



Department for
Business, Energy
& Industrial Strategy

RESEARCH ON ENERGY AUDITS AND REPORTING, INCLUDING THE ENERGY SAVINGS OPPORTUNITY SCHEME (ESOS)

Phase 2 Technical Report

February 2020



OGL

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1. Introduction

Background to this document

This Technical Report sits alongside the Phase 2 report for “Research on Energy Audits and Reporting, Including ESOS”¹. It contains the aims and approaches to all primary and secondary data collection and analysis strands of the project. It also presents the theory of change and evaluation frameworks that guided the design, delivery, analysis and synthesis of the strand of the study which focused on a longer-term evaluation of the ESOS policy. This report also includes the research materials from all strands.

The methodology associated with Phase 1 of this study are included in annexes within the Phase 1 report itself.

¹ <https://www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme>

2. Evaluation framework

A theory-based approach to assessing the impact of ESOS on the energy efficiency practices and outcomes of its obligated population was undertaken.

The feasibility of conducting a quasi-experimental evaluation of ESOS was explored (in the [2016 feasibility and early impact evaluation study](#)) but was found to face substantial challenges. Most significantly, the ESOS-obligated population lacks a natural comparison group to form a counterfactual given compliance is a universal requirement for large organisations. While various approaches were considered during the feasibility study to construct a counterfactual group, these were found to either lack comparability to the ESOS population or to involve significant analytical hazards or implementation risks. A full exploration of these considerations is available in the published evaluation scoping study.

This means that while quantitative and longitudinal approaches were used to measure the realisation of key outcomes in the ESOS population as far as possible, an assessment of the extent to which ESOS had influenced the realisation of these outcomes was explored using a synthesis approach. Data were collected from a range of key stakeholders through a quantitative survey and in-depth qualitative research, supported by energy savings modelling; these sources of evidence were synthesised for consideration against the evaluation questions.

To support future policy decisions, the evaluation questions considered not only the extent to which energy audits and reporting in general, and ESOS specifically, had led to energy efficiency savings, but also focussed on “in which ways and in which contexts” they had done so. 2 Principles of a realist approach – specifically developing a Context-Mechanism-Outcome (CMO) framework alongside a theory of change – were therefore adopted as a useful framework for designing a data collection approach to best answer the full range of evaluation questions.

The sampling frame for qualitative case studies was designed to ensure the full range of organisational contexts identified in the framework were captured and this framework also fed into the design of the quantitative survey and qualitative topic guides to explore whether or not the mechanisms hypothesised to be relevant in different contexts were apparent in reality and whether there were further alternative mechanisms. The CMO framework, and more broadly the framing of the evaluation around the realist-inspired question of “what works, for whom and in which contexts”, also informed the subgroup analysis within both the quantitative and qualitative data.

Overall, this approach supported a wide-ranging evaluation that gathered multiple perspectives on ESOS but also other influences on organisational energy efficiency. It supported the evaluation team to explore how the influence of ESOS varies and in what ways depending on the context in which audits were delivered and recommendations received.

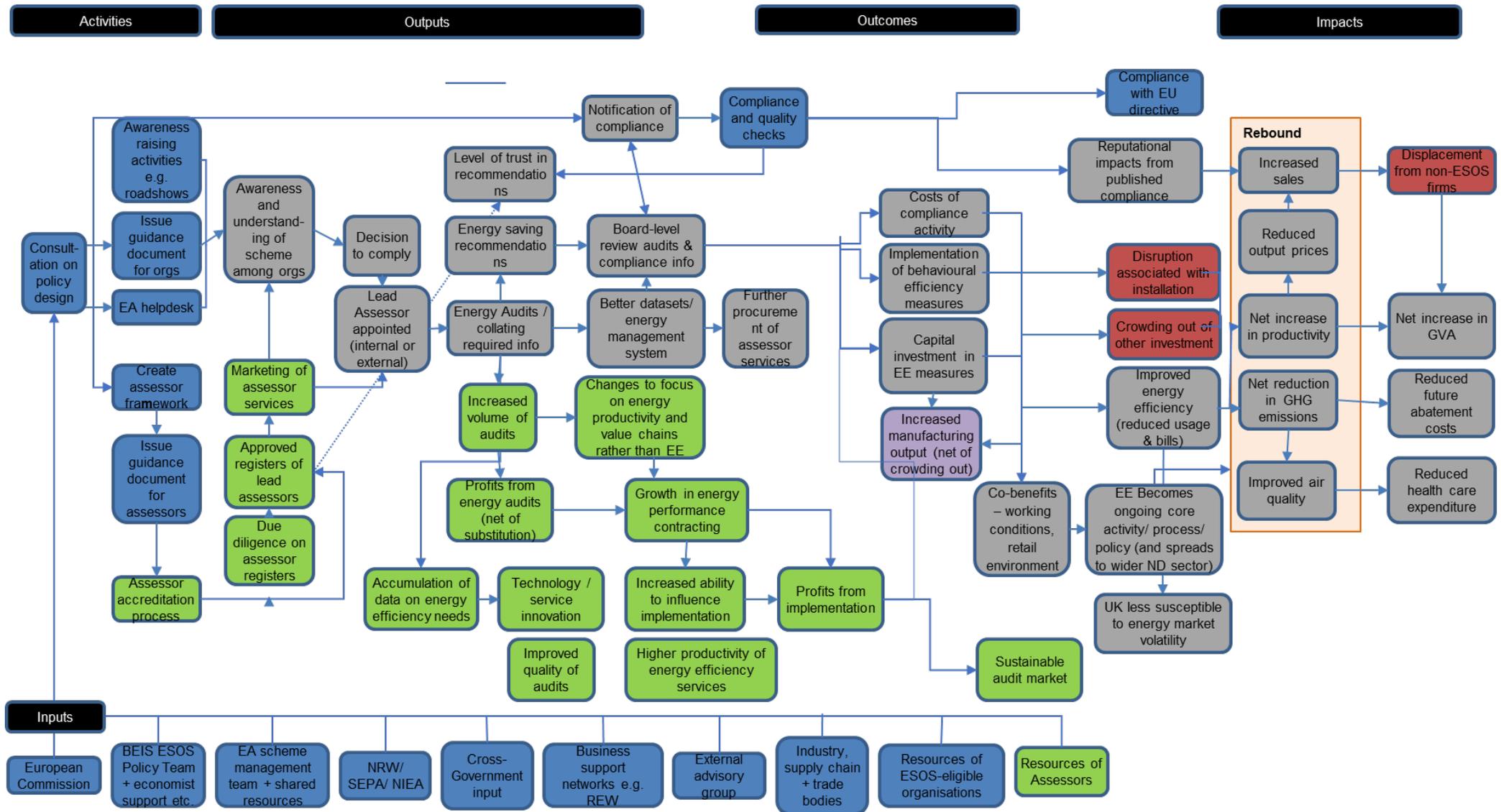
Theory of Change

The evaluation of ESOS was guided by a **theory of change** which sets out the causal pathway through which the inputs and activities involved in ESOS are anticipated to lead to the policy's intended outcomes and impacts. This theory of change sat at the centre of the evaluation framework as it defined the key outcomes of interest for the impact evaluation; the key activities and processes to assess; and the external factors, assumptions and risks that could affect the realisation of the policy vision.

The theory of change was updated during this project from that produced during the interim ESOS evaluation. This update followed a theory of change workshop facilitated by the evaluation team with BEIS policymakers and analysts in June 2018. The interim evaluation theory of change was focused on the implementation of measures leading directly to energy efficiency savings. In addition, the workshop identified additional activities, outputs and outcomes of interest: including co-benefits to the implementation of energy efficiency measures (such as improved working conditions) and the longer-term embedding of energy efficiency principles via a broad shift in organisational culture, beyond the implementation of individual measures. This updated theory of change and its supporting rationale, assumptions and external factors are shown in Figures 1 and 2.

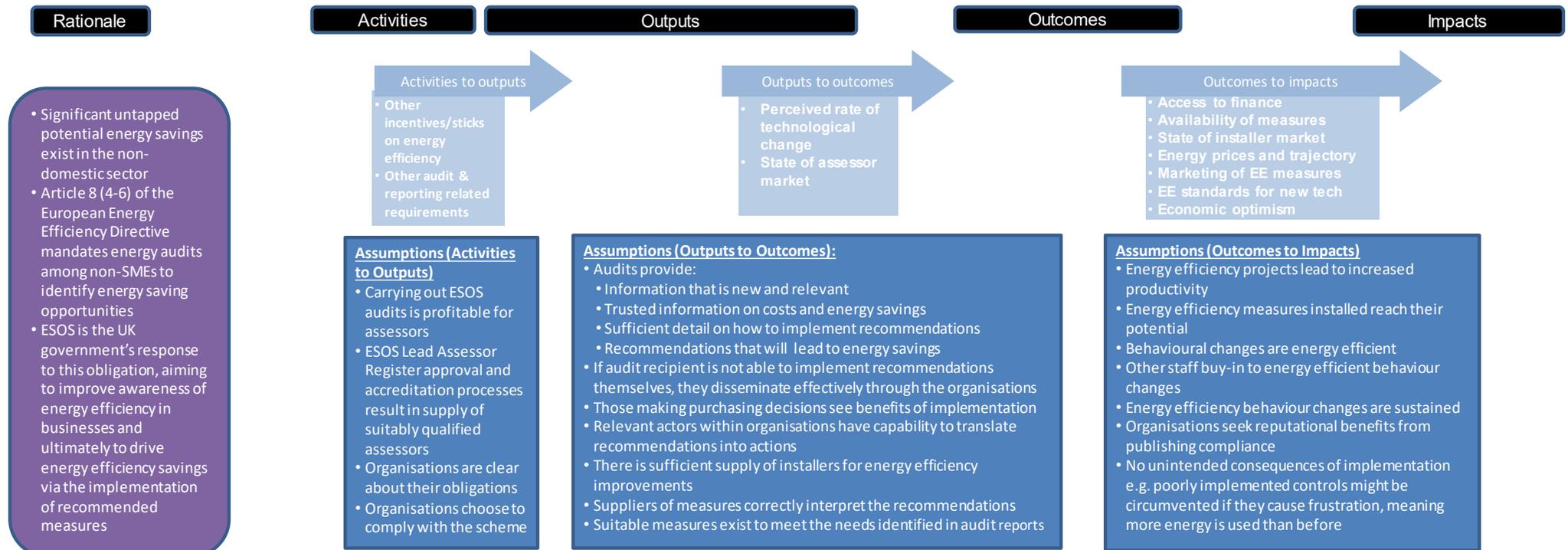
As well as the revised theory of change, a set of alternative hypotheses were also developed. These outlined alternative routes to the same outcomes and impact being realised in the absence of, or in spite of, ESOS. These are presented in the next section.

Figure 1: Theory of change diagram



2. Evaluation framework

Figure 2: Theory of change rationale, assumptions and external factors



Hypotheses and alternative hypotheses

The impact evaluation ultimately sought to test **four high-level hypotheses** which were based on the vision of success for ESOS of key policy stakeholders elicited in a theory of change workshop:

H1	If organisations comply with ESOS, then there will be additional reductions in energy consumption and associated emissions from compliant organisations (for a given level of output) , because they adopt more energy-efficient practices or processes and install more energy-efficient equipment as a result of information seen in their ESOS audit report.
H2	If organisations comply with ESOS then there will be an upward shift in the level of priority organisations give to energy efficiency in BAU state (for example, in planning or investment decisions) because of the adoption of better energy management practices in the longer term.
H3	If organisations comply with ESOS via externally commissioned audits then a high quality and sustainable audit and energy services market will develop more quickly because of demand for audits which in turn encourage ongoing commissioning of (profitable) services.
H4	If (obligated) organisations comply with ESOS then there will be additional reductions in energy consumption and associated emissions (for a given level of output) across the wider non-domestic sector because the buoyant assessor market and supply chain stimulates energy audits and implementation of recommendations among non-ESOS obligated organisations.

The theory of change described the anticipated causal chain for the achievements of ESOS's intended outcomes and impacts. However, it is also possible that the same outcomes and impacts could be achieved via **alternative pathways**, without the influence of ESOS. These are summarised in the table below (linked to the overall hypotheses above).

Alternative hypotheses		Alternative pathway for hypothesis:
A1	If organisations have carried out audits previously, then there will be additional reductions in their energy consumption and associated emissions (for a given level of output) , because they adopt more energy-efficient practices or processes and install more energy-efficient equipment as a result of information seen in their previous audit reports.	1

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A2	<p>If organisations participate in other schemes e.g. CCA, then there will be additional reductions in their energy consumption and associated emissions, because they adopt more energy-efficient practices or processes and install more energy-efficient equipment as a result of information highlighted by these other schemes</p>	1
A3	<p>If energy costs are a significant outgoing for organisations, then there will be additional reductions in their energy consumption and associated emissions (for a given level of output) and an upward shift in the level of priority given to energy efficiency in BAU state (for example, in planning or investment decisions), because they adopt more energy-efficient practices or processes (including in the longer-term) and install more energy-efficient equipment for economic reasons.</p>	1, 2
A4	<p>If assessors are able to successfully encourage the voluntary uptake of audits, then a high-quality and sustainable audit and energy services market will develop more quickly because of demand for audits, which in turn encourage ongoing commissioning of (profitable) services.</p>	3
A5	<p>If simple-to-execute grants or concessionary loans are available to SMEs for audits and implementation of energy efficiency measures, then there will be additional reductions in energy consumption and greenhouse gas emissions (for a given level of output) across the wider non-domestic sector, because the key barrier of finance will have been overcome.</p>	4

Context-Mechanism-Outcome framework

As mentioned above, the evaluation adopted principles of a realist approach as a framework for data collection, specifically to inform the design of research instruments and research samples. At the core of the realist approach is seeking an understanding, not

2. Evaluation framework

only of **whether** a policy contributes to its intended outcomes, but also **how, for whom and in what circumstances**². A Context-Mechanism-Outcome (CMO) framework was developed to create a set of hypotheses (presented as CMO statements) which articulated for whom, and in what circumstances (i.e. in what 'contexts'), the ESOS policy was expected to lead to particular reasoning and choices being made (i.e. causal 'mechanisms' being activated), leading to desired or undesired policy outcomes.

The framework contained:

- The four **overarching hypotheses** that summarise how ESOS intends to deliver on its key outcomes, as well as the five **alternative hypotheses** for how these outcomes may be achieved in the absence of ESOS, as set out above.
- **Context sets**: a list of the contexts that may affect whether, and the extent to which, ESOS is impactful. This considered contexts for both obligated organisations and Lead Assessors. In order to keep the list of contexts manageable, these were grouped into 'context sets': for example, 'organisational attitudes to energy efficiency' or 'organisational resources for energy efficiency', each of which contained a number of specific underlying contexts.
- **Mechanisms sets**: a list of the reasoning or choices that may affect whether, and the extent to which, ESOS is impactful: for example, whether or not organisations found the recommendations in the ESOS report to be trustworthy and relevant. Again, the reasoning or choices made in response to the policy by assessors were included as well as those that may be made by obligated organisations.
- **Context-Mechanism-Outcome configurations**: these combined contexts and mechanisms to show how they may jointly influence either desired or undesired policy outcomes. CMOs were defined for each of the four overarching hypotheses for ESOS. This did not represent an exhaustive list of all possible context-mechanism combinations, but instead reflected those believed plausible by the evaluation team and BEIS, drawing on previous research and evaluation into ESOS, including phase 1 of this study³ and the interim evaluation⁴. The CMO combinations were also designed to be illustrative of the range of possible organisational/assessor contexts and responses, for example from those offering strong enabling contexts for ESOS to have impact, to those where ESOS was least likely to be effective.

An extract of the final CMO framework is provided below. This presents the full Context and Mechanisms sets developed during the evaluation and two examples from the CMO configurations to show how these worked in practice.

² Pawson R, Tilley N. Realistic evaluation. Sage, 1997

³ <https://www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme>

⁴ <https://www.gov.uk/government/publications/energy-savings-opportunity-scheme-esos-evaluation-of-the-scheme>

Context set		Helpful context	Unhelpful context
	Organisational context sets		
C1	Organisational attitude to energy efficiency	<p>Positive attitude to energy efficiency. This can be driven by any of/mix of: senior personnel championing energy/sustainability issues; considering the ROI on EE action to be attractive; and external demand from client base.</p> <p>Perceive any risk/burden with taking energy efficiency action to be acceptable</p>	<p>Negative perception of energy efficiency e.g. lack Board-level support for energy efficiency action, no culture of considering energy efficiency</p> <p>Perceive risks/burden to taking energy efficiency action (e.g. risks to realised levels of returns, operational disruption)</p>
C2	Organisational experience of audits	<p>Positive relationship/has had positive experience working with an energy assessor</p> <p>No experience of auditing (could be helpful or unhelpful)</p>	<p>Negative relationship /previous experience working with an energy assessor</p> <p>No experience of auditing (could be helpful or unhelpful)</p>
C3	Organisational resources for energy efficiency	<p>Financial resources available that can be used for energy efficiency actions</p> <p>Human resources & skills available that can be used for energy efficiency actions</p>	<p>Limited financial resources or do not ringfence these for energy efficiency actions</p> <p>Limited personnel/ or lack the required skills to be able to implement energy efficiency actions</p>
C4	Organisational EE potential	<p>Level of unrealised potential for EE improvements</p> <p>Extent to which energy management is already operationalised e.g. via ISO 50001 certification</p>	
C5	Organisational structure/policies	<p>Internal champion promoting energy management issues</p> <p>Board frequently reviews energy efficiency policies and practices</p> <p>Higher level company requiring a focus on energy reporting</p> <p>Targets for energy use and/ or emissions reductions</p> <p>Wider CSR policies, of which energy use and/ or emissions reductions are one component</p>	<p>No-one with dedicated responsibility for energy issues</p> <p>Board do not review energy efficiency policies and practices, leaving this to dedicated teams</p> <p>Energy issues are dealt with by a central Procurement, Finance or other team (but not one dedicated to energy issues)</p> <p>No targets for energy use and/ or emissions reductions</p> <p>No defined CSR policies</p>

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C6	Organisational regulation context	Strong regulatory drivers (e.g. Health & Safety) Participates in other energy-related policies (e.g. CCA, CRC, GHG Reporting)	
C7	Organisational energy context	Relative size of energy costs as a proportion of total outgoings Good levels of submetering	Relative size of energy costs as a proportion of total outgoings Lack of access to granular energy data due to suboptimal metering arrangements
	Assessor context sets		
C97	Assessor attitude to ESOS	Perceive ESOS to offer potential long term business opportunity (i.e. by generating opportunities for follow-up services) Perceive ESOS to offer opportunity for profitable auditing work	Perceive ESOS to offer short-term work Perceive ESOS to offer low-return work
C98	Assessor networks	Established client base to market to with offer of ESOS audits	New to the auditing market
C99	Assessor experience	Experienced delivering energy audits in the sectors they deliver ESOS audits to (e.g. transport, aviation, industrial processes)	New to energy audits in the sectors they delivery ESOS audits to
	Mechanism set	Helpful	Unhelpful
	Organisational mechanism sets		
M1	Perceived trust & relevance of ESOS recommendations	Organisations trust ESOS recommendations Organisations find ESOS recommendations relevant	Organisations do not trust ESOS recommendations Organisations do not find ESOS recommendations relevant
M2	Perception of business opportunity	ESOS recommendations perceived as offering a good business opportunity due to the energy savings identified which justify the cost and effort involved in implementation	Perceive the implementation of recommendations as unacceptably disruptive to their operations

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		<p>Audits help provide trust in investment decisions</p> <p>Perceive improvements to their reputation with customers as a result of implementation of EE recommendations</p>	<p>Consider other types of investment to represent a better business opportunity</p> <p>ESOS recommendations do not provide new information</p>
M3	Perception of co-benefit to EE action	Perceive co-benefits to energy efficiency of implementing EE recommendations, such as around staff welfare	Perceive changes they could make to improve energy efficiency to have trade-offs for their other priorities (for example, health & safety, customer preferences)
M4	Actions following audit	<p>Audit recommendations shared across teams/sites</p> <p>Audit recommendations shared externally</p> <p>Energy managers use the audit as a tool to help increase the priority placed on energy efficiency at board level</p> <p>Energy managers procure energy management software to understand their consumption in more depth</p> <p>Organisations are convinced of value of better energy management and commit to ongoing monitoring of energy use and energy efficiency action plans, including further commissioning of energy auditor services</p>	Organisations undertook the audit due to a fear of penalty action (or associated reputational issues) but do not engage with the recommendations
	Assessor mechanism set		
M99	Assessor response to policy	<p>Deliver high quality audit that presents clear and relevant savings opportunities</p> <p>Think of different ways to present audit information to less engaged organisations</p> <p>Use ESOS success stories to market themselves to the wider non-domestic sector</p>	<p>Deliver low quality audit due to a lack of understanding of the sector</p> <p>Deliver low quality audits to organisations that seek compliance at lowest cost</p>

Examples of context, mechanism and outcome configurations

Context scenario	Context description	Mechanism	Outcome
C1 Helpful	Positive attitude to energy efficiency	ESOS recommendations do not provide new information e.g. they already knew about opportunities due to previous audit activity, or participation in other schemes (M2 unhelpful)	LIMITED ADDITIONALITY: ESOS does not lead to additional energy efficiency action
C3 Helpful	Have resources to act		
C6 Helpful	Participates in other energy-related policies (e.g. CCA, CRC, GHG Reporting)		
C4 Unhelpful	Low unrealised EE potential		
C97 Helpful	Positive assessor motivation		
C1 Helpful	Positive attitude to energy efficiency	Organisations trust the recommendations they receive through ESOS (M1 helpful) Recommendations perceived as offering a good business opportunity due to the energy savings identified which justify the cost and effort involved in implementation (M2 helpful)	HIGHLY DESIRED: ESOS leads to additional uptake of energy efficiency practices or measures
C2 Helpful	Positive prior auditor experience		
C3 Helpful	Have resources to act on EE		
C4 Helpful	Unrealised EE potential		
C97 Helpful	Positive assessor motivation		

The CMO sets developed informed the design of both the qualitative and quantitative research, such that the various CMO configurations could be explored:

- As set out in Chapter 3 of this report, questions were added to the telephone survey of complier organisations to help assign **contexts** from the CMO framework to organisations;
- Organisations were then recruited to the case studies based on these contexts, as described in Chapter 4;
- The discussion guides for both organisational case studies and interviews with assessors were designed to capture data on the **mechanisms** in the CMO framework;
- These research materials built on those used in the interim evaluation, for which relevant questions on **outcomes** (specifically uptake of energy or fuel efficiency practices or measures) were already included;

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- The research instruments and samples were designed in such a way as to explore the CMO configuration so that analysis could be conducted to understand in which ways and in which contexts energy audits and reporting, including ESOS, led to energy efficiency savings.

