



Department for
Business, Energy
& Industrial Strategy

EVALUATION OF THE ENERGY SAVINGS OPPORTUNITY SCHEME

Interim process and early impact evaluation
report: Technical Annexes

October 2017

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Interim process and early impact evaluation report: Technical Annexes

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Phase 1 Qualitative research

Aims of this evaluation strand

The Phase 1 qualitative research comprised two strands: interviews with organisations within scope of the scheme; and with the assessor market. These interviews were split across two phases, either side of the ESOS scheme compliance deadline (a first phase was conducted in September/October 2015, with follow-up interviews in March 2016).

Interviews with organisations

The key evaluation questions addressed through this research strand were:

KQ1: How have organisations reacted to ESOS?

KQ3. How is ESOS influencing organisational energy efficiency policy and practice?

KQ4. Has ESOS been implemented in a way that has avoided unnecessary burden and cost

The pre-compliance deadline interviews, in particular explored:

- Current organisational view, and action, on energy efficiency, including barriers and motivators, and key decision-makers;
- Levels of awareness & understanding about ESOS, and how it interacts with other policies, such as CRC, and other energy audits for DEC's or ISO 5001;
- Views of the scheme, and the impact compliance will have on their organisation;
- Expectations for the audit, intentions on whether, and how, they will comply, and which parts of the organisation will take responsibility for the requirement;
- Internal and external costs of compliance, and ease of calculating such figures

The post-compliance deadline interviews, in particular explored:

- A recap of some of the above insight questions (with the benefit of hindsight)
- Comparison of pre and post audit expectations/intentions.
- Experience of the notification of compliance process;

- Gain early insight into whether the audit recommendations are being implemented.

Qualitative interviews with assessor market

The key evaluation question answered through these this research strand was:

KQ2. How has the assessor market responded?

Interviews with representatives from the assessor market in particular sought to explore:

- Motivations for becoming an assessor;
- Perceptions of the market and its readiness to respond to ESOS;
- Views on how organisations are acting in light of ESOS requirements;
- The experience of audits, and their intentions
- Business development activity post-audit (e.g. whether, and how, achieved follow-on energy assessment business).

Approach to this evaluation strand

Sample profile

Primary data collection during Phase 1 involved interviews with a small number of representatives across the assessor market as well as organisations within scope of ESOS. It involved two distinct phases of research.

Initial interviews: September/October 2015

Lead assessor	Organisations
9 x Lead Assessors, including a mix of in-house and external consultants as well as diversity in terms of register and geography 3 x energy consultants not working under ESOS 2 x organisations hosting approved registers 1 x independent evaluator of the accreditation process	25 interviews across spread of industry sectors 19 x England, 2 x Scotland, 4 x Wales, 2 Northern Ireland Sectors: Transport (7) Real estate, renting and business (7) Manufacturing (3) Construction (3) Wholesale and retail trade (2) Finance (2) Hotels and restaurants (1) Other community and social (1)

Follow-up qualitative research: March 2016

Lead assessor	Organisations
6 follow up interviews with lead assessors from the initial qualitative research phase, plus one additional interview with a 7th Lead Assessor who was not available during the initial phase.	13 follow-up interviews: Transport (4) Real estate, renting and business (3) Manufacturing (3) Finance (2) Construction (1)

Sampling approach

Whilst qualitative research is not representative, this phase aimed to be reflective of the wide range of organisations in scope of ESOS. The breakdown of organisational types falling within ESOS' eligibility criteria were analysed and target numbers of interviews were set depending on the proportions falling under each. The key characteristics considered were:

- Size of organisation;
- Turnover;
- Industry sector – some industries had only a handful of organisations which were not targeted at all as a result (this included, for example, agriculture and fishery organisations). It should also be noted that the transport, storage and communications sector was disproportionately targeted due to the particular relevance of ESOS to organisations with a large transport fleet;
- Country; and
- Number of sites.

Interview discussion guide

Four discussion guides were developed for this workstrand; one per audience and phase (pre and post compliance). The discussion guide developed for the organisational interviews pre-compliance is presented here as an example:

Interview discussion guide: Organisational interviews pre-compliance, Sep/Oct 2015

For interviewer: overview and background to project:

The Energy Savings Opportunity Scheme places mandatory obligations on large undertakings to measure their energy consumption (which may involve completing an audit or being accredited under an energy management scheme, such as ISO 50001) to identify energy saving measures that might result in energy efficiency savings once every four years. Eligibility is based on either number of employees or financial criteria based on turnover and balance sheet. Compliance is required by 5th December 2015. Organisations that are subject to public contracts regulations 2006 are exempt from the scheme.

This stage of the research focuses on the 'pre-compliance' phase leading up to 5th December 2015 and evaluates awareness and understanding of the scheme and reactions to it. It will help provide early insight into any ways in which DECC can help reduce the administrative burden associated with compliance and also take full advantage and understand the potential gains which could come from the Scheme. It will also enable DECC to learn lessons which can help ensure organisations benefit fully from the scheme, including potentially identifying 'quick fixes' to assist organisations in complying or any interventions required in secondary markets.

Why organisations?

Central to this evaluation is for DECC and the EA to understand how different types and structures of organisation are approaching ESOS across various industries (i.e. the different decision-making processes in place, which types of role are involved in decisions around energy matters and complying with ESOS, levels of engagement of senior board members, and how this works across multiple sites). It will provide insight into:

- Current organisational view, and action, on energy efficiency, including barriers and motivators, and key decision-makers;
- Levels of awareness & understanding about ESOS, and how it interacts with other policies, such as CRC, and other energy audits for DECs or ISO 50001;
- Views of the scheme, and the anticipated impact compliance will have on their organisation;
- Expectations for the audit, intentions on whether, and how, they will comply, and which parts of the organisation will take responsibility for the requirement: and
- Provide early indications of the implementation of recommendations identified.
- This information will also help ensure the Phase 2 representative survey and case-studies target the most appropriate members of organisations.

Structure of research

25 interviews will be carried out with organisations in scope of ESOS – see recruitment screener for details of the quotas set for these.

This discussion guide relates to interviews with organisations only

Time	Key Questions/probes
5 mins	<p>Introduction</p> <ul style="list-style-type: none"> - Introduce self, Ipsos MORI, and explain the aim of the interview. - Explain that this research is about understanding ESOS and how lead assessors and in particular for this interview, organisations have responded, or intend to respond, to the requirements by the compliance deadline (5th December 2015). The research is on behalf of The Department of Energy and Climate Change to help DECC learn lessons for the future - Role of Ipsos MORI – to gather information and opinions: personal views are valid and interesting, no right or wrong answers or behaviours, we’re interested in the reality. - Confidentiality: reassure participants that they are not being judged and confirm that participants comments will be treated as confidential and will be aggregated with feedback from other participants and will form part of a research report, but comments and any quotations used in this report will not be attributed personally to them or their organisation and will be kept anonymous. - Get permission to record – reassure that no identifiable attribution of quotes. <p>Organisational background questions</p> <p>Before we start, please can I just check a few background details to ensure we understand the context for your answers</p> <p>Please can you briefly give me some background to the organisation, specifically:</p> <ul style="list-style-type: none"> - Industry - Number of employees/size - Number of UK based sites and their various functions - Worth enquiring about turnover and balance sheet as these are additional qualifying criteria for ESOS and you will be interviewing across turnover - Is organisation part of a group of organisations (i.e. with common parent) – is respondent aware of this? <p>What is your job title/role in the organisation? Please briefly describe your roles and responsibilities.</p> <p>Have you been involved in any other energy saving schemes? If so, which ones? What was your role/your responsibilities in relation to these other schemes?</p> <ul style="list-style-type: none"> - Probe for: CRC/EU Emissions Trading System (ETS) / Climate Change Agreements (CCAs)/ any others... <p>Do you have an in-house energy manager/employee? IF YES – what other role do you perform alongside your role for ESOS?</p> <p>As well as you, how many other staff in your organisation have responsibility for energy management? What are their job titles? How do the roles of these people compare to your own?</p>
10 mins	<p>Finding out about ESOS and initial perceptions</p> <p>Firstly I like to discuss how you found out about ESOS and what sources of information you used to understand it.</p> <p>When did you first find out about ESOS? How did you find out about it? Probe: via Lead Assessor, online, roadshows, EA, direct mail from EA, other</p> <p>How effective do you think the advertising around the scheme has been?</p> <ul style="list-style-type: none"> - Probe: regional roadshows, helpdesk/helpline, EA guidance document, lead assessor, EA direct mail, other <p>What was your perception of the advertising overall?</p>

What role, if any, did a lead assessor play in informing or and/or educating you about ESOS?

At this stage, what were your initial perceptions views on the ESOS scheme?

- PROBE: benefits to organisation (if any), cost savings – short, medium and long term, admin required, compliance-only

What do you think was informing these views?

- PROBE: experiences of other schemes, views of other organisations, views expressed in trade press/media. Can you think of any other ways in which ESOS could have been advertised or how businesses could have been made more aware of ESOS and its requirements?

Understanding ESOS

I'm now going to ask some questions about your understanding of the Scheme, its eligibility criteria and compliance requirements.

Firstly can you please explain to me your understanding of the requirements of ESOS?

Can you briefly explain to me your understanding of the Scheme's eligibility criteria? Do you understand the specific compliance routes for organisations such as yours?

- Probe if necessary: possible compliance routes (commissioning new audits vs. using previous audit data from past 4 years, using DEC status or ISO 50001), compliance deadline, elements of voluntary disclosure, process for non-compliance

Did you seek any further clarification about any element of the Scheme? If so, what was this?

What gaps, if any, were there in your understanding of ESOS?

Where, if at all, have you sought any further information about the policy?

- PROBE: from Lead Assessor, from EA helpline, from trade association, from DECC, other

Can you explain to me your understanding of the notification process which is required as part of the Scheme? What information do you understand that you have to provide?

Organisational response to ESOS

And now some questions about how you and your organisation has prepared itself for ESOS

What is your impression of the resources your organisation will need to put in to comply?

- How many staff will/have been involved in responding to the ESOS requirement? Which roles/teams do these staff come from?
- How much time do you anticipate being used in total to respond to the ESOS requirements?

Who else will be involved in the audit and compliance process and the bringing together of the Evidence Pack?

How do you think ESOS sits alongside any other government policies in this area that your organisation may also be complying with? (if needed, give examples of CRC, CCA and EU ETS)

- Are there any overlaps for your organisation between these schemes? In what, way?
- If any, in what ways do you think your compliance with other schemes will help in your compliance with ESOS?
- In what ways do you think the ESOS requirements are different or require additional/different action to the compliance work you do for different schemes?

How would you describe the overall mood around ESOS within your organisation?

- Are there members of your organisation who are more positive about the ESOS policy? Who? Why do you think this is?
- Are there members of your organisation who are less positive about the ESOS policy? Who? Why do you think this is?

How would you summarise what your organisation hopes to achieve by complying with ESOS?

	<ul style="list-style-type: none"> - PROBE: is it more than just compliance/avoiding penalties? Are you seeking improved energy efficiency? Or savings in your energy bills? Or reputational benefits?
<p>5 mins</p>	<p>The pre-audit process - identifying a Lead Assessor</p> <p>Have you been contacted by Lead Assessors in specific relation to ESOS?</p> <ul style="list-style-type: none"> - Have you received cold calls? e-mails? - What was their initial contact about? What questions did they have? - Has this contact come personally to you or to the organisation in general? <p>Have you, or someone else in your organisation, contacted a Lead Assessor?</p> <p>What has been your initial experience of contact or discussion with potential Lead Assessors?</p> <ul style="list-style-type: none"> - What has been good about the contact you have had? Has anything about this contact not been as good as you would have hoped/expected? - PROBE: level of assessor knowledge about scheme, quote for audit, response time to enquiry, level of skill in specific industry/org type <p>Where are you at with organising your energy audits/starting to comply with ESOS? If not already, when do you anticipate starting the audit process?</p> <p>Have you appointed an external Lead Assessor to carry out your ESOS energy audit or have you identified an internal (organisational) Lead assessor?</p> <p>ASK IF EXTERNAL LEAD ASSESSOR:</p> <p>How did you go about identifying and appointing a suitable Lead Assessor?</p> <ul style="list-style-type: none"> - PROBE: identification of a register, telephone/email contact, initial/follow up meeting, number of quotes received. How easy or difficult have you found it to identify a Lead Assessor? <p>Did you seek any external advice or guidance relating to appointing a Lead Assessor? If so, where from and what was this advice?</p> <p>What were the key factors which made you decide to appoint a particular Lead Assessor?</p> <ul style="list-style-type: none"> - PROBE: proximity to site(s), industry knowledge/understanding, experience, involvement in other schemes, recommendation, cost <p>Did you try to select an assessor with specific experience in your particular industry or was this not a consideration? If yes, why was this important?</p> <ul style="list-style-type: none"> - PROBE: familiarity with technology/processes within sector (what specifically?) - How easy or difficult did you find it to appoint an assessor that had the specific skills you were after? <p>ASK IF IN-HOUSE LEAD ASSESSOR:</p> <p>What were the main reasons that your organisation chose to have their ESOS audit carried out by an in-house Lead Assessor, rather than an external consultant?</p> <p>IF NOT MENTIONED ABOVE: Do you have an internal auditing team in-house? Please briefly explain the structure of this team and their role and responsibilities outside of ESOS.</p> <p>Can you talk me through any training your internal Lead Assessor received specific to ESOS? Who led this training? Was this training specifically about ESOS audits, or about carrying out energy audits more generally?</p> <ul style="list-style-type: none"> - Probe: length, frequency, face-to-face v distance, ongoing assessment, course materials - Probe: training targeted at specific areas of auditing e.g. Anything transport specific, training for industrial sites? Construction processes? <p>What do you see as the main advantages and disadvantages of this approach?</p> <p>ASK IF INTENDING TO APPOINTMENT A LEAD ASSESSOR BUT ARE YET TO DO SO:</p>

