cases through Xoserve's Query Management System.

3.1.2 Use of AQ correction process

The AQ correction process should be used where meter readings have failed validation because the AQ or SOQ is inaccurate. Where the AQ correction process is not used in a fair and consistent way, a risk is created to unidentified gas.

The Project Nexus workgroup is hoping to determine the most appropriate meter read validation tolerance for MPRNs with lower consumption. This should mean that the AQ corrections would principally need to be used where the AQ is increasing significantly. For MPRNs in EUC 01 the AQ would need to be 1/3 of actual consumption before the meter read would fail. The risk is significant because the kWh which individual shippers are under allocated can be significant and there is no obvious incentive for shippers to submit AQ corrections using a manual process.

It is worth noting that most meter read validation failures will not be because of an incorrect AQ and this would occur in exceptional circumstances.

The value at risk to initial allocation is £32,218,000 and to final allocation is £32,836,000.

The value at risk created supports implementing reporting to monitor use of the corrections process and provide assurance that corrections are being submitted in a fair and consistent manner across the industry.

3.1.3 Use of Estimated Reads for Product 1 and 2

A significant risk has been identified where estimated reads are used for daily read meters at D+5. Where an estimate is used, the reading has either failed metering validation or there has been an equipment failure. The estimate used either equates to the recorded consumption for the previous seven days or where there is no recorded consumption for that period the AQ/365. It should be noted, that the consumption at mandatory daily read sites can fluctuate significantly and whilst shippers can elect product 2 for any sized MPRN, it is likely to be used for high consuming customers. As a result, the use of estimated reads for these meters can affect unidentified gas volumes.

Estimated reads for meters within class 1 and 2 can be replaced up to D+5. Following D+5 any gas consumed and not accounted for will be identified when a check read is completed. A check read will trigger a re-reconciliation and will apportion any mis-identified energy to the MPRN in accordance to its usage profile. This risk is principally to initial allocation, where check reads are not completed by the transporter for product 1 and the shipper for product 2 the error will crystallised at final reconciliation.

The value at risk to initial allocation is £23,555,000 and to final reconciliation is £47,000. This final value at risk is based on 99.8% of check reads being completed.

Engage recommend that a performance target is implemented to target the number of estimates used for MPRNs in products 1 and 2. We recommend that adherence to check reads obligations for sites in Product 1 and 2 be targeted. There will be a further risk to settlement where energy volume adjustments are submitted outside the settlement window of 36-48 months using UNC Mod 429- Settlement error claims process.

3.1.4 Identified LDZ Offtake Meter Error

Offtake measurement errors occur when the meter measures consumption inaccurately; this prevents accurate allocation of gas to meter points within the LDZ. This risk has been identified as significant as recent Offtake errors have been frequent and sizable. Where a meter error occurs both the NTS shrinkage and initial allocation values will be inaccurate.

The network operator should maintain each offtake meter in accordance with the UNC Offtake Arrangements Document (Section G2.5.) and the Measuring Instruments Directive (MID). There have been instances where errors have persisted over multiple years. This suggests that the current arrangements should be reviewed and / or additional performance assurance measures be put in place to encourage timely repairs for faulty off-take meters.

The value at risk within the model is £21,152,000 to initial allocation.

Engage recommend that a transporter performance target is implemented to provide assurance that the UNC Offtake arrangements document is being followed.

3.1.5 Incorrect asset data held in the supply point register

Incorrect asset data has been identified as a significant risk, which affects initial and final gas volume allocation. Xoserve has provided a report showing outstanding data items as at

December 2014 that are being tracked as part of the data cleanse in preparation for Project Nexus go-live. Items that could affect volume allocation include;

- Correct factors of 0 and other potentially incorrect correction factors;
- MPRNs which are confirmed as live with not meter attached; and
- Incorrect read factors.

