

To: Jacqueline Balian[Jacqueline.Balian@ofgem.gov.uk]
From: Carlton, Walter (UK - Edinburgh)
Sent: 2011-09-22T19:14:39Z
Importance: Normal
Subject: RE: RHI - final report
Received: 2011-09-22T19:14:47Z
[RHI sampling approach FINAL2.docx](#)

Jacqueline

I've added logos and standard disclaimer. Does that make it sufficiently clear for DECC?

Regards

WALTER

From: Jacqueline Balian [mailto:Jacqueline.Balian@ofgem.gov.uk]

Sent: 21 September 2011 12:16

To: Carlton, Walter (UK - Edinburgh)

Subject: RE: RHI - final report

Hi Walter,

We need to share with DECC our latest thinking on audits. I would like to give them a copy of your report on audit volumes but the final version I have is not on letter head so its not obvious its from you.

Would it be possible for you to send me over a final version on Deloitte letter head?

Best wishes

Jacqueline

Jacqueline Balian

Head of RHI Operations
New Scheme Development
9 Millbank
London
SW1P 3GE
Tel: 0207 901 7211
www.ofgem.gov.uk

From: Carlton, Walter (UK - Edinburgh) [mailto:wcarlton@deloitte.co.uk]

Sent: 01 September 2011 16:12

To: Jacqueline Balian

Cc: Gavin Jenkins; Matthew Harnack; Chung, Matthew (UK - London)

Subject: RHI - final report

Jacqueline

Please find attached the final report. I have also copied in Gavin who's collating the audit committee papers.

Regards

WALTER

From: Jacqueline Balian [mailto:Jacqueline.Balian@ofgem.gov.uk]

Sent: 01 September 2011 15:43

To: Carlton, Walter (UK - Edinburgh)

Subject: RE: hopefully final email - sorry you have such a sad appointment tomorrow - jacqueline

Walter – that seems fine – Happy for you to send across as a final copy. Many thanks indeed for sorting this out so quickly

Jacqueline

Jacqueline Balian

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From: Carlton, Walter (UK - Edinburgh) [mailto:wcarlton@deloitte.co.uk]
Sent: 01 September 2011 14:00
To: Jacqueline Balian
Cc: Juliet Little; matthewharnack@Personal information redacted by the RHI Inquiry Ashley Malster
Subject: RE: hopefully final email - sorry you have such a sad appointment tomorrow - jacqueline

Sorry, now attached

From: Carlton, Walter (UK - Edinburgh)
Sent: 01 September 2011 13:56
To: Jacqueline Balian
Cc: Juliet Little; matthewharnack@Personal information redacted by the RHI Inquiry Ashley Malster
Subject: RE: hopefully final email - sorry you have such a sad appointment tomorrow - jacqueline

Jacqueline

Final draft attached with tracked changes from last night's version, incorporating your comments/changes. Please would you confirm you're happy with the changes or advise any further amendments.

Regards

WALTER

From: Jacqueline Balian [mailto:Jacqueline.Balian@ofgem.gov.uk]
Sent: 01 September 2011 09:58
To: Carlton, Walter (UK - Edinburgh)
Cc: Juliet Little; matthewharnack@Personal information redacted by the RHI Inquiry Ashley Malster
Subject: FW: hopefully final email - sorry you have such a sad appointment tomorrow - jacqueline

Hi Walter,

thanks for sending over the unlocked copy – however, I had toiled away last night producing this so I hope you won't mind if I pass it along in this form now.

Many thanks for the report.

Do give me a call if any of this is not clear. I will be at my desk until 11

Jacqueline

Jacqueline Balian

Head of RHI Operations
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 Tel: 0207 901 7211
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From: Jacqueline Balian
Sent: 31 August 2011 20:41
To: 'matthewharnack@Personal information redacted by the RHI Inquiry
Subject: hopefully final email - sorry you have such a sad appointment tomorrow - jacqueline

Matthew – draft email for Deloitte giving changes to the table.