Synthesis approach

As described above, the nature of the ESOS policy, in particular the lack of a clear comparison group, precluded a quasi-experimental approach to evaluating the impact of the scheme. Thus the evidence from the various strands of research set out below was triangulated in order to assess whether or not ESOS had been an influencing factor in the outcomes observed.

This approach to attribution involved drawing conclusions primarily from the quantitative survey which provided representative data on the ESOS complier population, supported by examples of how ESOS leads or does not lead to its anticipated outcomes from the qualitative research. Thus, while the energy savings modelling informed by the quantitative survey formed a key strand of evidence for understanding shifts in organisational energy efficiency, it was through the wider survey and in-depth qualitative research that conclusions were formed as to the likelihood of ESOS being a key influencer of energy consumption. The CMO framework helped to inform the analysis, as the key contexts that it identified were used as subgroups for further analysis.

The evaluation team took an iterative approach to assessing the evidence base, which was facilitated through a series of analysis sessions across the evaluation team, including a session with BEIS and project partners. These sessions explicitly considered the extent to which the evidence supported the overall theory of change focused on the causal pathway for ESOS versus the documented alternative hypotheses, identifying elements where the evidence base was less clear. This enabled the ongoing evidence collection (through further rounds of organisational case-study visits and qualitative interviews with assessors and supply chain representatives) to focus on supporting the evaluation team to further explore these issues. This resulted in a strengthening of the later assessment of ESOS's role versus that of other factors.

The analysis sessions were structured to:

- Explore the evidence from the various sources against the following **key evaluation questions**:
 - **RQ1: Organisational appetite for audits & reporting**: when & why they are used
 - **RQ2: Response to ESOS audits**: uptake of recommendations, other impacts
 - **RQ3 and 4: Lessons for wider policymaking** to support audits & reporting
- Test key elements of the **CMO framework**:
 - **Contexts** in which benefits of audits are realised / not realised
 - **Mechanisms** within audits driving action

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- The possible **outcomes** of ESOS, summarised as four overarching **hypotheses** and five **alternative pathways**

As such, these analysis sessions helped to generate an understanding of the impacts of ESOS, including the contexts in which ESOS had more or less impact, and the mechanisms by which these impacts were realised.

To organise the evidence to inform these sessions, interview notes for each assessor interview were transcribed into an analysis grid structured by the key evaluation questions, while case-study evidence was analysed directly from interview notes. Detailed notes were taken during the analysis sessions and used to develop the initial report structure and slide decks presented to BEIS.

The triangulation of evidence in forming conclusions varied depending on available evidence for answering the different evaluation questions. As such, the key findings of the impact of ESOS on organisational energy efficiency was focused on the representative survey of compliers and the modelling work, which were based on large quantitative samples. Qualitative examples from case study organisations were used to both support the broad quantitative findings, and to illustrate the range of experiences, such as how ESOS led directly to energy efficiency upgrades, even if this was relatively rare. By contrast, evidence as to the impact of ESOS on the wider market for energy efficiency services and products was primarily qualitative. Furthermore, triangulating views on lessons learned considered their sources, for example recommendations by assessors in some cases were judged to be motivated by increasing demand for assessor services without clear policy benefits and were therefore not included as lessons learned.

3. Telephone survey of ESOS obligated parent organisations

A quantitative telephone survey was conducted with a representative sample of 503 parent level organisations who complied with ESOS. The survey fieldwork took place in November and December 2018. It built on a baseline survey conducted in Autumn 2016 as part of an interim evaluation of ESOS. This follow-up survey was timed to ensure that more time had elapsed since the first compliance period for ESOS, enabling more opportunity for the implementation of energy and fuel efficiency measures to have occurred and potential impacts of ESOS to have been realised. There was a longitudinal element to the survey, with 276 of the organisations surveyed having also taken part in the survey strand of the interim evaluation in 2016.

Key aim for this task

The main aim of the survey of ESOS complier organisations was to provide self-reported quantitative measures for the impact of ESOS on these organisations. This data in turn was a key input into the energy and emissions saving analysis. The survey also aimed to capture key data on organisational contexts which may have influenced the implementation of energy and fuel efficiency measures, such as the priority placed on energy efficiency.

Sampling

Sample approach

In 2016, Ipsos MORI carried out a baseline survey of ESOS organisations (mostly of compliers but also including ESOS obligated organisations who had not yet complied). This baseline survey covered many of the same topics as the 2018 follow up survey. All respondents were asked if they were willing to be recontacted to take part in further research. To the greatest extent possible, the sample for the 2018 survey was **longitudinal**, that is using the recontact sample of 585 complier organisations from the baseline survey that were willing to be contacted about future research. This longitudinal design was implemented to track how organisations' response to ESOS changed with time since compliance. It also enabled the study to follow up on energy efficiency measures reported as planned by complier organisations in 2016, in order to understand implementation progress by 2018.

Nevertheless, a **boost** was needed of complier organisations that had not taken part in the baseline survey to:

- ensure the target of 500 survey completes was met, as it was not considered realistic to achieve this from the recontact sample of 585 (given natural attrition between survey waves in a longitudinal survey, and the likelihood of participants in 2016 having left their post); and,

3. Telephone survey of ESOS obligated parent organisations

- correct for differences between the profile of the recontact sample and the known population profile of compliers, such that the final achieved sample (combining both boost and recontact interviews) was representative of compliers.

Population description

The survey sample was designed to be representative of the population of ESOS compliers while also being comparable with the 2016 baseline survey. The population was therefore defined as organisations who had notified their compliance with ESOS as of August 2016. This is the same population from which the sample for the baseline survey was extracted⁵. This approach was chosen in preference to using the most up-to-date complier population for the following reasons:

- It ensured the two survey waves used the same sampling frame, making longitudinal comparisons more valid
- It better facilitated using compliance date as a sample selection variable, as it ensured both the re-contact sample and population from which the boost was drawn had the same range of compliance dates
- Using August 2016 as the cut-off date covered at least 90% of the latest total population of compliers, and could therefore be considered broadly equivalent
- Any cut off point beyond the compliance deadline was considered arbitrary by definition: even if the population was defined using the latest complier database available at the time, the population would be out of date at the time of publication of the report

Sample selection

All 585 organisations in the recontact sample from the 2016 baseline were included in the survey sample.

The boost sample was drawn from the total population of compliers up to August 2016, with the following exclusions:

- Organisations that had taken part in the baseline survey but not consented to be recontacted about further research
- Organisations that had refused to participate in the baseline survey

The sample was stratified by compliance date, sector, parent (UK or foreign), ISO 50001 certification, region, number of employees and turnover. The boost sample was randomly drawn into batches such that leads would be called multiple times, and new batches only used when the sample had been exhausted. This reduced the risk of non-response bias.

⁵ The 2016 survey used a sample of highest parents from the latest available compliance database. Further detail of the rationale taken in designing the 2016 survey is available in the technical annex to the [Interim Evaluation Report](#)

Questionnaire development

Draft questionnaire

The questionnaire was developed based on the evaluation framework set out at the start of the research and builds on the 2016 questionnaire. The 2018 survey sought to understand the actions of ESOS compliers, organisational plans around improving efficiencies, and further questions which aimed to understand how this varied in different organisational contexts (to test the CMO framework set out in Chapter 2, and to form the basis of the sample profile for the follow-up case-study recruitment). The 2018 questionnaire incorporated questions from 2016 which captured, and tracked progress against, the key outcomes detailed in the theory of change and CMO framework (i.e. on energy and fuel efficiency practices and measures). Where possible, the Phase 2 questionnaire was designed to repeat questions from the baseline survey, which allows for the data to be compared. Additional questions were added to the Phase 2 survey which aimed to close any evidence gaps identified in the Phase 1 report.

The questionnaire was drafted to gather the necessary evaluation data on process and impact-related issues based on the key evaluation questions.

Table 1 – Questionnaire structure and rationale

Section title / aims	Key aim / rationale
1. Introduction and screener section	Identify most suitable respondent within organisation: initially targeting the respondent to the first survey for the recontact sample, or leads from the compliance database for the boost, or if these individuals are no longer in post then identifying the person with responsibility for energy management.
2. Energy related attitudes, behaviours and investments (longitudinal comparison)	Explore the organisation's attitudes, culture and behaviour (including investment) towards energy efficiency; repeating baseline questions to measure changes in key outcomes e.g. priority levels given to energy efficiency, energy efficiency targets, number and type of staff with a role in energy efficiency (including energy champions), annual investment in energy efficiency, etc., previous experience of energy audits, tendency to consult externally on these issues.
3. Energy efficiency measures implemented or planned, and role of ESOS vs. other factors (self-reported impact)	Gather detail on specific energy and transport efficiency measures installed or policies introduced (or planned), over the last 2-3 years and ask extent to which these resulted from / are planned because of ESOS recommendations. The additional time passed since the interim evaluation means more time for benefits to have been realised. Record key associated data (e.g. floor area) needed for modelling as part of the energy efficiency and savings analysis. Also explore other main factors influencing any actions on energy efficiency.

3. Telephone survey of ESOS obligated parent organisations

4. Other lasting ESOS effects (self-reported impact)	Gather overall reflections on ESOS – process, usefulness of audit, impacts, cost-effectiveness. Perceptions of ongoing barriers to energy efficiency and any limitations to ESOS. Explore longer-term implications of choice of ESOS compliance route e.g. whether still in contact with external Lead Assessor. Whether compliance activity for ESOS 2019 has started and through what process.
5. Dissemination of ESOS through corporate groups	Understand how parent level organisations have communicated the audit report to other layers of their company structure, e.g. sharing it by email, presentations, workshops.
6. Contextual data and demographics	Gathering information on external confounding factors e.g. participation in other related schemes, change in company size, ownership or primary activity.

Several survey processes were implemented in an effort to maximise the accuracy and value of the data gathered in survey, based on learning from the 2016 baseline survey. These included:

- **Maximising participation:** best practice techniques were used to maximise participation such as providing advanced warning of the survey and a motivating introduction which explained the value of participating.
- **Maximising valid responses through flexible questions:** allowing participants to respond in a number of ways or by providing broad response categories to questions helped secure responses.
- **Maximising comparability of data capture:** as the role and remit of respondents to the survey varied considerably across the sample (from facilities managers to finance directors, and from those based at one operational site to those based in central shared services teams), collecting outcomes measures based on a comparable scale of organisational structure posed an analytical hazard. The survey mitigated this by asking participants about the scope of their energy management responsibility, the size and number of sites of their organisation, checking responses relate to sites or organisations, and through considering conversion factors.
- **Capturing investment (or planned investment) in energy efficiency measures:** A fully comprehensive list of measures would be vast and highly varied according to relevance by sector, building and operations type and prior energy efficiency history; a standardised list of 26 measures, adapted from the list of over 100 eligible measures supported by Salix⁶, was therefore used. Organisations were only asked

⁶ Salix provides interest free loans to the public sector for energy efficiency projects, funded by BEIS, the Department for Education, and the Welsh and Scottish Governments. Salix supports over 100 specific eligible energy efficiency technologies in 29 broader categories. This list was considered far too long to use in the survey therefore an abridged list of 26 measures in 8 broad categories was developed from the Salix list.

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about measures in up to two categories to keep the questionnaire at a length that would maintain engagement.

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:

- **Live pilot** - the questionnaire was piloted with 25 representatives from ESOS-compliant organisations to test the survey in a live environment, to refine the question wording and any aspects of the interviewer approach and indicate the length of the survey. After the pilot, feedback from interviewers was collated in writing, and via a telephone debrief. Ipsos MORI and BEIS discussed the pilot feedback and amendments to the survey ahead of the main stage of fieldwork. These changes primarily ensured the length was appropriate to maximise response.
- **Advance emails** - all representatives from ESOS-obliged organisations in both samples were sent an advance email ahead of fieldwork. This provided potential participants with:
 - details of what the survey was about, how it would operate in practice and how the findings would be used;
 - information regarding how Ipsos MORI obtained their contact details;
 - reassurances about how their personal data would be stored, the anonymity of their survey responses; and how the survey findings would be used; and
 - a link to a short information sheet which included details of how to opt out.
- **Making initial contact:** for the recontact sample, interviewers targeted the 2016 participant in the first instance. If they were not available, or had left their post, interviewers would attempt to engage the person responsible for long term decisions around energy use and management. For the boost sample, contact details in the complier database were used to engage named contacts, however interviewers checked these were the most suitable respondent i.e. the primary contact in the complier database may have taken responsibility for ESOS from a legal or compliance perspective, with someone else best placed to discuss energy use and management more broadly.
- **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).

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- **Responding to customer queries during fieldwork** - the sample contacts were given the opportunity to contact the survey team should they have a question, comment, complaint that they wished to lodge, or to opt out via a study-specific email address. Where necessary a follow-up phone call was made or e-mail written to ensure that the matter was dealt with.

Fieldwork quotas and final outcomes

Quotas were set to ensure that the final achieved survey sample was representative of the complier population as of August 2016. However, some quotas were relaxed during fieldwork in order to maximise the number of interviews with the recontact sample. This was necessary as the recontact sample was skewed with respect to some sample variables, in particular it contained a disproportionate number of early compliers. A fully representative sample would therefore have needed to exclude some early compliers from the recontact sample, meaning the use of this sample would not have been maximised by definition. The final achieved sample is shown in Table 2.

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Table 2 - Fieldwork quotas and final outcomes

Overall sample	Completes
Recontact (R)	282
Boost (B)	221
Total	503

Region	Quota	Completes			
		Total	% of quota	R	B
Midlands	106	111	105%	60	51
Greater London	172	154	90%	86	68
North	76	84	111%	50	34
South	96	110	115%	61	49
Devolved administrations	50	44	88%	25	19

Headcount quintile	Quota	Completes			
		Total	% of quota	R	B
1	100	110	110%	70	40
2	100	94	94%	56	38
3	100	104	104%	54	50
4	100	88	88%	42	46
5	100	107	107%	60	47

Turnover quintile	Quota	Completes			
		Total	% of quota	R	B
1	100	106	106%	67	39
2	100	87	87%	53	34
3	100	105	105%	52	53
4	100	101	101%	54	47
5	100	104	104%	56	48

Parent	Quota	Completes			
		Total	% of quota	R	B
UK parent	320	310	97%	183	127
Foreign parent	180	193	107%	99	94

Sector	Quota	Completes			
		Total	% of quota	R	B
Manufacturing	100	115	115%	72	43
Other intensive industries	40	44	110%	27	17
Automotive	70	65	93%	38	27
Financial and insurance activities	45	26	58%	13	13
Misceellaneous services	150	150	100%	86	64
Other service activities	85	103	121%	46	57

ISO 50001 at any site	Quota	Completes			
		Total	% of quota	R	B
Yes	36	46	128%	31	15
No/ missing	464	457	98%	251	206

Compliance date	Quota	Completes			
		Total	% of quota	R	B
Pre- Nov 2015	45	58	129%	38	20
Nov-15	105	124	118%	82	42
1 - 5 Dec 2015	145	162	112%	87	73
6 Dec 2015 - 24 Jan 2016	45	37	82%	17	20
25 - 29 Jan 2016	105	83	79%	39	46
After 29 Jan 2016	55	39	71%	19	20

Weighting

The survey data was weighted prior to analysis to reduce the bias from any disproportionate non-response to the survey (i.e. correcting for divergence between achieved interviews and quota targets). It was weighted such that the sample was representative of the population with respect to:

- region;
- turnover and number of employees (by quintile);
- highest parent (UK or foreign);
- sector;
- compliance date; and
- ISO 50001 at any site.

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The rim weighting efficiency was 92.5%, meaning an effective sample size of 465.

Impact of randomisation of categories of energy efficiency measures

Where participants had installed measures in more than two categories, the interview script implemented a randomisation procedure to limit detailed questions about measures to two categories to reduce participant fatigue. This section explains that process and the implications of taking this approach: it was not possible to report on certain measures as a result, further details of which are provided below. In addition, for some measures, it was possible to report minimum estimates of the extent of implementation only. Further details are also provided below, and where this is the case it has been flagged in the main evaluation report.

Background

Question 14 of the survey asked participants if they had implemented, or planned to implement, energy efficiency improvements from a list of eight broad categories (heating, lighting, cooling, computers & IT, processes, hot water, building fabric and ventilation). If they said they had implemented or were planning to implement measures in a given category, they were then asked if they had implemented or planned to implement specific individual measures in that category at question 15.

For example, an organisation that indicated they had implemented cooling measures at Q14 would be asked specifically about cooling plant upgrade or replacement, cooling control systems and replacing air conditioning with free/ evaporative cooling at Q15. There were between two and five specific measures on the list for each category.

For specific measures that have been implemented, participants were also asked:

- whether this was done as a result of ESOS, or other factors (Q17); and
- for multi-site organisations, the proportion of sites in which the measure had been implemented (Q16).

Thus, if a participant reported at Q14 that they had implemented measures in all eight categories, they could in principle be asked follow-on questions about implementation, influence of ESOS, and prevalence across sites (Q15-17) for up to 26 measures. The pilot carried out as part of the baseline survey revealed that this could lead to very long interviews, inducing participant fatigue.

Therefore, for the mainstage of the baseline survey, participants were only asked about a maximum of two categories at Q15 onwards. If they reported implementing measures in more than two categories, they were randomly allocated two by the telephone interviewing script. This ensured the survey length was appropriate.

This approach of limiting the detailed questions asked in the survey to a random selection of two categories of energy efficiency measures (where more than two categories were initially selected by the respondent) was also adopted in the 2016 survey.

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Impact of randomisation on data about measures implemented

By adopting this randomisation approach, a significant volume of data about specific measures implemented and the attribution to ESOS was not captured. For example, for the 65 organisations that have implemented measures in four categories, the randomisation meant there were two categories per organisation that could have been asked about but were not, and therefore 130 instances in total of missing values for a category. This missing data is summarised in the table below.

Table 3 – Summary of missing data on energy efficiency measures implemented

Number of categories in which measures have been implemented	Count of organisations	Categories asked per organisation	Total categories asked about	Categories not asked per organisation	Total categories not asked about
0	48	0	0	0	0
1	85	1	85	0	0
2	71	2	142	0	0
3	56	2	112	1	56
4	65	2	130	2	130
5	74	2	148	3	222
6	44	2	88	4	176
7	31	2	62	5	155
8	29	2	58	6	174
	Total (>2 categories): 299 organisations				TOTAL: 913

The randomisation approach (which was opted for to keep the overall questionnaire length manageable, participant fatigue low and data quality – at answered questions – high), limited the ability of the survey data to quantify the percentage of organisations that attributed the implementation of specific energy efficiency measures to ESOS, and as such, the total percentage that had attributed the implementation of one or more measure at least in part to ESOS.

The survey results showed that 38% of participants had implemented **at least** one energy efficiency measure at least in part as a result of ESOS. However, this is almost certainly an underestimate since:

- As shown in Table 3, of the 503 organisations surveyed, **299** said they had implemented measures in more than 2 categories, meaning our understanding of their action on energy efficiency was limited by the need to randomly expand on

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their responses for only 2 categories (for the remaining 204 organisations there was no missing data).

- Of these 299 organisations, **130** attributed the implementation of at least one measure to ESOS in the 2 categories that they were asked about. Therefore, while there was missing data on implementation for the other categories they were not asked about, enough information was known to include them in the 38%.
- However, this leaves **169** organisations that have implemented measures since ESOS in more than 2 categories, did not attribute anything to ESOS in the categories they were asked about but **may** have implemented measures as a result of ESOS in the categories they weren't asked about.

Approach to estimating extent of measures implemented

In order to understand further the implications of the randomised approach taken, the evaluation team ran analysis to estimate what the results would have been had there been time within the survey to ask all organisations about all categories of measures.

Analysis of the available data showed some evidence of correlation between categories, i.e. for participants asked about two categories, if they had not implemented measures as a result of ESOS in one category, it was more likely than average that they had not implemented measures in the other category. It was assumed that there would be a similar correlation for each participant between categories both with and without data (i.e., if a participant reported their organisation had taken no action as a result of ESOS in the two categories they were asked about, it was assumed they would be less likely than average to have taken action as a result of ESOS in the categories they were not asked about). However, the volume of missing data meant that it was not possible to impute these values with a sufficient level of accuracy to be defensible.

The above prevents reliable reporting of the proportion of organisations who implemented one or more measures at least in part as a result of ESOS. However, it has been possible to estimate the average number of measures implemented per organisation, and the average number of measures implemented per organisation attributable at least in part to ESOS.

To generate such estimates the analysis uses a scale up based on the **average** scores for each category:

- This involved imputing the average number of measures installed and attributable to ESOS to each participant for the categories not asked about, using data from those respondents who did answer about those categories,
- For example, the average number of cooling measures installed by organisations who said they had installed a cooling measure at Q14, and who were then asked about cooling measures at Q15, was 1.16, with an average of 0.42 measures implemented as a result of ESOS. These averages were therefore imputed for all organisations who reported installing a cooling measure at Q14, but who were not asked about cooling measures at Q15.
- Given the assumption of a correlation as described above, it was not appropriate to use these averages to estimate which specific actions were taken by individual organisations and which organisations attributed doing so to ESOS.

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- However, these averages were summed across the sample to provide estimates for the average number of measures that organisations had implemented and attributed to ESOS across all eight categories, rather than just those they were asked about, as well as at a total level.

