

Title: Review of the Energy Savings Opportunity Scheme Regulations 2014 PIR No: BEIS004(PIR)-20-EEL Original IA/RPC No: DECC0142 Lead department or agency: Department for Business, Energy & Industrial Strategy Other departments or agencies: Department for Transport Devolved Administrations	Post Implementation Review
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1. What were the policy objectives of the measure?

The Energy Savings Opportunity Scheme (ESOS) was introduced in 2014 to contribute towards the delivery of the UK Energy Efficiency Strategy¹. It was also designed to meet the requirement of Article 8 (4-6) of the EU Energy Efficiency Directive (EED) that large undertakings² in Member States conduct an energy audit at least once every four years. ESOS audits aim to provide undertakings with tailored advice on making cost-effective energy savings to stimulate the take-up of cost-effective energy efficiency measures. They aim to do so while minimising the cost to businesses and maximising synergies with existing policies.

2. What evidence has informed the PIR?

The department commissioned an external evaluation, proportionate to the scale of the policy, which had an estimated net benefit of £1.6 billion. This included an interim process and early impact evaluation which took place from mid-2015 to mid-2017, and an impact evaluation split into two phases and conducted from late 2017 to mid-2019. Research methods included quantitative surveys, qualitative interviews, case studies, and data modelling.

Detailed findings from the evaluation have been published (alongside this PIR) and are available to access online³. This PIR has also utilised additional evidence from (i) the consultation on the implementation of Streamlined Energy and Carbon Reporting⁴, (ii)

¹ <https://www.gov.uk/government/collections/energy-efficiency-strategy>

² The EED uses the terminology 'large enterprises' whereas the ESOS regulations use the term 'large undertakings'. The intended meaning is the same and for consistency the term 'undertakings' has been used throughout this document.

³ Interim process and early impact evaluation: <https://www.gov.uk/government/publications/energy-savings-opportunity-scheme-esos-evaluation-of-the-scheme>

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

Impact evaluation Phase 2 report: <https://www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme>

⁴ <https://www.gov.uk/government/consultations/streamlined-energy-and-carbon-reporting>

enforcement and compliance figures for ESOS Phase 1⁵, (iii) two European Commission studies covering evidence from other EU Member States⁶, (iv) recommendations on reform of ESOS by the Business, Energy and Industrial Strategy Committee in their 'Energy Efficiency: Building Towards Net Zero' report⁷.

3. To what extent have the policy objectives been achieved?

ESOS has been largely successful in providing organisations with information about their energy and fuel use and opportunities for cost effective energy efficiency measures. It has met the requirements of the EED, with over 99% of eligible organisations considered compliant in Phase 1, while minimising the administrative cost to business.

The introduction of ESOS often led to organisations carrying out energy audits for the very first time. It encouraged increased collation of data and awareness of aggregate energy and fuel consumption costs. Audits have proven useful for both identifying new opportunities and as an external validation for already identified measures.

The annual energy savings that have resulted from ESOS so far are broadly in line with the overall saving of 3.0TWh per year which the Impact Assessment estimated could be achieved, with some variation across sectors.

Nearly all ESOS compliers surveyed in 2018 reported their organisations to have implemented or planned an energy efficiency improvement in at least one category⁸ (90%⁹) since the start of the ESOS process. Four in five (85%) reported planning or implementing¹⁰ at least one fuel efficiency action. For a small proportion of these, ESOS was considered to have been the *primary driver* (for 6% of energy efficiency and 4% of fuel efficiency measures). More commonly, ESOS was considered a *contributory factor* of planned and implemented measures (38%¹¹ energy efficiency, 32% fuel efficiency). More than a third (37%) of organisations also self-reported a net cost saving as a result of changes they made due to ESOS¹².

As was expected, ESOS demonstrated less of an impact for those organisations already highly engaged in energy efficiency, but there were still examples of benefits.