	<p>Why have you not yet appointed a lead assessor? How do you plan to go about identifying and appointing a suitable Lead Assessor?</p> <ul style="list-style-type: none"> - PROBE: identification of a register, telephone/email contact, initial/follow up meeting, number of quotes received. How easy or difficult have you found it to identify a Lead Assessor? <p>What criteria will you consider when choosing who to appoint?</p> <ul style="list-style-type: none"> - PROBE: proximity to site(s), industry knowledge/understanding, experience, involvement in other schemes, recommendation, cost <p>Will you try and identify/appoint a lead assessor with specific experience in your particular industry? Why/why not is this important?</p> <ul style="list-style-type: none"> - PROBE: familiarity with technology/processes within sector (what specifically?) <p>How easy or difficult did you find it to appoint an assessor that had the specific skills you were after? Do you plan to get any external advice or guidance relating to appointing a Lead Assessor? If so, who do you plan to ask?</p> <p>The pre-audit process – cost</p> <p>Are you able to tell me the cost to the business of carrying out the ESOS assessment? How does this compare to average costs for any other audits you have done in the past? Were costs quoted to undertake the audit clear and easy to understand? Did the Lead Assessor clearly itemise the cost?</p> <ul style="list-style-type: none"> - PROBE: size of organisation, number of sites, type of industry sector, availability of any prior information
<p>10 mins</p>	<p>The audit process</p> <p>I now want to ask some questions about the audit itself. If your company has yet to undergo an audit then I'd like to ask some questions about your expectations in relation to the audit and your preparedness for it.</p> <p>ASK IF UNDERGONE AUDIT</p> <p>Can you briefly describe the ESOS audit?</p> <ul style="list-style-type: none"> - Probe: initial commission, communication with Lead Assessor, frequency and length of site visits, types of energy sources/fuels included (if known), methods <p>How long did full audit process take from initially appointing the assessor to having your audit report? How much time did the Lead Assessor spend on site?</p> <p>IF MULTIPLE SITES: How many sites did the Lead Assessor visit? How were the number of sites determined and by whom? Who accompanied the assessor on site? What preparation did you/your organisation do for the audit? What were the key things you did to prepare for the audit? What energy and transport data did the auditor ask for and what were the challenges in getting access to this data?</p> <ul style="list-style-type: none"> - Do you think the amount of work/administration required could be reduced? If so, how? <p>To what extent did Lead Assessors make use of audit findings from other energy saving schemes which you have participated in?</p> <ul style="list-style-type: none"> - Probe: difference between industry, analysis of energy usage, age of building(s), number of sites, cost per turnover, cost per saving <p>Did anyone from senior management get involved with the audit? Were they present during the audit for example?</p>

	<p>ASK IF NOT CARRIED OUT AUDITS</p> <p>What are your expectations for how the audit will be carried out?</p> <ul style="list-style-type: none"> - PROBE: communication with organisation (who?), frequency and length of site visits, types of energy sources/fuels included, methods <p>In what ways do you expect the process to be different to other energy audits you carry out, or do you think it will be similar?</p> <p>What preparation do you anticipate you/your organisation will need to do for the audit? Have you made plans to gather the required energy and transport data?</p> <p>ASK ALL</p> <p>Did you involve senior management in the audit process? If so, what did this involvement comprise of?</p> <ul style="list-style-type: none"> - IF YES: Can you explain how you went about engaging senior management? (or how you intend to engage them) - IF NO: How do you think organisations like yours could get engagement from senior management? <p>To what extent has your audit report been shared with other members of the business? In what format? Through what channels?</p> <p>How much support would you say you had from others in your organisation for the audit?</p> <ul style="list-style-type: none"> - IF NOT A LOT: Why do you think this was the case? Did this reflect any lack of understanding?
<p>5 mins</p>	<p>The post audit process - report</p> <p>I'd now like to talk about the audit reports and recommendations. Again, if you have not yet undertaken an audit then I'd like to get your views on your organisation's expectations.</p> <p>Please can you explain how you found the format of your audit report? IF NOT CONDUCTED ESOS AUDIT YET – ask about expectations for audit report</p> <ul style="list-style-type: none"> - Probe: structure, number of pages, inclusion of summaries, technical v narrative, plain English, detail, recommendations <p>Did the audit report meet your pre-audit expectations?</p> <p>To what extent did you trust the information contained within the report? Do you think it was correct and valid?</p> <p>Can you explain to me a recommendation in your report? IF NOT CONDUCTED ESOS AUDIT YET What type of recommendations do you expect to be part of the report? What specific information does it/would you expect it to contain?</p> <ul style="list-style-type: none"> - Probe: does it tend to include quantifiable savings, how are these expressed (if able to say whether Simple Payback Period (SPP) or Life Cycle-Cost Analysis (LCCA)), are the audits easily understandable in 'layman's' terms, scale of savings being identified, timescale to deliver recommendations - [If able to say whether savings calculated using LCCA or SPP] How was the decision to use one or the other made? <p>In relation to your organisation what quantifiable savings did the report identify?</p> <p>How likely is it that your organisation is going to implement the recommendations identified by the audit? Which of the recommendations do you think you are most/least likely to implement and why?</p> <p>The post audit process – notification</p>

	<p>ASK IF ALREADY NOTIFIED EA OF COMPLIANCE</p> <p>Overall, how did you find the notification of compliance process?</p> <ul style="list-style-type: none"> - PROBE: duplication of effort (if so with which other schemes), burdensome <p>Thinking specifically about the notification of compliance process, how much do you think the compliance process actually cost? (NB – this is separate to the overall company cost of ESOS)</p> <p>How could the notification of compliance process be improved, if at all?</p> <p>Adapt following questions to ask about expectations if notification not yet conducted</p> <p>Can you explain what information you submitted / expect to submit as part of the notification process?</p> <ul style="list-style-type: none"> - What information did / do you understand as being compulsory? - What information, if any, did/ do you understand as being voluntary? Why did you/why did you not submit voluntary information at this stage? (Voluntary information includes – quant energy efficiency target, senior (board) level involvement, has organisation published anything) <p>Did you / do you intend to publish any information relating to the ESOS assessment? If so, what information and why? What are the benefits to your organisation of publishing information?</p> <ul style="list-style-type: none"> - If not then why did you not publish any information? <p>What are the costs (if any) of publishing any ESOS audit information?</p> <p>Have you prepared your evidence pack? Has this received board level involvement/sign off?</p> <p>What checks on the compliance process do you expect there to be from the EA?</p> <p>What do you understand to be the penalties if organisations do not comply with ESOS?</p> <ul style="list-style-type: none"> - At what point do you think these would be enforced (e.g. straight after deadline, after a defined period – how long)? - How likely do you think it is that the penalties will be enforced? - What would be the impact of receiving a non-compliance notice or penalty for your organisation? PROBE: financial impact, reputational impact – which is most motivating as a reason to comply?
<p>2 mins</p>	<p>Wrap up</p> <p>Thinking about your experience of being involved in ESOS so far, what are your overall impressions of the scheme?</p> <p>In summary, what impact do you think it's having on organisations required to comply?</p> <p>And finally, what impact do you expect the scheme to have on the uptake of energy efficiency measures and behaviours within your organisation over the longer term?</p> <p>Are there any suggestions you would like to make about improving ESOS – either from the perspective of auditors or from the perspective of organisations - in the final months before compliance?</p> <p>Would it help if there was some sort of incentive to implement the recommendations from the audit?</p> <p>Our evaluation of ESOS is running throughout the rest of 2015 and into 2016. In order to hear more about the audit process, and to understand the impact which it has had on organisational behaviour, we would really appreciate speaking with you again in January following the compliance deadline. Would you be willing to take part in further research on behalf of DECC concerning ESOS?</p> <p>RECORD RESPONSE</p>

Telephone survey of ESOS obligated parent organisations

Aims of this evaluation strand

A representative survey of parent-level organisations in scope of ESOS was conducted to gather evidence contributing to all six key evaluation questions, contributing evidence to the process, impact, and economic evaluation strands.

The survey collected baseline data to enable longitudinal tracking of outcomes for any future impact evaluation. However, where possible, this survey also sought to capture any early indications of impact on organisations, e.g. impact on investment in energy efficiency.

Approach to this evaluation strand

Survey sampling

Sample source data

The survey sample was drawn from the Environment Agency's notification database (published in August 2016) which included contact details for organisations which had:

- submitted a compliance notice by 30th June 2016;
- submitted an 'intend to comply' notice by 26th August 2016.

In addition, the Environment Agency provided a file of organisations that it considered in-scope of the policy (based on publicly available turnover and employee data) but that it had not received one of the above notifications from (or a 'Do Not Qualify' notification). Contact details were not available for these non-notifying organisations (contact details for the groups set out above had been self-recorded in the notification forms) and so a matching exercise was conducted using Company House Reference Numbers to link to contact information procured through an external sample provider.

Sample design considerations

Following discussions with BEIS, a sample design was selected based on surveying parent-level organisations only within both notifying and non-notifying organisations. This sample design was chosen for the following reasons:

- Parent-level organisations were easily identifiable within the available databases;

- To maximise the comparability of the data by ensuring survey responses were in relation to a similar company level for both notifying and non-notifying organisations (i.e. at a parent-level rather than at parent-level for some and subsidiary-level for others);
- Among notifying organisations, interviews were conducted at the level of the organisation submitting the notification so up-to-date contact details from the notification form were available for this portion of the sample; aiding a good response rate among notifying organisations;
- Interim Environment Agency data suggested that the majority of notifications covered the highest parent company (93%), and that the majority of eligible organisations are not submitting at a disaggregated level which further supported this approach.

It was recognised, however, that there were disadvantages to this sampling approach which has implications for the generalisability of the findings and the extent to which the full impact of ESOS across company structures can be understood. These limitations result from the sampling approach only allowing the evaluation to baseline, and subsequently measure, the impact of ESOS at the level of parent organisations as the survey does not gather any information from lower level organisations (either among the notifiers or non-notifiers). This is because the survey did not include any organisations at a non-parent level, but also because the survey questions asked of responding parents required them to answer on behalf of their own legal entity rather than for any other organisations in their group or in their notification (this is because the interim Environment Agency notification database showed that, on average, each notification was recorded to cover 12 entities and it was not possible for the survey to capture data on each of these).

While an alternative approach, based on randomly sampling organisations across the notification databases (capturing organisations at varying levels of company structure), was considered it was ultimately decided to have more extensive limitations and risks than the parent-level approach explained above. This is because while it would be the preferred option for gathering information to inform the impact evaluation, there were significant limitations to its practical application:

- Response rates would be lower due to the lack of contact details for subsidiary firms included within notifications (as these were only recorded by the notifying level);
- Some sections of the survey would not be meaningful for subsidiary firms included within the notification (but not the notifying level) leading to lower quality data about process issues;
- It would be challenging to identify the compliance notification status of the responding organisations at lower levels of hierarchy given the complexities involved in identifying individual entities within company hierarchy data. This would

also have led to significant challenges in devising a sensible weighting plan for the data.

Profile of surveyed population

In total, 871 interviews were carried out with the ESOS obligated parent population. The average interview length was 31 minutes. Table 1 summarises the profile of these interviews with a comparison to the sample profile.

Table 1 – Summary of achieved survey profile compared with population data

	Target no. interviews	Achieved no. interviews	% of available sample population	% of achieved interviews
Notifying	715	801	87%	92%
Intend to comply	30	20	1%	2%
Suspected Non-notifying	130	50	11%	6%
Total	875	871		

As shown in Table 1, the responding sample profile matched relatively closely to the sample population profile aside from a shortfall in the achieved number of non-notifier interviews. The implications for this on data analysis, and the approach to weighting to account for non-response bias, are discussed later in this annex. A complete breakdown of the organisational profile within each of the above groups can be seen in the accompanying data tables.