Additional analysis impacted by the randomisation

It is also important to note that the missing data outlined above has impacted on additional analysis in the main report, due to the result that data on the percentage of organisations that have implemented measures as a result of ESOS are minimum estimates only. Chapter 4 of the main report considers the organisational contexts and factors which influence the likelihood of taking action due to ESOS. Organisations with different characteristics were compared to examine which were more likely to have implemented measures as a result of ESOS.

General conclusions were provided in this chapter based on the comparison of minimum estimates of the proportions of organisations with different characteristics who had taken action due to ESOS. Numeric data was not presented in this section of the main report given there were no exact estimates to report and to prevent any misinterpretation of the comparison of minimum estimates. However, as shown in the table below, the differences in the minimum estimates are of very large magnitude.

Table 4 – Minimum estimates of organisations attributing multiple energy efficiency actions to ESOS, by key organisational contexts

Proportion of organisations reporting 2+ energy efficiency actions implemented as a result of ESOS...		%
That do not have a set goal for reduction in energy use		30%
Whose set goal for reduction in energy use was:	Introduced/ updated as a result of ESOS	55%
	In place before ESOS	18%
That do not have an action plan/ strategy to meet their energy reduction goal		29%
Whose action plan/ strategy was:	Introduced/ updated as a result of ESOS	57%
	In place before ESOS	17%
That have or are working towards ISO 50001 certification		28%
Whose ISO 50001 certification was:	Introduced/ updated as a result of ESOS	55%
	In place before ESOS	15%
That do not have training or other processes to encourage and support staff in reducing energy consumption		23%
Whose training or other processes were:	Introduced/ updated as a result of ESOS	62%
	In place before ESOS	22%

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That are a member of a corporate group	35%
That are not a member of a corporate group	21%
Whose board level priority has increased as a result of ESOS	57%
Whose board level priority has not increased as a result of ESOS	12%
That participate in CCAs (1+ action)	49%
That do not participate in CCAs (1+ action)	36%

As such, the evaluation team are confident that the same pattern of differences would have been observed had all categories been asked of all participants, even if the individual figures would have been expected to be higher. For example, the table shows that organisations who introduced or updated a set goal for reductions in energy use as a result of ESOS (55%) were much more likely to have implemented two or more energy efficiency measures as a result of the scheme than organisations without such a goal (30%), or those whose goal was unchanged since ESOS (18%). As these are all minimum estimates, it is expected that if there had been no randomisation, and all energy efficiency categories had been asked of all participants, all three of these percentages would have been higher. However, given the magnitude of the differences, it is expected that the key headline (organisations who introduced or updated a goal for reducing their energy use as a result of ESOS were more likely to implement energy efficiency actions due to ESOS) would remain valid.

Furthermore, it is important to note that the differences in Chapter 4 related to fuel efficiency and net cost savings were not affected by the randomisation. Numerical values were not included for consistency with findings related to energy efficiency; however, there is no element of uncertainty related to these findings as they were based on complete data. The relevant figures are presented in the table below.

Table 5 – Minimum estimates of organisations attributing one or more fuel efficiency actions to ESOS, by key organisational contexts

Proportion of organisations reporting 1+ fuel efficiency action implemented as a result of ESOS	Introduced/ updated as a result of ESOS	Do not have	In place before ESOS
A set goal for reduction in energy use	61%	25%	24%
An agreed action plan/ strategy to meet energy reduction/ efficiency goal	59%	23%	22%
Have or working towards ISO 50001 certification	65%	27%	34%

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Training or other processes to encourage and support staff in reducing energy consumption	66%	19%	23%
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4. Qualitative case studies with ESOS organisations and SMEs

Eight half-day face-to-face case study visits were conducted with ESOS complier organisations to complement the survey findings, and to gain further detailed understanding of attitudes towards and impacts of audits and reporting in general and ESOS more specifically. Each case study involved interviews with a range of stakeholders such as the energy manager, facilities manager, and the board member responsible for energy management. Two telephone case studies were also carried out with engaged SMEs to explore their perceptions and experiences of energy audits and reporting outside.

Key aim for this task

Organisational case-studies were carried out with both ESOS complier organisations and SMEs.

The ESOS case studies aimed to explore the issues covered in the survey in more depth in a small number of organisations, and the testing of hypotheses in the CMO framework. They allowed a much deeper exploration of context, and the extent to which this drives organisational response to the policy and the audit recommendations, and therefore their outcomes. These case studies also allowed deeper exploration of the factors outside the policy that have affected the organisations' approach to, and impacts resulting from, auditing, as well as exploring any alternative routes to similar outcomes being attained.

The SME case studies aimed to provide further evidence on the drivers of auditing activity and energy efficiency outside ESOS, how these activities have been funded, and any other barriers to further action.

Sampling

The sampling frame for the ESOS-compliant organisational case studies consisted of the 60% of survey participants who agreed to be re-contacted for this purpose.

The sample approach was purposive, seeking to represent a range of experiences of energy auditing and organisational energy efficiency contexts. This approach was fulfilled using quota sampling (described below).

SMEs were sampled using Carbon Trust contacts – as such, these may not reflect the attitudes and experiences of typical SMEs with respect to energy efficiency and energy management, but nevertheless provided useful data on the types of actions that have been taken in SMEs, drivers and barriers.

Quota targets

Given the small number of case studies being conducted, the aim of the ESOS complier organisation case studies was not to be representative of the ESOS complier population

4. Qualitative case studies with ESOS organisations and SMEs

(which was achieved through the telephone survey), but instead to be reflective of the broad range of organisational contexts which were hypothesised to affect organisations' engagement with ESOS and the resulting impacts from compliance.

ESOS complier organisations were therefore targeted based on a set of pen portraits developed from the evaluation framework and Context – Mechanism – Outcome (CMO) framework. These pen portraits ensured a range of appropriate organisational contexts were covered; for example, both helpful and unhelpful attitudes to energy efficiency action, and different levels of action as a result of ESOS. They also ensured organisations with fleets that have taken action on fuel efficiency were included in the case studies to understand such action in more detail. Given the range of contexts in the CMO framework, there were hundreds of potential combinations; the pen portraits were therefore not intended to be exhaustive. Rather, they aimed to test hypotheses of the outcomes that might result from different plausible context combinations.

The pen portraits were as follows:

- Type 1: Enabling organisational structure and helpful attitude to energy efficiency, but no or limited action as a result of ESOS
- Type 2: An organisation that has installed at least one energy efficiency measure as a result of going through the ESOS process
- Type 3: An organisation with two or more planned energy efficiency measures as a result of going through the ESOS process
- Type 4: Unhelpful attitude towards energy efficiency and no action taken
- Type 5: Unhelpful attitude towards energy efficiency but action taken on energy efficiency nonetheless
- Type 6: An organisation with a medium or large transport fleet that has installed or is planning at least one fuel efficiency measures as a result of going through the ESOS process
- Type 7: An organisation with a medium or large transport fleet that has installed fuel efficiency measures since but not because of ESOS

One case study was carried out with each type, plus an additional case study with Type 2.

In addition, case studies were recruited to provide a mix (with no hard quotas set) with respect to the characteristics listed in Table 6 below. The table also shows the final achieved numbers of case studies that met each characteristic.

Table 6 – Profile of ESOS complier case study organisations

Compliance	Yes	No
Complied via ISO 50001	2	6
Commissioned follow on services from ESOS assessor	2	6
Participates in other energy efficiency schemes (E.g. CRC, CCA)	6	2

4. Qualitative case studies with ESOS organisations and SMEs

Shared audit report or recommendations with other entities in corporate group	3	5
Foreign highest parent	3	5

Compliance date	Number
Pre- Nov 2015	1
November 2015	2
1 - 5 Dec 2015	2
After 29 Jan 2016	3

Sector	Number
Manufacturing/ industrial	2
Services	6

No quota targets were set for the SME case studies.

Topics covered

The discussion guide was developed from the guide used for case studies carried out under the first phase of the research, in 2016 and 2017.

The guide sought to first understand the context for an organisation's energy use and enablers and barriers to taking energy efficiency action to date. After this, the discussion sought to understand the organisation's response to the audit report, and impacts of ESOS, both of the report and the process itself. The final section considered planned activity for the second phase of ESOS. Throughout, the guide contained probes around the level of impact ESOS compliance had on the organisation, including any actions taken towards energy efficiency and barriers to action, and further probes around organisational energy efficiency contexts. Specific probes for board members were included throughout the guide.

Case study fieldwork

Qualitative case study fieldwork was conducted by Ipsos MORI from January to March 2019, following the conclusion of the quantitative survey. ESOS complier case studies took

4. Qualitative case studies with ESOS organisations and SMEs

place face to face: interviewees varied by business type and availability of key personnel, but typically included the energy manager and other team members if relevant, the facilities/ estates manager and the board member with responsibility for energy efficiency. Three to five interviews were typically conducted per organisation. In addition, the evaluation team reviewed, as relevant, the ESOS audit report, implementation reports, ISO 50001 reports and broader environmental strategy/ CSR reports. The SME case studies took place by phone and were held with the person responsible for energy efficiency and management, who could be the founding CEO in particularly small organisations. Organisations received a £100 donation to a charity of their choosing as a thank-you for participating in the research.

Analysis approach

The analysis combined a “within-case-study” and “across-case-study” approach: qualitative data gathered across interviews within the same case study were analysed to draw conclusions on the impact of ESOS for that organisation; however, the evaluation team also looked across cases to consider what the case study strand overall revealed about the contexts in which ESOS was having more or less influence, and the perceptions of the scheme from a range of perspectives and job roles.

This analysis was conducted within the framework provided by the overarching evaluation questions, the Theory of Change, and the CMO framework: each case was examined for evidence that either supported or refuted hypotheses around the contexts in which ESOS would have an impact and the key mechanisms by which it would do so.

Qualitative evidence gathered through case-studies was also triangulated against survey data: this strand of analysis sought examples within the case-studies that helped to explain the survey data (for example, the key reasons that organisations had identified cost savings accrued as a result of ESOS), and also sought examples which provided an alternative point of view or experience to the majority experience represented in the survey. This synthesis was again guided by the overall evaluation framework, theory of change and CMO framework.

5. Qualitative in-depth interviews with ESOS Lead Assessors

Qualitative telephone interviews were conducted with 20 ESOS lead assessors who were qualified and practising under ESOS Phase 1. Fifteen of the assessors also had experience of auditing transport and/or industrial processes. These aimed to explore which types of recommendations were made in audits and why, and to understand the response of the auditing market to ESOS specifically.

Key aim for this task

The evidence gaps report at the end of Phase 1 identified several gaps that were well suited to primary research with assessors. These interviews sought to understand the types of recommendations made by assessors and how this varies by organisational context. They also aimed to complement the research with organisations in improving understanding of what action has been undertaken by organisations and what drives this, including key mechanisms within the audit itself. Assessors were well placed to provide insights on the operation and effectiveness of other energy efficiency policies and how this compares to ESOS and other policy tools that could work alongside audits and reporting to support the promotion of energy efficiency. Some were also able to share their experiences of auditing SMEs.

Sampling

The sample was formed from four registers of ESOS Lead Assessors within the UK: The Chartered Institution of Building Services Engineers (CIBSE), The Institute of Chemical Engineers (IChemE), Elmhurst, and the Energy Managers Association (EMA). These registers were used as they were well populated in terms of contact telephone numbers, and gave a good mix of experiences (for example it was assumed IChemE assessors would be experienced in auditing processes). It aimed to include assessors from each of these registers, as well as:

- assessors with experience of auditing transport and/ or industrial processes to ensure a detailed understanding of relevant savings, as well as those related to buildings; and
- a mix of independent assessors and those working for consultancy firms, as it was hypothesised they may have different approaches to encouraging action off the back of audits and selling of future services.

Quotas were set to achieve the desired mix of assessors. The research aimed to recruit 20 assessors across the targets.

Sample profile

Quotas were set to target assessors with a range of experiences and focuses, and from a range of registers. 20 qualitative interviews were carried out. The achieved sample profile was as follows:

Table 7 – Profile of assessor interviews

ESOS Lead Assessors Register	Min. target	Achieved interviews
CIBSE	5	9
Elmhurst	3	3
EMA	3	4
IChemE	5	4

Expertise	Min. target	Achieved interviews
Transport	5	4 (12) ⁷
Industrial processes	5	3 (11)
Experience in both	N/A	8
Experience with neither	N/A	5

Employment type	Min. target	Achieved interviews
Independent	8	12
Part of a firm	8	8

Topics covered

The consultations with lead assessors sought to understand what types of recommendations were made, how these were presented, and whether and how assessors adapted the audits and recommendations based on the requirements and contexts of the organisations. These interviews also explored with assessors which types of recommendations were typically taken forward by different types of organisations. The discussion guide also covered perceptions of the operation and effectiveness of other energy efficiency policies and how this compares to ESOS, and which other policy tools could work alongside ESOS to support the promotion of energy efficiency.

⁷ Including the 8 assessors with experience in both transport and industrial processes, 12 interviewees had transport experience, 11 had experience with processes

5. Qualitative in-depth interviews with ESOS Lead Assessors

The guide also sought to understand the work that assessors had carried out under ESOS and their work outside of ESOS and wider perceptions of impacts of ESOS on the auditing market.

Lead assessor fieldwork

The qualitative in-depth interviews with assessors were carried out by telephone by Ipsos MORI researchers in December 2018 and January 2019, and typically lasted 45 – 60 minutes. Assessors received an incentive payment of £50 as a thank-you for participating in the research.

Analysis

These interviews were thematically analysed, facilitated by a data management grid. Each row in the grid represented a single interview, with columns representing the key interview topics, linked to the research questions of interest (e.g. recommendations made). Interviewers completed this grid which facilitated the drawing out of key themes across interviews.

6. Qualitative in-depth interviews with supply chain representatives

Qualitative telephone interviews were conducted with 13 supply chain representatives including firms involved in consulting, designing and/or implementing a range of energy efficiency solutions. These explored awareness of ESOS and the extent to which the scheme was impacting on demand for supply chain services.

Key aim for this task

These interviews sought wider perspectives from supply chain stakeholders on the role played by ESOS in driving action on energy efficiency - both within obligated organisations but also in the wider non-domestic sector. They aimed to help to further test and develop the theory around the circumstances in which ESOS could influence energy efficiency attitudes and behaviours beyond its directly targeted population.

This audience was targeted to support further development, and testing, of the CMOs for obligated organisations by offering their experiences of the ways in which organisational context can impact on the uptake of new technology, how effectively any new measures are used within an organisation and ultimately what benefits are realised.

They also provided evidence as to what other trends, initiatives, policies or incentives may contribute to progress towards the same outcomes in spite (or instead) of ESOS.

Sampling

Supply chain stakeholders such as manufacturers and installers of energy efficiency equipment marketed at large organisations were targeted. Interviewees tended to be Managing Directors, or Sales/Commercial Directors. Several were founders and owners of their companies. They represented a range of types and size of supply chain organisation, and a range of geographies across the UK. A range of technology types were covered including:

- LED lighting
- Photovoltaic solar panels
- Electric vehicle charging
- Battery storage
- Voltage optimisation
- Compressors
- Heating, ventilation, and air conditioning (HVAC)
- Boilers
- Infrared heating
- Ground and air source heat pumps
- Biomass servicing

Sample for these interviews was generated via the Carbon Trust's network.

Topics covered

The discussion guide development was led by Carbon Trust. These interviews sought participants wider views on trends they had observed in their market, and what they believed were the key drivers of organisational energy efficiency and demand for their products.

Fieldwork with supply chain representatives

13 interviews were carried out by telephone by the Carbon Trust in December 2018 and January 2019, and typically lasted 30 – 45 minutes. Interviewees received an incentive payment of £50 as a thank-you for participating in the research.

Analysis

These interviews were analysed using a thematic approach: individual interview notes were reviewed in detail to draw out key themes across this research strand.

7. Linking of scheme data to business databases

Key aim for this task

This task provided longitudinal observations on key business characteristics among the complier population – capital investment, energy and fuel expenditure, GVA productivity, sales and profit – to explore if such data linking contributed to the understanding of the impact of ESOS on compliant organisations.

Approach to data linking

Data was linked to data held at the Office for National Statistics (ONS) Secure Research Service (SRS) using the Company Reference Number (CRN) as a unique identifier. Once the Ipsos MORI proposal outlining the proposed sources for linking, the variables to be linked, and the rationale, had been approved by the SRS, data was linked using the following process:

- A database of compliers containing the CRN, and variables from the compliance database held by the Environment Agency, was taken to the SRS
- All variables in the compliance database for which data was available were included for completeness, although given the hypotheses of the evaluation team, the analysis focused on compliance date, sector, parent (UK or foreign) and ISO 50001 certification (yes or no)
- The compliance database was linked via CRN to two databases at the SRS:
 - Annual Business Survey (ABS) for data on output, capital expenditure, productivity and energy expenditure
 - Business Structure Database (BSD) for data on employment and turnover
- Linked data was obtained from 2012 to provide greater robustness to the pre-ESOS baseline, and for all available years to the present to allow for more robust trend analysis, i.e. using just one data point before ESOS and one after would be much more susceptible to the influence of external factors in those years than looking at longer term trends. As such, data was used for 2012 to 2017 for ABS variables, and 2012 to 2016 for BSD variables
- Descriptive analysis focused on key subgroups was carried out to feed into the impact evaluation

There were 6,869 records with available CRNs for linking. Of these, a match was found for all years in 3,020 cases, a match rate of 44%. In individual years, the match rate varied from 52% - 61%.

It should be noted that this evaluation used a theory-based approach due to the lack of a suitable comparison group for a quasi-experimental evaluation, as described in the impact

7. Linking of scheme data to business databases

evaluation scoping report produced as part of the interim evaluation. This secondary data, as well as being limited in the time period it covered since ESOS compliance, was limited in its analytical insight, as the lack of a comparison group meant that it was not possible to robustly attribute any changes in outcomes of interest to ESOS. Given these limitations, findings from this strand of research did not help to answer the evaluation questions and therefore are not included in the final evaluation report.

8. Linking of scheme data to raw energy meter

Key aim for this task

This task aimed to show the extent to which, if at all, ESOS organisations have reduced their energy consumption before and after compliance. It was intended that triangulating this data with the primary evidence and analysis could facilitate attribution of any changes in energy consumption to the scheme.

Approach

Metered energy data was sought to establish for each ESOS complier organisation who participated in the survey, the extent to which the energy saving predictions from the energy and emissions savings analysis were supported by changes over time in actual metered energy consumption. Access was granted by BEIS to the annualised metered energy dataset for the UK for this purpose.

Addresses for 12,119 sites associated with the 503 companies in the survey were obtained from Experian, by linking branch addresses with the head office details available for complier organisations. These addresses were matched to meters from the annualised metered energy dataset supplied by BEIS using a program based on the matching method used in the [UCL 3DStock model](#). This method first matches to the Unique Property References Numbers (UPRNs) related to each address and from there matches to the meters associated with the UPRNs. This process resulted in approximately 7,000 matches for electricity meters and 800 matches for gas meters. This represented match rates of approximately 58% for electricity meters and 7% for gas meters: these are lower than normally achieved when using the full 3DStock model.

Match rates in the 3DStock model are typically high (>90%) for the towns and regions where the model has been fully applied. However, the sites data provided by Experian contains addresses distributed across the whole of England and Wales, most of which have not yet been processed by 3DStock. This means that the full 3DStock matching method could not be used. Instead, a program was developed for the project using the advanced address matching routines from 3DStock but without the full data for all addresses. This resulted in lower match rates for UPRNs than would normally be expected using the full 3DStock method.

8. Linking of scheme data to raw energy meter

Table 8: Data available for sites and companies

Total Number of companies		503
Number of addresses linked to companies		12119
Number of companies with:	Some floor area matched	242
	All floor area matched	93
	5 years of electricity data for all sites	55
	5 years of gas data for all sites	14
	5 years of electricity data for all sites and all floor area	49
	5 years of gas data for all sites and all floor area	14
	5 years electricity and gas data for all sites and all floor area	10

The sites with matched meters were consolidated to the level of companies. Of the 503 companies in the survey, 55 could be matched to electricity meters for all sites and only 14 could be matched to gas meters for all sites. Table 8 shows the number of companies metered data could be matched to for all five years in the dataset.

It was intended that comparisons would be made between the trends in the energy meter data (year on year increases or decreases) and the predictions from the energy and emissions savings analysis. This analysis could only be conducted for organisations which had available floor area data in order to scale up from saving rates per square meter to net energy savings (see section 9 for further details). Comparisons between predicted energy savings from the energy and emissions savings analysis, and the actual changes to energy consumption demonstrated by the meter data, were therefore only possible for companies having both meter data and floor area data.

Unfortunately, the successive reduction in the sample resulting from meter matching, company level consolidation and floor area data availability produced a very small sample of companies with matched meters and floor area data for all five years in the dataset (electricity 49 and gas 10). It would not be possible to draw any firm conclusions from the proposed comparisons between the energy meter data and the predictions from the modelling using such a small sample and hence these comparisons have not been made.

9. Energy and emissions savings analysis

Key aim for this task

This task aimed to quantify the energy and emissions savings that can be attributed to ESOS based on the known measures implemented from the survey, and the resulting estimated savings. Whilst this analysis was limited by definition to the survey population, it was scaled up to provide an estimate of the savings across the whole ESOS population.

Overview of approach

Two separate models were developed: one to estimate the energy and emissions savings attributable to improvements made to **buildings and processes**, and one to estimate the savings from improvements made to **transport**.

While the broad principles in the design of the two models were the same, there were sufficient differences in estimating savings and so the approach to the two models is set out separately below.