While ESOS has delivered some key benefits, the early nature of the scheme limits our ability to evaluate its full impact. Some organisations surveyed in 2018 still had plans to implement further energy or fuel efficiency measures that they at least partly attributed to their first ESOS

⁵ <https://data.gov.uk/dataset/energy-savings-opportunity-scheme>; <https://data.gov.uk/dataset/13c0893a-049a-4608-9f9b-7f268a71f15a/climate-change-civil-penalties>

⁶ [Development of recommendations on the implementation of certain aspects of Article 8 and Annex VI of the Energy Efficiency Directive](#), European Commission, 2018, and [A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems: Report on the fulfilment of obligations upon large enterprises, the encouragement of small- and medium-sized companies and on good-practice](#), European Commission, 2016

⁷ <https://www.parliament.uk/business/committees/committees-a-z/commons-select/business-energy-industrial-strategy/news-parliament-2017/energy-efficiency-report-published-17-19/>

⁸ Organisations were asked 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).

⁹ Of which 8% had only planned energy efficiency improvements

¹⁰ Of which 8% had only planned fuel efficiency actions

¹¹ 39% of implemented measures

¹² This represents organisations who reported they 'strongly agree' or 'tend to agree' with the statement 'changes made as a result of ESOS have already led to net cost savings in the organisation'. A further 37% reported they 'strongly disagree' or 'tend to disagree'; 24% 'neither agree or disagree'; and 2% said they don't know.

audit. More time is therefore required to fully understand the policy impact, with most organisations having completed only one audit at the time of the research for this review. We also recognise the potential for greater levels of implementation of ESOS recommendations and that the scheme has scope to deliver greater levels of energy efficiency in the future.

Sign-off for Post Implementation Review: Chief economist/Head of Analysis and Minister

I have read the PIR and I am satisfied that it represents a fair and proportionate assessment of the impact of the measure.

Signed: Kate Collyer, Chief Economist

Date: 09/08/2019

Signed: Kwasi Kwarteng

Date: 27/01/2020

Further information sheet

Please provide additional evidence in subsequent sheets, as required.

4. What were the original assumptions?

Overall, it was estimated that ESOS could generate annual savings of around 3.0TWh per year. The estimated breakdown was 1.3TWh from buildings, 1.0TWh from industrial processes and 0.7TWh from transport. The level of savings achieved was expected to be lowest for organisations in energy intensive industries and those already measuring their energy use and covered by existing policy instruments. Savings were expected to result from the collection and presentation of detailed energy efficiency recommendations. For organisations not already measuring their energy use in detail, ESOS was also assumed to lead to savings from the implementation of measurement.

Including wider benefits, ESOS was expected to have a total benefit of £2.8bn. Estimated assessment, administrative accreditation, capital and hassle costs totalled £1.2bn, largely based on assumptions derived from industry stakeholders.

5. Were there any unintended consequences?

Limited evidence of unintended consequences was found.

One unexpected outcome was the impact of ESOS on organisations already covered by Climate Change Agreements (CCAs). It was predicted that such organisations would already have high awareness of their energy use and opportunities for energy savings, and therefore would not be impacted by ESOS. However, uptake of energy efficiency measures at least in part due to ESOS was in fact found to be higher amongst CCA participants than non-participants, indicating potential synergy between the two policies.

Consequences of ESOS, which were not direct objectives of the scheme, were also observed. This includes evidence of some cases where ESOS was perceived to have enhanced the reputation of organisations (16% of surveyed complier organisations agreed this was the case).

6. Has the evidence identified any opportunities for reducing the burden on business?

Overall, the interim evaluation found that ESOS placed no more burden on obligated organisations than was anticipated in the Impact Assessment, taking into account arrangements for small energy users and *de minimis* thresholds (for example the ability to not audit up to 10% of total energy consumption). We also expect administrative burdens to be reduced for such organisations in future phases as familiarisation costs fall and necessary data collection processes and systems are adopted.

Qualitative evidence did find that some organisations considered compliance could be burdensome, particularly those who had not participated in other energy reporting schemes and had not previously collated energy and fuel data. Again, familiarisation should help address this as organisations come to understand their obligations and adopt relevant processes. Steps have already been taken to understand and mitigate any difficulties experienced by organisations, with new guidance issued for Phase 2. In the design of other schemes, such as Streamlined Energy and Carbon Reporting, we have also considered synergies with ESOS, e.g. by using a similar transport definition, to keep burden to a minimum.