Survey questionnaire

The survey questionnaire was drafted to gather the necessary evaluation data on process and impact-related issues which had been detailed through the following evaluation stages and outputs:

- The evaluation scoping report, which mapped the required outcomes data to potential data sources;
- Standard Cost Model – which set out the required organisational cost information relating to compliance with ESOS;
- The Phase 1 qualitative interviews with organisations and assessors which raised issues that required quantifying and/or exploring in more detail;

- Other external sources – including issues pertinent to the EDR evaluation, ideas generated from reviews of the non-SME tracker survey (types of questions to repeat and issues asked about already) and previous surveys of non-domestic organisations (e.g. CRC).
- The table below outlines the broad structure of the questionnaire and summarises the rationale underpinning it.

Table 2 – Telephone survey structure and rationale

Section title / aims	Key aim/rationale
1. Introduction and screener section	Explain aims, and value of survey; Provide re-assurances around confidentiality; Ensure interview is with the most relevant respondent.
2. Energy related attitudes, behaviours and investments (IMPACT)	To gain an understanding of a company's attitudes, culture and behaviour (including investment) towards energy efficiency; Collected baseline (pre-ESOS) information e.g. a baseline measure of annual investment in energy efficiency pre-ESOS; Core set of longitudinal tracking questions to be repeated over future waves to measure changes in key outcome measures targeted by ESOS
3. Experience of ESOS process (PROCESS)	To gain insight into organisation's experience of complying with ESOS and the process they followed internally.
4. Costs of compliance (PROCESS, IMPACT, ECONOMIC)	To gather cost data (both internal time costs and external expenditure) required for the SCM.
5. Perceptions of likely impact (IMPACT)	To understand current perceived likelihood of organisations responding to audit recommendations and the processes and factors affecting organisational response (Inc. satisfaction with audit report, potential investment sources, ongoing barriers).
Demographics	Including participation in other related schemes and policies

Approach to survey fieldwork

Survey fieldwork was carried out by Ipsos MORI's in-house telephone unit. The key stages to the fieldwork approach were as follows:

- **Small-scale pilot survey** – this was conducted among a random sample of 50 organisations in order to test the draft survey in a live interview environment; generating lessons for the simplification of questions that generated high levels of non-response (leading to changes, for example, in the approach to capturing energy expenditure information or organisational site information).
- **Advance e-mail** - an advance email was sent to the contact recorded as the first point of contact for ESOS in the compliance notification form (or the primary contact identified through procured information for those in the non-notifying group). This

provided advance warning of the Ipsos MORI telephone survey unit making contact, provided information about the background to the survey and the value of the research and offered an option to opt-out of being further contacted. This communication referred in general to a business energy survey that would help the government with decisions around energy policy, rather than referencing ESOS specifically;

- **Making initial contact** - some notifying organisations provided more than one named contact in their compliance notification form. In these instances, attempts to engage the primary listed contact were made in the first instance as this was likely to be the person leading ESOS compliance activity for that organisation. A second or third contact was only contacted if repeated attempts to contact the primary contact was unsuccessful;
- **Advanced datasheet** - an advance datasheet was prepared to help provide further detail about survey questions which respondents could answer if they had the necessary information to hand (e.g. about financial or energy usage data). This datasheet was offered to respondents once contact had been made with the most relevant person within the organisation, and an appointment was made for the survey to be conducted;
- **Confidentiality and permissions** –at the end of the survey, consent was sought for respondent contact details to be stored (within a secure environment) for potential use when inviting organisations to participate in future research, and also for organisational details and survey responses to be linked to other administrative datasets held about UK businesses by BEIS and other parts of government (e.g. administrative datasets about company structures, energy use and publicly available company performance data);
- **Follow up visit to organisation** – respondents were also given the opportunity to provide their consent to be contacted about follow-up case-study visits which were conducted later in the evaluation period;
- **Further information** – respondents were given a BEIS e-mail address should they wish to verify the authenticity of the research.

Approach to survey data processing and analysis

The ESOS survey data tables¹ lay out responses to each question, including any groupings of responses (for example, all who agree with a statement, made up of both those who 'strongly agree' and those who 'tend to agree') and cross breaks which explore how the findings differ across sub-groups.

The following sub-groups have been set out in the data tables as they represent key characteristics likely to interact with both the approach to complying with ESOS and the impact of the scheme (according to the theory of change work and earlier analysis of Phase 1 qualitative evidence).

Organisational factors:

Number of sites

Number of employees

Turnover

Energy use/spend

Sector (from sample)

Tenure of premises

Participation in other energy efficiency schemes (self-reported)

Fleet size

Region

Whether part of wider corporate group

Energy efficiency context:

Action taken on energy efficiency since early 2015

¹ A full set of data tables is available at <https://www.gov.uk/government/publications/energy-savings-opportunity-scheme-esos-evaluation-of-the-scheme>

Energy efficiency investment (£) in accounting period ending 2015

Level of priority placed on energy efficiency by the board

Level of priority placed on energy efficiency by the organisation as a whole

Nature of budget for energy efficiency improvements (ring-fenced, or otherwise)

If and when they require board approval for energy efficiency investment

ESOS factors:

ESOS notification status

ESOS compliance route (e.g. internal lead assessor, ISO route)

Date of ESOS compliance notification completion (from EA sample database)

Job title/Department of main ESOS contact (from EA sample database)

Whether commissioned further services from ESOS assessor

Differences presented in the tables have been tested for statistical significance at the 95% confidence interval.

Given the shortfall in the profile of achieved interviews with non-notifying organisations, larger differences in survey responses were needed to detect significant differences between notifying organisations (including those who submitted intend to comply notices) and non-notifiers, as shown Table 3 below.

Table 3 – Percentage differences required for statistically significant differences

Sample description	N=	10% or 90%	30% or 70%	50%
Notifying / intend to comply vs. Non-notifying organisations	821 vs. 50	+/-8.5	+/-12.9	+/-14.1

The quantitative evidence gathered in the telephone survey was triangulated with the evidence gathered through the qualitative phases and then against the theoretical framework to provide a judgement as to how far the relevant hypotheses were supported (or not supported) by the results.

Data weighting

The survey data was weighted prior to analysis to reduce the bias from any disproportionate non-response to the survey.

Weighting variables

A logistic regression model was fitted, and from that, non-response weights were calculated. Region (including country) and notification status (notifier; intend to comply, non-notifier) was included in the non-response model for all records. In addition, based on sampling frame information available only for compliant organisations, the following variables were also included in the non-response model for these organisations:

- Sector (included in the ESOS notification form)
- Number of organisations included within the ESOS notification (detailed in notification form)
- Date ESOS compliance notification completed
- Turnover in 2014/2015^[1]
- Employee size in 2014/2015^[2]

Implications and considerations from weighting approach for data analysis:

The design choices described above limit the impact evaluation to understanding the influence of ESOS at a parent level only.

The information gathered through this survey, although primarily for use in the ESOS evaluation, may also be used to inform the wider evidence base around non-domestic energy efficiency practices. The key limitation to using the survey data for purposes outside of the ESOS evaluation is that this sample is not aiming to be representative of UK non-domestic organisations overall. As the sample is aiming to be representative of ESOS this means there may be some key differences. Most obviously, the ESOS sample excludes SMEs as these organisations are not required to comply with the scheme, and it also excludes publicly funded organisations. It should therefore be fairly representative of large organisations overall but there may be slight differences (e.g. if turnover, employee size, company structure or public funding receipt, mean an organisation is ineligible for ESOS).

^[1] Available as this data was requested from Experian for use in other strands of analysis

^[2] Available as this data was requested from Experian for use in other strands of analysis

The survey has also been conducted with one representative of the organisation and this is likely to be an energy manager or similar. Reporting on attitudes to the scheme or perceptions of organisational priority on energy efficiency, for example, are therefore likely to differ from those obtained if other roles within an organisation had responded. For example, energy managers may view energy efficiency initiatives more positively than other staff in their organisation owing to their professional commitment to this field. A potential bias is likely to be particularly strong in ESOS-compliant organisations where the respondent is the main contact who has handled the ESOS process. However, other organisational representatives from other roles and departments have been engaged through the qualitative case-study strand, which has allowed exploration of these issues through triangulation of all the evidence strands.

Costs of compliance methodology

Aims of this evaluation strand

A key aim of ESOS is to enable obligated organisations to reach compliance at minimum burden and costs to themselves. The evaluation therefore gathered data on the costs incurred by obligated organisations (i.e. in taking action to meet the scheme requirements) in order to make an assessment of the extent to which this aim of the policy had been met.

The key evaluation question addressed through this strand of the evaluation was:

KQ4. Has ESOS been implemented in a way that has avoided unnecessary burden and cost

Approach to this evaluation strand

Data to feed into an assessment of the costs of compliance with ESOS was collected from obligated organisations surveyed through the telephone survey described in the Annex above. Responding organisations were asked to provide the following information:

- Time spent by their organisation responding to the ESOS requirements at different stages of the audit and compliance process
- External costs incurred as a direct result of ESOS

The approach taken to collecting this data is explained further below.

All obligated organisations responding to the survey were asked to provide these two types of costs, not just those who had reached compliance. This is because even organisations which had not yet reached, or did not intend to reach, compliance may have incurred costs at some stages in this process (for example, in finding out about their organisations eligibility for the scheme, or appointing a lead assessor for an initial assessment). These costs needed to be included in an assessment of the costs incurred as a result of the scheme.

The design of this section of the survey drew on principles of the Standard Cost Model methodology², the experience of the CRC in gathering similar type of information in 2011

² Cabinet Office Better Regulation Executive Measuring Administrative Costs: UK SCM Manual 2005

and 2016 and the small-scale pilot conducted during this evaluation of ESOS (this gathered feedback from both responding organisations and telephone interviewers on the ease with which the cost of compliance question could be answered).

Approach to gathering data on time spent internally by organisations

The survey question included to gather time spent information is presented below. This question is based on the following key principles:

- The request to record internal time spent is broken down into common stages in the compliance activity that is likely to have been pursued by most organisations i.e. starting with the time taken to initially find out about the scheme and to check eligibility and the requirements, through the compliance period itself involving support for audit activity and collation of necessary data, up until the notification of compliance with the scheme compliance body. This approach was taken to try to improve the accuracy of the time recorded, preventing, for example, a particular stage or set of actions in the compliance period being forgotten, or the overall time spent being over-estimated.
- Respondents were asked to only include time that was incurred above and beyond the time they would have spent anyway even in the absence of the scheme.
- Flexibility was built into the answer options to maximise response to this question, and enable respondents to answer in a way that was most logical for them, again hoping to improve the accuracy of the data gathered. Responses could be given in hours, half-day or full day units.

<p>Q29. We'd like to understand the time spent by organisations responding to the ESOS requirements at different stages of the audit and compliance process.</p> <p>[IF NOT YET REACHED COMPLIANCE:] We'd like to understand the time spent by organisations considering whether and how to respond to ESOS, even if this process was not completed for any reason.</p> <p>Approximately how many hours or days of staff time, at any level, did the following elements of ESOS take for your organisation? The government are keen to understand what additional time was required for ESOS – so please only include any time that was spent only because of this policy and which wouldn't have been spent anyway. Please also only include time spent by your own organisation on ESOS and not any time spent by any other members of your group.</p> <p>ALLOW DON'T KNOW / REFUSED AT EACH STATEMENT.</p>		
1	Finding out about, and understanding the scheme requirements, including whether your organisation was eligible	
2	Deciding whether, and through what route, to comply with ESOS	
3	Procuring or training an auditor / assessor	
4	Supporting auditor / assessor in compliance activity (e.g. collating of organisational data)	
5	Submitting notification of compliance	ONLY IF COMPLIANT
6	Reviewing and signing off audit report	ONLY IF COMPLIANT
7	Considering whether, and how, to implement recommendations from the ESOS process*	ONLY IF COMPLIANT

** Although respondents were asked to record the time they spent considering the ESOS recommendations, this did not form part of the cost of compliance calculation as this was a voluntary step taken.*

If respondents were unable to provide the time taken for any of the compliance stages set out in the question above, they were asked instead to provide an estimate of the overall number of days spent by their organisation. This helped to ensure as many respondents as possible provided some information to feed into calculations of the time costs incurred.

ASK IF DON'T KNOW RESPONSE GIVEN AT ANY OF STATEMENTS AT 0

Q.30 Are you able instead to provide an estimate for the total number of days spent on ESOS by your organization? Remembering to only include time your organisation would not have spent in the absence of the ESOS policy, and also only time spent by your own organization and not any subsidiaries or other group members.

		Staff time (at any level)
1	RECORD NUMBER OF DAYS (allow half-days)	
2	Don't know	

Approach to gathering data on external costs incurred by organisations

The survey question included to gather external cost information is presented below. Similarly to the approach taken to gathering staff time data, respondents were asked to only record costs that were additional as a result of the scheme i.e. they would not have incurred these costs anyway. The question provided examples of the most common types of cost that may have been incurred (informed by qualitative research with ESOS obligated organisations and the small-scale pilot survey), but also allowed other types of external cost to be recorded.