Approach to modelling buildings and processes

This model ultimately sought to:

- Estimate the energy efficiency savings attributable to ESOS that would be expected to be realised by each organisation in the survey by:
 - assigning a saving rate to each of the energy efficiency measures that were included in the survey; and
 - using this saving rate to estimate the savings that result from each measure that each organisation reported implementing both **since** and **as a result of** ESOS
- Scale up these savings to estimate the total energy efficiency savings realised in the whole ESOS population and attributed to the scheme

Inputs and data sources used

Source	Description
Q14 from survey	Data on which of the 7 building energy efficiency categories plus processes each organisation has implemented measures in or plans to implement measures in, since beginning the ESOS process
Q15 from survey	Data on individual measures that have been implemented since ESOS or are planned for the future

9. Energy and emissions savings analysis

Source	Description
Q16 from survey	Coverage i.e. the proportion of each organisation's sites at which each measure at Q15 had been implemented (for multi-site organisations)
Q17 from survey	ESOS influence i.e. whether organisations reported implementing the measures at Q15 entirely as a result of ESOS, partly ⁸ as a result of ESOS, or entirely because of other factors
Q18 from survey	Self-reported likelihood that organisations will actually implement planned measures reported at Q15
D1 from survey	Sector for each organisation: used in scaling up the survey results to account for the different sector profiles in the survey sample and ESOS population, and the importance of sector to energy demand.
Savings rates from BEES tables	Data from the Buildings Energy Efficiency Survey (BEES) abatement potential tables . This provided saving rates in kWh/ m2 by measure category and premises type (e.g. industrial, private office, health). Each measure category and sector in the survey was assigned to the most appropriate saving rate from the BEES data based on measure and premises type. The savings rates ultimately used in the model are shown in the steps in deriving modelled estimates below.
Address information from Experian	Provided details of all addresses linked to the company reference numbers of organisations responding to the survey, to be matched to floor area data from the Valuation Office Agency.
Number of employees from Experian	Used to calculate kWh savings per employee for each business. The average kWh savings per employee within each sector was then used to scale up the results to the ESOS population.
Floor area data from the Valuation Office Agency	Matched to address data for each business where available to provide estimates of the floor area to which measures implemented apply.

Challenges

There were four key challenges in estimating the energy savings attributable to ESOS for each business. A number of solutions were adopted in response to the challenges faced, but considerable limitations to the modelling remain and the estimated savings reported

⁸ For the purposes of the modelling it was assumed that where organisations reported implementing building energy efficiency measures partly due to ESOS, ESOS was 50% responsible for the implementation of those measures. For process related energy efficiency measures where ESOS was reported to be partly responsible for their implementation, it was assumed ESOS was only 25% responsible. This lower figure was used for process measures on the basis that there are a greater number of policies in this space likely to have influenced the decision.

9. Energy and emissions savings analysis

should be considered in the context of these limitations. The key challenges, solutions adopted and limitations to the modelling are detailed below:

Challenge	Solution and limitations
<p>As described in Chapter 2, organisations were asked in which of eight main categories of energy efficiency measures they had implemented measures to date and then they were asked detailed questions about the specific measures under, at most, two of these main categories. This was done because pilot experience showed response fatigue after more than two main categories. The consequence is that detailed information about all individual measures implemented (including the coverage percentage, and whether or not implementation was as a result of ESOS) was missing for some categories for organisations that implemented measures in more than two categories.</p>	<p>Average implementation rates, coverage percentages and ESOS influence were applied to those companies where this measure-level detail was not available.</p> <p>However, analysis of survey responses suggested a strong correlation between the two categories asked about, i.e. if an organisation had taken no action in one category, they were less likely to have taken action in the other. Using the average implementation rate cannot take account of these correlation, meaning averages are limited in their accuracy, but there was insufficient data to impute any other estimate with confidence.</p>
<p>The accuracy of the savings estimates was limited by the data available in the Buildings Energy Efficiency Survey (BEES) abatement potential tables. BEES estimates the potential energy saving from implementing buildings energy efficiency measures, for high level categories only (such as heating or cooling). It does not provide estimates on a per measure basis. For example, in the category of hot water, there are two possible measures: hot water distribution improvements and installation of point of use heaters: it is likely that these two measures yield different saving rates, but these were not known.</p>	<p>Savings had to be estimated based on the proportion of all measures implemented within each category, rather than based on the specific measures implemented by each business in each category.</p> <p>In the hot water example, in the absence of per measure savings information, if an organisation had installed one of the two measures, they were assumed to have realised 50% of the potential hot water savings for their sector based on the BEES tables. Whereas with per measure savings, it might be that each of these measures is associated with different levels of savings.</p>
<p>The BEES tables assigning potential energy saving rates to eight broad premises types, such as private office, industrial, health, whereas the survey organisations represented 18 specific sectors.</p>	<p>The most relevant premises type was assigned to each sector. For example, industrial was assigned to organisations from the manufacturing and mining/quarrying sectors; and private office to those undertaking real estate and other service activities. However, while the savings thus represent a 'best fit', in some sectors nevertheless in some cases this fit is possible that different savings rates would ultimately be realised in different sectors with the same broad premises type.</p>
<p>For a given energy efficiency measure, the energy efficiency savings that will be realised (in kWh) depend on the floor area in which they are installed (in m²). Thus to calculate the energy savings for each business accurately, it was necessary to know the floor area. However, floor area data was secured from the Valuation Office Agency (VOA) for 6,211 of the 12,732 addresses linked to the 503 companies</p>	<p>For organisations with floor area data for some but not all sites, missing site floor areas were imputed as the lower of the average site floor area for the relevant sector and the average site floor area for that individual organisation. We therefore expect there to be inaccuracies in the estimated floor area for these organisations. Floor area data was not imputed for organisations that had no available floor area data for any of their sites. It was considered that there was not enough information about these organisations to</p>

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Challenge	Solution and limitations
<p>surveyed, and this was not evenly spread across all 503 companies: no floor area data was available at all for 261 organisations.</p>	<p>produce informed floor area estimates. Modelling of energy savings was therefore limited to around half the sample.</p>
<p>Once the research had been completed, it was found that the 261 organisations without floor area described above were not evenly distributed across sectors. In particular, there were no organisations with floor area in two sectors (Sector D: Electricity, gas, steam and air conditioning supply; and Sector N: Administrative and support service activities). This meant that the overall savings for these sectors of the ESOS population were erroneously modelled at a value of zero. The average energy savings per employee (as described in step 21 below) could therefore not be calculated.</p> <p>This meant that these sectors were not included in the scale up from the estimates modelled from the survey, to the estimated population level savings. However, survey responses to Q15 and Q17 showed that organisations in these sectors had implemented measures as a result of ESOS. If floor area data had been available, non-zero savings would have been estimated for these sectors. As such, the modelled energy savings for the ESOS population were underestimated.</p>	<p>Different approaches were taken in each of the two sectors to quantify the approximate extent of this underestimate.</p> <ul style="list-style-type: none"> • For sector D, floor area was estimated pro-rata to floor area data from water companies, based on the total floor areas and the number of addresses. • For sector N, the savings were made the equivalent to the savings for sector M (Professional services), pro-rata to the number of employees in each. <p>These approaches projected that the modelled estimate of energy savings included in the main evaluation report may have been underestimated by a margin of around 2%.</p> <p>It was decided not to revisit the model and revise the estimates and the research report for these two sectors because:</p> <ul style="list-style-type: none"> • in the context of the overall uncertainties within the model, the approximate underestimate of ~2% is very small; • the estimates produced are themselves very uncertain, based as they are on pro-rating from different sectors; • this approach would be consistent with the methodology described above of not imputing floor data for individual organisations that had no available floor data for any of their sites; and • a disproportionate amount of work would be involved in revising the model and reports, given the scale of the error and the uncertainties of the model.
<p>The BEES data did not include the potential energy savings for industrial processes. An alternative approach therefore had to be taken to estimate the energy savings resulting from implementing energy efficiency process measures.</p>	<p>The original impact assessment for ESOS estimated that the total technical potential for industrial process energy savings resulting from ESOS was 22 TWh. An estimate of the potential savings per m² was therefore calculated by dividing the 22 TWh by an estimate of the floor area of relevant premises with potential for implementing process measures to give an estimate of the saving rate.</p> <p>To generate this estimate, it was assumed that the total floor area of manufacturing premises would be relevant. However, using floor area data from manufacturing organisations in the ESOS population provided an estimate of 889 kWh/ m² which was considered a significant overestimate. UCL therefore extracted the total floor area from Valuation Office Data for factories.</p>

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Challenge	Solution and limitations
	<p>Nevertheless, there remained uncertainties in this floor area estimate. In particular, workshops were excluded from this floor area calculation as it was assumed (given an average area of 315m²) that they were too small to form part of the complier population of large organisations. However, some large organisations may own smaller sites in which industrial processes would be relevant. Similarly, it was assumed warehouses were unlikely to contain processes so these were also excluded. Neither of these assumptions could be fully verified.</p>
<p>Considering these challenges, there were uncertainties in the modelled estimates despite the mitigation actions taken.</p>	<p>Upper and lower estimates of the savings were generated, such that a range of estimates could be presented alongside the modelled central estimate. As described above, the model imputed survey averages in place of missing data for floor area, implementation of energy efficiency measures, and the coverage percentage of these measures. The model also allowed for data from the nth percentile to be imputed, rather than the average. Upper and lower estimates were thus generated by replacing these missing values with the 75th and 25th percentiles of available data respectively.</p>

Steps in deriving modelled estimates

Ultimately, the model sought to calculate the ESOS-influenced energy efficiency savings for measure categories for each organisation using the following formula:

$$\text{floor area (m}^2\text{)} \times \text{energy savings rate (kWh/ m}^2\text{)} \times \% \text{ implementation in that category} \times \% \text{ coverage in that category} \times \% \text{ ESOS influence in that category.}$$

These savings were then aggregated to estimate the overall ESOS savings.

Taking into account the challenges detailed above in assigning values to all of these variables, the following steps were taken to calculate the energy efficiency savings:

Determining the number of measures implemented/planned in each energy efficiency category

1. Where available, Q15 data on the number of individual measures implemented in each category was divided by the total number of possible measures to provide a % implementation for each category. This process was repeated for planned measures within each category.
2. As outlined above, where participants had indicated they had implemented measures in more than two categories at Q14, the individual measure data at Q15 was limited to two categories. Therefore, for categories where detail on individual measures was missing, the mean of the implementation % in each category across the whole sample of companies as per step 1 above was applied.

Determining the site coverage of implemented measures

3. Where available, coverage data for the proportion of sites within an organisation where individual measures were installed (from Q16) was averaged within each category to provide a coverage percentage for each category for each organisation.
4. This coverage data was only available for individual measures, which was limited to two categories. Therefore, averages across the whole sample were used for measures in categories with missing data.
5. Future coverage was not asked in the survey. In broad terms, it was assumed organisations would aim to upgrade all sites eventually, such that if they had installed a given measure in 60% of sites to date, they would plan to install it in the remaining 40% in the future. However, it was not considered realistic that an organisation that has only implemented a measure in a small proportion of sites to date would be expected to implement it in many sites in the future. The future coverage was therefore estimated as the lower of the current coverage, and the remaining coverage (100% - current coverage).

Determining the likelihood of future implementation

6. The likelihood of implementation of 'future' measures as reported in Q18 was applied to each of the individual energy efficiency measures and then these were averaged for the main energy efficiency categories (similar to steps 2 and 4).

Determining the extent of ESOS influence

7. The derived % of ESOS influence was calculated for individual measures where data was available at Q17: 100% where organisations reported implementing the measures entirely as a result of ESOS, 50% for building measures and 25% for process measures implemented partly due to ESOS (see footnote 4), and 0% for measures implemented entirely because of other factors. This was averaged within each category to provide an average ESOS influence percentage for each category for each organisation.
8. This data was also limited to two categories; therefore, the average for each measure was used where there was missing data as above.

Based on steps 1-8 above the % implementation, % coverage and % ESOS influence were calculated for each category for each organisation, using averages where there was missing data. As described above, the model also allowed for the use of different percentiles to be imputed in place of averages to generate ranges of modelled estimates.

Determining the kWh/ m² energy savings rates

9. The BEES tables assign potential savings rates for each measure category to broad premises type e.g. private office, industrial and health. A 'best fit' premises type was therefore assigned to each sector from the survey.
10. The potential energy savings rates in kWh/ m² for each category were then determined from the BEES tables according to the relevant premises type for each organisation (determined by its sector as above). The BEES data provided abatement potential estimates split out by electricity and non-electricity savings and so separate kWh / m² savings rates were determined for the two energy types.

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11. The BEES data did not include savings rates for industrial processes, therefore an alternative approach had to be adopted to calculate the kWh / m² savings rate for process:
- i. The saving rate in kWh/ m² is equal to:
$$\frac{\text{total technical potential energy saving}}{\text{total floor area to which the potential savings apply}}$$

(i.e. the total area of relevant premises within the ESOS population).
 - ii. Therefore, the total technical potential of 22 TWh as quoted in the ESOS Impact Assessment was used as the numerator for the saving rate.
 - iii. There was no publicly available estimate of the applicable floor area therefore this had to be estimated.
 - iv. UCL therefore extracted the total floor area from Valuation Office Data for factories to use in the equation in i) above.
12. Thus the table at the end of this section shows the savings rates in kWh/ m² that were ultimately used in the model by sector and measure type.

Determining the floor area of each organisation

13. Floor area data was secured from the Valuation Office Agency (VOA) for 6,211 of the 12,732 addresses linked to the 503 companies surveyed. This was not evenly spread across all 503 companies. Many organisations had floor area available for some sites, but not all. Missing site floor areas were imputed as the lower of the average site floor area for the relevant sector and the average site floor area for that individual organisation. No floor area data was available at all for 261 organisations.

Calculating the Estimated Energy Savings

14. As separate kWh/ m² energy savings rates were determined for electricity and non-electricity, the modelled energy savings in kWh for each organisation in each category were calculated separately for electricity and non-electricity savings.
15. The energy savings were calculated based on the following formula:
- $$\text{floor area (m}^2\text{)} \times \text{energy savings rate (kWh/ m}^2\text{)} \times \% \text{ implementation in that category} \times \% \text{ coverage in that category}$$
16. Multiplying these modelled savings by the ESOS influence gave the savings that can be attributed to ESOS for each organisation in each category. The electricity and non-electricity savings for each category were summed to give the total ESOS influenced savings for each organisation.
17. Given the importance of floor area to this calculation, the energy savings could thus only be calculated for the 242 organisations with floor area data.

Calculating the estimated planned energy efficiency savings due to ESOS

18. For each energy efficiency measure that survey participants indicated that they planned to implement, they were asked how likely it was that the measures would

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be implemented in the next year on a scale of 1 to 10, where 10 meant that the measure was certain to be implemented and 1 meant there was a high chance of the measure being cancelled.

19. These were converted to a percentage for the model, such that 1=10%, 2=20% etc.
20. The planned energy efficiency savings due to ESOS were thus calculated in the same way as realised savings above, but multiplied by the percentage chance of implementation

Scaling up savings to the total ESOS population

21. As a sample of 503 organisations was surveyed, rather than the entire ESOS population, the next step was to scale up these modelled savings to estimate the population-level savings, both from measures already implemented and those planned for the future. To do this accurately, it would be necessary to know the proportion of the total energy intensity of the ESOS population represented by the survey sample. As this was not known, the results were scaled up by number of employees within each sector, as it was assumed that sector would be a key determinant of energy intensity: organisations in the same sector of the same size were assumed to be similar in energy intensity, whereas those of the same size but in a different sector (for example manufacturing vs financial services) could differ hugely in energy intensity. The process for this scale up was as follows:
 - i. The savings as a result of ESOS for each organisation were divided by the number of employees to provide a measure of energy intensity (kWh/employee)
 - ii. A small number of outlier companies (less than 10) were excluded from this process because the number of employees was judged to be unrealistically low (1 or 2 people). This resulted in 232 companies used for the scale up.
 - iii. The average savings per employee in each sector were multiplied by the number of employees in that sector in the ESOS population of highest parents. This provided an estimate of the total energy savings for each sector.
 - iv. The sum of these was thus the overall estimate for the savings across the ESOS population.

In addition to scaling up by number of employees, two alternatives for scale up were considered:

- **Number of organisations:** this would have involved calculating the average savings per organisation in each sector and multiplying by the number of organisations in the ESOS population in that sector, then summing these to provide an estimate of total savings. This approach was discounted as it implicitly assumed the organisations in each sector in the sample were representative of the population in terms of their energy intensity which could not be verified.
- **Turnover:** this would have been similar to the approach used with number of employees, but would have involved calculating the average energy intensity for each sector in terms of kWh per £1m turnover rather than per employee. Multiplying these averages by the total turnover in each sector then summing these

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sectoral totals would give an overall estimate. This was not used as turnover was considered a less reliable proxy for energy intensity than number of employees.

Limitations

This model uses the best available input data to model energy savings. However, as set out above, the approach involved several uncertainties, particularly with respect to incomplete data on measures implemented, per-measure saving rates and premises floor areas.

Additionally, as discussed in more detail above, an absence of data for floor area led to the overall savings being inaccurately modelled for two organisational sectors, which likely led to a small underestimate of the overall savings from ESOS; this error was found after the research had been completed.

The modelled estimates of energy efficiency savings from buildings and processes that can be attributed to ESOS should therefore be seen as indicative. Considering these uncertainties, upper and lower estimates of the savings were generated as described above, such that a range of estimates could be presented alongside the modelled central estimate.

Saving rates for electricity (E) and non-electricity (N-E) in kWh/ m2 by sector and measure type

Survey Sector	BEES Premises type	Heating		Cooling		Hot water		Lighting		Computers/ IT		Building fabric		Ventilation		Process	
		E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E
Agriculture, forestry and fishing	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Mining and quarrying	Industrial	1.37	23.58	1.83	N/A	1.14	7.10	15.46	N/A	1.40	N/A	0.63	10.06	4.00	0.34	95.56	80.56
Manufacturing	Industrial	1.37	23.58	1.83	N/A	1.14	7.10	15.46	N/A	1.40	N/A	0.63	10.06	4.00	0.34	95.56	80.56
Electricity, gas, steam and air conditioning supply	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Water supply sewerage, waste management and remediation activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Construction	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Wholesale & retail trade/ repair of motor vehicles & motorcycles	Storage	1.03	11.49	0.74	N/A	0.64	3.51	10.02	N/A	0.80	N/A	0.36	4.07	1.75	0.07	95.56	80.56
Transportation and storage	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Accommodation and food service activities	Health	3.16	60.62	5.82	N/A	2.93	25.60	19.06	N/A	3.94	N/A	0.67	18.00	16.64	0.00	95.56	80.56

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Survey Sector	BEES Premises type	Heating		Cooling		Hot water		Lighting		Computers/ IT		Building fabric		Ventilation		Process	
		E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E	E	N-E
Information and communication	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Financial and insurance activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Real estate activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Professional, scientific and technical activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Administrative and support service activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
Education	Education	1.29	38.04	1.42	N/A	1.42	13.46	10.41	N/A	1.66	N/A	0.25	11.88	4.06	0.00	95.56	80.56
Human health and social work activities	Health	3.16	60.62	5.82	N/A	2.93	25.60	19.06	N/A	3.94	N/A	0.67	18.00	16.64	0.00	95.56	80.56
Arts, entertainment and recreation	Community	2.62	37.46	2.42	N/A	1.21	9.85	9.33	N/A	1.35	N/A	1.15	12.69	5.04	0.19	95.56	80.56
Other service activities	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56
No response/ not stated	Private Office	4.68	20.34	7.23	N/A	2.52	5.83	17.03	N/A	11.94	N/A	2.16	8.04	9.04	0.10	95.56	80.56

Approach to modelling transport

Similar to the buildings and processes model, the transport model ultimately sought to:

- Estimate the fuel efficiency savings attributable to ESOS that would be expected to be realised by each organisation in the survey by:
 - estimating the total annual mileage for each vehicle type in their fleet;
 - assigning a saving rate to each of the fuel efficiency measures that were included in the survey, and deciding which vehicle types this would apply to;
 - using these saving rates to estimate the proportionate mileage or fuel reductions by vehicle type that would result from the implementation of these measures; and
 - converting these reductions to kWh to estimate the energy savings resulting from fuel efficiency measures that each organisation reported implementing both **since** and **as a result of** ESOS.
- Scale up these savings to estimate the total energy efficiency savings that would be realised in the whole ESOS population and be attributed to going through the scheme.

Inputs and data sources used

Source	Description
Q25 from survey	Data on the composition of each organisation's fleet i.e. how many of each vehicle type (car, LGV, HGV etc.) they own/ lease.
Q26 from survey	The proportion of cars and LGVs at Q25 that are either electric or low carbon.
Q26b from survey	Whether the fleet as described at Q25 is the number of vehicles owned or leased across all the organisation's sites, or just those sites for which the participant is responsible for energy management and energy efficiency.
Q27 from survey	Data on which of six fuel efficiency measures each organisation has implemented since ESOS, or plans to implement in the future.
Q28 from survey	Self-reported likelihood that organisations will actually implement planned measures at Q27.
Q29	ESOS influence i.e. whether organisations reported implementing the measures at Q27 entirely or partly as a result of ESOS, or entirely because of other factors.
D1 from survey	Sector for each organisation: used in scaling up the survey results to account for the different sector

9. Energy and emissions savings analysis

Source	Description
	profiles in the survey sample and ESOS population, and the importance of sector to size and composition of transport fleets.
Mileage stats from DfT Travel Survey (cars) and Carbon Trust estimates reviewed by DfT (other vehicle types)	Provided estimated annual business mileage per vehicle for each vehicle type, used to calculate total mileage for each organisation based on its fleet composition.
Data on saving rates that apply to individual fuel saving measures (various)	Provided an estimated percentage saving rate that should be applied to the mileage of relevant vehicles for each measure implemented (e.g. the driver training saving rate would be applied to all vehicles, whereas the rate for switching freight operations from HGVs to more efficient modes of transport was applied to HGVs only). Many sources were used in estimating the savings across the six measures as multiple sources were used for each. This was because no single existing data source was found which provided robust and reliable estimates of the expected saving rate from implementing each of the fuel saving measures. Therefore, the estimated savings were developed based on a wide range of sources as well as the reasoned judgements of the evaluation team and consultation with stakeholders in the Department for Transport.
Fuel consumption data, estimated by evaluation team based on experience, crosschecked with DfT fuel consumption data	Provided estimated fuel consumption for each vehicle type in miles per gallon. The estimates of the evaluation team are lower than the corresponding figures crosschecked in the gov.uk tables which reflects that vehicles in the surveyed fleets are of unknown age, and that real world fuel consumption is expected to be lower than the rated values.
Fuel conversion factors from BEIS - Greenhouse gas reporting: conversion factors 2018	Provided estimated kWh/mile emissions for each vehicle type. This data was used to calculate estimates of the kWh per litre of fuel for each vehicle type, which were combined with fuel consumption for each vehicle type in miles per gallon (above) to give estimates of kWh/mile emissions per by vehicle type. These were then used to calculate total kWh emissions by vehicle type for each organisation, based on mileage.