It is difficult to evaluate incorrect asset details as each incorrect data item affects settlements differently. The dynamic model evaluates the current percentage of incorrect correction factors and assumes that a 1 in 20 worst-case would be out by a factor of 10. It also evaluates where the meter details are incorrect as having a potential misallocation of 20% of the current AQ. The model evaluates incorrect read factors as a confusion between metric and imperial indicators.

This results in a value at risk of £13,987,000 to initial allocation and £14,073,000 to final allocation.

Engage therefore recommend that correction factors of 0, MPRNs with no meter attached and incorrect read factors are also included within the performance assurance framework. Currently, Xoserve contact shippers highlighting these issues and requesting corrective action, however, there is no regulation to ensure shippers co-operate. These issues can have a significant financial impact to unidentified gas, as shown by the dynamic model.

3.2 Medium sized Risks

The sixth to ninth most significant risks have a value at risk between £2m-£10m. Engage recommend that these risks are also considered within any performance assurance regime.

3.2.1 Use of WAR for EUC 03 and above

There is a risk to accurate daily settlement of meter points that do not having a site-specific winter annual ratio (WAR band) and therefore the profile applied for initial allocation and reconciliation will not reflect accurate consumption. Additionally, for sites that do not have a profile that mirrors the LDZ average, their AQ will be less accurate. For 2014/2015 25% of sites do not have a site specific EUC.

WAR bands are available for EUC 03-08, they are assigned to eligible MPRNs if there is enough read history to determine the winter consumption from the previous year. There are four WAR bands for each LDZ W01-W04. The standard profile falls between W02 and W03 in terms of seasonality and load factor. Profile W01 is the flattest and W04 the most seasonal, but these can vary significantly by LDZ. Sites with lower WAR bands will be allocated less energy in winter.

Where no winter consumption is established, settlement uses a standard EUC for that AQ band. If the site is more or less sensitive than average, its initial allocation may be less accurate. Any misallocation in energy will be corrected by individual meter point reconciliation; however, the profiling between days will create some permanent error. This should be minimised as these sites should be read monthly. A site with an incorrect WAR may have an incorrect AQ dependent on the time between reads used in the AQ calculation. This error is dependent on whether a site is more or less sensitive to weather and if the AQ has been derived using a period which is biased towards summer or winter.

The value at risk by not completing a site specific WAR on 25% of sites is £8,908,000 for initial allocation although individual meter point reconciliation will mean that the value at risk is corrected by final reconciliation.

Engage recommend that a performance assurance target should be implemented to increase the percentage of MPRNs with a site specific WAR. The majority of sites without a site specific WAR in 2014/2015 are because of lack of available reads, read targets for Nov/Dec and Mar/April could be implemented for MPRNs in EUC 03-08. This will reduce financial impact to initial allocation and potential profiling error, which could affect allocation between days.

3.2.2 Undetected LDZ Offtake Meter Error

There is a risk that some LDZ offtake meter errors remain undetected. This means that NTS shrinkage and unidentified gas remain permanently inaccurate. Offtake measurement errors that are identified and investigated last an average of 298 days. Engage has estimated that on average 10% of metering errors remain undetected. This creates a value at risk of £7,051,000 to both initial and final allocation of energy. If the percentage of meter errors that remain undetected reduces to less than 5% this value at risk reduces to zero.

This risk should therefore be covered by transporter performance targets to provide industry assurance around the UNC Offtake Arrangements set out in section 3.1.3.

3.2.3 Shipperless Sites

Shipperless sites are where a supply point exists within the supply point register with no registered shipper. To become shipperless these sites must have previously had a shipper. In July 2004, UNC 0675 was implemented to enable registered users to end the registration of a supply point. Shippers must submit a supply point withdrawal and complete physical work to isolate the supply point, creating the provisions for shipperless sites. Shippers need to do this in accordance to UNC TPD section G3.