Evidence from the interim evaluation suggested that external costs incurred as a result of complying with ESOS, while in line with estimates, were potentially inflated by high demand in the final months before the compliance deadline. This was driven largely by obligated organisations delaying contracting external auditors until very close to the compliance deadline. Therefore, in communications for Phase 2, we have reminded participants of the ability to carry out audits across the phase and the risks of leaving activity until close to the compliance deadline.

ESOS applies to large undertakings and their corporate groups only, so is expected to result in minimal burden for small and medium-sized enterprises (SMEs).

7. For EU measures, how does the UK's implementation compare with that in other EU member states in terms of costs to business?

In 2016 and 2018 the European Commission's Directorate-General for Energy commissioned studies on Article 8 implementation¹³. These brought together information and evidence from stakeholders, including National Authorities, auditors and companies in scope. They include information submitted by Member States in their National Energy Efficiency Action Plans¹⁴. But at the time of these studies, little information was available from Member States on the cost of audits, making it difficult to compare the costs to business in the UK with other Member States.

In the absence of this data, this review compares the implementation of Article 8 (4-6) of the Energy Efficiency Directive (EED) by Member States. Phase 1 of the impact evaluation found that implementation was broadly similar in the UK to other EU Member States, particularly in terms of eligibility and use of *de minimis* thresholds.

¹³ [Development of recommendations on the implementation of certain aspects of Article 8 and Annex VI of the Energy Efficiency Directive](#), European Commission, 2018 and [A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems: Report on the fulfilment of obligations upon large enterprises, the encouragement of small- and medium-sized companies and on good-practice](#), European Commission, 2016

¹⁴ <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>

Introduction

The Energy Savings Opportunity Scheme (ESOS) is an energy audit scheme which is mandatory for all large undertakings¹⁵. Organisations which meet the qualifying criteria, based on number of employees or turnover¹⁶, are required to carry out audits of their energy use to identify and make recommendations for cost-effective energy saving opportunities. The scheme was introduced in the UK in 2014, with the deadline for qualifying organisations to have conducted their first energy audit being 5 December 2015. Subsequent audits are then to be carried out at least once every four years.

BEIS commissioned a comprehensive policy evaluation to assess the effectiveness of ESOS specifically, and energy audits and energy reporting more broadly, in driving energy efficiency savings in organisations. The findings from this evaluation work have informed this Post Implementation Review.

Policy Background & Rationale

ESOS was introduced in the UK to comply with Article 8 (4-6) of the EU Energy Efficiency Directive, which requires Member States to establish an energy audits regime whereby large undertakings must conduct an energy audit once every four years. In 2018, a new amending Directive on Energy Efficiency (2018/2002) was agreed which introduced a headline energy efficiency target for 2030. The new Directive continues to include energy audit requirements for large undertakings and also requires Member States to encourage energy efficiency action and audits by SMEs. The new amending Directive needs to be transposed into national law by EU Member States by June 2020. The UK government is strongly committed to maintaining environmental standards as we leave the EU¹⁷.

In addition to compliance with the EU Directive, ESOS is also closely linked to the UK Government's strategic aims. The Government in 2012 introduced an Energy Efficiency Strategy, which highlighted remaining energy efficiency potential in the commercial and industrial sectors, while also indicating market failures likely to inhibit organisations from realising these efficiencies and recognising that these may not be overcome without public sector intervention. One of the market failures identified in the Energy Efficiency Strategy was information failure and the introduction of ESOS sought to address this particular failure. ESOS was designed to respond to information failures by requiring large organisations to gather information on the cost and benefits of the energy efficiency measures available to them, identifying cost-effective energy saving opportunities.

More information about the policy background to ESOS can be found in Annex 1.