Suggested changes to the 'Proposed management action, responsibility and timeframe' column of the Deloitte report OFGEM independent Assurance 2011-03:RHI Systems and Processes

3.1.2 Para 2 Line one – delete 'consider'

Line 2 – delete 'development team or the'

Responsibility – add – 'Ade Obaye'

Timeframe – add – 'From 30 September to 1 April 2012'

3.2.1 Para 1 delete – 'and robust processes and safeguards' and replace it with ' and safeguards, along with a detailed Standard Operating Procedure and robust controls.'

Para 2

Delete – 'In the meantime, we will establish a detailed SOP with robust controls to cover the transfer of this data.'

Responsibility – delete Andrew Venn and replace with Andrew Amato

3.2.2 Para 1 Line 1 delete 'government'

Responsibility – add 'Curt Silver'

3.2.3

The content of the column marked 'Proposed management action, responsibility and timeframe' differs in type from that in other

observations. It is not Ofgem's response, as is the case elsewhere, but the Deloitte recommendation.

We suggest replacing this text with the following:

Deloitte has suggested that Ofgem management should consider the use of an external data feed of business changes/movers to detect potential ownership changes. That the external business information should be compared to the details registered in the RHI system, which would identify discrepancies between the registered business details and the details as held by a third party provider eg royal mail or Experian or Yell.

Where there are differences, further investigations could then be conducted to clarify the registration details and to determine ownership of the installation.

While we will consider this risk further to determine the appropriate mitigation action the use of a third party data feed is not planned for this purpose. As an interim measure additional text will be positioned above the 'submit' button on the IT system to include a statement that information provided should be accurate, to help act as a deterrent.

Responsibility: Lindsay Goater/Sophie Jubb

Timeframe: 16 September

This acknowledges your advice but does not, I am afraid, accede to it!

3.2.5 Para 1 Line one please delete 'ask' and replace with 'consult with'

Line 2 delete 'to advise' and replace with 'and obtain their advice'

Para 2 please delete and replace with.

A requirement will now be imposed for all complex systems above 45kW to supply an independently produced metering report and for all systems below 45kW to supply an MCS installation number. This will provide an independent check of the existence of the installation. In addition, for simple systems between 30th September and 1st April 2012 additional desk checks of evidence of installation will be imposed. A SOP covering this procedure will be produced by 16th September.

Responsibility: Lindsay Goater

Timeframe: by 16 September

3.2.7 Para 1 Line 1 delete 'should consider performing a' and replace it with 'will'

Line 2 delete the word 'of'

Responsibility – add – Juliet Little

Timeframe – add – October 2011-08-31

3.3 Again – these are your suggestions rather than ours. I attach for your information our proposed actions.

1. Where co-owners are listed we will ask for their names and contact details to be supplied as part of the application. This will also be the case if ownership details change. Where such information is provided to us, we will check with a sample of those listed that they have given their consent. A standard operating procedure to this effect is currently being prepared and this work will be complete by 16th September.

2. It is recognised that there are disadvantages in manually processing data, however given the volumes in year one it was not felt appropriate to automate the process. However, integrated systems, with the possibility of automated transfer and secure links will be investigated during the first year of operation once scheme volumes are better understood.

3. a. In these cases Ofgem will seek documentary evidence from the participant that the third party users are domestic premises and that their uses are eligible. Such evidence might include heating system schematics and site plans showing that no outdoor swimming pool exists at the property, for example. We believe that this will be sufficient to mitigate the relatively low risk at domestic properties which have few options for using heat for ineligible purposes and use a small amount of heat per home. The audit strategy has been updated to reflect this change.

3b. In the case of biomethane installations, Ofgem will require the participant to provide third party verified evidence of the accuracy of information pertaining to the composition of the gas flowing through this plant. This will verify that the gas going through the plant is of a composition which shows that it is biogas. The third party evidence can also verify the amount of gas being injected, ie the meter readings. The risks associated with biomethane plant are also currently relatively low given that fewer than a handful exist. Our audit strategy has also been updated to reflect this change.