There is a risk to accurate settlement where a shipperless site is either still consuming gas or begins to consume gas at a future date without the supply point being re-registered. The gas that is consumed and not identified will be picked up as unidentified gas. UNC Modifications 424 and 425 have been implemented to help reduce the risk to unidentified gas following Nexus go-live.

UNC modification 424 will reinstate a shipper's registration of a supply point from the withdrawal date where the transporter identifies that the same meter is installed at the premise and is capable of off taking gas. In this instance, the meter point will be individually reconciled and reconciliation of unidentified gas will occur. Whilst initial allocation will be incorrect final allocation following the reconciliation process will be correct.

UNC modification 425 will place an obligation on the last registered shipper to work with the transporter to remedy a site identified as incorrectly shipperless. Corrective action will include reregistering the site or transporter disconnecting the site. Wherever possible the registration date will be as close as possible to when the site began consuming gas. The meter point will be individually reconciled.

The value at risk of shipperless sites has been determined as £2,326,000 to initial allocation. Provided both mod 424 and 425 are effective, there should be no risk created by shipperless sites within the final allocation of energy. This is based on a report provided by Xoserve of monthly isolations and withdrawals. An estimate of 5% sites being incorrectly withdrawn from was applied.

Engage recommend that performance assurance monitoring is implemented to ensure that the intentions of UNC Modifications 424 and 425 are achieved, for example that transporters complete GSR visits on time, shippers re-register sites and energy volume is replenished through unidentified gas reconciliation.

3.2.4 Unregistered sites

Unregistered sites are meter points that no shipper has ever registered. They create a risk to accurate settlement when these unregistered meter points begin to consume gas.

UNC Modification 410A was implemented to minimise the number of unregistered sites. It aims to address the root cause of the site becoming unregistered by making the transporter accountable if the site is unregistered as a result of a transporters actions or by making the shipper responsible where the shipper requested that the MPRN is created. This should mean that the cost to final allocation is minimised.

The dynamic model calculates the value at risk as £2,481,000 to initial allocation and £621,000 to final allocation. This uses MPRN creation statistics and a probability of 5% that each MPRN will become unregistered. Mod 410A should reduce this risk and therefore the value at risk can be updated when Xoserve has obtained suitable data showing the level of reconciliation because of 410A. The risk to final allocation is where unregistered sites have been created without any contract with a supplier.

Engage recommend that performance assurance monitoring is implemented to ensure that the intentions of UNC Modification 410A are achieved.

3.3 Less Significant risks

Following analysis of the risks Engage recommend that the lowest risks be given a low priority within the performance assurance framework. The value at risk associated with frequency of meter reading is not significant and will be corrected by final allocation. Where no meter reading is accepted by Xoserve within the meter-reading window the risk to other shippers is minimal.

3.3.1 Meter Read Validation Failure

Where meter readings are submitted and fail validation there is a risk that subsequent readings will fail validation and that the AQ will become less accurate. The value at risk created by readings not being accepted for 12 months is £1,539,000 to initial allocation, which is likely to reduce as more MPRNs move from Product 4 to Product 3.

3.3.2 Late check reads on meters that derive a read

The risk to settlements created by shippers not carrying out check reads within the agreed timescales is small. This Nexus rule obligates shippers to carry out check reads on meters that derive a read, which could be all AMR devices used on industrial and commercial sites. The value at risk has been assessed to be £1,437,000 to initial allocation and £467,000 to final allocation. The risk is spread over all I&C MPRNs, some of which will be within product 3 and 4.

3.3.3 Meter read submission frequency for product 4

This risk shows the value at risk created by MPRNs in product 4 not being read as frequently as MPRNs in product 3. The value at risk created by MPRNs in product 4 is £1,350,000 to initial allocation only. Individual meter point reconciliation should correct this misallocation.