Policy objectives

The overarching objectives of ESOS, when it was introduced, were to:

¹⁵ Including small or medium undertakings that are part of a large undertaking, with specified exceptions

¹⁶ Full details of qualifying criteria can be found in the Environment Agency's guidance:

<https://www.gov.uk/government/publications/comply-with-the-energy-savings-opportunity-scheme-esos>

¹⁷ <https://www.gov.uk/government/news/new-environment-protections-set-out-in-flagship-bill-2>

- Provide large undertakings with information specific to them about how they can make energy savings,
- Stimulate the take-up of cost-effective energy efficiency measures,
- Minimise the cost to businesses of complying with the Directive, and
- Maximise the synergies with existing policies.

To support meeting these objectives, ESOS also sought to secure board level visibility of energy saving opportunities. Research has highlighted that the size, structure and sector of an organisation affects its approach to energy efficiency¹⁸. For example, in some organisations mid-level managers are responsible for energy management, but it is senior managers who make strategic decisions that affect energy consumption. ESOS was designed to address this disparity by providing tailored information to inform senior decision makers about available energy efficiency opportunities. The requirement for compliance sign-off by a Board Member was also intended to increase awareness of energy efficiency opportunities at this level.

The timescales for delivering the objectives of ESOS were expected to vary. The provision of specific information about how energy savings can be made was anticipated to occur fairly quickly. It was expected that each undertaking would receive tailored recommendations within their first ESOS audit report, and again as part of each subsequent four-yearly audit. ESOS regulations also allow those with the ISO 50001 energy management system to use this as an alternative compliance route, which requires continual annual improvement.

From the outset, ESOS regulations aimed to minimise business compliance costs. Costs were expected to reduce over time as organisations became familiar with their requirements and set up data collection processes and systems. ESOS was also designed from the outset to be complementary to other existing policies, but work will continue after this review to consider how to maximise any synergies, including as a result of lessons learned from the evaluation.

The objective to stimulate the take up of energy efficiency measures was expected to take longer to be realised. After conducting their ESOS audit, it may be possible for organisations to implement some recommendations quickly and easily. For other recommendations it was anticipated organisations may take time to consider the options available to them, agree on what to take forward, secure financing, and physically implement measures. It was also expected that implementation would depend on availability of financial resources and waiting for the appropriate stage in an organisation's capital replacement cycle. Some measures may not be implemented until a more appropriate time in the future and potentially after further ESOS assessment cycles. For some organisations, the timing of implementing energy efficiency measures may also be influenced by compliance deadlines for other schemes such as the Climate Change Agreements Scheme.

This review sets out progress towards meeting the policy objectives as evidenced through the evaluation. While some progress towards meeting the objectives is expected to have been achieved at the time of this review, the full impacts of ESOS are likely to take more time, and potentially further ESOS audit cycles, to be realised.

¹⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65601/6925-what-are-the-factors-influencing-energy-behaviours.pdf

Methodology

It was estimated that ESOS would have a net benefit of £1.6bn. Given this potential impact, BEIS considered it proportionate to conduct a comprehensive external evaluation to provide a high level of independent evidence on the impact of the scheme. Two separate pieces of work were externally commissioned to ensure an appropriate level of evidence was obtained. The first was an interim process and early impact evaluation of ESOS which took place from 2015 to 2017¹⁹. The aim of this project was to design, and collect baseline evidence for, a future longer-term impact evaluation, and to provide early input on the ESOS process. This fed into the second piece of work, a theory-based impact evaluation of energy audits and reporting, with a specific emphasis on ESOS. This evaluation was divided into various work strands and delivered across two phases. Phase 1 took place from 2017-2018²⁰ and Phase 2 from 2018-2019²¹. A consortium led by Ipsos MORI were successful in competitive tender for both pieces of work.

The interim evaluation involved a number of different data collection approaches including logic model and theory of change development, a quantitative survey of 871 ESOS-obligated organisations, qualitative interviews with ESOS-obligated organisations and assessor market firms, and in-depth case studies with complier organisations.

Phase 1 of the impact evaluation involved a literature and evidence review and stakeholder engagement with ESOS-obligated organisations, SMEs, ESOS assessors and trade bodies, involving both interviews and workshops. Phase 2 involved a quantitative survey of 503 complier organisations, qualitative interviews with ESOS assessors and supply chain representatives and in-depth case studies with ESOS complier organisations and SMEs. It also involved data modelling based on survey data to estimate the energy savings resulting from ESOS.