Challenges

Challenge	Solution and limitations
Some of the fuel efficiency measures encompassed multiple elements which would have different associated saving rates, posing a challenge in assigning a single accurate saving rate to each measure. For example, "Installation of infrastructure or policies that support alternative or reduced	Savings rates were estimated based on the best available information and judgement of the evaluation team, for example by scaling back the sum of the savings for all sub-measures as it was assumed most organisations will not have implemented every element of each measure.

9. Energy and emissions savings analysis

Challenge	Solution and limitations
<p>journeys e.g. better cycling facilities, vehicle charging points, car sharing policy, video conferencing, home working” encompasses several sub-measures.</p>	<p>Where information was only available for one element of a measure, this was assumed to be the saving rate for the measure as a whole.</p>
<p>No single existing data source was found which provided robust and reliable estimates of the expected saving rate from implementing each of the fuel saving measures. Therefore, the estimated savings were developed based on a wide range of sources, for example DfT datasets, fleet journals such as Commercial Fleet, and the Energy Saving Trust. The evaluation team then made reasoned judgements about how to assign a savings rate to each measure, based on their professional experience, consideration of the varying sources available, and consultation with stakeholders in the Department for Transport.</p>	<p>For each measure, the evaluation team reviewed multiple sources and assessed them for reliability. Depending on the outcome of this review, either the source judged to be the most reliable overall was used in the model, or an average of multiple reliable sources was used.</p> <p>Given the absence of a singular robust data source to inform these estimates, the estimates savings are expected to be limited in their accuracy and should be treated as indicative only.</p>
<p>Survey respondents did not provide any information on fuel consumption within their fleet, only number of vehicles within each vehicle type⁹.</p>	<p>To estimate the fuel consumption of organisational fleets, an estimated average annual business mileage was used for each vehicle type. This was then multiplied by an estimated average miles per gallon to obtain the equivalent fuel usage. Thus, mileage and the resulting fuel use was estimated based on the best available information; however, actual mileage for a given vehicle type will not be uniform across organisations. This means that, for example, in organisations with a mileage per vehicle below the averages used in the model, the savings will be overestimated.</p>
<p>Survey respondents did not provide data on the percentage of vehicles to which each fuel efficiency measure had been applied. A review of available sources also found that secondary data on typical coverage rates was not available.</p>	<p>For the purposes of the overall estimates used in the report, coverage rates of 75% were used as it was assumed that these measures would typically be rolled out to a large majority of the fleet at the same time. However, within the model itself these can easily be adjusted, thus the savings could be amended to reflect more accurate coverage data should this become available in the future.</p> <p>Given the uncertainty around coverage, upper and lower estimates of the savings were calculated by adjusting the coverage to 100% and 50% respectively. This enabled a range of estimates to be presented alongside the modelled central estimate.</p>

⁹ The level of information gathered through the survey about fuel efficiency measures implemented within ESOS organisation was restricted to prevent the survey length becoming too long to achieve the target response rate. It was also expected that many participants would struggle to provide accurate information as they were not dedicated fleet managers.

Steps in deriving modelled estimates

In broad terms, the model sought to calculate the ESOS-influenced fuel efficiency savings for vehicle type for each organisation using the following formula:

$$\text{Number of vehicles} \times \text{average annual mileage (miles)} \times \text{average emissions (kwh/mile)} \times \text{estimated fuel saving rate (\%)} \times \text{fleet coverage (\%)} \times \text{ESOS influence (\%)}$$

These savings for each vehicle type were summed to give the savings for each organisation, which were then aggregated to estimate the overall ESOS savings.

Taking into account the challenges detailed above, the following steps were taken to calculate the fuel efficiency energy savings for each organisation:

Determining the annual mileage per vehicle type for each organisation

1. Estimates were developed for the average mileage per vehicle type based on the National Travel Survey and informed assumptions of the evaluation team, and sense checked by the Department for Transport.
2. The average mileage per vehicle type was multiplied by the number of vehicles within each vehicle type from Q25 to estimate the total annual mileage for each respective vehicle type at that organisation.

Determining the fleet coverage of implemented measures

3. Fuel efficiency measures which organisations reported implementing at Q27 were assumed to have 75% coverage across that organisation's fleet (as described in the challenges table above).
4. An alternative approach was taken to determine coverage of switching to electric or low carbon vehicles: the coverage for this measure was based on the declared percentages of such vehicles owned or leased by each company and assumed that all such vehicles were bought or leased since ESOS.

Determining the % of energy saved by implementing each fuel efficiency measure

5. Estimated energy saving rates were developed for each of the fuel efficiency measures based on the reasoned judgement of the evaluation team after identifying and reviewing a range of data sources and consulting with stakeholders in the Department for Transport.
6. The estimated savings rate for each of the fuel efficiency measures was multiplied by the assumed coverage percentage to give an adjusted saving rate for each measure.

Determining the vehicle types each fuel efficiency measure applies to

7. The evaluation team used reasoned judgement to determine which vehicle types the implemented measures were assumed to have been applied to (e.g. it was decided that the driver training saving rate would be applied to all vehicles, whereas

9. Energy and emissions savings analysis

the rate for switching freight operations from HGVs to more efficient modes of transport would be applied to HGVs only).

Determining the likelihood of future implementation

8. The likelihood of implementation of 'future' measures as reported in Q28 was applied to each of the individual fuel efficiency measures. For example, for organisations who reported '1' on a scale of 1 to 10 of likelihood of implementing the measure was assumed to be 10%

Determining the extent of ESOS influence

9. The % of ESOS influence was determined for individual measures based on responses to Q29: 100% where organisations reported implementing the measures entirely as a result of ESOS, 50% where they reported doing so partly due to ESOS, and 0% for measures implemented entirely because of other factors.

Determining the kWh/mile emissions for each vehicle type

10. Fuel conversion factors in kWh per litre were assigned to each vehicle and fuel type.
 - a. BEIS fuel conversion factors provided relevant data for different fuel types (petrol or diesel).
 - b. As the survey did not capture the proportions of fleets that were petrol or diesel, it was assumed that HGVs and Coaches were all diesel; minibuses and others were 25% diesel/ 75% petrol; as were cars and LGVs (excluding those vehicles known from the survey to be electric or low carbon) .
 - c. Thus, the conversion factors for minibuses, cars and LGVs take account of this presumed split.
 - d. As the survey did not capture whether vehicles were specifically electric or low carbon, a 50:50 split was assumed, with the overall energy use for electric/ low carbon vehicles therefore an average of the use for electric and low carbon vehicles of that vehicle type.
11. **1 gallon = 3.79 litres**. These factors were therefore multiplied by 3.79 to provide factors in kWh per gallon.
12. Dividing these factors by the fuel consumption for each vehicle type in miles per gallon provided the estimated energy use, in kWh per mile.

Calculating the estimated fuel efficiency energy savings due to ESOS

13. The estimated savings rate for each of the fuel efficiency measures was multiplied by the assumed coverage percentage to give an adjusted saving rate for each measure.
14. This adjusted saving rate was then multiplied by the ESOS influence to give an estimated saving rate for each measure that took account of ESOS influence (this varied by organisation and measure).

9. Energy and emissions savings analysis

15. When more than one energy saving measure has been implemented for a particular type of vehicle, the percentage saving for that vehicle type was calculated by subtracting the product of the residuals from 100%. For example, if an organisation had implemented adjustments to loading practices, switching freight operations and driver training:
 - a. The associated savings are 12%, 5% and 6% respectively.
 - b. The residuals were equal to 100% - the saving rate, i.e. 88%, 95% and 94% respectively.
 - c. The product of these residuals was $88\% \times 95\% \times 94\% = 79\%$.
 - d. The total saving = $100\% - 79\% = 21\%$.
 - e. This compares with a simple sum of the savings which would be 23%.
16. For each vehicle type in an organisation, the total estimated saving rate was then multiplied by the estimated total mileage to give an estimated mileage reduction for each vehicle type.
17. For each vehicle type, this mileage reduction was then multiplied by the estimated kWh/mile emissions in order to convert this mileage reduction to an energy saving for each vehicle type. The savings for each vehicle type were then summed to give the total ESOS-related saving in kWh for each respondent.

Calculating the estimated planned fuel efficiency energy savings due to ESOS

18. For each fuel efficiency measure that survey participants indicated that they planned to implement, they were asked how likely it was that the measures would be implemented in the next year on a scale of 1 to 10, where 10 meant that the measure was certain to be implemented and 1 meant there was a high chance of the measure being cancelled.
19. These were converted to a percentage for the model, such that 1=10%, 2=20% etc.
20. The planned fuel efficiency savings due to ESOS were thus calculated in the same way as realised savings above, but multiplied by the percentage chance of implementation.

Scaling up savings to the total ESOS population

21. As with the buildings and process model, the next step was to scale up these modelled savings to estimate the population-level savings. To do this accurately, it would have been necessary to know the relative proportions of fleets in each vehicle type in the ESOS population that were captured in the survey. However, information on fleets in the wider population was unknown. Therefore, as with the buildings and process model, the results were scaled up by number of employees within each sector, as it was assumed that sector would be a key determinant of fleet size and composition: i.e. this assumed that organisations in the same sector of the same size would be similar in fleet size and composition, and thus also fuel intensity. Scaling up by employee numbers alone would not be appropriate as organisations of the same size but in a different sector (for example transportation

9. Energy and emissions savings analysis

and storage vs financial services) could differ hugely in fuel intensity. The process for this scale up was as follows, carried out separately for measures already implemented and those planned for the future:

- i. Sector information from the survey was used to calculate the total savings per sector from the survey sample.
- ii. A population scaling factor was calculated for each sector as the ratio of the number of employees in that sector in the population divided by the number in the sample.
- iii. The savings total for each sector were then multiplied by the relevant scaling factor: the total sum of all these scale up calculations was the total population-level saving.

Limitations

As with the buildings and process model, this model uses the best available input data. However, this involves several uncertainties, particularly with respect to the savings rates that apply to each fuel efficiency measure. The modelled estimates of fuel efficiency savings that result from ESOS should therefore be seen as indicative.

The modelled estimates were reported using upper and lower bounds to reflect some of the uncertainties. Given that coverage of measures (except switching to electric vehicles) was not known and estimated at 75%, the upper and lower bounds were calculated by adjusting the coverage to 100% and 50% respectively. In all other respects, the savings were calculated in the same way as for the central estimate.

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1. Advance email provided to ESOS-obligated organisation re-contact sample



**Department for
Business, Energy
& Industrial Strategy**

Ipsos

Invitation to tell us about your experience of ESOS

REF: «ID»

Dear «Main_contact»,

We are speaking to organisations across the UK about how they manage their energy use and to gather their feedback on ESOS. We would love to hear about your experience.

Ipsos MORI, the independent research company, is carrying out this research on behalf of the UK Government Department for Business, Energy and Industrial Strategy. The results will be used by the Department to inform decisions regarding future energy efficiency policy, including the new energy and carbon reporting framework. This is an opportunity for your organisation to feed into their decision making. This follows on from a survey that you took part in two years ago – thank you very much again for your participation in that survey, and for giving us permission to recontact you about future research.

An Ipsos MORI interviewer may call you in the next few days to invite you to take part in this research. The interview will last 20 to 30 minutes and can be scheduled to take place by telephone at a date and time that is convenient for you.

We hope that you will be able to take part in this important study. However, if you do not want to be contacted, or if you would like to find out more about the research, please email: businessenergysurvey@ipsos.com Please remember to give your name and the reference number at the top right of this letter.

If you are interested in taking part, please click [here](#) which links to a short information sheet about some of the questions we would like to ask. You don't need to send the sheet back to us, but it will help to considerably speed up the call if you have it to hand during the interview.

I would like to assure you that everything you tell us in the interview will be treated as strictly confidential unless you give us permission otherwise, and used for research purposes only. Your answers will only be reported at the aggregate level, with all the other organisations taking part in this survey; it will not be possible to identify any individual or organisation in the published findings. For full information on how your responses and personal data will be stored and used, please click [here](#) to view the full data privacy notice for this research.

If you would like to verify the authenticity of this research, please contact the Department via email to esos@beis.gov.uk.

Your participation will be important in helping the Department to understand how businesses like yours manage their energy use, and I do hope you will be able to take part in this survey.

Thank you in advance for your help,

Antonia Dickman, Research Director, Ipsos MORI

2. Advance email provided to ESOS-obligated organisation boost sample



**Department for
Business, Energy
& Industrial Strategy**

Ipsos

Invitation to tell us about your experience of ESOS

Dear «Main_contact», «ID»

We are speaking to organisations across the UK about how they manage their energy use and to gather their feedback on ESOS. We would love to hear about your experience.

Ipsos MORI, the independent research company, is carrying out this research on behalf of the UK Government Department for Business, Energy and Industrial Strategy. The results will be used by the Department to inform decisions regarding future energy efficiency policy, including the new energy and carbon reporting framework. This is an opportunity for your organisation to feed into their decision making.

An Ipsos MORI interviewer may call you in the next few days to invite you to take part in this research. The interview will last 20 to 30 minutes and can be scheduled to take place by telephone at a date and time that is convenient for you.

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If you would like to verify the authenticity of this research, please contact the Department via email to esos@beis.gov.uk.

Your participation will be important in helping the Department to understand how businesses like yours manage their energy use, and I do hope you will be able to take part in this survey.

Thank you in advance for your help,

Antonia Dickman, Research Director, Ipsos MORI

3. ESOS-obligated organisations survey questionnaire

Good morning/ afternoon. My name is X and I am calling from the independent research company, Ipsos MORI, on behalf of the UK Government Department for Business, Energy and Industrial Strategy.

ASK ALL

S0. Please can I speak to [NAMED CONTACT]?

1. Yes
2. No

ASK IF RECONTACT SAMPLE AND CODE 2 AT S0

S0a. Is [NAMED CONTACT] still working at your organization?

1. Yes – MAKE APPT/ CHECK BEST TIME TO CALL
2. No

ASK IF BOOST SAMPLE AND CODE 1 AT S0

S1a. For the purposes of this interview, we would like to speak with an employee, manager, director or long term contractor who is responsible for decisions around energy use and energy management. Are you the most suitable person within the business for us to speak to?		
1	Yes	CONTINUE
2	No	ASK FOR APPROPRIATE CONTACT AND RECORD AS MUCH OF FOLLOWING INFORMATION AS POSSIBLE: NAME, EMAIL, PHONE NUMBER
3	REFUSED	THANK AND CLOSE

ASK IF BOOST SAMPLE AND CODE 2 AT S0, OR IF RECONTACT SAMPLE AND CODE 2 AT S0a

S1b. For the purposes of this interview, we would like to speak with an employee, manager, director or long term contractor who is responsible for decisions around energy use and energy management. Are you able to provide me with the name and contact details of someone suitable within the business?		
1	Yes	RECORD AS MUCH OF FOLLOWING INFORMATION AS POSSIBLE: NAME, EMAIL, PHONE NUMBER
2	No / Refused	THANK AND CLOSE

READ OUT IF RECONTACT SAMPLE AND S0=1

[IF SPEAKING TO NAMED RESPONDENT] You took part in our survey for BEIS in 2016 about your organisation’s approach to energy management, and your experiences of

10. Research Materials

complying with ESOS. Thank you very much again for taking part. We are now carrying out another survey to understand more about your approach to energy efficiency and energy management.

This survey will be used by the Department to inform their decisions regarding future non-domestic energy efficiency policies, as well as their future approach to ESOS implementation.

IF NECESSARY TO ENCOURAGE PARTICIPATION:

We are contacting you again as after the first survey you gave us permission to recontact you about this research

READ OUT FOR BOOST ONCE SPEAKING TO RELEVANT PERSON AFTER S1a/ S1b

We are carrying out a survey on behalf of the Department for Business, Energy and Industry Strategy (BEIS) about energy management and energy efficiency in organisations, with a focus on ESOS (the Energy Savings Opportunity Scheme), which we understand your organization complied with in [INSERT COMPLIANCE MONTH AND YEAR FROM SAMPLE]. The results will be used by the Government to feed into their design of future non-domestic energy policies.

ASK ALL

A0, Can I just check, are you:

- 1. An employee of [INSERT ORGANISATION NAME]**
- 2. An external employee nominated to respond on behalf of [INSERT ORGANISATION NAME]**

ASK IF CODE 2 AT A0

A0A. And can I also check – do you have the remit to put forward recommendations on energy efficiency within [INSERT ORGANISATION NAME]?

1. Yes
2. No – go back to S1b to find right person.

A1. The survey should take around 25 minutes. I would like to reassure you that your answers will not be reported or otherwise shared with BEIS in a way that can identify you or your organization, unless you give permission otherwise. Your participation is voluntary and you can change your mind at any time. Can you confirm that you are happy to take part on this basis?

Yes, happy to book an appointment	1
Can interview now	2
Unwilling to participate	3 (RECORD REASON - THANK AND CLOSE)

ASK ALL

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S1. Can you tell me if your organisation operates on a single site or has multiple sites? We are just interested in your own organization, rather than any subsidiaries or other group members.		
1	Single	
2	Multiple	
3	Don't know	

IF CODE 2 AT S1

S2. And which of the following best describes the scope of your responsibility for energy management and energy efficiency? Do you have responsibility for energy management and energy efficiency as at least part of your role at...		
1	...a single site in a multi-site organisation	
2	...some, but not all sites in a multi-site organisation	
3	...all sites in a multi-site organisation	
4	Don't know / Refused	

ASK ALL

S5. Is your organisation part of a wider corporate group? i.e. one of two or more active organisations working as a collection of parent and subsidiary firms		
1	Yes	
2	No	
3	Don't know	

ASK ALL

I'm now going to ask you a few questions about the way in which your organisation deals with energy efficiency issues. At all these questions, I'd like you to answer on behalf of the organisation for which you work, rather than on behalf of any wider corporate group you may be part of. For example, if you are a parent organisation, please just answer about the situation at your own organisation rather than at any of your subsidiaries.

Q1. How many employees are involved in managing energy efficiency or energy use and costs within your organisation?		
DO NOT READ OUT, CODE NUMERIC ANSWER TO BANDS		
1	1	
2	2-3	
3	4-5	
4	6-10	
5	11-20	
6	More than 20	
7	Don't know/refused	

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IF CODE 1 OR 2 AT S2 AND IF CODE 1-6 AT Q1

Q1A. And is that the number of employees involved in energy efficiency at all your organization's sites or just at the sites at which you have responsibility for energy management and energy efficiency?		
1	For all sites	
2	For sites I'm responsible for	
3	Don't know	

ASK IF CODE 1-6 AT Q1

Q1B. And which of the following best describes the staff level of the most senior person with managing energy efficiency as part of their role		
1	C-suite/ Board member	
2	Middle/ senior manager reporting directly to board member	
3	Manager/ supervisor with management responsibilities but not reporting directly to board member	
4	Other employee	
5	Don't know	

ASK ALL

Q4. What level of priority would you say energy efficiency currently has at board level in your organisation? Please use a scale of 1 to 10 where 1 means a very low level of priority and 10 means a very high level.		
1 - Very low priority	10 - very high priority	
Don't know		

ASK BOOST ONLY

Q5. And do you think this level of priority placed on energy efficiency by the board level of your organisation has increased or decreased over the last three years?		
1	Increased significantly	
	Increased slightly	
2	Decreased significantly	
	Decreased slightly	
3	Stayed the same	
4	Don't know	

ASK ALL RECONTACT SAMPLE, ONLY ASK BOOST SAMPLE IF CODE 1 OR 2 AT Q5

Q6. RECONTACT SAMPLE: I'd now like you to think back to the time period before your organisation started the ESOS process for the first time. As a reminder, your organization complied with ESOS in INSERT COMPLIANCE MONTH AND YEAR. To what extent do you agree or disagree that the level of priority placed on energy		
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efficiency at the Board-level within your organisation has increased as a result of going through the ESOS process ?		
BOOST SAMPLE: And to what extent do you think this level of priority placed on energy efficiency at Board-level has increased as a result of going through the ESOS process?		
1	Strongly agree	
2	Tend to agree	
3	Neither agree nor disagree	
4	Tend to disagree	
5	Strongly disagree	
6	Don't know	

ASK ALL

Q7. As far as you are aware, how often does your board/senior management consider energy efficiency matters?		
1	At least once a month	
2	About once a quarter	
3	About once every six months	
4	About once a year	
5	Less often than once a year	
6	Never	
7	Don't know	

ASK ALL

Q8. And what level of priority would you say your organisation as a whole currently places on energy efficiency? Remember that we are interested in your own organization, rather than any subsidiaries or other group members. Please use a scale of 1 to 10 where 1 means a very low level of priority and 10 means a very high level.		
1 - Very low priority	10 - very high priority	
Don't know		

ASK BOOST ONLY

Q9. And do you think this level of priority placed on energy efficiency by your organisation as a whole has increased or decreased over the last three years?		
1	Increased significantly	
	Increased slightly	
2	Decreased significantly	
	Decreased slightly	
3	Stayed the same	
4	Don't know	

ASK ALL RECONTACT SAMPLE, ONLY ASK BOOST SAMPLE IF CODE 1 OR 2 AT Q9

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Q10. [RECONTACT SAMPLE: And to what extent do you agree or disagree that the level of interest placed on energy efficiency by your organization as a whole has increased as a result of going through the ESOS process? BOOST SAMPLE: And to what extent do you think this level of priority placed on energy efficiency by your organization as a whole has increased as a result of going through the ESOS process?		
1	Strongly agree	
2	Tend to agree	
3	Neither agree nor disagree	
4	Tend to disagree	
5	Strongly disagree	
6	Don't know	