3.3.4 Estimated reads at change of shipper

The risk to allocation is created by estimated change of shipper reads being used and not replaced in 34% of supply point transfers. The value at risk created by using estimated is £408,000 to initial allocation and £410,000 to final allocation. This risk is sometimes beneficial to shippers and sometimes detrimental and therefore Engage recommend this is not included within the performance assurance framework. The majority of estimated transfer reads are not replaced by actual reads because the estimate reflect actual consumption. The main risk to settlement is where estimates cause subsequent reads to fail. Where this occurs, the oncoming shipper will be able to replace the reading for 12 months through the SAR process. They will be able to use UNC mod 434 to update site details and use the AQ correction process if the reads are failing because of the AQ and SOQ not reflecting true consumption. The controls in place facilitate accurate settlement.

3.3.5 Failure to obtain a meter reading within the settlement window

There is a risk to final allocation created by not obtaining a read for a site within the settlements window. As 0.2% of sites do not have a read within the settlement window the value at risk is £79,000 to initial and final allocation. Engage recommend not including this in the performance assurance framework due to the low value at risk.

3.3.6 Consistent approach to retrospective updates

An inconsistent approach to retrospective updates is likely to have a minimal effect on settlement allocation. The value at risk has been evaluated as just £14,000.

4 Other Observations

4.1 Reporting

There is currently limited reporting following Nexus go-live. UNC Modification 520 has been raised to facilitate implementation of a suite of reports; Engage would recommend that where possible this should tie in with the largest risks to accurate settlement allocation. Appropriate reporting should include a report of AQ changes and a reporting to track theft of gas as the Mod 81 and AUGE reports will become obsolete from 2016. Lack of current reporting will make it difficult to update some of the risks within the model.

4.2 Average AQ

When evaluating risks Engage has used the Mod 81 report to approximate average AQ values. These values are after the AQ review has been completed. The T04 report might be a better approximation for average AQs before the AQ amendments process, but it contains less MPRN information than the finalised Mod 81 report 3. The PAW should decide the level of average AQ.

5 Conclusion

Engage recommend that the risks with a value at risk of above £2m should be included within a performance assurance regime.

Engage recommend that the following targets are considered for implementation into a performance assurance framework;

1. Interim targets are implemented to ensure that theft of gas cases are reported and resolved;
2. Targets are implemented to ensure the AQ correction process is used when incorrect low AQs require increasing.
3. Targets are implemented to minimise the use of estimated reads for products 1 and 2;
4. Targets are implemented to ensure check reads are completed every 12 /24 months in accordance with the rules defined in the Nexus BRDs;
5. Monitor and target offtake meter inspections to reduce the severity and frequency of offtake meter errors;
6. Incentivise shippers to maintain asset data held on the supply point register by targeting shippers to update;
    a. Correction factors;
    b. Sites with no asset details; and
    c. Read factors.
7. Target read submission in November/December and March/April for MPRNs in EUC 03 and above;
8. Target the registration of requested MPRNs to minimise unregistered sites.
9. Continue to monitor and reduce shipperless sites by;
    a. Targeting transporters GSR visits on withdrawn sites; and
    b. Targeting investigation and reregistration by shippers.

The lower level risks should only be addressed if input data changes or the PAW determine there is sufficient need to include them within the performance assurance framework. The frequency and accuracy of meter readings is less important financially in ensuring accurate settlement. Permanent error typically occurs when meter reads are not obtained within the settlement window of 36-48 months. According to the Xoserve sample, 0.2% of MPRNs do not have a meter reading within this settlements window, causing minimal misallocation. Whilst the settlement window remains so long, there is sufficient opportunity for individual meter point reconciliation on all sites. Engage would recommend looking at the percentage of latest meter reading date to determine an acceptable percentage. If the settlement window was reduced, a performance target should be implemented to work in conjunction with a shorter settlement window to provide an acceptable level of risk.

Engage believes that the retrospective updates processes is not likely to be used on a frequent basis by shippers and therefore the financial impact on settlement will be minimal.