Did your organisation incur any external costs as a direct result of ESOS, that would not have been incurred anyway (this could include, for example, the cost of commissioning an external assessor, or purchasing energy monitoring equipment or software)?		
1	Yes	
2	No	
3	Don't know	

IF CODE 1 AT 0

Please can you tell me what type of external costs you incurred and provide an approximate cost (in £) for each external expenditure?		
NOTE TO INTERVIEWER: If respondent unsure an approximation is fine, or record Don't Know. Respondents are not expected to check for accurate figures.		
RECORD, ALLOW DON'T KNOW and N/A		
1	External consultant / assessor services	
2	Training internal assessor	
3	Software	
4	Energy monitoring equipment / hardware	
5	Other (please specify)	

Approach to analysis of this strand of data collection

The internal staff time and external expenditure reported by surveyed ESOS-obligated organisations was analysed by Ipsos MORI to estimate the overall costs incurred on organisations by the scheme.

While the costs have been estimated in line with the principles of the Standard Cost Model (i.e. splitting out internal and external costs), there were some amends made to the full SCM approach in order to make this a simpler exercise for surveyed organisations to feed into.

Responding organisations were asked to provide total time spent information (by each stage of the compliance process) at any grade/seniority/role of staff. A full SCM approach would require this data to be broken down into specific staff roles (with associated hourly rates) in order to more accurately estimate costs incurred. A full SCM approach would also require a breakdown of time separated from overheads. The simplified approach taken to gathering cost related information in the ESOS evaluation was necessary to reduce the time taken to gather this data -the cost of compliance question formed just one part of a longer survey gathering data for all aspects of the wider evaluation.

Instead the staff time information collected through the ESOS survey was monetised at an average gross hourly pay rate of £13.67, based on a 37.5 hour working week, as derived from the Annual Survey of Hours and Earnings.

The survey data was extrapolated to provide an estimate of costs incurred across the obligated population. The average reported costs were grossed up to the estimated size of the obligated population (6,933 organisations).

Both median and mean values have been reported as the mean figures reflected some significant outlying values. Within the report, these calculated costs of compliance are compared to those presented in the ESOS Impact Assessment³, once re-scaled to an updated assumption on the size of the obligated population and taken for one ESOS cycle (rather than four which is the basis of the Impact Assessment calculations).

Limitations to this evaluation strand

The design of this data collection exercise aimed to balance both the quality of data recorded and the ease of providing this information for responding organisations. This does mean that there are some limitations to the data collected and the analysis conducted:

- The analysis is based on data provided by respondents to the survey of obligated organisations. It is therefore based on self-reported estimates of the time and costs incurred, and did not involve any receipt of administrative data from organisations (e.g. timesheet data). Despite efforts to maximise the quality and coverage of data collection (for example, by offering different ways of recording it and breaking the request down into stages), there are likely to have been errors in responses received. Respondents may have duplicated time across categories, or may have had poorer recall of earlier stages of the compliance process, or included time that was not truly additional (i.e. they would have incurred part of the time cost recorded anyway even in the absence of the scheme).
- The analysis only provides an assessment of the time and cost burden incurred by parent organisations obligated by ESOS. In keeping with the approach taken throughout the survey, respondents (who were the highest level parent organisation) were asked to only record time spent and external costs incurred by their own organisational entity and not any subsidiaries or other organisations in their group.

The simplified approach to collecting grade / seniority information and use of an average gross hourly pay rate of £13.67 are likely to have reduced the accuracy of the data collected.

- This evaluation strand did not represent a full economic evaluation of ESOS; while it provided an assessment of the administrative costs of compliance, capturing the

³ Based on selected Policy Option 2: mandatory notification of compliance with an option of further voluntary disclosure. Impact Assessment: Energy Savings Opportunity Scheme, Department for Energy and Climate Change and Department for Transport, 2014. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf

financial benefits of ESOS was outside of the scope of this exercise, including energy and cost savings realised through better energy management and billing control.

Organisational case-studies

Aims of this evaluation strand

A small number of in-depth case-studies with respondents to the representative survey were used to add nuance to the quantitative findings, by building a fuller picture of organisational experiences and processes relating to ESOS. Case studies helped the team to explore both general and organisation-specific findings in more depth.

Gathering multiple sources of evidence from each case-study organisation enabled triangulation and, therefore, richer and more detailed findings. In compliant organisations, a particular focus on decision-making across an organisation helped to pinpoint enablers and barriers to change following the audits.

The overall aims of the case-study element to the evaluation were:

- To explore organisational factors that have influenced both process and impact issues related to ESOS, collecting evidence under all six key evaluation questions;
- To get a rounded view of ESOS, and its impact, from across the organisation – not just from the person most engaged in the policy'
- To unpick issues that were not as well suited to the survey – for example, delays in compliance activity, internal decision-making processes, and the handling of ESOS and impacts across multi-site organisations.

The core research team spent between one and two days working with ten case-study organisations. It was felt that this approach would generate sufficient data to provide a range of perspectives from within the organisation, without being excessively burdensome for organisations to accommodate.

Approach to this evaluation strand

Key details of the approach taken to this strand of the evaluation are:

- 10 case-study visits with selected organisations (discussion of selection approach below)
- Each comprising a 1 to 2-day visit to the organisation

- Approximately 5 or 6 interviews or discussion groups per organisation, conducted across multiple contacts with varying roles/ responsibilities.
- In-depth interviews for the majority of individuals, to allow individual views to be expressed
- Interviews conducted face-to-face where possible, but by telephone where key staff were located in different sites
- Telephone interviews were the best means of contact with the assessor, if the assessors were external, or had finished in their role by the time of fieldwork
- In a few instances, mini-groups were conducted with members of the main staff body, where it was appropriate to do so – where, as a collective, they had useful views and observations to share about how energy is used across the business, and what, if any, communication there is about energy use (from a more distant viewpoint on the ESOS requirements specifically, or the outputs of this process).
- Each case-study also involved a data and document review where organisations were willing to share written information about their energy use, any energy or environmental policy, energy efficiency actions, and in many cases their ESOS audit report.

Organisational typologies targeted for case-study recruitment

Given the small number of case-studies being conducted (10 in total), the aim of this evaluation workstrand was not to be representative of the ESOS participants (which was achieved through the large-scale telephone survey), but instead to be reflective of the broad range of organisational factors and circumstances that exist across this population. A key aim for the recruitment of the case-studies was to reflect the spread of characteristics which were likely to impact on an organisation's response to ESOS. This was sought to enable the evaluation to gather the greatest insight into the effectiveness of ESOS' processes and its potential impacts.

Characteristics of key interest for the case-study recruitment were identified through a review of the following key evaluation sources: the Impact Assessment; Theory of Change; findings from earlier strands of qualitative research; and interim findings from the representative survey of organisations. Characteristics were selected on the basis of both their relevance to ESOS, and their prevalence in the population, to provide an effective and pragmatic approach to sample selection. A summary of these characteristics is included in Table 4.

Table 4 Factors considered in case-study selection

Key factor	Way in which factor interacts with potential ESOS impact (based on theory and evaluation evidence)
Business energy profile	
Energy intensity of business	If highly energy intensive, energy efficiency measures will likely already be central to organisation, resulting in minimal ESOS impact. If energy use more peripheral/less visible (e.g. via office premises usage rather than industrial processes) may have more information asymmetry and impact from ESOS.
Size / importance of transport fleet to business	If fleet is large – likely to already be addressing this, resulting in lower ESOS impact. If fleet is small/peripheral – greater chance of impact from ESOS.
Level of energy efficiency installs to date	Will affect scale of potential for energy efficiency action.
Approach to investment in energy efficiency, vs. other capital investments	Level of priority placed on energy efficiency by business vs. board, & no. staff to implement recommendations / operationalise change. Level of autonomy over investment decisions e.g. sign-offs required. Firms with high margin pressure may struggle to justify capital investments in energy efficiency. If business objective is revenue maximisation may be difficult to prioritise.
Approach to ESOS	
Positioning of ESOS within company structure	Whether handled by Environment/Sustainability team, Facilities team, or Procurement team. Extent to which the person responsible for ESOS compliance is an effective “change agent”.
Choice of compliance route	ISO route may result in longer-term embedded impact sustained over time OR may mean less engagement if compliance is seen as ‘tick box’
Price paid for assessment	Financial commitment to ESOS may reflect and / or impact quality of outputs and degree of engagement with outputs.
Obligations under other EE policies / Prior audit activity	If complying with CRC, EU ETS, CCA, organisations are likely to experience a smaller impact from ESOS, as reporting required by these schemes may already be overcoming information asymmetry. ESOS does differ in coverage, however, so some peripheral impacts could still be expected (e.g. inclusion of transport, requirement to identify energy saving opportunities).
Organisational context	
Tenure	If renting, less capability to change building fabric. Impacts may be more behavioural. Energy billing arrangements may result in split incentive to improve energy efficiency.
Company size	If there is a large number of sites, it is important to consider how information from audits is disseminated, and whether impacts vary by site
Sector	Could influence ability of assessor to provide recommendations e.g. construction and transport require more specialist knowledge, so assessors may have less valuable input.

From these characteristics, ten ‘typologies’ of potential case-study organisations were developed and agreed with BEIS. These ten case-studies were recruited using the re-contact sample generated through the telephone survey of ESOS-obligated parent organisations. The case-studies achieved are listed in Table 5 and further detail of the recruitment process is provided in the next section.

Table 5 Achieved case studies

Ref	Key factors	Mix of characteristics achieved across case-studies
1	Large, energy intensive business (e.g. manufacturing sector) already placing high priority/taking action on energy efficiency. Complied via ISO route.	Tenure Number of sites Size of transport fleet Date of compliance notification Job title/corporate position of ESOS lead contact Level of impact reported from ESOS on uptake of energy efficiency measures
2	Large, energy intensive business, not rating itself as placing high priority on energy efficiency	
3	Small, non-energy intensive business (e.g. retail, office), not placing high priority on energy efficiency	
4	Transport sector organisation	
5	Non-transport sector organisation but with large fleet	
6	Charitable organisation	
7	Large multi-site office-based organisation – ISO 50001 certification	
8	Large multi-site office-based organisation – audit compliance	
9	Cement industry or business involving combustion	
10	Compliance led by internal Lead Assessor	

Recruitment

Recruitment was conducted by Ipsos MORIs in-house qualitative recruitment team, by telephone, using responses to the survey questions, and organisation contact details. Only organisations which had given explicit permission to the quantitative interviewer to be re-contacted for future research were contacted.

The following recruitment screener was used.

Introduction for receptionist:

Good morning/ afternoon/ evening. My name isfrom Ipsos MORI, an independent research company. We are carrying out some research on behalf of the Department for Business, Energy and Industrial Strategy (BEIS) (formerly the Department of Energy and Climate Change) to evaluate a national energy saving scheme (if necessary called the Energy Savings Opportunity Scheme, or ESOS).

On [insert interview date from sample] my colleague [interviewer name] spoke with [respondent name], and they agreed that we could phone them back to talk about the possibility of someone coming to visit your organisation to understand more about your approach to energy management, and experiences of ESOS. Is [respondent name] available now?

Introduction for respondent:

Good morning/ afternoon/ evening. My name isfrom Ipsos MORI, an independent research company. I understand you spoke with my colleague [interviewer name] on [insert interview date from sample], about your energy management.

At the time we asked if we could re-contact you to further explore your approach to energy management and experiences of ESOS. We're now looking to organise these kinds of visits, and wondered if you might be able to help us by participating? A researcher would need to visit your organisation at a convenient time to speak with you and a few different people about these issues. A £100 charity donation would then be made on your behalf.

The results will be used by the Department to inform decisions regarding future energy efficiency policy. This is an opportunity for your organisation to feed into their decision making, and help shape future energy efficiency policy for all UK businesses.

ASK ALL

Would you be interested in taking part?

Yes – CONTINUE

No – CLOSE

Would you be able to spare the time to talk with the researcher, and show them around on the day?

Yes – CONTINUE

No – CLOSE

Would you or a colleague be able to help organise this visit, setting up meeting times with relevant colleagues, and arranging a meeting space, if available?

Yes – I can do this – CONTINUE

Yes – my colleague can do this [RECORD NAME AND CONTACT DETAILS]

No – GO TO Q4

ASK IF 'NO' AT Q3

Would you or a colleague be able to send us the details of relevant colleagues and of your reception or facilities teams, so that we can organise interviews with relevant colleagues, and a meeting space, if available?

Yes – I can do this – CONTINUE

Yes – my colleague can do this [RECORD NAME AND CONTACT DETAILS]

No – THANK AND CLOSE

ASK ALL

Would you be able to send through any relevant document, such as your audit report, any presentations developed from the report, energy efficiency data, plans or strategies, or anything else you are willing to share and think might be relevant?

Yes – RECORD, CONTINUE

No – RECORD, CONTINUE

Can I just check, would you be willing to have a brief chat with the researcher who will come to visit you ahead of time, to help them organise the visit?