ASK ALL

Q13.	<p>I'm now going to read out a number of policies that your organisation may or may not have in place. For each one please tell me whether this is something your organisation either has or doesn't have, and whether it was introduced or updated because of the ESOS process or because of other factors. As a reminder your organization formally complied with ESOS in [INSERT COMPLIANCE MONTH AND YEAR] and may have been working through this process for a number of months leading up to this.</p> <p>[READ OUT STATEMENT THEN ASK]: Is this something your organisation has? [IF YES, CHECK]: was this in place before starting the ESOS process or has it been introduced or updated...as a result of going through the ESOS process, partly due to ESOS but partly due to other factors, or entirely due to other factors? READ OUT. SINGLE CODE</p>						
		A Do not have	B In place before ESOS and unchanged since then	C Introduced or updated since ESOS but entirely due to other factors	D Introduced or updated partly due to ESOS/ partly other	E Introduced or updated as a result of ESOS	F DK
1	A set goal for a reduction in your energy use as a business						
2	An agreed action plan/strategy in place to meet your energy reduction or efficiency goal						
4	Certification or working towards						

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<p>Q13.</p>	<p>I'm now going to read out a number of policies that your organisation may or may not have in place. For each one please tell me whether this is something your organisation either has or doesn't have, and whether it was introduced or updated because of the ESOS process or because of other factors. As a reminder your organization formally complied with ESOS in [INSERT COMPLIANCE MONTH AND YEAR] and may have been working through this process for a number of months leading up to this.</p> <p>[READ OUT STATEMENT THEN ASK]: Is this something your organisation has? [IF YES, CHECK]: was this in place before starting the ESOS process or has it been introduced or updated...as a result of going through the ESOS process, partly due to ESOS but partly due to other factors, or entirely due to other factors?</p> <p>READ OUT. SINGLE CODE</p>						
	<p>certification to ISO 50001</p>						
<p>5</p>	<p>Training or other processes to encourage and support staff in reducing energy consumption</p>						

ASK ALL

<p>Q14. I'd now like to ask you about energy efficiency improvements that may have been made to your organisation's sites. For each of the categories I read out, please tell me whether energy-related improvements in these areas have either been implemented at any of your organisation's sites since your organization started the first ESOS process or are planned for the near future.</p> <p>IF NEEDED: As a reminder your organisation formally complied with ESOS in [INSERT COMPLIANCE MONTH AND YEAR] and may have been working through this process for a number of months leading up to this.</p> <p>MULTICODE OK . ALLOW DON'T KNOW AT EACH STATEMENT</p>				
		<p>1 Yes – done since ESOS</p>	<p>2 Yes - planned</p>	<p>3 No</p>
<p>1</p>	<p>Heating system (including changes to boilers, pumps, controls, insulation or fuels)</p>			
<p>2</p>	<p>Cooling system (including changes to chillers, pumps or controls)</p>			
<p>3</p>	<p>Hot water system</p>			
<p>4</p>	<p>Lighting (including changes to fittings, lamps or controls)</p>			
<p>5</p>	<p>Computers & IT solutions</p>			
<p>6</p>	<p>Building fabric, including windows and doors</p>			
<p>7</p>	<p>Ventilation system (including changes to fans or addition of heat recovery)</p>			

10. Research Materials

8	Processes (including process re-engineering or changes to equipment such as fans, drives, pumps etc.)			
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IF 2 OR FEWER CATEGORIES CODED 1 OR 2 AT Q14, READ OUT THE CORRESPONDING LIST OF MEASURES BELOW. IF MORE THAN 2 CATEGORIES CODED, ASK ABOUT ONLY 2 OF THESE CATEGORIES, AT RANDOM

Q15. (AD) I'm now going to read out a list of more detailed measures that your organisation may have done since your organization started the first ESOS process. For each one, please tell me whether this has already been done or is being planned for any site within your organisation.

. READ OUT HEADING BEFORE ASKING EACH SECTION.

1	has done this at any site since ESOS	
2	is planning to do this at any site in the near future	
3	Don't know	

	Heating and boilers
1	Install a New more efficient boiler or burner
2	Implement a Building management system
3	Connect to existing district heating
4	Install Local heating controls e.g. Thermostatic Radiator Valves (TRVs), zone control
	Cooling
5	Replace or upgrade a cooling plant
6	Install a cooling control system
7	Replace air conditioning with free / evaporative cooling
	Hot water
8	Implement hot water distribution improvements
9	Install Point of use heaters
	Lighting
10	Install Lighting controls, time switches, discrete or centralised controls
11	Replace internal lighting with T5 fluorescent
12	Replace internal fluorescent lighting with LED
13	Replace internal incandescent/tungsten halogen lighting with LED
14	Replace external lighting with LED
	Computers & IT solutions
15	Implement PC power management
16	Upgrade to more efficient screens
17	Install Energy efficient file storage or server replacement
	Building fabric, including windows
18	Install Wall insulation
19	Install Roof / loft insulation
20	Install Draught-proofing

10. Research Materials

21	Replace windows with double/ triple glazing
22	Install automatic / revolving doors
	Ventilation
23	Install Variable Speed Drivers (VSDs)
24	Install heat recovery ventilation
	Processes
25	Implement Process re-engineering
26	Change equipment such as fans, drives, pumps

IF S1 CODE 2 OR 3, FOR EACH MEASURE CODED 1 AT Q15, ASK:

<p>Q16. (AD) And which of the following best describes at how many sites across your organisation this measure has been installed or upgraded in since your organization started the first ESOS process. NOTE TO SCRIPTER: ONLY REPEAT EVERY 4TH MEASURE IMPLEMENTED. Remembering that we would like to understand this for just your own organisation, rather than any subsidiaries or other group members, has it been installed or upgraded...</p>		
1	... at one main site	
2	... at a few sites (less than a quarter)	
3	... at some sites (between a quarter and a half)	
4	...at many sites (between a half and three quarters)	
5	...at nearly all sites (more than three quarters but not all)	
6	...at all sites across your company	
7	Don't know	

IF CODE 1 OR 2 at Q15

<p>Q17. And was the decision [USE TEXT SUB FROM LIST] the result of going through the ESOS process, influenced by both the ESOS process but also other factors outside the scheme, or not influenced by ESOS at all? REPEAT FOR EACH CODE 1 or 2 GIVEN AT Q15. ALLOW DON'T KNOW</p>		
1	This was a result of going through the ESOS process	
2	This was influenced by both the ESOS process and other factors outside of the scheme	
3	This was not influenced by ESOS	
4	Don't know	

FOR EACH MEASURE CODED 2 AT Q15

<p>Q18. And how likely or unlikely is it that this measure will be implemented in the next year. Please give your answer on a scale of 1-10, where 10 means that it is certain to be implemented (for example, the budget has been signed-off, any required contractors procured, and the work just needs to begin) and 1 means there is a high chance of the planned measure being cancelled within the next year)</p>
--

10. Research Materials

1	Enter number between 1 and 10, allow DK		
---	---	--	--

FOR EACH MEASURE THAT WAS PLANNED AT BASELINE (FROM SAMPLE) NOT GIVEN AS INSTALLED OR PLANNED (CODE 1 OR 2 AT Q15)

Q19. In the last survey, you said your organization was planning to [INSERT MEASURE FROM BASELINE] Has this now been done at any site in your organisation? If NO – does your organization still plan to do this in the near future?		
1	Yes this has been done	
2	No this has not been done	
3	No this has not been done, but we are still planning to in the near future	
4	Don't know	

ASK ALL

Q20. (AD) Again, thinking about your own organisation, what was your company's actual capital spend on energy efficiency measures for your latest accounting period? IF NECESSARY - By energy efficiency measures we mean any improvements or enhancements to areas of the business (e.g. infrastructure, process operations etc.) which were made with the principal aim of reducing energy consumption and/or saving money through reduced energy bills IF DON'T KNOW - If you can't tell me for your organisation as a whole, can you tell me for the site or sites you are responsible for? WRITE IN EXACT FIGURE AND CODE RELEVANT BAND / OR JUST USE BANDS IF EXACT FIGURE NOT GIVEN, OR CODE 'don't know']		
WRITE IN		
1	£0 – no investment	
2	Less than £10,000	
3	£10,000 - £24,999	
4	£25,000 - £49,000	
5	£50,000 - £99,000	
6	£100,000 - £499,000	
7	£500,000 - £999,000	
8	£1,000,000 or more	
9	Don't know	

ASK IF CODE 1-8 AT Q20 AND CODES 1-2 AT S3

Q21. INTERVIEWER TO RECORD IF REFERRING TO ALL SITES OR JUST THOSE RESPONSIBLE FOR		
1	For all sites	
2	For sites I'm responsible for	
3	Don't know	

ASK ALL

10. Research Materials

Q22. (AD) Thinking about this same accounting period, what was the total energy consumption by your organisation (excluding transport fuel)? WRITE IN, RECORD VALUE GIVEN AND UNITS, either kWh or SPEND		
IF DON'T KNOW: If you can't tell me for your organisation as a whole, can you tell me for the site or sites you are responsible for?		
1	WRITE IN: VALUE UNITS	
2	Don't know	

IF CODE 1 AT Q22 AND CODE 1 OR 2 AT S2

Q23. INTERVIEWER TO RECORD IF REFERRING TO ALL SITES OR JUST THOSE RESPONSIBLE FOR		
1	For all sites	
2	For sites I'm responsible for	
3	Don't know	

ASK ALL

Q24. As far as you are aware, does your company own or lease vehicles which are used, at least some of the time, for commercial use? This might include cars driven by employees, vans used for deliveries or other types of journey related to your business. For the purposes of this survey we are not interested in transport that is used by subcontractors, even if this is core to your business. NOTE TO INTERVIEWER: if all of the respondent's company vehicle use is via subcontractors, then code 2 ('No') here. SINGLE CODE		
1	Yes (and this is not all through subcontractors)	
2	No	
3	Don't know	

IF CODE 1 AT Q24

Q25. (AD) Approximately how many of each of the following types of vehicle does your company own or lease? SINGLE CODE EACH INTO BANDS. IF UNSURE PROBE FOR BEST ESTIMATE									
		A 0	B 1	C 2-10	D 11- 19	E 20- 49	F 50-99	G 100+	H DK
1	Cars								
2	LGVs								
3	HGVs								
4	Minibuses								
5	Coaches								
6	Other (please specify if code 2-7)								

10. Research Materials

ON SAME SCREEN AS Q25, IF ANSWER IS NOT ZERO FOR CARS OR LGVs, THEN ASK Q26

<p>Q26. [AD] And what proportion of these [FOR STATEMENT 1 AT Q25‘cars’, [or] FOR STATEMENT 2 AT Q25‘LGVs’], if any, are either electric or low carbon? This could include, for example, vehicles subject to a reduced level of Vehicle Excise Duty due to their fuel efficiency. SINGLE CODE. IF UNSURE PROBE FOR BEST ESTIMATE If code 2 at Q23 (i.e. a response of 1 vehicle) then suppress codes 2 to 4i.e. so only code 1 (Displayed as ‘none’), code 7 (All) or code 8(DK) show</p>									
		A None	B Less than a quarter	C Between a quarter and a half	D Around half	E Between a half and three quarters	F More than three quarters but not all	G All	H Don't know
1	Cars								
2	LGVs								

IF CODE 1 at Q24 AND CODE 1 OR 2 AT S2

Q26b. And are these the number of vehicles owned or leased across all your organization's sites, or just those owned or leased by your organization at sites at which you have responsibility for energy management and energy efficiency?		
1	For all sites	
2	For sites I'm responsible for	
3	Don't know	

IF CODE 1 AT Q24

<p>Q27. I'm going to read out a list and I'd like you to tell me if your organisation has done this at any of its sites since your organisation started the first ESOS process, and if not, if it's something your organisation has planned for the future/ As a reminder your organisation formally complied with ESOS in [INSERT COMPLIANCE MONTH AND YEAR] and may have been working through this process for a number of months leading up to this. NOTE TO INTERVIEWER: If respondent from multi-site organisation says that the answer differs for different sites, and if code 1 is applicable to any of its sites then code 1 as the single response. If code 1 is not applicable at any sites, but code 2 is applicable for at least one site, code 2 as the single response</p>						
		A Yes, done since ESOS	B Yes, planned	C No	D Don't know/ Refused	E N/A
1	Adjustments to journeys or loading practices, to reduce mileage, time spent on the road, or load weights					

10. Research Materials

2	Switching freight operations from HGVs to more efficient modes of transport, or from air to sea, or from road to rail.					
3	Adjustments to existing fleet vehicles, e.g. improving aerodynamics, adjusting tyre pressure, speed restrictors or driver monitoring technology					
4	Driver awareness training (eco-driving training, idling practices, etc.)					
5	Switching some or all vehicles to lower fuel consumption, electric, hybrids, or alternatively fuelled vehicles					
6	Installation of infrastructure or policies that support alternative or reduced journeys e.g. better cycling facilities, vehicle charging points, car sharing policy, video conferencing, home working					

FOR EACH MEASURE CODED 2 AT Q27

<p>Q28. And how likely or unlikely is it that this measure will be implemented in the next year. Please give your answer on a scale of 1-10, where 10 means that it is certain to be implemented (for example, the budget has been signed-off, any required contractors procured, and the work just needs to begin) and 1 means there is a high chance of the planned measure being cancelled within the next year)</p>	
1	Enter number between 1 and 10, allow DK

FOR EACH MEASURES CODED 1 or 2 AT Q27

<p>Q29. And was the decision to implement this measure the result of going through the ESOS process, influenced by both the ESOS process but also other factors outside the scheme, or not influenced by ESOS at all? REPEAT FOR EACH CODE 1 or 2 GIVEN AT Q27. ALLOW DON'T KNOW</p>	
1	This was a result of going through the ESOS process
2	This was influenced by both the ESOS process and other factors outside of the scheme
3	This was not influenced by ESOS

ASK ALL

<p>Q32. Your ESOS audit report will have included various recommendations to improve your organisation's energy efficiency. What barriers, if any, has your organisation faced in implementing recommendations? DO NOT PROMPT. PRE-CODE. MULTICODE OK</p>	
	Financial/business pressures
1	Lack of funding/finance
2	Too much uncertainty about long term benefits and costs
3	We don't stand to benefit from taking action
4	Impacts on quality of our goods and services/ ability to meet customers' expectations

10. Research Materials

5	Reluctance to take action in market that isn't well established don't want to take action yet in case new and better (cheaper or more effective) options will be available in future	
	Practical limitations	
6	Limitations of the premises	
7	Personnel resources not available to take forward	
8	They would require action on the part of the landlord/landlord won't be willing to make the changes	
9	There are no further cost effective technologies available to us at the moment	
	Organisational	
10	Energy efficiency not an organisational priority	
11	Lack of support from board/senior management	
12	Lack of support from the workforce	
	Information	
13	Lack of trusted information - We are aware of options, but advice isn't sufficiently tailored or we get conflicting advice	
14	Lack of information - We don't know what's possible	
15	No	
16	Other, please specify	
17	Don't know	

ASK ALL

I'd now like you to think again about your organisation's overall use of energy, including transport as well as all other sources.

Q33. Since your organisation went through the ESOS process, overall would you say that the amount of action your organisation takes on energy and/or fuel efficiency has increased, decreased or stayed the same?		
1	Increased since ESOS compliance	
2	Decreased since ESOS compliance	
3	Stayed the same since ESOS compliance	
4	Don't know	

IF CODES 1 OR 2 AT Q33

Q34. What do you think has motivated this [INCREASE/DECREASE] in action on energy and/or fuel efficiency? DO NOT READ OUT, PRECODE FROM APPROPRIATE LIST. ALLOW DK/REF. DO NOT PROMPT		
INCREASED ACTION		
Financial reasons		
1	To reduce energy expenditure	
2	Increasing energy prices	
3	Reduce costs for tenants (landlords)	
4	Reduce cost/make savings	
Environmental concerns		
5	Carbon footprint /sustainability/climate change/ environmental concerns/reduce carbon emissions	

10. Research Materials

6	To show leadership on energy efficiency	
Compliance/legislation		
7	Response to climate change agreements (CCAs)	
8	ESOS requirements (e.g. to implement an energy audit)	
9	ESOS requirements - In response to ESOS audit recommendations	
10	ESOS requirements - To help gather information needed for ESOS audits	
11	ESOS requirements - To help meet requirements of ISO 50001 for ESOS compliance	
12	Other environmental/energy efficiency agreements – what?	
13	CRC requirements	
14	Legislation/regulation/government targets	
Organisational aims		
15	To assist in meeting internal targets	
16	To improve / protect reputation	
17	Shift in corporate ethos	
18	Don't know	
19	Other, please specify	
20	Following recommendations provided through audit activity not related to ESOS	
DECREASED ACTION		
21	Lack of finance	
22	Lack of staff time	
23	Have done all the obvious things	
24	Other business priorities	
25	Energy has become a smaller proportion of our costs	
26	Don't know	
27	Other, please specify	

ASK ALL

Q35. To what extent do you agree or disagree with each of the following statements? For each statement please say whether you strongly agree, tend to agree, neither agree nor disagree, tend to disagree or strongly disagree.							
		A Strongly agree	B Tend to agree	C Neither agree nor disagree	D Tend to disagree	E Strongly disagree	F Don't know
1	Changes made as a result of ESOS have already led to net cost savings in the organisation						
2	Staff productivity has increased as a result of energy saving measures recommended by ESOS being implemented						

10. Research Materials

3	Complying with ESOS has enhanced our reputation with clients/customers						
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ASK IF BOOST AND COMPLIED VIA EXTERNAL LA (FROM SAMPLE) OR RECONTACT AND DID NOT RECEIVE AUDIT REPORT BY BASELINE SURVEY (FROM SAMPLE)

Q38. How confident or not were you in the accuracy of the following aspects of your audit report?						
		A Very confident	B Fairly confident	C Not very confident	D Not at all confident	E Don't know
1	The estimated costs of implementing the recommendations					
2	The predicted benefits of implementing the recommendations					

ASK IF PART OF CORPORATE GROUP (Code 1 AT S5)

Q39. Has your ESOS audit report or any of the ESOS recommendations been shared with other organisations within your corporate group?		
1	Yes	
2	No	
3	Don't know	

ASK IF CODE 1 AT Q39

Q40. Which, if any, of the following aspects of your ESOS audit report have been shared with other organisations in your corporate group? MULTICODE OK		
1	The full audit report as signed off by the board	
2	The executive summary	
3	All of the recommendations included in the report	
4	Only recommendations relevant to each organization	
5	A site or subsidiary-specific report created by the lead assessor as part of the evidence pack	
6	A site or subsidiary-specific report created by you or someone else internal to the organisation	
7	None of these	
8	Don't know	

ASK IF CARRIED OUT AUDITS BY EXTERNAL LEAD ASSESSOR (FROM SAMPLE)

Q41. Have you commissioned any further services from your ESOS assessor?		
1	Yes	
2	No	
3	Don't know	

10. Research Materials

ASK IF CODE 1 AT Q41

Q42. What further services have you commissioned from your ESOS assessor? DO NOT READ OUT		
1	Further comprehensive/ investment grade audits	
2	Site or process specific audits	
3	Implementation of energy efficiency measures	
4	Training for staff in energy management	
5	Preparation for ISO 50001	
	Energy brokering	
	DECs/ Display Energy Certificates	
	EPCs/ Energy Performance Certificates	
	Other (SPECIFY)	
	None of these	
	Don't know	

ASK ALL

Q43. Does your organization have sub-metering at any of the sites for which you are responsible for energy management, or not? By this, we mean metering for different systems, buildings or building zones/sites or fuel uses. For example a multiple occupancy building could have sub-metering for heating and cooling systems and metering for individual premises within that building.		
1	Yes	
2	No	
3	Don't know	

ASK ALL		
Q46. As you may be aware, we are now in phase 2 of ESOS compliance, which has a compliance deadline of December 2019.		
Which of the following best describes your organisation's current status with respect to phase 2 of ESOS?		
[IF NECESSARY] This survey is independent from the compliance process. No information about your plans for compliance will be linked to your organisation or you personally, and will not be shared with the Environment Agency.		
SINGLE CODE		
1	My organisation has begun phase 2 compliance activity	
2	My organisation has not yet begun phase 2 compliance activity, but intends to in future	
3	My organisation has not begun phase 2 compliance activity, and does not intend to	
4	Don't know	

ASK IF CODES 1-2 AT Q46

ASK ALL

10. Research Materials

Q47. Can I confirm in which of the following ways your organisation is planning to comply with ESOS phase 2? MULTICODE OK		
1	Audits through a Lead Assessor external to your organisation	
2	Audits through a Lead Assessor internal to your organisation	
3	ISO50001 compliance route, via an existing/planned ISO50001 certification	
4	ISO50001 compliance route, with certification process prompted by ESOS phase 2	
5	Display Energy Certificates	
6	Green Deal Assessments	
7	Other, please specify	
8	Don't know	

ASK ALL

Q48. In addition to providing notification of your compliance, would you be willing to share any of the following information with the Environment Agency as a standard part of the compliance process for any future ESOS phase, beyond 2019? IF NEEDED: This is not a requirement for Phase 2 ESOS compliance, but we are interested in your potential willingness to share this type of information in future. Information would be shared in confidence for analysis and aggregated reporting only – no identifiable data would be published MULTICODE OK

1	Your full ESOS audit report	
2	Detail of the recommendations included in your audit report	
3	Detail of energy or fuel efficiency actions taken by your organisation as a result of the audit	
4	None of these	
5	Don't know	

Finally I'd like to ask a few questions in order to classify your answers. As with the rest of this survey, please answer these questions on behalf of the organisation for which you work, and do not include any subsidiary or other group members in your responses.

ASK ALL

D0. What year did you start working for or with the organisation?

1. WRITE IN YEAR
2. Don't know

ASK ALL

D1. I have [READ OUT SECTOR DESCRIPTION FROM SAMPLE] as a general classification of your organisation's principal activity. Bearing in mind this is a general classification only, does this sound about right?		
1	Yes	
2	No	
	IF NO: What is the principal activity of your organisation?	
	PROBE AS NECESSARY:	
	What is the main product or service of this organisation?	WRITE IN
	What exactly is made or done at this organisation?	
	What material or machinery does that involve using?	