Appendix A Value at Risk Reports

A 1 Theft of Gas

£000s per Year

	Allocation	Reconciliation
VAR	£ 195,739	£ 215,231

Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%
Small Polluter	£ 37,100	£ 52,395	£ 15,294.42	41%	£ 37,038	£ 54,306	£ 17,267.78	47%
Medium Pollute	£ 39,468	£ 49,903	£ 10,434.48	26%	£ 39,527	£ 50,311	£ 10,783.55	27%
Large Polluter	£ 162,478	£ 234,619	£ 72,140.80	44%	£ 162,377	£ 241,941	£ 79,564.23	49%
Small Polluted	£ 61,834	£ 56,213	-£ 5,621.26	-9%	£ 61,772	£ 56,263	-£ 5,509.40	-9%
Medium Pollute	£ 49,730	£ 45,209	-£ 4,520.93	-9%	£ 49,672	£ 45,328	-£ 4,343.70	-9%
Large Polluted	£ 188,396	£ 171,269	-£ 17,126.90	-9%	£ 188,522	£ 168,621	-£ 19,901.55	-11%
Residual Pollute	£ 776,607	£ 706,006	-£ 70,600.62	-9%	£ 776,705	£ 698,845	-£ 77,860.91	-10%

Model Paramters

Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	194,535.00	kWh	Risk specific
Class 2 - Error Factor - IA	972,675.00	kWh	Risk specific
Class 3 - Error Factor - IA	2,918,025.00	kWh	Risk specific
Class 4 - Error Factor - IA	15,368,265.00	kWh	Risk specific
Class 1 - Error Factor - Rec	194,535.00	kWh	Risk specific
Class 2 - Error Factor - Rec	972,675.00	kWh	Risk specific
Class 3 - Error Factor - Rec	2,918,025.00	kWh	Risk specific
Class 4 - Error Factor - Rec	15,368,265.00	kWh	Risk specific

A 2 Use of AQ Correction Process

£000s per Year

	Allocation	Reconciliation
VAR	£ 32,218	£ 32,836

Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%
Small Polluter	£ 37,100	£ 39,916	£ 2,815.65	8%	£ 37,038	£ 39,956	£ 2,917.97	8%
Medium Pollute	£ 39,468	£ 38,899	-£ 569.70	-1%	£ 39,527	£ 38,870	-£ 657.15	-2%
Large Polluter	£ 162,478	£ 175,772	£ 13,293.50	8%	£ 162,377	£ 175,877	£ 13,500.19	8%
Small Polluted	£ 61,834	£ 60,941	-£ 892.53	-1%	£ 61,772	£ 60,965	-£ 806.89	-1%
Medium Pollute	£ 49,730	£ 49,012	-£ 717.82	-1%	£ 49,672	£ 49,035	-£ 636.16	-1%
Large Polluted	£ 188,396	£ 185,677	-£ 2,719.36	-1%	£ 188,522	£ 185,607	-£ 2,914.71	-2%
Residual Pollute	£ 776,607	£ 765,397	-£ 11,209.75	-1%	£ 776,705	£ 765,302	-£ 11,403.25	-1%

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	-	kWh	Yes
Class 2 - Error Factor - IA	-	kWh	Yes
Class 3 - Error Factor - IA	-	kWh	Yes
Class 4 - Error Factor - IA	2,849,093.60	kWh	Risk specific
Class 1 - Error Factor - Rec	-	kWh	Yes
Class 2 - Error Factor - Rec	-	kWh	Yes
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	2,849,093.60	kWh	Risk specific