Yes – RECORD, CONTINUE

No – RECORD, CONTINUE

ASK IF YES TO Q5

When would be a convenient time to have a brief chat with the researcher to help them organise the visit?

RECORD TIME AND DATE, AND MAKE APPOINTMENT. CONFIRM / TAKE EMAIL ADDRESS TO SEND MEETING INVITE.

ASK ALL

Thanks very much, when would be a convenient time for us to come and visit you? Ideally this would be a time when your other relevant colleagues are available, [If they are not the lead assessor, and lead assessor is internal (from sample)] including, if possible the lead ESOS assessor.

RECORD TIME AND DATE, AND MAKE APPOINTMENT. [IF NOT DONE ALREADY] CONFIRM / TAKE EMAIL ADDRESS TO SEND MEETING INVITE.

I have here that your address is [insert from quant data]. Is this the correct address for the researcher to visit you at?

Yes – CONTINUE

No – RECORD, CONTINUE

And is this the same address as that at which other relevant team members are based?

Yes – CONTINUE

No – RECORD, CONTINUE

Thank and close

Discussion guide

Because of the multiple different roles represented across the case-study participants (both within and between the organisations engaged through this evaluation strand) and the potential that single individuals may take on multiple relevant roles within an organisation, a matrix discussion guide in Excel was developed.

This offered interviewers flexibility in directing the discussions in the most useful and relevant directions for each individual respondent. Interviewers read across the topic area, through overarching section probes, and followed up with specific question by role in ESOS, as appropriate. Specific probes were included for the following roles:

- ESOS lead contact within an organisation (sometimes overlapping with another category listed below)
- Board member
- Finance director/manager

- General staff
- Lead assessor (internal or external)

An example section of the guide is shown overleaf:

Topic area	Overarching section probes	Board	Lead assessor	Compliance support	Finance	Staff
Understand context for organisation's energy use, enablers and barriers to taking energy efficiency action to date.		How involved were they in the ESOS process? Who provided Board-level sign-off? What is the level of sign-off on EE measures generally?	How aware of contextual factors were they? How did company structures affect their audit? How was this different from / similar to other companies they audited?	What part of the business do they sit in? Be clear on extent of their role within a multi-site or corporate group structure. What drove the way, and timing, of how they approached ESOS compliance?	How are investment decisions made and signed off? What involvement did they have in the ESOS compliance process? What involvement are they having in considering ESOS recommendations?	How did this play out in practice? Have they heard of ESOS? Have any changes been made/announced this year around energy or transport behaviours or purchases?
	Energy efficiency context: Main energy needs, significance of energy expenditure in overall costs.	Main drivers of energy and fuel consumption for the business.	How aware of contextual factors were they? Was the company forthcoming or did they seek out this information?	X	X	
Energy Efficiency - Structures and priorities	Energy efficiency management structure	Explore their involvement - level of sign-off and input	How did the management structure affect the audit process?	Key question If ESOS compliance lead has an explicit role in energy efficiency/mgt explore general role of this team in more detail, what works well and less well about the		How does the energy management team communicate with staff more broadly?
Energy efficiency policies / strategies / action plans		What involvement have they had in shaping this? What have they signed-off?	What evidence has the assessor seen of EE within the organisation's business priorities or strategy? Have any changes been observed in the inclusion/detail/targets around EE within policies or strategies? Any evidence of action plans connected to these?	How were these developed? Interplay with other EE schemes [covered later]? Influence of market forces at a strategic level - enabler / constraint?		Are staff aware of relevant energy efficiency policies / strategies / action plans? How do they find out about these?
Board-level or [IF APPLICABLE] parent company level involvement in decisions - when, and for what type / scale of investment (money or staff time, e.g. in training)?		How deep is involvement? Light touch, or full immersion? Examples of things they have become involved with, and how this has worked.	What did LA pick up about level of priority that organisation seemed to put on EE? What were the signals? How did this affect their approach to ESOS?	How does board involvement enable / constrain?	X	
Level of priority for Energy Efficiency		[IF DIFFERENT AT DIFFERENT LEVELS IN THE COMPANY] Why do differences exist? How does this play out in practice?		[IF DIFFERENT AT DIFFERENT LEVELS IN THE COMPANY] Why do differences exist? How does this play out in practice?		How do staff feel priority levels play out on the ground? Do their perceptions match those of energy managers?
Energy Efficiency - actions, changes, and scheme involvement		Key question Perceptions of usefulness / burden of ESOS versus other schemes.	Did organisations involvement in other schemes affect their approach to ESOS in any way? Was there anything from previous obligations that helped or hindered ESOS compliance process?	Key question What role have other schemes had in shaping EE policy to date? Were information / skills / knowledge from participation in these schemes 'recycled' into ESOS? How was ESOS similar / different? Be careful to note how long ago previous audit or compliance activity was (i.e. has it provided up-to-date info on energy use and potential EE improvements?)		Have staff been aware of these schemes and any impact they may have had?
History of EE scheme involvement for the organisation, and where ESOS fits in this history. Probe on schemes cited in survey responses.	Explore the dynamics of Energy Efficiency action and the impacts of legislation on these dynamics and actions.	Discuss levels of trust in previous information they have received/procured around energy use and energy saving actions - what did this previous experience and level of trust mean for their approach to ESOS?	Probe on context of overall capital constraints on the firm.			

Approach to analysis of this strand of data collection

Initial analysis of qualitative case-study evidence

Case-study interview notes were written up in a pro-forma, using the Excel discussion guide as a template. A 2-3 page summary for each organisation was produced, making reference to that organisation's key characteristics, as per the recruitment specification, and how these have or have not influenced the impact of ESOS on the organisation (presented later in this annex).

The data in the pro-forma was then combined into a single analysis spreadsheet, allowing comparison of all responses under a specific topic area, and review of responses as a whole, or specific to different types of respondents, e.g. lead assessors.

The team conducted thematic analysis and coded the data, identifying emerging findings and hypotheses for further exploration in the case-study data itself, or through other data sources. These preliminary findings were then brought to a synthesis analysis session, where the team met face-to-face, along with BEIS colleagues who joined face-to-face and by phone.

Synthesis analysis session and return to primary data

The synthesis analysis session was structured around the key evaluation questions, and explored the findings and hypotheses relevant to addressing each from the perspective of the telephone survey and case-study data, as well as drawing in learning from previous and parallel strands of the evaluation (e.g. the Phase 1 qualitative interviews, the secondary analysis of the Environment Agency's scheme data etc.). Combining data strands in this way ensured triangulation of the findings, bringing nuance and challenge to the survey findings, whilst sense-checking impactful case-study findings against the robust survey data.

After this session, the final analysis and reporting stage involved returning to the survey data tables and the case-study write-ups, to interrogate further and robustly test and develop insights into finalised evaluation findings.

Case Studies

Case 1: Energy intensive firm with high priority on energy efficiency pre-ESOS, complied via ISO 50001

Summary of case-study findings:

The firm placed a high priority on energy efficiency pre-ESOS: they exceed group-level targets on energy use and CO2 reduction, and work to maintain a good position in the Dow Jones sustainability index. They opted for ISO 50001 compliance as it demands continuous improvement, and also for competitive advantage. Within this context, ESOS has had limited additional impact on this firm's energy-related action although the scheme did expedite compliance with ISO 50001, which in turn has helped raise awareness of energy management across the organisation.

Interviews conducted with: Energy Manager (ESOS lead), Director of Real Estate, Head of Real Estate Operations, Head of HSE, Company Secretary (board-member)

Key facts and figures (from ESOS survey response):

11-20 employees with responsibility for energy management

High level of priority placed on energy use by board and organisation pre-ESOS

14 days spent supporting Lead Assessor in compliance activity

1 day spent reviewing ESOS report

£4,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Manufacturing organisation

Corporate structure and size:

- Global organisation with headquarters overseas
- 62,000 employees globally with turnover of €18.9 billion
- UK operations: employee count 6,900, turnover €1.81 billion

Type of sites and tenure: 57 total UK sites, 13 main ones.

Relevant recent context: Consolidating a few main sites into one high energy efficiency new site (BREEAM rating of excellent)

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Emit 25,000t of CO₂ annually, use 54,000 MW of energy, 70% of which is for heating, lighting, etc., 30 % for processes
- Spend ~ £6m on electricity, £600k on gas

Prior corporate or regulatory requirements:

- Certified to ISO 14001 and ISO 14064, with regular energy auditing
- Group (headquarters overseas) targets for energy use and CO₂ emissions to maintain a good position in the Dow Jones Sustainability Index (targets frequently exceed by UK operations)

Energy efficiency investment process: No set budget for energy efficiency with approval needed if pay back is over 3 years (examples of this previously being granted e.g. for £750k lighting upgrade)

Attitudes expressed towards energy efficiency:

- Actively look for opportunities to save energy, and have in recent years upgraded lighting, chillers, more efficient plant equipment
- Try to manage sites as cost efficiently as possible and see energy efficiency as part of this, although principal driver is return on investment

ESOS compliance process:

- Assessor carried out gap analysis to identify gaps in energy management system and actions needed for ISO 50001 certification. Two stages of assessment to highlight major and minor non-conformities before certification confirmed after 3rd assessment
- Began this process in October 2014, completed February 2016 as had to resolve a major non-conformity
- All sites audited for certification, then 2 sites are audited every 6 months over a 3-year cycle to maintain certification
- Spent £800 per day for 10-15 days for auditing

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- ISO 50001 attractive compliance route as it could build on energy policies and targets already in place (including ISO 14001) and as it would encourage an ongoing commitment to continuous improvement – including leveraging resource and investment into energy efficiency issues - which was considered important given a corporate motivation and ‘duty of care’ to reduce consumption
- Energy manager presented to board that ISO 50001 compliance would also help them secure public contracts (matching certifications already in place for some of their competitors)

Review of ESOS audit report:

Initial ‘Gap Analysis’ reports identified areas for attention by category e.g. Energy Planning, EPIs, Operational controls

Stage 1 and 2 reports highlighted major non-conformities (as well as minor non-conformities and areas for improvement). Nine major NCs at stage 1 e.g. the need to roll out energy management training; taking into account energy performance of suppliers in their procurement

Two major NCs remained at stage 2, showing good progress but meaning certification could not be granted

The final report assessed all open non-conformities, including any further corrective actions needed

Organisational response to ESOS report:

- The report was considered very clear and helpful. As an ISO report, it’s purpose was not to identify energy savings, but certified their energy management system

Impact of ESOS:

- Not a ‘paradigm shift’ – they were doing lots on energy efficiency anyway, but there is a greater awareness of energy management across the organisation now as a result of the scheme and a framework is now in place with clear performance benchmarks for monitoring

Case 2: Large, energy intensive business, not rating itself as placing high priority on energy efficiency

Summary of case-study findings:

This firm is obligated under ESOS due to its high turnover but as an office-based site employing only 50 people it has not tended to place priority on energy efficiency issues. Low engagement with energy use is also likely to be related to energy bills being combined with property lease charges and the multi-occupancy office building sharing a single meter. ESOS was considered a compliance activity only by this firm – rather than as an energy saving opportunity, and they aimed to reach compliance at minimum cost. The impact of the scheme has been minimal with poor recall of the audit recommendations made and a lack of follow-up on zero-cost behavioural strategies.

Interviews conducted with: Operations Director, Health & Safety Co-ordinator (ESOS internal lead), external Lead Assessor

Key facts and figures (from ESOS survey response):

2-3 employees with responsibility for energy management

Level of priority placed on energy use by organisation and Board rated as very low (and decreasing)

10 days spent supporting Lead Assessor in compliance activity

3 days spent reviewing ESOS report

£2,500 spent on external assessor services

Organisational structure & energy use context:

Business type: Petroleum company

Corporate structure and size: Subsidiary firm with 50 employees across two office-based sites (turnover of £5 billion triggered eligibility). London-based parent company, and overseas ultimate parent

Type of sites and tenure: All rented office-based sites

Transport fleet: ~15 leased company cars (extensive other transport use but all outsourced)

Relevant recent context: Large factory site closed in mid-2015 which has substantially reduced their energy use as their sites are now only office-based.

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Energy spend combined with property leasing bills, and multi-occupancy building share single meters.
- Energy use predominantly for office-space heating & cooling and IT equipment.
- Energy spend represents very small percentage of business outgoings. Energy efficiency improvements considered as “general building upgrades” have been completed recently by the external building manager e.g. light motion sensors, removal of heater panels, upgraded air conditioning. Driver training courses were on offer two years ago

Prior corporate or regulatory requirements: Complies with GHG reporting, and accredited with ISO 140001

Energy efficiency investment process: Board-level approval needed for any energy efficiency spend.

Attitudes expressed towards energy efficiency:

- Factors such as employee comfort prioritised over energy bills
- Interest in low emission vehicles due to beneficial tax breaks – the company does not have any fixed term contract with the lease company so they are considering a trade-in and out approach and know that employees are keen to be able to select LEVs as their company cars.