10. Research Materials

ASK ALL

D2. Which of the following best describes how your organisation typically pays for its premises?		
1	Rented	
2	Leased	
3	Lease Purchase	
4	Owned - Outright	
5	Owned - Mortgage	
6	Other (SPECIFY)	
7	Mixture IF SO RECORD WHICH	
8	Not sure DON'T READ OUT	
9	Don't want to say DON'T READ OUT	

ASK ALL

D3. Approximately how many people are employed by your organisation overall, not including any subsidiaries or other group members?		
1	Less than 250	
2	250 - 499	
3	450 - 999	
4	1,000 - 4,999	
5	5,000 - 9,999	
6	10,000+	
7	Don't know/ Refused	

ASK ALL

D4. Approximately what is your company's annual turnover within Britain? If you are not sure, please give me your best estimate.		
1	Up to £250,000	
2	£250,000-£499,999	
3	£500,000-£749,999	
4	£750,000-£999,999	
5	£1m-£1.25m	
6	£1.25m-£1.5m	
7	£1.5m-£2m	
8	£2m-£5m	
9	£5m-£25m	
10	£25m-£50m	
11	More than £50m	
12	Refused	

ASK ALL

MULTICODE OK

10. Research Materials

D5. Which, if any, of the following schemes does your organisation participate in?		
1	CRC Energy Efficiency Scheme	
2	EU Emissions Trading Scheme	
3	Climate Change Agreement	
4	Climate Change Levy	
5	Mandatory greenhouse gas reporting	
6	Energy Performance Certificate (EPC)	
7	Display Energy Certificates (DEC)	
8	None of these	
9	Don't know	

ASK ALL

D6. [IF CODES 1-6 AT D5 add: Apart from any of the policies already mentioned,] Does your organisation currently report on its annual energy use externally, e.g. to the government, the public or shareholders/investors		
1	Yes	
2	No	
3	Don't know	

IF CODE 1 or 2 AT S2

D7. You said earlier that you aren't responsible for energy management and energy efficiency for all of the sites at your organisation. I'd therefore like you to think about the relative size of the site(s) at which you have responsibility compared to all the sites across your organisation. What is your best estimate for what percentage of your organisation's total [energy spend / floor area / annual turnover within Britain / number of UK employees] is represented by just the sites you have responsibility for?

1. Energy spend (excluding transport fuel)

ONLY ASK 2-4 IF DK/ REF AT 1

2. Overall floor area
3. Annual turnover
4. Number of UK employees
 - A. Less than 10%
 - B. 10-20%
 - C. Around a fifth (20%)
 - D. Around a quarter (25%)
 - E. Around a third (33%)
 - F. 40-50%
 - G. Around a half (50%)
 - H. Around two thirds (66%)
 - I. Around three quarters (75%)
 - J. More than 75%

10. Research Materials

Don't know / Refused

IF CODE 1 at S5

<p>D8. Thinking about the relative size of your own organisation within its wider corporate group, please can you tell me what proportion of the group's total [number of UK based sites / annual turnover within Britain / number of UK employees] is represented by your own organisation? RECORD EXACT PERCENTAGE FOR EACH OF 1-3. IF CANNOT ANSWER, PROVIDE OPTIONS BELOW AND ASK FOR BEST ESTIMATE</p>		
1	Energy use	

ONLY ASK 2-4 IF DK/ REF AT 1

2	Annual turnover within the UK	
3	Number of UK employees	
4	Number of UK based sites	

- A. Less than 10%
- B. 10-20%
- C. Around a fifth (20%)
- D. Around a quarter (25%)
- E. Around a third (33%)
- F. 40-50%
- G. Around a half (50%)
- H. Around two thirds (66%)
- I. Around three quarters (75%)
- J. More than 75%
- K. Don't know / Refused

ASK ALL

<p>D9. Would you be willing to share your ESOS audit report with the research team for this study? IF NECESSARY - This includes researchers at Ipsos MORI, Carbon Trust and University College London. This would not be shared with BEIS or the Environment Agency</p>		
1	Yes [CONFIRM THEIR EMAIL ADDRESS TO SEND AN UPLOAD LINK/REQUEST AFTER THE INTERVIEW]	
2	No	

ASK ALL

<p>D10. Many thanks for your time in completing this questionnaire. As part of our quality procedures a research manager may be in contact with you to verify/clarify some of your responses, is this ok?</p>		
1	Yes	
2	No	

RECONTACT AND DATA LINKING

1. Following this survey, Ipsos MORI would like to re-contact some organisations up to January 2019. We'd like to find out, in more depth, about your approach to energy management and any changes made as a result of ESOS. An Ipsos MORI researcher would visit your organisation at a convenient time to speak with a few different people about these issues. A £100 charity donation would then be made on your behalf. Would you be willing to be re-contacted in the next few weeks to discuss this in more detail? If you agree now, you are still free to change your mind and decline at a later date.

RECORD RESPONSE IN SCRIPT:

1. *Yes would be willing to be re-contacted to discuss a follow-up visit to my organisation*
2. *No would not be willing to be re-contacted to discuss a follow-up visit to my organisation*

2. Thank you for taking part in this survey. I will now explain one of the ways in which we would like to use your answers from today's survey if you give us permission to do so.

We would like to link your answers to other information held by the Government about UK businesses, such as energy use or company ownership information.

If you agree to this, your answers to this survey, together with your organisation's address, would be seen and held securely by the Department for Business, Energy and Industrial Strategy for research and statistics purposes only. Data will not be sold or used for commercial purposes. Any research findings will also be anonymised before being published.

You will be sent an email that confirms this information and provides more detail. Please read it carefully and contact us if you have any further questions. You can withdraw your permission at any time and do not have to give your consent at all if you don't want to.

RECORD RESPONSE IN SCRIPT on same page as this declaration text:

1. *Yes – I consent to my organisation's address and the survey answers I have given being seen by the Department for Business, Energy and Industrial Strategy and linked to other administrative information they hold*
2. *No -I do not give my consent for my survey answers to be linked to other information*

DO NOT ASK IF GAVE EMAIL ALREADY AT D9: And please can I take your email address to send you the full Privacy Notice? ENTER EMAIL ADDRESS

3. And finally, speaking with organisations about energy policy issues is extremely helpful for BEIS. Therefore, would you be willing to be contacted again in the next 2 years for further follow-up research on this topic?

Should you agree to this, your contact details and survey responses would be held securely by Ipsos MORI and passed on securely to the Department only for the purposes of the follow-up research. If you agree to this now you would still be under no obligation to take part at a future date.

RECORD RESPONSE IN SCRIPT:

1. *Yes would be willing for my contact details and survey responses to be securely stored to be re-contacted to be invited to participate in future research*
2. *No would not be willing to be re-contacted to be invited to participate in future research*

4. Case study recruitment screener

These case studies are part of phase 2 of the evaluation of the Energy Savings Opportunity Scheme (ESOS). Phase 2 is mainly comprised of a quantitative survey of organisations that complied with ESOS, and supplemented with secondary data analysis and qualitative research.

Background

The Energy Savings Opportunity Scheme (ESOS) requires large organisations (based on their turnover and/ or number of employees) to carry out an energy audit every four years, and notify the Environment Agency of their compliance. The audit report will make **energy efficiency recommendations**, for example setting out upgrades to lighting, heating, industrial processes, or driving practices where they have a fleet. etc. that would reduce the organisation's energy bills. However, there is no legal requirement for organisations to implement these recommendations, only to have the audit carried out and notify compliance.

We have therefore carried out a survey to understand, among other topics, whether or not organisations have made changes to their business as a result of going through the ESOS process. The case studies will help us to understand this in more depth.

The sample and audience

The contact details you have are for organisations which have completed a quantitative telephone survey through the Ipsos MORI telephone centre, and have agreed to be recontacted to take part in a case study up to January 2019.

The individuals you speak to will need to be aware of what the case study involves, and be willing to speak again to the assigned researcher ahead of the visit to make plans and organise the visit. They would ideally help the interviewer with the following:

1. Planning the visit, including setting up meetings with different team members, and booking meeting rooms for these meetings.
2. Sending relevant data and documents to the researcher for review ahead of the visit, particularly the ESOS audit report, and others if possible
3. Spending time with the researcher during the visit, discussing ESOS.
4. (Optional) taking the researcher on a tour of energy saving measures within the organisation.

On 1) above, we would look to interview several people per organisation i.e. the main ESOS contact in the sample, plus a board member, possibly others from the energy team, the facilities manager, the lead assessor, anyone else they have contacted about implementation of measures.

Ideally these will be individual **in-depth interviews** to allow individual views to be expressed. However, we can be flexible e.g. by offering telephone interviews for key staff that are not based on site or are unavailable (the Lead Assessor will be external and therefore a phone interview will almost certainly be required)

Quotas

You will see there are two spreadsheets in the sample – the '**recontact**' spreadsheet are organisations for which we also carried out a survey in 2016. We have much more data on these organisations, therefore they should be prioritised. The **boost** sheet are organisations for which we just have one wave of survey data, therefore these should be used to fill quotas once the recontact sheet has been exhausted.

As you can see in the sample, there are 7 different types of organisations that we want to recruit. To cover the 10 case studies we want:

- 2x type 1
- 2x type 2
- 1x type 3
- 1x type 4
- 2x type 5
- 1x type 6
- 1x type 7

There is a column for each type, and leads could be used to fill more than one type. The sample is therefore ordered from left to right by the types for which have fewest available leads, and sorted such that these leads are at the top. What this means in practice is that to maximise the chances of us hitting the quotas, we should start dialling at the top but aiming to recruit the left-most type that has not been filled yet. So for example, the first lead could be used for type 2, 5 or 7, but we would only use it for type 7 if types 2 and 5 were already filled given the smaller available sample for types 2 and 5.

The other quotas, all based on sample information, can be in any combination across the 7 types:

- 2 case-studies with organisations complying via **ISO accreditation**
- At least 2 case-studies (but max 5) where organisation has **commissioned follow-on services**
- At least 3 case-studies with organisations who have **participated in other schemes**

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- At least 3 case-studies with organisations who **do not participate in any other schemes**
- At least 2 case studies with **organisations that have shared the audit recommendations or full report with other members of their corporate group**

In addition, we would like to monitor the spread of compliance date, region, sector and whether or not the organisation has a foreign parent, but there are no hard quotas on these. Finally, we will monitor the past experience of auditing before ESOS – this is asked at Q11 below, but again there is no quota.

Recruitment screener

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) to evaluate a national energy saving scheme (if necessary called the Energy Savings Opportunity Scheme, or ESOS).

Recently, my colleague 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 any changes made as a result 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 recently spoke with my colleague as part of a survey about ESOS

At the time we asked if we could re-contact you to further explore your approach to energy management and any changes made as a result 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 in January 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

Q1. Would you be interested in taking part?

1. Yes – CONTINUE
2. No – CLOSE

ASK ALL

Q2. Would you be able to spare the time to talk with the researcher, and show them around on the day?

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1. Yes – CONTINUE
2. No – CLOSE

ASK ALL

Q3. 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?

1. Yes – I can do this – CONTINUE
2. Yes – my colleague can do this [RECORD NAME AND CONTACT DETAILS, TELEPHONE AND EMAIL]
3. No – GO TO Q4

ASK IF 'NO' AT Q3

Q4. 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?

1. Yes – I can do this – CONTINUE
2. Yes – my colleague can do this [RECORD NAME AND CONTACT DETAILS, TELEPHONE AND EMAIL]
3. No – THANK AND CLOSE

ASK ALL

Q5. 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?

1. Yes – RECORD, CONTINUE
2. No – RECORD, CONTINUE

ASK ALL

Q6. 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?

1. Yes – RECORD, CONTINUE
2. No – RECORD, CONTINUE

ASK IF YES TO Q6

Q7. 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

Q8. Thanks very much, when would be a convenient time in January for us to come and visit you? Ideally this would be a time when your other relevant colleagues are available?

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

ASK ALL

Q9. I have here that your address is [insert from quant data]. Is this the correct address for the researcher to visit you at?

1. Yes – CONTINUE
2. No – RECORD, CONTINUE

ASK ALL

Q10. And is this the same address as that at which other relevant team members are based?

1. Yes – CONTINUE
2. No – RECORD, CONTINUE

ASK ALL (FOR INFORMATION, NO QUOTA)

Q11. Which, if any, of the following best describes your organisations use of energy audits before you complied with ESOS. [IF NECESSARY]: An energy audit is when the various activities and processes that make up an organisation's energy consumption are audited by a trained assessor, who then makes tailored energy savings recommendations based on the audit. This includes continuous improvement activities such as under ISO50001

1. We carried out energy audits at least annually as part of our regular energy management processes
2. We carried out occasional ad hoc energy audits
3. We never carried out energy audits
4. Don't know

Thank and close

5. Organisational case studies discussion guide

Topic area	Board Probes
Introduction to interview	
Introduce self and Ipsos MORI	
<p>Explain the aims and objectives of the research:</p> <ul style="list-style-type: none"> - carrying out research on behalf of BEIS to understand impact of ESOS and role of energy audits and reporting more generally on driving energy efficiency in businesses - BEIS also keen to hear suggestions for what other policy tools could work alongside ESOS to promote energy efficiency - EXPECT MOST WILL SAY ESOS HAS HAD LIMITED/ NO IMPACT: explain government acknowledges energy efficiency action is often due to other factors beyond ESOS but it's important for us to understand these other factors in more detail, or where businesses haven't taken much action on EE (whether due to ESOS or not) it's important for us to understand what the barriers are - [remind and thank them for participation in survey]: Therefore these case studies allow us to follow up on similar topics to the survey but in more depth to improve our understanding of organisations decision making around energy efficiency and the role played by ESOS (if any!) 	
<p>Explain these case studies will feed into our report along with the survey, work with assessors and modelling of energy savings led by UCL. We may include quotes from these case studies but not in a way that can be linked back to them or their organisation.</p>	
Case-study practicalities: check how long they have, who else is coming and when	
Questions and obtain informed, voluntary consent, get permission to record	
Introduction to organisation	
<p>Organisation structure e.g. understanding location of parent company, context of organisation within corporate group, number of sites, no of employees</p> <p>Brief intro to energy use i.e. rough energy spend and % of total costs, main areas of energy use</p>	
Understand context for organisation's energy use, enablers and barriers to taking energy efficiency action to date.	
Energy Efficiency - Structures and priorities	

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<p>Energy efficiency management structure</p> <p>-Who is responsible for decision making and action on energy efficiency and management? -are there any members of staff who champion energy/sustainability issues? 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)? Interviewer to probe to understand roles mentioned in survey -does the board review EE action planning, policies or procedures? -How would you describe the culture at board level around energy efficiency action? does your organisation have board-level support for EE action? -How would you describe the overall culture around energy efficiency within the organisation?</p> <p>Any changes over recent years, and how this affected / was affected by ESOS, and by other factors. Any differences in priority levels at different levels in the company, and how such differences are managed.</p>	<p>Involvement in setting up etc.</p> <p>Board perception of business case for EE. Barriers to EE action? Extent to which they drive it?</p>
<p>Energy efficiency policies / strategies / action plans</p> <p>Context Qs: -IF RELEVANT FROM SURVEY: you mentioned that your organisation sets energy use reduction targets. please can talk through how that was set, who sets it, what the target is. -are there any targets to do with reducing emissions? -does your organisation have any wider CSR policies of which EE is a factor?</p> <p>-does your organisation have regulatory drivers which impact EE behaviours/actions? Such as health & safety drivers -do you know if your organisation participates in other energy-related policies (e.g. CCA, CRC, GHG Reporting)?</p>	<p>Involvement in setting up etc.</p>
<p>Energy Efficiency - actions, changes, and scheme involvement</p>	
<p>Previous history of (voluntary) audits before ESOS? If so, how often, prompted by what, internal or external? Did these lead to implementation of recommendations?</p> <p>Would you describe these previous experiences of energy audits as positive or negative?</p> <p>Have you carried out any further voluntary audits since the introduction of ESOS (e.g. in addition to the audit you carried out to comply with ESOS phase 1?) why / why not? / If so, did this lead to implementation of recommendations?</p> <p>Would you consider carrying out further voluntary audits in the future, i.e. not just for ESOS phase 2 compliance? why/ why not?</p>	
<p>What level of sub-metering do you have across your organisation? What level of granularity do they provide? Is this appropriate for your business? does your organisation utilise any additional tools in order to understand their consumption in more depth? If so, what are these? How do they work? What do they show?</p>	
<p>does the organisation have financial resources available that can be used for EE/ FE actions? If not, why not? - does EE investment displace other investment? Does the organisation have relevant staff to identify and implement energy saving opportunities?</p>	

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Do they use minimum payback periods, rate of return and/or life cycle cost analysis in EE decision-making?	
Response to the audit report, and impacts of ESOS, both of the report and the process itself	
Commissioning assessor and Recommendations Keep note of other motivations/ barriers that arise through this discussion	
Were you involved in the process of commissioning the Lead Assessor? IF YES: Did you get quotes from multiple Lead Assessors? What were the key factors which made you decide to appoint a particular Lead Assessor? -PROBE: proximity to site(s), industry knowledge/understanding, experience, involvement in other schemes, recommendation, cost 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? -PROBE: familiarity with technology/processes within sector (what specifically?)	Board involvement?
To what extent did the audit report: a. Provide new information; and / or b. Provide external validation that changes already identified would be worthwhile to make.	
Do the assessments provide recommendations which clearly identify quantified savings as a result of implementation?	
Did you trust the recommendations in the report? Why/ why not? How did this compare with your expectations?	
Were all the recommendations relevant to your business? If not, why do you think this was? PROBE for examples of irrelevant recommendations. How did this compare with your expectations?	
How practicable is the implementation of recommendations made in the assessments? Does the organisation have the right levels of staff resource, the right skills?	
Was the report clear on how best to go about implementing recommendations, or was further assessor input required to make this clear? How did this compare with your expectations?	
Expected costs and benefits of implementing recommendations - including which recommendations were attractive from a commercial point of view. Did different recommendation types require different thresholds of informational quality	
What else has influenced whether or not recommendations are taken forward?	
Dissemination and response	

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<p>Dissemination of audit report and response from staff - including exploration of whether there has been any dissemination of findings/recommendations beyond own organisational entity to subsidiaries or other enterprises in corporate group, and any response from / resulting actions taken by them?</p> <p>[IF NOT IN POST FOR ESOS]: find out how the report got to them? e.g. just saw it on drive, or something more active/ handover?</p> <p>Did / why did level of engagement differ at different levels in the company, and what was done to promote engagement.</p> <p>If large, multi-site company or part of wider group - what dissemination, if any, occurred across different levels of the organisation?</p>	
<p>Impacts of ESOS</p>	
<p>Probe for each measure that was implemented as a result of ESOS from survey: Can find this in sample</p> <ul style="list-style-type: none"> - What do they mean by this? ALLOW FOR SPONATANEOUS THEN PROBE: - Was the recommendation something they had not considered before? - Or did the audit report provide external validation? or suggest the payback period was shorter/ cost lower/ savings higher than previously thought? - Was there something about the ESOS process beyond the audit itself that led to implementation of this measure e.g. it encouraged greater priority on energy efficiency? - how likely is it they would have implemented the recommendation without ESOS and if they would, in what timeframe? 	
<p>Probe for all installed measures from survey:</p> <ul style="list-style-type: none"> - what other factors led to this being implemented? - what factor or factors were the most important? <p>Perceptions around costs and benefits of implementation - to what extent have businesses considered costs of disruption or other 'hassle' costs in this assessment?</p>	
<p>For measures installed at some but not all sites (from survey)</p> <p>How widely was this rolled out in your business? [i.e. to check survey response]</p> <p>IF SOME BUT NOT ALL: Why was this measure not rolled out at all sites? E.g. not relevant? Cost? Lack of suitable staff?</p> <p>How were sites selected for improvement?</p>	

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<p>INTERVIEWER NOTE: much of this may have already been covered in which case use the probes that have been missed to fill the gaps, rather than run through the whole exercise which could be repetitive</p> <p>I would now like to understand the decision making process in a little more detail. For one of the measures you have implemented over the last few years, would you be able to talk me through the steps between receiving the audit report with the recommendation in it (if relevant), and the final implementation? If you haven't implemented anything, could you talk through how this process would work in theory. Example probes, get timings at each stage as relevant:</p> <ul style="list-style-type: none"> - how did you decide which recommendations to take forward, if any? e.g. based on payback periods, ROI, or previous moves towards implementation? - did payback calculations include indirect costs/benefits? - did you need to get a further site/ process specific audit to have suitable 'investment grade' information to take the recommendation forward? - did you have to write and/ or present a business case to the board? Does this depend on the level of investment? How does the board make it's decision? - How did you procure a supplier? Did you get several quotes? How did you choose? - was there any disruption to the business during installation? how did you manage this? - What processes, if any, did you put in place to ensure the measure is being implemented as required, e.g. new equipment being used correctly/ efficiently? do you know if these have been effective? - overall, what has been the impact on your business of installing this? 	
<p>Probe for each planned measure from survey:</p> <ul style="list-style-type: none"> - what stage are you up to with implementation? - what barriers have you faced, if any? - IF LIKELIHOOD IF IMPLEMENTATION BELOW 7: you indicated there is a chance this might not be implemented. What would you say are the main reasons for this? - is there anything that would lead to this being implemented more quickly? 	
<p>As a result of going through the ESOS process, do you think there have been benefits for your organisation beyond fuel/ energy efficiency savings? ALLOW FOR SPONTANEOUS THEN PROBE:</p> <p>has the going through the ESOS process had any impact on the reputation of the organisation?</p> <ul style="list-style-type: none"> -Has it had any impacts on the customer experience? Or on working conditions for staff? -To what extent, if at all, has ESOS been perceived as a business opportunity for your organisation? 	
<p>What levels of savings are the implemented recommendations expected to realise? And when?</p>	
<p>IF ESOS NOT LED TO FOLLOW ON WORK (from survey) In the survey, you said you have not commissioned further services from your ESOS assessor. What are the main reasons for this? ALLOW FOR SPONTANEOUS THEN PROBE:</p> <ul style="list-style-type: none"> - the audit provided everything we needed/ no reason to commission further services - have done things in house instead 	
<p>Summary and ESOS phase 2</p>	
<p>IF PLAN TO COMPLY VIA ISO AT PHASE 2 BUT DIDN'T AT PHASE 1 (from survey/ sample): You said in the survey that this time you plan to comply with ESOS via ISO 50001. What are the main reasons for this?</p>	

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<p>IF PLAN TO COMPLY WITH PHASE 2 VIA LA: Do you plan to use the same assessor as phase 1? Why/ why not? IF NOT: What skills do you want the assessor to have? ALL COMPLYING VIA LA: What type of service are you looking for from your lead assessor? What sort of outputs? Does this differ from phase 1? If so, why?</p>	
<p>IF DOES NOT INTEND TO COMPLY IN PHASE 2 (from survey): you said in the survey your organisation does not intend to comply with the second phase of ESOS. What are the main reasons for this? example probes: - threat of enforcement not credible/ not aware of enforcement at phase 1 - didn't benefit from phase 1 - don't think we qualify - too expensive/ costs of compliance</p> <p>TRY TO UNDERSTAND: Are they looking for an assessor to do everything e.g. all data collection, or just sign off a report mostly collated internally, or something in between, more collaborative? Are they looking for something to achieve compliance at low cost, or something more in depth e.g. in terms of assessing business, engaging with staff, presenting findings?</p>	
<p>Are there any other planned changes you expect to make as a result of ESOS that we have not covered? When do you expect these to happen</p>	
<p>What further help or support do you need to become more energy efficient?</p> <p>Do you think there need to be any further types of rules or regulations on businesses to promote energy efficiency?</p>	
<p>Can we have their audit report? Reassure around confidentiality</p>	
<p>any other comments?</p>	

6. Lead assessor interview recruitment screener

Good morning/ afternoon/ evening. My name isfrom Ipsos MORI, an independent research company. We understand that you are a member of [REGISTER] and as such are an accredited lead assessor for ESOS – the Energy Savings Opportunity Scheme.