A 3 Estimated Reads for Products 1 and 2

	£000s per Year							
	Allocation				Reconciliation			
VAR	£ 23,555				£ 47			
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%
Small Polluter	£ 37,100	£ 36,708	-£ 392.35	-1%	£ 37,038	£ 37,038	-£ 0.65	0%
Medium Pollute	£ 39,468	£ 43,207	£ 3,738.47	9%	£ 39,527	£ 39,534	£ 7.36	0%
Large Polluter	£ 162,478	£ 170,517	£ 8,038.97	5%	£ 162,377	£ 162,393	£ 16.30	0%
Small Polluted	£ 61,834	£ 61,180	-£ 653.92	-1%	£ 61,772	£ 61,771	-£ 1.18	0%
Medium Pollute	£ 49,730	£ 49,204	-£ 525.92	-1%	£ 49,672	£ 49,671	-£ 0.93	0%
Large Polluted	£ 188,396	£ 186,404	-£ 1,992.36	-1%	£ 188,522	£ 188,518	-£ 4.25	0%
Residual Pollute	£ 776,607	£ 768,394	-£ 8,212.91	-1%	£ 776,705	£ 776,689	-£ 16.64	0%

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	693,089.77	kWh	Risk specific
Class 2 - Error Factor - IA	1,386,179.54	kWh	Risk specific
Class 3 - Error Factor - IA	-	kWh	Yes
Class 4 - Error Factor - IA	-	kWh	Yes
Class 1 - Error Factor - Rec	1,386.18	kWh	Risk specific
Class 2 - Error Factor - Rec	2,772.36	kWh	Risk specific
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	-	kWh	Yes

A 4 Identified LDZ Offtake Meter Error

	£000s per Year								
	Allocation				Reconciliation				
VAR	£ 21,221				£ -				
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%	
Small Polluter	£ 37,100	£ 36,502	-£ 598.43	-2%	£ 37,038	£ 37,038	£ -	0%	
Medium Pollute	£ 39,468	£ 38,832	-£ 636.63	-2%	£ 39,527	£ 39,527	£ -	0%	
Large Polluter	£ 162,478	£ 159,857	-£ 2,620.79	-2%	£ 162,377	£ 162,377	£ -	0%	
Small Polluted	£ 61,834	£ 60,836	-£ 997.39	-2%	£ 61,772	£ 61,772	£ -	0%	
Medium Pollute	£ 49,730	£ 48,928	-£ 802.15	-2%	£ 49,672	£ 49,672	£ -	0%	
Large Polluted	£ 188,396	£ 185,357	-£ 3,038.85	-2%	£ 188,522	£ 188,522	£ -	0%	
Residual Pollute	£ 776,607	£ 764,080	-£ 12,526.75	-2%	£ 776,705	£ 776,705	£ -	0%	

Model Paramters

Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	290,342.00	kWh	Risk specific
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	-	kWh	Yes
Class 2 - Error Factor - IA	-	kWh	Yes
Class 3 - Error Factor - IA	-	kWh	Yes
Class 4 - Error Factor - IA	-	kWh	Yes
Class 1 - Error Factor - Rec	-	kWh	Yes
Class 2 - Error Factor - Rec	-	kWh	Yes
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	-	kWh	Yes

A 5 Incorrect asset data held on the supply point register

	£000s per Year								
	Allocation				Reconciliation				
VAR	£ 13,987				£ 14,073				
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%	
Small Polluter	£ 37,100	£ 38,265	£ 1,164.39	3%	£ 37,038	£ 38,239	£ 1,200.31	3%	
Medium Pollute	£ 39,468	£ 40,298	£ 829.99	2%	£ 39,527	£ 40,316	£ 789.17	2%	
Large Polluter	£ 162,478	£ 167,478	£ 4,999.23	3%	£ 162,377	£ 167,424	£ 5,047.17	3%	
Small Polluted	£ 61,834	£ 61,432	-£ 401.69	-1%	£ 61,772	£ 61,412	-£ 360.24	-1%	
Medium Pollute	£ 49,730	£ 49,407	-£ 323.06	-1%	£ 49,672	£ 49,388	-£ 284.02	-1%	
Large Polluted	£ 188,396	£ 187,172	-£ 1,223.86	-1%	£ 188,522	£ 187,221	-£ 1,301.30	-1%	
Residual Pollute	£ 776,607	£ 771,562	-£ 5,045.00	-1%	£ 776,705	£ 771,614	-£ 5,091.08	-1%	