3c. DECC has agreed the policy of delaying the start of formal audits until April 2012. Tighter post accreditation desk checks have now been specified. These will include an effective check of the existence of complex plant by requiring an independent metering report for all plant above 45kW and a microgeneration certification scheme installation number for all plant below 45kW. For simple systems, until April 2012 we will institute a standard operating procedure which requires additional evidence of the existence of the plant to be submitted. This SOP will be revised to add this requirement by 14th September.

Responsibility – J Balian

Timeframe add- by 16 September

Jacqueline Balian

Head of RHI Operations

New Scheme Development

9 Millbank

Received from OFGEM on 14.11.2017

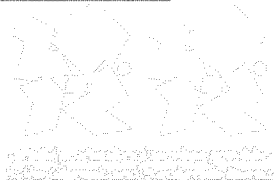
Annotated by RHI Inquiry

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RENEWABLE HEAT INCENTIVE – AUDIT SAMPLING APPROACH

This paper sets out a proposed approach to audit sampling as part of the RHI audit strategy. It should be borne in mind that there is no “right answer” as to the sample size; different approaches may be adopted and judgements are required regarding acceptable error rates and confidence levels. The key decisions for the proposed approach are presented below; further detail and supporting explanation are included in the remainder of this document.

(i) Sampling method

Leaving aside a judgemental approach, the two generally recognised statistical sampling approaches are Monetary Unit Sampling (where each £ has an equal chance of selection) and Attribute Sampling (where each installation has an equal chance of selection), both of which are commonly used in financial auditing.

Preferred option: Monetary Unit Sampling

Rationale: Provides direct linkage between the financial value of the RHI payments and the sample items selected, with the chance of selection proportional to the value of the payment.

Evaluation of sample results and their extrapolation to the entire population is straightforward.

(ii) Materiality or precision

This represents the maximum allowed error value in the population and may be expressed as a percentage or an absolute amount. For the former, the sample size will remain constant regardless of the size of the population whereas for the latter, the sample size will grow in proportion to the population. As a driver of the sample size, materiality is inversely correlated with the volume of sample testing required.

Preferred option: Materiality of £200k in 2011 increasing to £2.5m in 2015

Rationale: The level of materiality is a matter of judgement, but as an indication, 0.5% of turnover is often applied in financial statements auditing while a number of EU grant scheme use materiality of 2%. The levels proposed represent 2.18% of total projected RHI payments in 2011 reducing to 0.56% in 2015, providing a balance between error detection and the cost of performing the sample testing.

(iii) Confidence

This is the level of confidence that the population is not misstated by greater than materiality.

Preferred option: 86% confidence from sample testing which combined with other sources of assurance provides overall confidence of 95%

Rationale: It is not feasible to provide absolute assurance so most financial auditing work is performed to 95% confidence. In audit assurance models, assurance may be obtained from different sources, including risk assessment and controls testing (which may involve judgement), reducing the assurance required from sample testing. From sample testing alone the volume of sample testing required for 86% confidence is two thirds of that required for 95% confidence.

(iv) Segmentation

Dividing the population into sub populations with similar attributes or risk profiles allows the risk assessed for each segment to be taken into account when determining the level of confidence required from sample testing.

Preferred option: Separate into small, medium and large installations

Rationale: Although it is currently proposed to apply the same confidence level across all three sub populations, applying segmentation allows each sub population to be evaluated separately, so that if there are problems in the sample results for one, the additional testing can be restricted to that sub population alone.



Background

Ofgem is in the process of developing the RHI audit strategy to monitor participant compliance with RHI eligibility criteria and obligations, detect fraud and non-compliance, and also act as a deterrent to participants that might be tempted to break the rules of the Scheme. A key component of the RHI audit strategy is the audit sampling approach.

The RHI Scheme is significantly larger and more complex than any of the current environmental schemes administered by Ofgem. Furthermore, unlike many of the current schemes which are operated through Suppliers and other licensed parties, RHI will require Ofgem to engage directly with the heat generators who will be the recipients of RHI payments under the Scheme. The volumes of heat generator are anticipated to rise from several thousand in the first year of operation to around 300,000 by 2015.