Further methodological details about both evaluations can be found in Annex 2, including sample sizes and details of the limitations of the methodology.

Other evidence sources used to inform the PIR include:

- Two reports commissioned by the European Commission's Directorate-General for Energy²² were reviewed to compare with other EU member states. They brought together evidence from stakeholders, including National Authorities, auditors and companies in scope, about EED Article 8 implementation across national and regional EU governments. Evidence from these reports was limited however as they recognised that information on achieved energy savings was not yet available, due to insufficient time for implementation of some audit recommendations.

¹⁹ <https://www.gov.uk/government/publications/energy-savings-opportunity-scheme-esos-evaluation-of-the-scheme>

²⁰ <https://www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme>

²¹ <https://www.gov.uk/government/publications/energy-audits-and-reporting-research-including-the-energy-savings-opportunity-scheme>

²² [Development of recommendations on the implementation of certain aspects of Article 8 and Annex VI of the Energy Efficiency Directive](#), European Commission, October 2018 and [A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems: Report on the fulfilment of obligations upon large enterprises, the encouragement of small- and medium-sized companies and on good-practice](#), European Commission, April 2016

- In October 2017 BEIS launched a consultation to seek views on the proposals for a streamlined and more effective energy and carbon reporting framework, to take forward reporting by business following the closure of the CRC Energy Efficiency Scheme²³, after the current phase. Written responses were received from 155 organisations and individuals. Some of the responses provided feedback on ESOS, given links between ESOS and the proposed streamlined energy and carbon reporting framework (SECR). These responses have been reviewed and, where relevant, learning from this consultation has been included²⁴.
- ESOS Phase 1 enforcement and compliance data has been reviewed which provides data on the number of organisations which have notified their compliance with Phase 1 and the extent to which enforcement and penalty notices have been issued.²⁵

Outcomes

ESOS was introduced to meet the requirements of Article 8 (4-6) of the EU Energy Efficiency Directive by requiring large undertakings to conduct an energy audit once every four years. This section considers whether the objectives of the policy, as set out in the Impact Assessment, have been achieved.

Provide large undertakings with tailored information about how they can make cost-effective savings

Qualitative research showed that assessors generally undertook pre-audit scoping to understand their client's organisational contexts, which in turn helped assessors tailor their audits to organisations. Assessors also reported providing quantifiable savings in their audit reports, generally presented as spend versus savings with associated payback periods, or as Return on Investment (ROI). Typically, they reported including caveats on the magnitude of likely savings, and risks of achieving them.

Feedback from both organisations and assessors suggests that the information provided in audit reports helped lead to investment in energy or fuel efficiency by:

- Providing **independent verification** of the benefits of actions previously considered by Energy Managers, giving them clout within their organisation to take them forward.
- Highlighting **new areas of potential energy savings**, for example by auditing aspects of energy consumption that have previously not been as visible to organisations.

Highlighting new potential savings was particularly relevant to transport: the interim evaluation showed that many organisations (aside from those with large fleets, or from the transport sector) had limited awareness of the opportunity to become more fuel efficient pre-ESOS.

Assessors also reported tailoring the format of audit reports to engage clients with recommendations (e.g. using simple language; providing an executive summary upfront with

²³ Formerly known as the Carbon Reduction Commitment

²⁴ <https://www.gov.uk/government/consultations/streamlined-energy-and-carbon-reporting>

²⁵ <https://data.gov.uk/dataset/energy-savings-opportunity-scheme>; <https://data.gov.uk/dataset/13c0893a-049a-4608-9f9b-7f268a71f15a/climate-change-civil-penalties>

key recommendations and associated costs, savings and payback periods; focusing on total energy spend for the organisation to draw in attention).