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	636.00	kWh	Risk specific
Class 2 - Error Factor - IA	1,272.00	kWh	Risk specific
Class 3 - Error Factor - IA	228,960.59	kWh	Risk specific
Class 4 - Error Factor - IA	1,041,134.67	kWh	Risk specific
Class 1 - Error Factor - Rec	636.00	kWh	Risk specific
Class 2 - Error Factor - Rec	1,272.00	kWh	Risk specific
Class 3 - Error Factor - Rec	228,960.59	kWh	Risk specific
Class 4 - Error Factor - Rec	1,041,134.67	kWh	Risk specific

A 6 Use of WAR for EUC 03-08

	£000s per Year								
	Allocation				Reconciliation				
VAR	£ 8,908				£ -				
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%	
Small Polluter	£ 37,100	£ 37,879	£ 778.47	2%	£ 37,038	£ 37,038	£ -	0%	
Medium Pollute	£ 39,468	£ 39,311	-£ 157.51	0%	£ 39,527	£ 39,527	£ -	0%	
Large Polluter	£ 162,478	£ 166,154	£ 3,675.39	2%	£ 162,377	£ 162,377	£ -	0%	
Small Polluted	£ 61,834	£ 61,587	-£ 246.77	0%	£ 61,772	£ 61,772	£ -	0%	
Medium Pollute	£ 49,730	£ 49,532	-£ 198.46	0%	£ 49,672	£ 49,672	£ -	0%	
Large Polluted	£ 188,396	£ 187,644	-£ 751.85	0%	£ 188,522	£ 188,522	£ -	0%	
Residual Pollute	£ 776,607	£ 773,507	-£ 3,099.27	0%	£ 776,705	£ 776,705	£ -	0%	

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	-	kWh	Yes
Class 2 - Error Factor - IA	-	kWh	Yes
Class 3 - Error Factor - IA	-	kWh	Yes
Class 4 - Error Factor - IA	779,459.06	kWh	Risk specific
Class 1 - Error Factor - Rec	-	kWh	Yes
Class 2 - Error Factor - Rec	-	kWh	Yes
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	-	kWh	Yes

A 7 Undetected LDZ Offtake Meter Error

	£000s per Year									
	Allocation				Reconciliation					
VAR	£ 7,074				£ 7,074					
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%		
Small Polluter	£ 37,100	£ 36,901	-£ 199.48	-1%	£ 37,038	£ 36,872	-£ 166.23	0%		
Medium Pollute	£ 39,468	£ 39,256	-£ 212.21	-1%	£ 39,527	£ 39,283	-£ 243.69	-1%		
Large Polluter	£ 162,478	£ 161,605	-£ 873.60	-1%	£ 162,377	£ 161,558	-£ 819.13	-1%		
Small Polluted	£ 61,834	£ 61,501	-£ 332.46	-1%	£ 61,772	£ 61,473	-£ 299.22	0%		
Medium Pollute	£ 49,730	£ 49,463	-£ 267.39	-1%	£ 49,672	£ 49,436	-£ 235.91	0%		
Large Polluted	£ 188,396	£ 187,383	-£ 1,012.95	-1%	£ 188,522	£ 187,441	-£ 1,080.86	-1%		
Residual Pollute	£ 776,607	£ 772,431	-£ 4,175.60	-1%	£ 776,705	£ 772,477	-£ 4,228.65	-1%		

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	96,781.00	kWh	Risk specific
LDZ Volume Error Reconcilation (M3)	96,781.00	kWh	Risk specific
Class 1 - Error Factor - IA	-	kWh	Yes
Class 2 - Error Factor - IA	-	kWh	Yes
Class 3 - Error Factor - IA	-	kWh	Yes
Class 4 - Error Factor - IA	-	kWh	Yes
Class 1 - Error Factor - Rec	-	kWh	Yes
Class 2 - Error Factor - Rec	-	kWh	Yes
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	-	kWh	Yes