The resources and cost of RHI audit work are driven by the nature and volume of audit testing, for which the sampling approach adopted is a key driver. Currently Ofgem's revised costings include estimates of audit costs rising from £96k in 2011-12 to £537k in 2014-15.

Objective

The objective of this brief paper is to set out options for the audit sampling approach to be taken for RHI audits. It provides an outline of the sampling theory and examples of its practical application. It should be noted that Ofgem will require to make judgements as to the specific approach to be taken, confidence or assurance levels, and other key assumptions which will affect the RHI audit sample sizes.

Requirement

The overall objective of the audit process as set out in the draft strategy for the audit of RHI installations is to:

- Check that participant information provided during accreditation is correct and that the installation is entitled to be accredited.
- Confirm on-going compliance with eligibility criterion and obligations.
- Check that meter reading/output volumes/fuel measurement data notified to Ofgem are correct and are such that the right amount of RHI support payments are being made.
- Check plausibility of eligible heat claims given capacity of installations.
- Detect fraud and/or non-compliance with RHI eligibility criteria and obligations, and where appropriate, make recommendations for prevention of future occurrences.

RHI installations will be subject to audit both at the accreditation stage and throughout the duration of eligibility for incentive payments.

The purpose of the audit effectively is to identify overpayments (of any type) to heat generators including:

- Installation does not exist or is not certified
- The technology type and/or installation size has been recorded incorrectly



- An appropriate meter has not been installed, is not certified or is malfunctioning
- Non renewable fuels have been used for the generation of heat
- Meter readings have been overstated

Monetary Unit Sampling

This standard method for audit sampling involves selection based on monetary value of payments to the installations rather than by installation. Alternatively it could be based on their installed heat capacity (although this would not take into account different tariffs for different technology types and installation sizes) or the notional payment value (based on the product of the installed capacity and the applicable tariff). With the population being the pounds value (or kW value), not all installations will have the same chance of selection and the sample will be naturally weighted towards larger installations and more complex technologies receiving greater payments. This method provides a direct relation between the payments population and the sample selected.

Sample size is determined by the confidence level and required precision:

- A confidence level of 95% is typically used in financial statements auditing and we would suggest that would also be appropriate for the RHI audits. Reducing or increasing the confidence level will have a significant effect on the volume of work: at a 90% confidence level, the volume of work would reduce by 23% whereas it would increase by 54% for a 99% confidence level compared to the 95% confidence level. Under a standard audit assurance model, different sources of assurance may be combined to achieve 95% confidence, rather than necessarily requiring all assurance to be obtained from sample testing. The inherent assurance obtained from risk assessing individual sub populations may reduce the assurance required to be obtained from sample testing to satisfy the overall 95% confidence level.
- Precision represents the maximum estimated error that would be acceptable in the population and may be expressed as a percentage of the population or an absolute amount. In financial statements auditing in the private sector, precision is based on a value that most reasonably reflects the value of the audit subject. An amount based on a percentage of turnover may be used, with a value of 0.5% typically being applied for a large company or group. Typical of choosing an amount is that if the population changes, the materiality amount remains constant. In the public sector, for example with auditing of EU monies, a percentage precision of 2% is often applied. Clearly, where set at a percentage of the base being audited, the required sample size will remain constant as the base population changes. So, if the grant is underspent, additional items need to be selected from the amounts paid. If an absolute value is used, the sampling interval will remain constant but the sample size will vary with the population size.

The sample size formula is derived from the specification of the risk of incorrect acceptance – for zero tolerated deviations it represents the chance of finding zero deviations in a sample from a population that contains a material misstatement, assuming the number of deviations in the sample follows a Poisson approximation of the binomial distribution. The formula is

$$\frac{-\log_e(1 - \text{confidence \%})}{\text{precision \%}}$$

In Excel, the sample size may be determined by

$$\text{GAMMAINV}(\text{confidence \%}; \text{tolerated number of deviations} + 1; 1 / \text{precision \%}).$$



The following table uses examples based on the projected RHI subsidy value presented in the RHI feasibility study.