ESOS compliance process:

- UK parent was felt to be delaying their response/action on the scheme, so the subsidiary pursued compliance on their own to ensure they did not miss the deadline
- Compliance process led by Health and Safety co-ordinator –limited involvement of other internal staff (only submission of some energy data from second site)
- Fuel use less than 10% of total energy use so under ‘de minimus’ threshold
- ESOS first heard of via legal updates provided in Cedrec bulletin
- EA scheme guidance was consulted extensively by the internal ESOS lead and found very helpful (used to check eligibility and at which level of organisational structure to comply).

- Lead assessor was appointed after consulting accredited list, receiving referrals and recommendations from other firms, and then going out to tender to 4 auditing firms
- Internal ESOS lead started compiling energy data for ESOS compliance in summer 2015. Lead Assessor was appointed in October 2015 (prior to this was waiting for decision on approach to overall organisational response to ESOS from Parent level)
- Compilation of energy data was complex as energy bills were not separated from property rent and maintenance bills and the multi-floor multi-occupant building shared the same meter. Information to help split these usage figures had to be requested from the external building manager, but this data was often incomplete.
- Internal ESOS lead put significant time into compliance process – describing it as taking months in total. This included 4 days compiling invoice data, liaison time with the building manager and second site manager, supervision of the 1 site visit and compiling large sections of the audit report himself (to reduce cost of external Lead Assessor services).
- ESOS audit report signed off by Managing Director
- Internal ESOS lead completed notification form – found some question around corporate structure challenging to answer accurately.

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- ESOS was considered as simply a compliance process so they aimed to comply with lowest external cost – quotes were requested for “light-touch” assessor services (only covering 1 site visit and providing the recommendations section of the audit report – all energy consumption data collation, analysis and presentation in the report was completed by the internal ESOS lead).
- ISO was not pursued as felt to be “too involved with too many requirements”.
- Limited Board-level interest: 20-minute review meeting held with Board member to sign-off final report
- ESOS eligibility should be based on energy use (kWh) rather than organisational turnover and employee size.

Review of ESOS audit report:

20-page report covering: energy consumption data, details of, and rationale for, site selection for auditing, energy saving recommendations by site, detailing anticipated saving (in kWh, £s, CO2), costs and payback length.

Examples of audit recommendations include: mostly zero/low-cost recommendations e.g. more effective control-setting for existing heating & cooling systems, new metering, lighting controls, driver training

Total identified savings across 5 sites: £78,320 at cost of £1,526 (three-month payback)

Organisational response to ESOS report:

- Technical and Operational Director (the director of the lead ESOS contact) could not recall recommendations made in ESOS report.
- Audit report not considered to have identified anything significant in the way of energy saving opportunities and instead to have highlighted small potential changes (Lead Assessor shared view that this organisation was relatively limited in what further improvements they could make to further reduce their energy use – more advance lighting controls offered most potential).
- Audit report posted on Sharepoint site accessible by Health & Safety team and Executive Summary presented at a department meeting. No further circulation of report (i.e. not circulated among other teams, sites, external building manager, or across global corporate group).
- Attitude of business is that ESOS should have focused on energy use for eligibility rather than turnover and/or employee size.

Impact of ESOS:

- ESOS process has had little impact on this organisation to date.
- While recommendations made were mostly either zero, or very low cost, these have not been followed up e.g. recommendation of free lighting survey not pursued, recommendation for a change to the setting of HVAC controls not checked since receipt of the report.
- Some peripheral impacts however e.g. ongoing collection of energy use data (including more active chasing of energy bills) which is helping with GHG reporting and is anticipated to help with ESOS compliance next time.

Case 3: Small, non-energy intensive business, not placing high priority on energy efficiency

Summary of case-study findings:

An example of ESOS being a low priority for an organisation, but having potential future impacts.

ESOS had been a low priority for most in the organisation, with the exception of the ESOS lead. This person had subsequently left the organisation and those interviewed for this case-study had some difficulty recalling the ESOS report and locating it. It was, however, stated that the clear and easy-to-implement opportunities identified in the report were to be followed up in the near future.

Interviews conducted with: Procurement manager, Health and safety manager, external lead assessor.

Key facts and figures (from ESOS survey response):

Turnover £25m up to £50m

2-3 employees with responsibility for energy management

Level of priority placed on energy use by organisation and board rated low in 2015, but having increased significantly at board level only since the beginning of the ESOS period

18 days spent on compliance activity

1 day spent reviewing and signing off the ESOS report

£1,000 spent on procuring external auditor services

Pre-ESOS context for energy efficiency action (drivers/barriers):

Business type: Light industrial sector organisation

Corporate structure and size: 250 to 499 employees.

Type of sites and tenure: Rented, predominantly industrial, with offices attached.

Transport fleet: 11-19 cars.

Relevant recent context: At the time of the case-study visit, the company had been subject to a recent takeover. The person who led on ESOS within the organisation had also left before the case-study visit occurred.

Energy use context:

- Very low engagement with energy prior to ESOS, although some energy efficiency changes, such as installation of LED lighting, have been made as part of rolling maintenance of the business.
- An energy broker is used to organise contracts, and there is a strong relationship of trust between the broker and the company. The ESOS audits were organised through the broker. Use of this broker may have contributed to the low awareness even of energy bills prior to ESOS, as the auditor noticed the company was being over-charged for energy they were not using, but had not noticed this.

“They were being billed more than they were using, which... highlighted the lack of interest. They got a bill at the end of every month and paid it. The lack of understanding of energy use at a board level was evident because they could not say what energy different activities were using.” - ESOS lead assessor

- A third-party haulier is used, and transport is a very low priority for energy efficiency, with no monitoring in place prior to ESOS.

Prior corporate or regulatory requirements:

The organisation has previously been involved in CRC, Climate Change Agreement, Climate Change Levy and Energy Performance Certificate (EPC) schemes.

The organisation attributes some change to the CRC, as they were advised that grants were available to help them cut usage and stay below the level. They invested in flat plate heat exchangers to tap surplus heat from water heating for steam driven process. The CRC also prompted them to look into solar energy, but the payback period was considered too long for this.

Energy efficiency investment process:

This has so far gone largely untested as there have been few investments to date. Anything over about £5,000 needs board approval, unless there is proven payback. Any capital investment needs to go through the board.

Attitudes expressed towards energy efficiency:

- The external auditor noted the very low awareness of energy spend, which was evident to the researcher in the fact that lighting was top of mind for the procurement manager, despite very energy intensive industrial processes being part of the core business (for example heating for drying, and packing processes).
- The procurement manager felt that energy would become more of a priority as customers of the business started to demand more evidence of energy saving initiatives, as part of their own corporate social responsibility work.

- There is a general feeling that energy efficiency has not been top of mind, and that this has led to some poor decisions. For example, a machine purchased for a new product line is far more energy expensive than anticipated, but this was not factored in when the machine was purchased.

ESOS compliance process:

- This firm received a large volume of calls from auditing companies marketing their ESOS services. This was described as a “nuisance” as, at one point they were receiving 2-3 calls per week.
- The company’s existing energy broker informed them of ESOS and the deadline. They offered to get an associate business of theirs to conduct the audit, which the company agreed to.
- The auditor made them aware of the data sources they needed to make available. The company collated some of this data for the auditor. Collating transport data was found to be very burdensome, and the personnel interviewed considered it to have generated little value for their organisation (their transport consists of a very small fleet, alongside millage claimed back on privately owned vehicles).

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

Ownership of ESOS was taken by the ESOS lead within the organisation, who had left by the time of the case-study visit. The procurement manager reported that the ESOS lead had difficulty getting buy-in from others into ESOS, particularly around obtaining data needed for the auditor (it was reported that the ESOS lead had to threaten to escalate her requests for information to individuals’ managers or the board in order to get what was needed).

Compliance activity was completed “quite last minute”, in the view of both the procurement manager and the external auditor. Data collection did not begin until mid-September 2015, and was more time-consuming than expected. The report was signed off on the 7th December.

“Like everything else it kind of gets swept up till the last minute.” - Procurement manager

“I was an early adopter and promoter, and hit an absolute brick wall for 9 months, then everything came in the last three months. As much as I’d been trying to encourage people there was no benefit for them in being early adopters.” - External auditor

The audit process was seen as straight forward, other than the difficulties supplying transport data.

Review of ESOS audit report:

Comprehensive report in Excel with a summary page at the front, identifying seven key savings that could be made with costs, savings, and payback periods clearly identified.

Detailed analysis of electricity, gas, other fuels and total energy savings from initiatives, as well as pages laying out energy use, energy make-up, Identified Energy Conservation Measure (IECM) and calculations, and other considerations.

Organisational response to ESOS report:

- The ESOS report was considered to be a good fit in terms of depth and detail for the organisation's needs and level of engagement.
- The report was described to have measured energy use in detail for the first time, and identified potential savings.
- The review by the board was described by those interviewed as "fairly cursory". The procurement manager knew only that the MD and Operations directors were aware of it and had signed it.
- There was a feeling that the report had identified savings that, had energy efficiency been a priority, the organisation itself may have identified. The report has essentially been shelved until this greater priority arises, at which point the findings may need to be updated.

"We were aware of some of these things but having them put down in the black and white on the report was useful. It was not that useful at first, but now the changing commercial context is making it more relevant." - Procurement manager

Impact of ESOS:

- There has been no impact from ESOS as yet.
- There are plans to put a project team in place to look at the findings, but it is unclear when this will happen.

Case Study 4: Transport sector organisation

Summary of case-study findings:

This organisation had already achieved ISO 50001 in 2012. As a transport organisation, fuel is their highest cost and they had already managed investment in this area. They described finding ESOS compliance straightforward as a result and despite already having the certification in place, considered ESOS to have had an impact in pushing the organisation to collate usage information on a site-by-site basis, which had not previously been done.

Interviews conducted with: Health & Safety Manager (ESOS lead)

Key facts and figures (from ESOS survey response):

More than 20 staff are now involved in energy efficiency (some of these are frontline, on-site supervisors). Pre-ESOS there were three staff involved in energy management – (1) Management systems support (2) Waste and carbon officer (3) Utilities manager (plus an apprentice). Now this is only a central team of one as they are de-centralising responsibility to site supervisors.

The priority level reported to be placed on energy efficiency pre-ESOS was rated as 5 out of 10

The organisation was already ISO 50001 accredited (in 2012), but spent over five days complying with ESOS, the majority of which was in understanding the scheme and whether the organisation was in scope

Spent c£90k on energy efficiency measures in last financial year

Organisational structure & energy use context:

Business type: Transport operation

Corporate structure and size: Large firm with between 5,000 and 10,000 staff

Type of sites and tenure: Transport hub facilities

Transport fleet: 100+ electric and diesel trains

Relevant recent context: Organisation has recently become part of another wider group company

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Energy management system in place through ISO 50001.

- The Department for Transport has recently started to require ISO 50001 as a requirement in franchise agreements, so this has increased focus on it at board level
- There is an internal working group responsible for driving action on energy efficiency, but historically this has been very centralised. It was reported to have been a challenge to get frontline staff to engage in energy efficiency, mainly because they have so many other priorities (e.g. punctuality, timetabling, customer service etc.)
- Organisation sits on a local corporate 'energy club', which shares best practice amongst other organisations in the area. ESOS became a topic of conversation during these events and they shared best practice.

ESOS compliance process:

- Organisation was already ISO 50001 compliant and therefore had little to do during compliance itself
- It did spend some time at the outset to check the compliance guidance – also did this as part of the local 'energy club'
- Left notification to shortly before the deadline, mainly because they knew they were compliant
- Notification form had certain questions which the organisation felt were not relevant to the ISO 50001 route. Specifically, these were around:
- Details of the lead assessor and determination from lead assessor that the assessment meets the requirements of ESOS
- Estimation of data to calculate energy usage
- Confirmation of recording information in ESOS evidence pack

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- Organisation already feels that it had done sufficient on energy efficiency, and feels that it could not have done any more
- However, involvement in the 'energy club' did allow them to appreciate how they compared to other organisations: *"Eye opener to see where we are compared to other companies"*
- ESOS has made organisation build collation and analysis of site-specific energy data into its wider energy management system, which it had not done in the past. It

has also increased the profile within other organisations (members of the 'energy club') to consider the benefits of ISO 50001.

Case Study 5: Large transport fleet (outside transport sector)

Summary of case-study findings:

This is an example of a firm which placed low priority on energy efficiency pre ESOS, and, as such, regarded compliance as a tick box exercise. The organisation delayed embarking on its compliance route initially (as it was a low business priority), and then found that original quotes had increased because of an increase in demand for external Lead Assessor services.

The firm has a large transport fleet but already had driver training and education in place, which was unaffected by ESOS. No plan has been put into place regarding implementation of the recommendations.