The interim evaluation found that most organisations were satisfied with the standard of information provided through the ESOS process (81% reported satisfaction with the level of detail included in their audit report, 71% were satisfied with the suitability of the recommendations, and 71% reported satisfaction with the clarity of information provided on costs and potential savings). Case study evidence found audit recommendations were mostly considered relevant and practical. Best practice examples included assessors establishing client requirements and energy maturity and tailoring recommendations accordingly. However, some case studies revealed that there were sometimes perceived limitations in assessor reports. For example, some recommendations were felt not to have taken certain key characteristics of the organisation into account e.g. tenancy or group structure. In one case study an organisation believed the payback periods to be unrealistically short, reflecting a lack of understanding of their processes by the assessor.

The qualitative research with assessors also highlighted challenges obtaining energy, and in particular fuel, data from across different parts of an organisation and its fleet. As a result, some of the recommendations made in ESOS reports focused on encouraging organisations to put better monitoring and reporting processes in place around energy and fuel data. If such recommendations are actioned, this may enhance the ability of ESOS auditors to provide tailored information to organisations during future compliance rounds.

In some instances, ESOS was already found to have prompted the establishment of new data-gathering structures and the collection and analysis of energy or fuel information in sites or businesses that had not previously been examined. Case study evidence found that even where ESOS was not felt to have driven uptake of specific measures, it made organisations generally more aware of how much energy they were using, where, and how much that was costing their business.

Stimulate the take up of cost-effective energy efficiency measures

The evaluation found evidence that ESOS improved awareness of energy efficiency opportunities. In some circumstances, ESOS was the primary driver in the take up of energy and fuel efficiency measures. More commonly, however, ESOS was considered a contributory factor alongside one or more other factors responsible for driving the implementation of energy and fuel efficiency measures.

Implementation and cost-effectiveness of energy and fuel efficiency measures

By late 2018, when the impact evaluation took place, nearly all complier organisations surveyed (90%) reported their organisation to have implemented or planned²⁶ an energy efficiency improvement in at least one category²⁷ since starting the ESOS process. On average, 5.71²⁸ measures were reported to have been implemented or planned per organisation. Out of all of the energy efficiency measures implemented or planned by ESOS complier organisations since starting the ESOS process, 38% of these measures were attributed at least in part to the scheme, with 6% directly attributed to ESOS.

The proportions of organisations reporting that they implemented or planned specific measures as a result of ESOS varied considerably in accordance with the type of improvement made. For each

²⁶ Of which 8% had only planned improvements

²⁷ See footnote 7

²⁸ 5.04 measures had been implemented on average

category of energy efficiency action, such as lighting or heating, between 13% and 48% of those who implemented or planned a measure in that category reported doing so at least partly because of ESOS. Between 0% and 9% reported doing so directly because of ESOS.

Measures falling under the lighting and process categories were more likely to be attributed to ESOS by those who had implemented them, than measures in any of the other categories. Measures in the computer and IT and ventilation categories were the least likely to be attributed to ESOS. Case study evidence found that organisations who did not attribute any energy efficiency measure to ESOS may already have been aware of the opportunities identified in the ESOS report before participating in the scheme.

In relation to transport, 83% of complier organisations who owned or leased vehicles reported that they had implemented or planned²⁹ fuel efficiency improvements since starting the ESOS process. An average of 2.27 fuel efficiency measures were implemented or planned³⁰ in organisations with a transport fleet. Out of all of the fuel efficiency measures implemented, complier organisations attributed 32% of these measures at least in part to ESOS, and 4% were attributed directly to the scheme. Adjustments to journeys or loading practices were most likely to be attributed to ESOS.

The evaluations suggest that ESOS often influenced organisations by confirming or validating previously recognised energy or fuel efficiency opportunities. Case study evidence indicated that ESOS encouraged implementation of measures by strengthening the case for opportunities that organisations had previously identified and for which other drivers may also have been in place. Even in cases where energy efficiency improvements conducted since the start of the scheme may have been likely to occur anyway, ESOS was at times attributed to having brought forward the timing of the actions. However, some organisations did report that implementation of measures was limited by the extent to which ESOS was able to highlight new opportunities.

Overall, the impact evaluation found that 37% of all complier organisations reported net cost savings had been achieved by their organisation as a result of changes made due to ESOS. This is based on agreement with the statement 'changes made as a result of ESOS have already led to net cost savings in the organisation'. Organisations were not asked themselves to estimate the savings that had resulted.