Year	2011	2013	2020
RHI subsidy value	£50m	£240m	£2.4bn
Sample sizes based on			
• 0.5% precision	600	600	600
• 2% precision	150	150	150
• £250k precision	600	2,880	28,880
• £1m precision	150	720	7,200

This table shows that a sample size of 600 would provide 95% confidence that the RHI payments were not overstated by more than 0.5%, or that in 2020 a sample size of 7,200 would be required to give 95% confidence that the RHI payments were not overstated by more than £1m.

It may be desired to set precision to an absolute value which rises over time but at a lower rate than the increase in payments.

Year	2011	2013	2020
RHI subsidy value	£50m	£240m	£2.4bn
Precision	£1m	£2.4m	£12m
As % of population	2%	1%	0.5%
Sample sizes	150	300	600

By segmenting the population into individual sub populations sharing common attributes, the risk associated with each can be assessed and factored into the overall assurance model. Higher risk populations will have no inherent assurance, so sample testing will be the sole source of assurance. The inherent assurance obtained for lower risk populations can enable the confidence required from sample testing to be reduced, say to 86%, while delivering 95% confidence overall. This can reduce sample volumes by 33% in the lower risk populations compared to the higher risk population.

The following example assumes an even spread of value across the three sub populations and a precision level of £2.5m.



Sub population	Small	Medium	Large
RHI subsidy value	£100m	£100m	£100m
Risk assessment	Low	High	Low
Confidence	86%	95%	86%
Sample sizes	80	120	80

In order to take differences in perceived risk over sub populations into account, mitigate aggregation risk and evaluate sample results separately for each sub population, it is necessary to determine precision per component. The component precision would be derived in such a way that when all individual component precisions are met, overall precision is also met. Sample sizes for each sub population would be determined based on component precisions and risk (confidence) for each component; however it is important to note that the lower component precisions would result in higher sample sizes than applying the overall precision (in this example £2.5m).

Sub population	Small	Medium	Large
RHI subsidy value	£100m	£100m	£100m
Risk assessment	Low	High	Low
Confidence	86%	95%	86%
Component precision	£1.2m	£1.2m	£1.2m
Sample sizes	167	250	167

These sample sizes represent the minimum required sample sizes allowing for zero deviations. Typically, minimum required sample sizes are increased by a chosen percentage (between 10% and 25%) to allow for minor deviations to occur without the risk of rejection of the population based on only a small error fraction.

It should be noted that the above tables present the number of pounds selected and large sites may receive multiple hits, reducing the overall numbers to be tested.

Monetary unit sampling also enables the extrapolation of the errors or misstatements identified in the sample to the projected probable misstatement and estimated maximum misstatement for the population. The latter is compared to materiality to verify that sufficient audit work has been done to accept the population. Once accepted, the most likely error in the population is quantified by calculating the projected probable misstatement.

A similar approach can be adopted for installed capacity or the notional payment value (based on installed capacity multiplied by the applicable tariff) should it be preferred to use an ex-ante rather than an ex-post measure.



Attribute Sampling

This method for audit sampling gives each installation an equal chance of selection. As a result a simple, small-scale heat pump will have the same chance as a complex, large-scale biomass CHP installation. This does not reflect the different value, risk and impact associated with different technologies and scales.

As for monetary unit sampling, the sample size is driven by the confidence level and precision, with the latter expressed either as a percentage (keeping the sample size constant as the population changes) or an absolute number (resulting the sample size varying in line with population size).

The following table uses the Projected RHI uptake by installation size included in the RHI Feasibility Study.

Year	2011	2015	2018	2020
Installations	13,300	480,400	1,114,100	1,872,600
Sample sizes based on				
• 0.5% precision	600	600	600	600
• 2% precision	150	150	150	150

Under this method, extrapolation of errors or misstatements is more challenging and while error rates can be estimated, these are not directly quantifiable into monetary terms.