Interviews conducted with: Facilities Manager (ESOS lead), Transport Director

Key facts and figures (from ESOS survey response):

2-3 employees with responsibility for energy management

Very low level of priority placed on energy use by organisation and board pre-ESOS

5 days spent supporting Lead Assessor in compliance activity

Less than a day (4 hours) spent reviewing ESOS report

£3,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Insurance Company

Corporate structure and size:

- 100 employees across four office-based sites, with a depot in North-West England and London-based fleet
- Part of a larger corporate group – but parent organisation described as “arms length”

Type of sites and tenure: All rented office-based sites

Transport fleet: c2,000 fleet, mix of courtesy cars and transport wagons

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Limited structure for energy management - facilities manager, 1 assistant. Main task is to make sure all buildings are in operation (so not energy specific).
- No energy policy to date (attributed by respondents to organisation growing very quickly but with no dedicated policy)
- Driver training is undertaken regularly, with incentives given for those who improve their driving across defined time periods (monitored through league tables).
- Choose fleet based on fuel consumption with limits enforced on CO2 emissions for company cars – the fleet includes hybrid vehicles, and installing charging points at offices (all in place prior to ESOS).

Energy efficiency investment process: Apply minimum payback period guidelines in investment decisions – e.g. in a business case to upgrade to LED lights (anticipated to have 3-year payback) which has been implemented in one office site and is to be rolled-out in others.

ESOS compliance process:

- Decided not to train and accredit an internal assessor due to lack of time and ability to dedicate to energy management.
- Three quotes were obtained for external assessor services. Originally received quotes in March 2015, but the finance director did not want to pursue compliance at that stage (not considered a business priority). Quotes were re-tendered in Summary 2015 (on receipt of further communication about the scheme deadline and non-compliance penalties) – at this point they had risen by ~ £2,000.
- 1-day visit conducted at two sites by assessor (main site, and depot), with organisation collating a lot of information beforehand (e.g. usage data across 12-13 office sites and depots) – estimated to have spent 1-week internally on this.

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- ESOS was considered as simply a compliance process so they aimed to comply with lowest external cost – quotes were requested for “light-touch” assessor services

Review of ESOS audit report:

24-page report detailing energy usage and premises information, benchmarking and energy saving opportunities.

Report identified 'energy saving opportunities' including carbon and energy management, heating and cooling, IT equipment, boiler optimisation, CHP, general lighting, daylight linking, daylight harvesting, transport energy.

No payback periods identified.

Organisational response to ESOS report:

- Report was considered by firm to only contain a list of basic recommendations and to draw "generic conclusions" (such as LED lighting upgrades being appropriate)

Impact of ESOS:

- This organisation did not consider their approach to energy use or energy efficiency to have been impacted by ESOS. The evaluation team note that, in spite of a range of energy saving recommendations being made in the audit report they commissioned, this organisation appears unlikely to experience any impact at least in the short-term as they have not put any plans in place to further review or consider the report provided.

Case 6: Charitable organisation

Summary of case-study findings:

An unusual case study in that as a charitable organisation they were unclear about their eligibility for ESOS, but were motivated to comply anyway; they were keen to identify energy saving opportunities that would help reduce their overheads and allow donations to their organisation to go as far as possible. However, while ESOS has had some impact, many 'low hanging fruit' measures had already been pursued, and they were constrained in more long term investments by a forthcoming consolidation of premises into one new site.

Interviews conducted with: Energy Manager (ESOS lead), Maintenance Supervisor (Electricity Specialist), Maintenance Supervisor (General)

Key facts and figures (from ESOS survey response):

4-5 employees with responsibility for energy management

Level of priority placed on energy use by board and organisation both 4 out of 10

6 days spent supporting Lead Assessor in compliance activity

1 day spent reviewing ESOS report

£6,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Charitable organisation

Corporate structure and size:

- Global organisation with headquarters overseas
- ~500 voluntary staff in the UK

Type of sites and tenure: Mixed sites, including offices, warehouses & residential accommodation.

Transport fleet: Mixed fleet included 30+ vans, 10 trucks, ~20 cars

Relevant recent context: consolidating four main sites into one central hub in 4 years' time. Reduced staffing levels by 20% since September 2015

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Spend ~ £600k per year on energy (15% of this on printing activities, laundry and catering also significant users of energy, in addition to offices functions e.g. heating, lighting)
- ~ £250k on transport fuel
- **Prior corporate or regulatory requirements:**
- No binding targets

Energy efficiency investment process: Approval needed for any expenditure which focuses on payback periods e.g. payback from LEDs wasn't sufficient to replace T5.

Attitudes expressed towards energy efficiency:

- Overall attitude is “be sensible, don't waste”, especially as it is donors' money
- Would select energy efficient components when replacing them or taking on new premises, however retrofitting is expensive
- Have installed heat exchanger in printing press
- Overall measures they have put in place are saving c £100k per year

ESOS compliance process:

- Became aware of ESOS as energy manager is a member of CIBSE.
- As a charity they were unsure of their eligibility so sought clarification from the Environment Agency but this was never fully resolved
- Compliance was pursued through external ESOS audits (ISO 50001 considered too expensive and difficult, and no internal skills for completing internal audits)
- Chose an assessor who showed more enthusiasm, with quotes on a par with the others
- Signed contract with assessor in August 2015, site visits in November and December, with assessor submitting notification on their behalf
- Findings disseminated to other teams as relevant, e.g. transport, and reminders to staff as part of behavioural campaigns

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- Uncertainty of their eligibility status under ESOS but chose to comply as keen to identify energy saving opportunities (motivated by desire to spend donor money wisely)

Review of ESOS audit report:

ESOS report summarised characteristics and energy use of each site

Traffic lighted recommendations, included measures such as replacing fluorescent with LED lighting, voltage optimisation, behavioural changes in particular for transport

Organisational response to ESOS report:

- Audit report was well received, included technical information and quantifiable savings, although mostly recommendations that had already been considered
- Signed off by the board, who were given a synthesis of the key findings by the energy manager
- Looked at the key recommendations as a team and made action plans in conjunction with the board

Impact of ESOS:

- Helpful learning curve from compliance – contributes to CPD of energy manager
- Followed through some lighting recommendations, and behavioural campaigns e.g. memos to encourage switching off computers at night, and monitors during lunchtime, and encouraging ecodriving
- However, many of the ESOS recommendations were reported by the organisation to have been likely to have been pursued anyway e.g. they were already replacing lighting (though in one specific case ESOS highlighted a particular type of light)
- Many recommendations were a non-starter due to upcoming relocation

Case 7: Large multi-site office-based organisation – ISO 50001 certification

Summary of case-study findings:

A large global company motivated to have strong energy efficiency credentials mostly for reputational reasons (for tendering processes but also for internal profile within the Global corporate group). ISO 50001 was pursued to help meet these goals, with ESOS identified as the trigger for enabling resource to be dedicated to achieving this certification in this timescale. Due to concerns around the timeline needed for ISO 50001 (in advance of the grace period announcement) resulting in non-compliance (feared due to threat of penalty and reputational risk of being publicly declared non-compliant), audit activity was also run in parallel to the certification activity. Ultimately ISO 50001 was able to be completed prior to the end of the grace period for this compliance route, and the audit activity was halted due to high levels of dissatisfaction with the reported outputs received. Overall the impact of ESOS has been limited to date although with ISO 50001 now in place it will demand an ongoing focus.

Interviews conducted with: Environment Lead (ESOS lead), Workplace Solutions Manager

Key facts and figures (from ESOS survey response):

2-3 employees with responsibility for energy management

Level of priority placed on energy use by board pre-ESOS rated as high, but low for organisation as a whole

3 days spent supporting Lead Assessor in compliance activity

2 days spent reviewing ESOS report

£12,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Professional services company

Corporate structure and size:

- Large global company, 400,000 employees across 95+ countries
- 10,000+ UK employees

Type of sites and tenure: ~10 leased office sites in UK

Transport fleet: Large “grey fleet” (personal employee vehicles reclaiming fuel bills)

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Total consumption around 7 million kwh
- Spend large amounts on electricity for lighting, cooling, IT and heating in some offices - £1.5m per year.
- Travel significant component of energy spend – air travel in particular, but also ‘grey fleet’.

Prior corporate or regulatory requirements: ISO 14001 certified and energy use targets in place

Energy efficiency investment process: CFO decision on case-by-case basis. Payback length key consideration, though also: scale of upfront cost; length of lease on building; ability to spread upfront cost to re-coup gains more quickly and reduce impact in Year 1

Attitudes expressed towards energy efficiency:

ESOS compliance process:

- Became aware of ESOS from monthly bulletin they receive from an environmental consultancy who provide them with legal and regulation updates
- Although ISO 50001 was pursued, due to concerns the certification would not be completed by the deadline a Lead Assessor was also commissioned to carry out ESOS audits in parallel as an alternative means of reaching compliance on time
- Hired a company who already do work for them on electrical improvements and had an approved Lead Assessor (procuring a consultant from elsewhere would have necessitated going through an approved supplier process)
- The two routes fed into each other – the Lead Assessor carried out site assessments and liaised with the real estate company responsible for energy bills. This information fed into what was used by the ISO 50001 certification

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- Saw ESOS as opportunity to leverage ISO 50001 with the board; this had previously been suggested but had not secured backing from the management until it became an ESOS compliance option. The motivation to achieve ISO 50001 was to maintain a position as global leaders within the company (having been the first to achieve ISO 14001) and for reputational benefits during contract tendering.

- The fine, and potential reputational impact of being 'named and shamed', as a non-complier, was also a strong factor in ensuring compliance was met on time.

Review of ESOS audit report:

Site reports provide information on energy use breakdown for each site, and benchmarks

Energy saving opportunities listed with a high/ medium/ low carbon impact, but not quantified. In general, the recommendations focused on more obvious steps such as turning the temperature of heating down or reducing the quantity of lights, rather than anything bespoke to the particular sites being audited.

Organisational response to ESOS report:

- Low satisfaction with site reports from ESOS Lead Assessor as they were considered very basic in the recommendations made for improvement; tended to be measures the organisation had already thought of, and were not presented alongside quantifiable savings. The reports were also not felt to be tailored to each site, but instead to contain generic recommendations (to turn the heating temperature down or reduce the quantity of lights, for example). After receipt of the site audit reports, the organisation stopped the services of the Lead Assessor and did not request their overall report – instead pursuing their ISO 50001 certification.

Impact of ESOS:

- ESOS has had a limited impact to date on energy efficiency within this organisation, but they have now certified to ISO 50001 requiring this to become a long-term focus.

Case 8: Large multi-site office-based organisation – audit activity

Summary of case-study findings:

Example of ESOS having a limited impact due, in part, to pre-held perceptions of the potential (financial) value of energy efficiency improvements which had knock-on effects for organisation's approach to ESOS – considered a compliance cost, important to meet to avoid reputational damage but tightly controlled by the CFO and with limited engagement in the energy saving opportunities identified, despite potential for low-cost quick payback measures

Interviews conducted with: CFO (ESOS lead), site services supervisor, lead assessor

Key facts and figures from ESOS survey response:

1 employee with responsibility for energy management

Level of priority placed on energy use by organisation and Board rated as low

3 days spent supporting Lead Assessor in compliance activity

2 days spent reviewing ESOS report

£12,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Advertising and marketing parent company

Corporate structure and size:

- UK parent responsible for 100 subsidiaries across the UK
- ~10,000 employees across corporate group in UK (up to maximum of 600 employees in largest subsidiaries)
- UK makes up 10% of global corporate structure (~100,000 employees globally, ultimate parent headquarters based abroad)

Type of sites and tenure: Predominantly office-based sites, plus a few warehouses, mainly leased

Transport fleet: ~700 company cars

Relevant recent context: Significant consolidation of sites underway with employees across 35 subsidiaries being brought into a central hub office (4,000 staff on one site)

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- £3m per year energy spend, with £1.5m of this now in the new central hub office
- Energy spend separated from property leasing bills, paid via Finance team not seen by Facilities team
- Energy use predominantly for office-space heating & cooling and IT equipment.
- Energy spend represents very small percentage of business outgoings & considered 'fixed' in mind of Finance Director

Prior corporate or regulatory requirements:

- UK parent also eligible for CRC scheme
- Global corporate carbon footprint target with quarterly requirement for carbon reporting

Energy efficiency investment process: CFO decision on case-by-case basis. Payback length key consideration, though also: scale of upfront cost; length of lease on building; ability to spread upfront cost to re-coup gains more quickly and reduce impact in Year 1

Attitudes expressed towards energy efficiency:

- Energy use considered fixed – "*at the end of the day, what can you do in an office-space?*"
- Lack of belief in cost saving potential of energy efficiency measures (this is an assumption made rather than being based on information received)
- Factors such as office location, rental cost, layout & IT equipment functionality prioritised over energy efficiency considerations (e.g. LED lighting being considered at central hub site but due to desire for different coloured bulbs rather than energy efficiency)

ESOS compliance process:

- UK parent complied on behalf of all UK subsidiaries

- Compliance process led by CFO - limited involvement of other internal staff other than site visits being accompanied by Site Managers/Facilities Managers
- Energy advisors who manage their CRC compliance were appointed for ESOS process (already had access to all energy data)
- Fuel use less than 10% of total energy use so under 'de minimus' threshold
- ESOS first heard of via trade-press and marketing communications from Lead Assessors
- Started compliance process in early Autumn 2015 (waited for availability of advisor team and move into new central hub office)
- 5 sites audited, chosen to reflect diversity across all sites (new central hub site, largest subsidiary site, oldest building, long-lease building, smaller office)
- ESOS compliance was motivated by strong desire not to risk any reputational damage from non-compliance

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- Board considered ESOS compliance as “back-office activity” – therefore minimal involvement other than sign-off
- Compliance considered a business cost or “overhead” (rather than any type of opportunity) so process led by CFO with minimal involvement of any other internal staff, and with key objective of simply being compliant
- CFO thinks ESOS eligibility should be based on energy use (kWh) rather than organisational turnover and employee size.