Factors affecting the implementation of ESOS recommended measures

The impact evaluation identified a number of factors associated with higher levels of implementation of ESOS-recommended energy and fuel efficiency actions. Key contexts found to be associated with reported higher uptake of ESOS recommendations are:

- Where ESOS was reported to have led to the **introduction or update** of an energy efficiency goal or action plan;
- Where organisations reported an **increase** in the level of priority placed on energy efficiency at Board level;
- Where certification to ISO 50001 was **newly achieved** as a result of ESOS.

These findings suggest that the capacity for ESOS to drive additional implementation depends, to an extent, on the level of unrealised energy efficiency potential and whether policies and certifications are new or well-established. Organisations with greater existing awareness of potential energy savings, or a 'culture' of greater receptiveness to and focus on energy efficiency, were seen to be more likely to implement energy and fuel efficiency measures but were not necessarily more likely to identify ESOS as a driver of these. Interviews with assessors suggested

²⁹ Of which 8% had only planned measures

³⁰ 1.92 measures were implemented

that where organisations were already energy mature before ESOS there was less scope for unrealised energy potential for ESOS to capture. This aligns to an extent with the expectations of the Impact Assessment, which predicted that the energy savings achieved by participating organisations for buildings and industrial processes would be proportionally lower for organisations already measuring their energy use in detail.

It is difficult to predict how the future impact of ESOS might change as organisations develop greater awareness of their energy use and energy efficiency opportunities. There is potential that the scope for ESOS audits to identify unrealised energy could reduce, but the development of innovative and more cost-effective technologies could also open up new energy savings opportunities to be identified by future ESOS audits. Once additional phases of ESOS compliance have taken place, any future research could examine if there are changes to the impact of ESOS as organisations become more knowledgeable about energy efficiency.

Other factors driving take up of energy efficiency measures

ESOS is part of a mix of factors driving energy efficiency action. While the evaluation found evidence of ESOS audits leading to implementation of energy and fuel efficiency improvements, it also highlighted that other factors are often more important drivers of such activity. Qualitative research with organisations, assessors and supply chain representatives highlighted that a number of other factors were often considered more important drivers of action than energy audits:

- Energy efficiency changes were often driven by financial savings, being considered ‘no brainers’ when they made sound business sense³¹.
- Natural equipment lifespan was considered a key driver.
- When organisations move to new premises, this can also provide a natural opportunity to purchase new and more energy efficient equipment.
- Improved quality and comfort of the indoor environment.
- Some particularly ‘green’ organisations take action on energy efficiency as it fits into their broader commitment to sustainability and the associated reputational benefits.

Minimise the cost to business of complying with the mandatory auditing requirements

The interim evaluation found that overall, the costs of compliance were broadly in line with those anticipated in the Impact Assessment. Evidence from the interim evaluation suggested that external costs incurred as a result of complying with ESOS, while in line with estimates, were potentially inflated by high demand in the final months before the compliance deadline. This was driven largely by delay on the part of obligated organisations. Self-reported data from surveyed complier organisations found that the price paid for an assessor peaked in January 2016, at which point the cost was found to be double the price paid prior to October 2015. In response to this, in communications for Phase 2, we have reminded participants of the ability to carry out audits across the phase and the risks of leaving activity until close to the compliance deadline. Further details of the costs incurred are included in the costs and benefits section of this review.

Qualitative evidence suggests some organisations did consider compliance with ESOS to be burdensome, particularly those who had not previously collated the necessary energy and fuel data or who considered the scheme as a regulatory exercise rather than energy saving opportunity or

³¹ Assessors reported that as common practice they would include quantifiable savings in their audit reports, generally presented as spend versus savings with associated payback periods, or as Return On Investment. Feedback from organisations suggests that this information at times helped to lead to investment in energy or fuel efficiency.

felt they had not received sufficient value for money from their assessor's outputs. The interim evaluation found that the most time-intensive stage in the compliance process was supporting the ESOS assessor, with qualitative research suggesting this was a reflection of the time taken to collate and present energy and fuel consumption data required by the assessor. This was found to be most time-consuming for organisations that did not already have a process in place to collate their energy usage information regularly. It is expected therefore that with the establishment of such processes in order to comply with Phase 1 of ESOS, the time required to collate and present data to be shared with the assessor should be reduced for Phase 2.