A 8 Unregistered Sites

	£000s per Year									
	Allocation				Reconciliation					
VAR	£ 2,481				£ 621					
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%		
Small Polluter	£ 37,100	£ 37,294	£ 193.82	1%	£ 37,038	£ 37,088	£ 49.79	0%		
Medium Pollute	£ 39,468	£ 39,601	£ 132.23	0%	£ 39,527	£ 39,558	£ 31.09	0%		
Large Polluter	£ 162,478	£ 163,393	£ 914.23	1%	£ 162,377	£ 162,606	£ 229.43	0%		
Small Polluted	£ 61,834	£ 61,763	-£ 71.24	0%	£ 61,772	£ 61,756	-£ 15.89	0%		
Medium Pollute	£ 49,730	£ 49,673	-£ 57.29	0%	£ 49,672	£ 49,659	-£ 12.53	0%		
Large Polluted	£ 188,396	£ 188,179	-£ 217.05	0%	£ 188,522	£ 188,465	-£ 57.39	0%		
Residual Pollute	£ 776,607	£ 775,712	-£ 894.71	0%	£ 776,705	£ 776,481	-£ 224.51	0%		

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	2,243.78	kWh	Risk specific
Class 2 - Error Factor - IA	11,218.92	kWh	Risk specific
Class 3 - Error Factor - IA	33,656.76	kWh	Risk specific
Class 4 - Error Factor - IA	177,258.95	kWh	Risk specific
Class 1 - Error Factor - Rec	560.95	kWh	Risk specific
Class 2 - Error Factor - Rec	2,804.73	kWh	Risk specific
Class 3 - Error Factor - Rec	8,414.19	kWh	Risk specific
Class 4 - Error Factor - Rec	44,314.74	kWh	Risk specific

A 9 Shipperless Sites

	£000s per Year								
	Allocation				Reconciliation				
VAR	£ 2,326				£ -				
Supplier	Reference	Risk	Var	%	Reference	Risk	Var	%	
Small Polluter	£ 37,100	£ 37,282	£ 181.72	0%	£ 37,038	£ 37,038	£ -	0%	
Medium Pollute	£ 39,468	£ 39,592	£ 123.98	0%	£ 39,527	£ 39,527	£ -	0%	
Large Polluter	£ 162,478	£ 163,335	£ 857.15	1%	£ 162,377	£ 162,377	£ -	0%	
Small Polluted	£ 61,834	£ 61,767	-£ 66.79	0%	£ 61,772	£ 61,772	£ -	0%	
Medium Pollute	£ 49,730	£ 49,676	-£ 53.72	0%	£ 49,672	£ 49,672	£ -	0%	
Large Polluted	£ 188,396	£ 188,192	-£ 203.50	0%	£ 188,522	£ 188,522	£ -	0%	
Residual Pollute	£ 776,607	£ 775,768	-£ 838.85	0%	£ 776,705	£ 776,705	£ -	0%	

Model Paramters			
Parameter	Value	Units	Default used
LDZ Volume Error Initial (M3)	-	kWh	Yes
LDZ Volume Error Reconcilation (M3)	-	kWh	Yes
Class 1 - Error Factor - IA	2,103.55	kWh	Risk specific
Class 2 - Error Factor - IA	10,517.74	kWh	Risk specific
Class 3 - Error Factor - IA	31,553.21	kWh	Risk specific
Class 4 - Error Factor - IA	166,180.26	kWh	Risk specific
Class 1 - Error Factor - Rec	-	kWh	Yes
Class 2 - Error Factor - Rec	-	kWh	Yes
Class 3 - Error Factor - Rec	-	kWh	Yes
Class 4 - Error Factor - Rec	-	kWh	Yes