Review of ESOS audit report:

20-page report covering: energy consumption data, details of, and rationale for, site selection for auditing, energy saving recommendations by site, detailing anticipated saving (in kWh, £s, CO₂), costs and payback length.

Examples of audit recommendations include: Out-of-hours electrical baseload reduction, HVAC Control modifications, Upgrade to LED lighting, Demand management programmes

Total identified savings across 5 sites: £78,320 at cost of £1,526 (three-month payback)

Organisational response to ESOS report:

- CFO (lead ESOS contact) could not recall recommendations made in ESOS report
- In survey described himself as 'not very confident' in accuracy of predicted benefits contained in ESOS report, and that a barrier to taking action is "too much uncertainty on the long-term benefits and costs of energy efficiency"
- No circulation of report beyond those directly involved in compliance process at audited sites (i.e. not circulated among other teams, across subsidiaries, or across global corporate group)

Impact of ESOS:

- ESOS process has had little impact on this parent organisation, and its subsidiaries, to date.
- One large area of ongoing investigation which can, in part, be attributed to ESOS, is the potential for this organisation to participate in the Capacity Market using surplus generation capacity at its new central hub site to sell back to the grid or go offline for periods - this was described as something that would have been looked at "in the fullness of time" but the ESOS process is credited with bringing forward this assessment
- The organisation expects to benefit from reputational benefits of compliance through stating its ESOS compliance status on procurement exercises.

Case Study 9: Business involving combustion

Summary of case-study findings:

Energy is managed at a corporate group level and is part of a wider corporate framework. It sits within health and safety but given the nature of the business, health and safety does take priority rather than energy efficiency. Organisation reported being dissatisfied with the service and recommendations provided by their external lead assessor; both related to the timing and quality of delivery. This organisation was audited by the Environment Agency due to discrepancies in its notification form around the listing of non-trading subsidiaries – this has subsequently been resolved and the organisation is submitting a re-notification.

Interviews conducted with: Energy Manager (ESOS lead), Finance Director

Key facts and figures (from ESOS survey response):

Single individual (EHS Manager) involved in energy management, although high usage sites did also have health and safety specific employees (with energy remit)

Low priority on energy efficiency, which is reported to have increased slightly since early 2015

Spent 26 days overall complying with ESOS – 3 of these were to support the lead assessor in compliance activity

Less than a day (4 hours) spent reviewing recommendations in ESOS report

£10,000 spent on external assessor services

Organisational structure & energy use context:

Business type: Combustion company

Corporate structure and size: Three main sites in the UK with very high levels of energy usage

Pre-ESOS context for energy efficiency action (drivers/barriers):

Energy use context:

- Over 90% of energy was managed by Climate Change Agreement (CCA)
- Single board director with a health and safety brief

- Organisation does have health and safety management system in place, but it was developed overseas and rolled out globally. Energy is included but is a lower priority particularly given the potential health and safety implications of their particular industry
- Board reported to take energy efficiency seriously
- In 2014 organisation closed a site and therefore investment in energy efficiency was challenging
- Significant spend during the late 1990s and early 2000s on 'low hanging fruit' – easy to implement energy efficient measures. Some improvements to heating system are currently being considered.

ESOS compliance process:

- Chemical Industry Association first advised as to the Scheme, with direct mailings also received via the Environment Agency as well
- Felt that there was a period of uncertainty between first finding out about ESOS and then understanding the detail/compliance requirement
- Aware of ESOS in late 2014 and then undertook a scoping exercise in early 2015. The scoping exercise involved liaising with suppliers and the organisation found it straightforward to gather the information and produce a league table of usage on a site-by-site basis
- Organisation decided to pursue most straightforward route to compliance. For example, it considered training an internal assessor but resource was not available, and this route would have required two directors to sign off the report rather than just one. Did not think ISO 50001 was an option because it would have to be implemented over 11 sites and transportation in c18 months – did not think it was feasible
- Lead assessor had previous experience working with the company, and was selected through existing approved suppliers list. Two quotations were sought from this list before confirming the appointed assessor.
- Included in the Lead Assessor RFQ was the commitment to deliver and implement saving opportunities, not simply identify them. Both quotes were considered by the company to have "oversold their services" and recommended the auditing of every site, which the organisation knew was not necessary. Subsequently the chosen organisation only audited two sites. Ultimately, the price was the driving factor with c£3,000 difference between the quotations.
- The lead assessor was described to have "set the timetable" for the compliance activity. The organisation met with the lead assessor in January 2015 and the sites

visits did not then take place until September and November 2015. Report was therefore not issued before the compliance deadline, but the lead assessor did deliver a presentation of key findings within that time for sign off.

- The organisation were notified of the Environment Agency's intention to audit the organisation, which happened in January 2017. The Environment Agency spotted discrepancies in the structure because it had more legal entities registered to the organisation than it had submitted. The organisation felt that it did not therefore understand this part of the process, in particular because it registered a number of non-trading entities (with no premises) and therefore did not consider these to be within scope.

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- ESOS was considered as simply a compliance process so they aimed to comply with lowest external cost. The quality issue with the assessor meant that no further services (in terms of implementing recommendations) were carried out
- Generally, organisation is negative towards the scheme, describing it as a "*box to be ticked*".

Review of ESOS audit report:

Report was described as poor quality. Specifically, it was unstructured and contained information which conflicted, for example between what the organisation had given (i.e. usage information) and what was presented.

The recommendations were not perceived to be constructive. For example, one recommendation analysed energy consumption of the CSP plant against ambient temperature, which are two variables which are unrelated. The organisation felt that they fed the improvements to the lead assessor and did not have confidence in them.

Organisation was audited by the Environment Agency in January 2017 and a review of the audit report was carried out as part of this.

Organisational response to ESOS report/impact of ESOS:

- Organisation viewed ESOS as a compliance issue and because of the quality issues with the lead assessor did not intend to implement any findings as they lacked confidence in them.

Case 10: ESOS compliance led by internal Lead Assessor

Summary of case-study findings:

Example of ESOS being welcomed by an organisation, and adding structure and impetus to an existing desire to increase energy savings within a business. This was primarily facilitated by the attitudes of the Energy Manager, who went on to qualify as an internal Lead Assessor, and the strong support he received from his manager, who is the financial director and a board member.

Implementation of ESOS recommendations to date has been primarily at an infrastructural level. Investment is tightly controlled by payback calculations (at the level of the company's global-parent) which has prevented some recommendations being implemented.

Interviews conducted with: Energy Manager, Chief Financial Officer (board-member).

Key facts and figures (from ESOS survey response):

Turnover £50 million+

6-10 employees with responsibility for energy management

Level of priority placed on energy use by organisation and board rated moderate in 2015, but having increased significantly at board level only since the beginning of the ESOS period

33 days spent on compliance activity

4 days spent reviewing and signing off the ESOS report

£2,000 spent on internal Lead Assessor training

Pre-ESOS context for energy efficiency action (drivers/barriers):

Business type: Manufacturing organisation

Corporate structure and size: Foreign-based parent company owns a number of UK business units, with 1,000 to 4,999 employees in the UK, across 8 main sites

Type of sites and tenure: Multi-site organisation, mixed tenure – owned, leased and rented. Sites are predominantly industrial manufacturing units, with offices attached.

Transport fleet: 20-49 cars.

Relevant recent context: The internal auditor is very engaged in energy efficiency issues, and an internal champion for energy efficiency within the company. This is the first time a comprehensive energy management role has existed in the company. ESOS came in the throes of major review of energy and waste practices in the organisation, so was seized as an opportunity in this context.

Energy use context:

- Energy spend makes up about 10% of turnover, but the business does not consider itself very energy intensive per head of staff.
- Some business activities are very energy intensive, for example, melting and maintaining the temperature of molten metal at one of the business's sites. This can mean other areas of (relatively) smaller efficiencies are less likely to be considered.

Prior corporate or regulatory requirements:

CRC participants and accredited to ISO 14001

Energy efficiency investment process:

Payback considerations are key to all investment decisions, no matter the size. All investments must pay back within 2 years, or will not be considered, which can be restricting. No decision would be taken without a business case.

Attitudes expressed towards energy efficiency:

- The energy manager is very engaged with reducing waste, though energy tends to be a secondary consideration to reducing waste to landfill, which has been a huge area of potential efficiencies for the company.
- Some scepticism around the effectiveness of behavioural approaches to improving energy efficiency – a preference was stated for infrastructure which will “proof initiatives” from human error / failing – e.g. motion sensors on lights and heating that turns off when doors are opened, rather than attempting to train staff and expecting them to remember to do these things.
- This said, there has been some campaigning to reduce the ‘ghost load’. Energy use on Christmas day in 2015 was enough to supply two houses for the whole year. A poster campaign to reduce energy use over Easter was considered a success.

ESOS compliance process:

- Energy manager engaged with ESOS while still a student, and came to the company with the legislation before the company engaged with official communications.
- In communications with BEIS about ESOS, it was suggested that the Energy Manager upskill to conduct the audits in-house. Energy manager attended training

to qualify as a Lead Assessor, then travelled to all of the sites to conduct audits and implement an Energy Management System.

- Submitted compliance well ahead of deadline, as concerned about traffic on the portal approaching the deadline.

Attitudes towards ESOS and implications for approach to compliance and impact of scheme:

- ESOS was seen as a significant opportunity for identifying energy efficiency improvements by the Energy Manager, who was supported by his manager to make the most of the scheme. Conducting internal audits was seen as the most cost-effective approach as well as an opportunity to upskill the energy manager:

“Me, [my manager] and [the MD] have this attitude – we're capable people, we as a team can do it, why pay someone else when you are already paying yourself a wage? There's an attitude of ownership.” - Energy manager

- Some frustration has been felt within the company at the apparent lack of enforcement for ESOS, and the extension of the deadline, when they had worked hard to comply in a timely way.

Review of ESOS audit report:

4-page 'compliance report' which summarised energy use for the business. Full ESOS spreadsheet 'report' which scores energy saving opportunities out of ten rather than quantifying them in monetary terms.

Each site is scored for the following measures: Infrastructure, Lighting – Heating, Compressed air - tools etc., Testing, Supply of utilities 1, Supply of utilities 2, Knowledge, Other.

Organisational response to ESOS report:

- Energy manager is very positive about ESOS, but the ESOS report itself was not seen as a primary impact. Technical and Operational Director (the director of the lead ESOS contact) could not recall recommendations made in ESOS report.
- According to the Energy Manager, the ESOS process was considered of most value (more than the report), as the expertise was gained and remains in the workforce
- The ESOS report that was disseminated was very brief and top-line, as it was thought that MDs would not want or need more information, other than that compliance had occurred. The potential savings identified by the ESOS report has been well-received by the foreign parent firm.

- The ESOS spreadsheet was used extensively with relevant individuals (usually facilities managers) at each site, and contributed to the implementation of an energy management plan at each site.

Impact of ESOS:

- The ESOS process has had an impact, as savings were identified in the course of the audits and later implemented. Examples of actions include:
 - Turning off machines over the weekend / when not in use – for example, solder dip machines that keep molten metal hot.
 - Streamlining processes, so, for example, one furnace is filled to capacity rather than having two half-full furnaces running.
 - Fixing leaks of compressed air.
 - Installation of a sensor system which turns off heating when doors are opened.
- One major potential saving was identified but could not be implemented because the payback criteria could not be met. Currently energy is generated using a diesel generator for a specific testing process. This process is very inefficient compared to drawing energy from the grid. While major savings could be achieved by arranging for energy to be drawn from the grid, the contract for the specific testing process will only run for two further years, so the payback criteria have not been met and the change has not been implemented.
- The training the internal Lead Assessor received has benefitted him in his wider and ongoing role as energy manager.
- ESOS was the impetus for development of an Energy Management Framework for each site, which each site now takes ownership of.
- It is difficult to quantify the precise impact of ESOS, because the scheme was used as a framework through which the existing impetus and enthusiasm of the energy manager was directed. Much change may have happened anyway, particularly as the company is now working towards ISO 50001.