We have been contracted by the Department of Business, Energy and Industrial Strategy to carry out an evaluation of ESOS in order to understand the impact of the scheme on businesses, the assessor markets and the wider non-domestic sector. As part of this, we are speaking to lead assessors as we are very keen to hear your experiences of working with several organisations on ESOS compliance, and are particularly interested to learn what types of recommendations are more likely to be carried forward and why.

The interview would last for about 40-45 minutes, and we can offer you an incentive of £50 to thank you for your time.

The interview would be anonymous and reported in general terms such that you would not be identifiable.

ASK ALL

Q1. Would you be interested in taking part?

1. Yes – CONTINUE
2. No – CLOSE

ASK ALL

Q2. How many ESOS audits did you personally carry out? If you can't remember exactly, please just give me your best estimate.

1. 5 or more – CONTINUE
2. Less than 5 - CLOSE

Thank you. We'd just like to confirm a few details, to make sure we are speaking to a range of lead assessors.

ASK ALL

Q3. Please can you confirm if you are an independent consultant, or if you work for a firm of assessors?

1. Independent – RECRUIT TO QUOTA
2. Firm of assessors – RECRUIT TO QUOTA

ASK IF REGISTER SAYS THEY SPECIALISE IN TRANSPORT

Q4. The register also says that you have expertise in auditing transport and fuel efficiency. Is that correct?

1. Yes – RECRUIT TO QUOTA
2. No – RECRUIT TO QUOTA

ASK IF REGISTER SAYS THEY SPECIALISE IN INDUSTRIAL PROCESSES

Q5. The register also says that you have expertise in auditing industrial processes. Is that correct?

1. Yes – RECRUIT TO QUOTA
2. No _ RECRUIT TO QUOTA

Q6. We are keen to learn about the implementation of the equivalent legislation in Sweden and Germany therefore we would ask a few additional relevant questions of assessors that have experience in these countries. Have you ever carried out energy audits in Sweden or Germany?

1. Yes, Sweden
2. Yes, Germany
3. Yes, both Sweden and Germany
4. No, neither

Q7. Thanks very much, when would be a convenient time for us to call you?

RECORD TIME AND DATE OF INTERVIEW

7. ESOS Lead Assessor in-depth interview discussion guide

Time	Key Questions/probes
2 mins	<ul style="list-style-type: none"> • Introduce self, Ipsos MORI, and explain the aim of the interview. Thank the assessor for agreeing to contribute further to the evaluation. • Explain that this research is about understanding how the assessor market and organisations have responded to ESOS audits, in particular the types of recommendations that have been taken forward and why. The research is on behalf of The Department for Business, Energy and Industrial Strategy • 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.
5 mins	<p>Overview of ESOS and non-ESOS audits</p> <p>Firstly I'd like to spend some time getting an overview of your work under ESOS.</p> <ul style="list-style-type: none"> • How many ESOS audits have you conducted to date? • What were your motivations for becoming an ESOS Lead Assessor? • Probe for: existing levels of work in industry (were they low?), personal/career development, financial etc. • What work, did you carry out alongside ESOS auditing? What proportion of your time would you say was on ESOS as opposed to other paid work in late 2015 and January 2016? • And what work have you carried out since most organisations complied in 2016? Have you still been working on ESOS related work? PROBE: what type of ESOS-related work – further audit activity, implementation activity, other services? • How does ESOS work get shared across the assessor team at your company? Do different assessors specialise in different types of assessment or different industry sectors? • Have you delivered non-ESOS related audits alongside your ESOS-related activity over the last few years? What type of audits? To what types of customer? [COVER BRIEFLY HERE BUT RETURN TO IN MORE DEPTH LATER IN INTERVIEW GUIDE]

	<p>The audit process</p> <p>Now I'd like to talk in more detail about the organisations you have audited.</p> <p>Can you briefly describe how you went about carrying out the ESOS audit?</p> <ul style="list-style-type: none"> • Probe: communication with organisation (who?), frequency and length of site visits, who within the business accompanied these, inclusion of transport, types of energy sources/fuels included, methods <p>If conducted multiple ESOS audits:</p> <ul style="list-style-type: none"> • How did this change depending on the size of the organisation being audited? How would you define size? (IF NEEDED i.e. those with greater sq.m, or more sites, or more employees)? • How did this change depending on the industry sector of the organisation? (i.e. transport, manufacturing)? • How did this change depending on the organisation's needs/wants from the audit process? Did some organisations want a 'no frills' audit where others wanted something more comprehensive such as an Investment Grade Audit? How did the Investment Grade Audit process differ from the typical audit process? PROBE for types of organisations/ contexts that make requests for investment grade audits more likely <p>To what extent did you ask for or make use of audit findings from other energy saving schemes which the organisations might 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 • Who did you report to within the organisation? Generally did anyone from senior management get involved with the process? Did this include anyone at Board level? What about the report? What impression do you have of how organisations generally engage senior management (and in particular Board members) in ESOS? • Did any organisations prefer to comply via the ISO 50001 route? What types of organisations? What, if any, were the constraints to compliance via this route?
<p>20 mins</p>	<p>Post audit</p> <p>I'd now like to talk about the audit reports and recommendations.</p> <p>Do your audit reports typically differ between organisations based on any of the following factors? If so, why?</p> <ul style="list-style-type: none"> • Cost paid for audit • What the organisation wants from the audit • How engaged the organisation is with the audit process <p>What are the most common types of recommendations that you make? PROBE on: most common category of measures recommended (lighting, heating, cooling, IT, transport, processes, behavioural measures etc.) PROE on: most common scale of measures recommended (zero-cost, low-cost, payback limit etc.)</p> <p>Did recommendations in the audit reports tend to include quantifiable savings, how were these expressed, scale of savings being identified, timescale to deliver recommendations</p> <p>Does it include any of the following:</p>

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- Payback periods?
- Risks or uncertainty on the costs and savings side?
- Estimated disruption costs associated with physical works – etc
- Assessment of the cumulative effects of implementing multiple measures
- How implementation could have indirect benefits e.g. reputation, improved working conditions

What would you say are the main factors that affect which types of recommendations you make for different organisations?

PROBE: Organisational budget, priorities, broader energy efficiency culture, sector organisation works in (e.g transport, manufacturing, etc.), previous history of energy audits

Did the format of the recommendations vary by organisation? If so, how?

PROBE to understand if simplify for less energy-savvy organisations

Have you held any meetings or presentations with the organisations to discuss the report and recommendations? If so, who attended these? Were there Board level/senior management attendees? Was this standard practice or did it depend on the organisation?

As far as you are aware have any of the recommendations in your audit reports been taken forward, or has the organisation committed formally to taking them forward?

- IF YES – what types of recommendations? What are the main reasons they have been taken forward? Are some more likely to be taken forward than others? Why are some not taken forward? What are the timescales?
- IF NO – do you think they are likely to take any forward? What are you basing this on? Which ones? If no, why not?

What factors within organisations do you think make them more or less likely to take recommendations forward?

ALLOW FOR SPONTANEOUS THEN PROBE FOR:

- senior level buy in/ championing of EE
- whether they were an existing or new customer for the assessor,
- demand from their clients
- previous positive experience of energy audits/ working with energy assessors
- availability of financial resources
- staff with appropriate skills
- whether they own their buildings, or length of tenancy contract
- availability of submetering data, culture of energy efficiency
- participation in other schemes (e.g. CCA)
- industry/ level of energy intensity

Are there particular elements of the ESOS audit, or audits and reporting more generally, that you think are most effective in encouraging recommendations to be taken forward?

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	<p>From what you know of the next steps taken by organisations you audited for ESOS, roughly what proportion of all the measures you recommended do you think have been taken forward? And, what proportion of organisations do you think took forward any type of measure following their ESOS audit?</p> <p>In your experience, are organisations using/ applying new equipment/ processes correctly? Are the predicted savings and benefits being realised? What are the main barriers?</p> <p>As far as you are aware, have any of the organisations you audited shared your recommendations across their internal teams or sites? Were you ever involved in this process? And have any shared them externally, such as with other organisations or sector representatives?</p> <p>Did you have any further contact with senior level employees within organisations? Did this differ between certain organisations? If so in what way?</p> <p>What further follow-up work have you had following an ESOS audit? To what extent is this follow-up work related to your motivation to be involved in ESOS? What tactics did you take to maximise the potential for follow-up work?</p> <p style="padding-left: 40px;">PROBE if not already covered: have you used case studies or 'success stories' from your ESOS audit work to market yourself to the wider non-domestic sector?</p> <p>Beyond the implementation of recommendations, have you noticed any other impacts for organisations as a result of going through the ESOS process.</p> <ul style="list-style-type: none"> • E.g. increased interest in/ priority on EE among senior employees • Increased interest in/ move towards certification in ISO50001 • Changes in staff e.g. appointment of dedicated energy manager/ expansion of energy management team • Requests for investment grade audits that go beyond the ESOS requirements
<p>5 mins</p>	<p>Non-ESOS audits</p> <p>Now I'd like to discuss your experiences of delivering audits beyond ESOS</p> <p>Have you delivered audits to SMEs? What sort of demand for your services do you think exists among these types of organisation? Did you only deliver grant funded audits to SMEs or did some pay themselves? IF NOT MENTIONED: what are the main barriers to auditing among SMEs?</p> <p>IF AUDITED SMES THAT WERE NOT GRANT FUNDED: What do you think makes SMEs more likely to request a (paid for) energy audit? ALLOW FOR SPONTANEOUS THEN PROBE e.g. sector/ energy intensity, size, personal interest of CEO/ others on board, awareness of/interest in ESOS?</p> <p>Are the measures you recommend to SMEs similar to larger organisations? If not, what are the key differences?</p> <p>Do you present or frame recommendations differently to SMEs? If so, how? And why?</p> <p>Are there any other differences in your approach to auditing SMEs?</p> <p>IF TIME ALLOWS</p>

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	<p>- also check whether they have delivered audits to public sector organisation?</p> <p>- Probe questions above in relation to public sector demand & response to audits</p>
5 mins	<p>Organisational view of ESOS and appetite for audits</p> <p>What is your impression of the overall mood around ESOS among organisations you have had contact with which are in scope of the scheme?</p> <p>What do you think organisations were looking for from their ESOS audit? PROBE: seeking improved energy efficiency? Or savings in their energy bills? Or reputational benefits? To receive an investment-grade audit on which they could build a business case? Or just reaching compliance? PROBE: what evidence did you see of these motivations varying across different types of organisation?</p>
5 mins	<p>Opinions on response from wider market</p> <p>Beyond your own circumstances, how would you say the assessor market more generally has responded to the requirements of ESOS?</p> <p>Do you think most ESOS Lead Assessors were experienced auditors already in the industry, or do you think there were new entrants to the market coming to audits for the first time as a result of the ESOS policy?</p> <p>What did you think about the quality of ESOS Lead Assessors and the audits they delivered?</p> <p>Was quality consistent? If not, why do you think some were lower quality? IF NEEDED PROBE on spike in demand close to compliance deadline</p>
5 mins	<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>Overall, do you think that ESOS compares favourably or unfavourably to other energy efficiency policies (such as CCAs) in terms of effectiveness? How does ESOS sit alongside these other policies? What are the overlaps? What might this mean for organisations?</p> <p>What makes you say that?</p> <p>Are there any other policy tools or initiatives that could work alongside energy audits, reporting or ESOS that you think could help to further support the promotion of energy efficiency?</p> <p>And finally, what impact do you expect the scheme to have on the uptake of energy efficiency measures and behaviours recommended as a result of the energy audits?</p> <p>As you may know, the UK Government introduced ESOS under its obligations of the European Energy Efficiency Directive. As part of our research, we are also looking at the implementation of the EED in other countries, with a particular interest in Sweden and Germany. Do you have experience in auditing organisations in these countries? If so, would you be happy for us to contact you early in the new year to discuss these experiences? If not, are you able to pass us the contact details of any other assessors in your organisation who do have this experience? RECORD DETAILS</p> <p>CONFIRM DETAILS FOR BANK TRANSFER/ CHEQUE INCENTIVE OF £50</p>

8. Energy efficiency supply chain in-depth interview discussion guide

Intro

- Introduce self, Carbon Trust and rest of consortium, and thank interviewee for their time
- Explain that this research aims to understand the experience and perceptions of technology suppliers around energy audits and reporting, if and how they are used by their clients, and their relation to energy efficiency savings. More specifically, it will also seek to understand experience and perceptions of ESOS. ESOS is a mandatory energy assessment scheme for organisations in the UK that meet certain qualification criteria. Organisations that qualify for ESOS must carry out ESOS assessments every 4 years. These assessments generally entail audits of the energy used by their buildings, industrial processes and transport to identify cost-effective energy saving measures.
- The study is being conducted on behalf of the Department for Business, Energy and Industrial Strategy
- 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.
- Recording: Ask if respondents are happy to be recorded on the confidentiality basis set out above.

Technology suppliers

Overarching question:

We would like to start by finding a bit more about you and your organisations

Can you describe your role within the organisation?

How old is your Company?

What technologies are your Company involved with?

Examples for prompt: LED Lighting, Heat and Steam, HVAC, Controls, IT (server cooling), Dust/fume extraction, Pumps, Compressed Air

Which part(s) of the supply chain are you involved with?

Examples for prompt: Manufacture, Distribution, Installation, O&M

What was your Company's approximate turnover last financial year?

How would you describe the evolution of your sales in recent years? How do you see these trends going forward?

Example angles for prompt:

- Overall volume of sales
- Size and sector of clients
- New or repeat business
- Motive for sale
- Urgency of purchase

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Thinking of a “typical” sales year for your Company, how would you roughly break down the nature of your sales? By this I mean roughly what proportion of your sales would you say are:

- New-build projects
- Distressed purchases (i.e. clients seeking to replace/renew faulty equipment/systems):
- Planned refurbishment (i.e. clients replacing end-of-life equipment/systems):
- Energy efficiency/energy cost savings:
- Carbon reduction objectives:

We would like now to ask about your views on the energy efficiency market in general, and your sales driven by energy efficiency, energy costs savings and/or carbon reductions more specifically.

Thinking about the Energy Efficiency market in general, what do you see as the biggest trends in the market at the moment?

How important do you think energy efficiency is to your clients?

- Is it something they discuss with you / talk to you about it?
- What do they say?
- Do they seem knowledgeable about it?
- Are some types of clients more interested than others?

To what extent does your company promote energy efficiency?

- How do you do so?
- Do you use energy efficiency as a means to promote sales/purchases?
- Do you mention energy efficiency in advertising/marketing materials?
- Do you proactively promote it to existing customers? To prospective customers?
- Do you target promotion of energy saving opportunities in response to recommendations made in energy audits?

Thinking of your company’s sales that were driven by “Energy efficiency/Energy cost savings” and/or “Carbon reduction objectives”, what do you think were the major drivers behind those sales?

Examples for prompt:

- Your Company’s sales staff (i.e. proactive promotion to target clients)
- Your Company’s advertising and marketing efforts (e.g. adverts in trade/specialist press)
- Partnerships with trade/sector bodies or business organisations
- The listing of your equipment on the Energy Technology Products List (for ECA)
- Approaches from clients seeking proposal/quotation from your Company
- Your company undertaking (a system-level) energy audit of your client’s site/facilities
- Your clients undertaking an internal energy audit (system-level or whole building/facility)
- Your clients obtaining an energy audit report (system-level or whole building/facility) from another supplier
- Your clients commissioning an energy audit from an external independent energy consultant/specialist (i.e. an energy professional not tied to or associated with equipment manufacturers/suppliers)

What do you consider to be the barriers which prevent your customers from buying energy efficient products?

Examples for prompt:

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- Too expensive / can't afford
- Uncertainty over long term benefits / potential bill savings
- Concerns over quality/performance of products
- Not a priority for their organisation
- Practical limitations of their premises
- Not a priority for your company to promote these products (if not, why?)

We are exploring how suppliers of efficient technology perceive energy audits and if they have seen any impacts in the market since the introduction of the ESOS policy

[Reminder, if required] ESOS is a mandatory energy assessment scheme for organisations in the UK that meet certain qualification criteria. Organisations that qualify for ESOS must carry out ESOS assessments every 4 years. These assessments generally entail audits of the energy used by their buildings, industrial processes and transport to identify cost-effective energy saving measures.

How familiar or not would you say you are with ESOS? Is this something you've heard of, been involved with in some way, or not?

If "familiar":

Has your company been involved in the delivery of ESOS energy audits?

- If yes, what was the nature of that involvement?
- How frequently have you been involved with this / for what proportion of your customers?

What are your general feelings around the scheme?

- Positive/negative implications for your company / for your customers
- Encourages energy efficiency?
- Burdensome for customers?

Have ESOS audits been a topic of conversation with customers?

- Have your existing customers talked to you about ESOS?
- Have prospective customers?
- What sort of things do they say about it?
- Have they asked for your advice related to ESOS?
- Have they mentioned ESOS as the reason for purchases?

What impact (if any) do you think ESOS has had on the market?

- Do you think it has led to growth in the Energy efficiency market?
- Has the nature of purchases changed?
- Has the volume of purchases changed?
- What impact (if any) do you think it's had on your supply chain?

Has your company seen any uptake in demand that you could attribute to ESOS?

- Yes
- No

Do you think that ESOS has pushed energy efficiency forward in the wider non-domestic sector? Have you seen examples of ESOS influencing beyond the pool of targeted organisations?

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- Attitude changes towards energy efficiency?
- Increased awareness of energy efficiency?
- Increased uptake of / priority given to energy management?

Energy audits also take place outside of the ESOS scheme. For example non-obligated organisations such as SMEs and public sector organisations may conduct energy audits, and large businesses may conduct further voluntary audits in addition to the mandatory auditing as part of the ESOS scheme.

Are you aware of any of your customers conducting energy audits, outside of the ESOS scheme?

If yes:

- do you have a sense of why these customers are voluntarily undertaking energy audits?
- do you think ESOS has influenced their decision to do so?
- what is the nature of customers making voluntary audits (business size, industry)?

Has your company been involved in the delivery of any non-ESOS, voluntary energy audits?

- If yes, what was the nature of that involvement?
- How frequently have you been involved with this / for what proportion of your customers?

What impact do you think these voluntary energy audits have had on the market?

- Have they led to growth in the energy efficiency market?
- Has the nature of purchases changed?
- Has the volume of purchases changed?
- What impact (if any) do you think it's had on your supply chain

Has your company seen any uptake in demand that you could attribute to voluntary audits?

- Yes
- No

Now I'd like to ask you to think about all types of energy audits, both ESOS and voluntary audits...

In what ways, if any, do you think purchases related to energy audits differ from other purchases?

Examples for prompt:

- in terms of the characteristics of the companies making them?
- whether customers are new or returning
- the level of engagement of the customer in energy efficiency
- the type/amount of equipment purchased
- the combination of equipment purchased
- are there differences between ESOS driven and voluntary audit driven purchases?
- are there differences between audit driven (ESOS and voluntary) and non-audit driven energy efficiency purchases?

Do you have follow up communication with clients who made ESOS and/or voluntary audit related purchases?

- If yes, are new measures being used within organisations as intended?

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- Are energy savings being achieved?
- Are any other benefits being realised?
- Are there differences between ESOS driven and voluntary audit customers (in terms of use of measures / energy savings / benefits realised)
- Are there differences between audit driven (ESOS and voluntary) and non-audit driven customers who have bought energy efficiency measures (in terms of use of measures / energy savings / benefits realised)

Do you have any other comments on ESOS and energy audits more broadly, and their efficacy in driving energy efficiency uptake?

And finally thinking about the demand for energy efficiency products more generally...

Outside of ESOS and energy audits, what other factors could you attribute any demand for your energy efficiency products to?

- any general trends / attitudinal shifts
- alternative initiatives or policies
- incentives

What else do you think is needed beyond policies like ESOS (mandated energy audits) to drive demand and implementation of energy efficiency measures?

- other initiatives/schemes?
- additional/alternative policies?
- incentives for organisations?
- tax breaks for organisations?

This publication is available from: www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme

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