Segmentation of Population

The problem associated with all installations having an equal chance of selection may be overcome by segmenting the population based on known attributes, e.g. small, medium, large; simple, medium or complex; or by technology type. Difference levels of precision can be applied for each segment to reflect the respective value, risk and impact. Alternatively, the sample size for each segment may be determined with reference to the overall population and the segment population, taking the greater of the two calculations to produce sufficient sample items in important sub populations. As for Monetary Unit Sampling above, precision may be expressed as a percentage or an absolute number; the sample sizes will remain relatively constant with the former but increase in line with the population with the latter.

The following table uses the Projected RHI uptake by installation size included in the RHI Feasibility Study.



		Precision (based on total population)	2011	2015	2018	2020
Large	Installations		0	1,400	2,400	3,600
	Sample size	0.1%	0	9	7	6
Medium	Installations		2,600	29,300	79,700	141,000
	Sample size	0.5%	118	37	43	46
Small	Installations		10,700	449,900	1,032,000	1,728,000
	Sample size	2%	121	141	139	139
Total	Installations		13,300	480,400	1,114,100	1,872,600
	Sample size		239	187	189	191

Recommendation and next steps

We would recommend Monetary Unit Sampling as the preferred method for RHI audit sampling. It provides a direct linkage between the financial value of the payments and the sample items selected, weighting each installation's chance of selection to reflect the volume of heat generated and the tariff for the technology type and size. The evaluation of sample results and their extrapolation to the entire population is straightforward.

Having decided on the sampling method, decisions are required as to the confidence level and level of precision. Most financial audit work is performed to a 95% confidence level and we would recommend this be adopted as the overall level for RHI audit sampling. Segmenting the population into sub populations with similar attributes and performing a risk assessment can allow different sampling confidence levels to be applied to each segment, with sub populations assessed as lower risk requiring lower sampling confidence levels to achieve the overall 95% confidence.

The selection of precision affects the volume of testing required, and may be expressed as a percentage of the total population or an absolute level. In addition, segmentation may be applied to the population with a different precision being applied to each segment. We recommend careful consideration of the pros and cons in choosing between the use of precision as an amount or as a percentage as this choice will have a major bearing on the volume of audit testing and resulting costs in the future.

Further reading and references

AICPA Audit Guide – Audit Sampling

<http://www.aicpa.org/Publications/AccountingAuditing/KeyTopics/Pages/AuditSampling.aspx>

European Implementing Guidelines for the INTOSAI Auditing Standards, Guideline 23 "Audit Sampling"

<http://eca.europa.eu/portal/pls/portal/docs/1/133817.PDF>



Appendix I – Projected RHI uptake

Estimates of RHI uptake and payments per year, provided by Ofgem.

RHI Uptake					
	2011	2012	2013	2014	2015
Large	110	175	239	304	394
Medium	1862	5068	9962	17183	27098
Small	1769	15940	36812	76552	153275
Total Cumulative	3,741	21,183	47,013	94,039	180,767
Total New	3,741	17,441	29,572	64,467	116,300

Payments per year per size category					
	2011	2012	2013	2014	2015
Small 10%	917,062	5,192,765	11,524,688	23,052,563	44,312,921
Medium 46%	4,218,487	23,886,720	53,013,566	106,041,792	203,839,434
Large 44%	4,035,075	22,848,167	50,708,629	101,431,279	194,976,850
Total	9,170,625	51,927,652	115,246,883	230,525,634	443,129,205



Appendix II

Initial sample size calculations based on 1.5% and 1% materiality and 95%/86% confidence levels, provided to Ofgem on 3 June 2011.

payments per year per size category						
		2011	2012	2013	2014	2015
Small	10%	917,062	5,192,765	11,524,688	23,052,563	44,312,921
Medium	46%	4,218,487	23,886,720	53,013,566	106,041,792	203,839,434
Large	44%	4,035,075	22,848,167	50,708,629	101,431,279	194,976,850
Total		9,170,625	51,927,652	115,246,883	230,525,634	443,129,205

Materiality * 1.5%

Overall		137,559	778,915	1,728,703	3,457,885	6,646,938
Small		44,019	249,253	553,185	1,106,523	2,127,020
Medium		75,658	428,403	950,787	1,901,836	3,655,816
Large		74,282	420,614	933,500	1,867,258	3,589,347

* Note that overall materiality does not equal the sum of materialities for the individual components

Sample sizes

		Confidence				
Small	86%	42	42	42	42	42
Medium	95%	168	168	168	168	168
Large	86%	109	109	109	109	109
		319	319	319	319	319

Small	95%	63	63	63	63	63
Medium	95%	168	168	168	168	168
Large	95%	163	163	163	163	163
		394	394	394	394	394

Materiality * 1.0%

Overall		91,706	519,277	1,152,469	2,305,256	4,431,292
Small		29,346	166,168	368,790	737,682	1,418,013
Medium		50,438	285,602	633,858	1,267,891	2,437,211
Large		49,521	280,409	622,333	1,244,838	2,392,898

* Note that overall materiality does not equal the sum of materialities for the individual components

Sample sizes

		Confidence				
Small	86%	63	63	63	63	63
Medium	95%	251	251	251	251	251
Large	86%	163	163	163	163	163
		477	477	477	477	477

Small	95%	94	94	94	94	94
Medium	95%	251	251	251	251	251
Large	95%	245	245	245	245	245
		590	590	590	590	590



Appendix III

Revised sample size calculations based on 95%/86% confidence levels, provided to Ofgem on 7 June 2011.

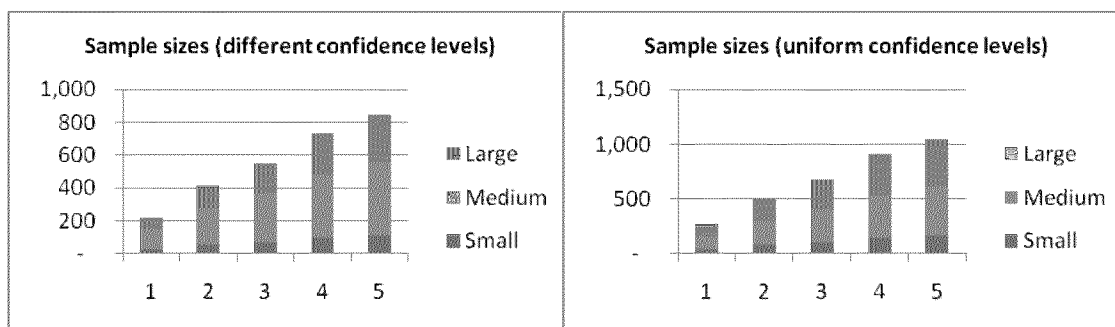
Payments per year per size category						
		2011	2012	2013	2014	2015
Small	10%	917,062	5,192,765	11,524,688	23,052,563	44,312,921
Medium	46%	4,218,487	23,886,720	53,013,566	106,041,792	203,839,434
Large	44%	4,035,075	22,848,167	50,708,629	101,431,279	194,976,850
Total		9,170,625	51,927,652	115,246,883	230,525,634	443,129,205

Materiality *	2.18%	1.16%	0.87%	0.65%	0.56%
Overall	200,000	600,000	1,000,000	1,500,000	2,500,000
Small	64,000	192,000	320,000	480,000	800,000
Medium	110,000	330,000	550,000	825,000	1,375,000
Large	108,000	324,000	540,000	810,000	1,350,000

* Note that overall materiality does not equal the sum of materialities for the individual components

Sample sizes	Confidence					
Small	86%	29	55	73	97	111
Medium	95%	116	218	290	386	445
Large	86%	75	142	188	251	289
		220	415	551	734	845

Sample sizes	Confidence					
Small	95%	43	82	109	145	167
Medium	95%	116	218	290	386	445
Large	95%	113	212	282	376	434
		272	512	681	907	1,046





Appendix IV

Revised sample size calculations based on 86% confidence levels, provided to Ofgem on 28 July 2011.

Sample sizes	Confidence	2011	2012	2013	2014	2015
Small	86%	29	55	73	97	111
Medium	86%	77	145	193	258	297
Large	86%	75	142	188	251	289
		181	342	454	606	697