Based on learning from the interim evaluation and audits carried out by the Environment Agency of a sample of Phase 1 compliance notifications and evidence packs, steps have already been taken to seek to further minimise any burden on organisations. As a result of learning around the common areas of misunderstanding by participants, the Phase 2 guidance has been updated to provide additional clarity. The Environment Agency and BEIS also ran Lead Assessor workshops in April 2019 to help improve Assessors' understanding of the ESOS obligations and have now circulated a checklist for assessors to encourage better quality audits in Phase 2.

Keeping burden to a minimum has also been considered when designing related schemes. In the design of Streamlined Energy and Carbon Reporting, for example, we have considered synergies with ESOS, such as by using a similar transport definition to help ensure a joined-up approach for organisations complying with both schemes.

ESOS obligates all large undertakings to carry out energy audits. Small and medium sized undertakings are therefore exempt, with the exception of those who are part of a large undertaking. No significant impact or burden is therefore expected for SMEs as a result of ESOS. For this reason, the evaluation work focussed predominantly on large organisations.

Maximise synergies with existing policies

The interim evaluation found that organisations who had participated in other energy reporting schemes (for example, the CRC Energy Efficiency scheme) generally considered the process of participating in ESOS more straightforward than organisations who had not. The primary reason for this is that they already had experience of collating and recording the information required (or had consultants in place who did this for them). This suggests a synergy with the information requirements of other related policies. On average, however, organisations who had participated in other energy reporting schemes did not report spending any less internal time on ESOS. This may be because these organisations are often larger and have multiple sites.

The Impact Assessment estimated that ESOS would have a lower impact on organisations that already measure their energy use in detail and covered by existing energy efficiency policies. The Impact Assessment assumed that CCAs, for example, would already capture most of the savings that could be delivered by an ESOS assessment. Firms covered by CCAs are typically energy intensive and less likely to be affected by information market failures, and so ESOS was expected to have no impact on their energy use³².

The evidence from Phase 1 of the impact evaluation was mixed about to the impact of ESOS on organisations covered by CCAs. Qualitative evidence from organisations, trade association

³² This only accounts for the energy used by plants covered by CCAs. Energy used by the wider organisations that own these plants (for example, in their HQ) is assumed to be affected by ESOS assessments.

representatives and assessors suggested that ESOS was less able to provide new information for some organisations with CCAs, particularly as some had already conducted audits. However, some organisations themselves indicated that ESOS had helped them to identify new energy saving opportunities in areas of business that were not covered by their CCAs. For example, one organisation reported meeting their CCA targets through renewable energy at one site, rather than through energy efficiency measures. ESOS, therefore, enabled them to identify new opportunities at that site, as well as at other sites they had not needed to consider for their CCAs. This suggests that for some organisations with CCAs, ESOS may have limited added value, but for others it has potential to identify new energy saving opportunities already not covered by their CCAs.

Quantitative evidence from Phase 2 also indicated that ESOS had impacted on the uptake of energy efficiency measures for at least some organisations covered by CCAs, despite their high level of pre-ESOS energy maturity. Organisations that participated CCAs were in fact found to be more likely to have reported some impacts of ESOS than those who did not participate. This suggests that there may be some synergy between the two policies.

The evaluation took place before SECR came into force in April 2019, so could not explore synergies between the two regulations. However, the two regulations are intended to be complementary where possible. For example, participants under SECR are required to provide a narrative commentary on energy efficiency action taken in the financial year, and they may choose to disclose ESOS action as part of this narrative. This is to give organisations an incentive to act on their ESOS recommendations. ESOS systems should also help organisations collect information on energy use required for SECR disclosures. Some organisations participating in the SECR consultation proposed that voluntary annual reporting on energy efficiency measures uptake could maintain momentum on energy efficiency action between four-yearly ESOS audit cycles.

Future impact

A comparison of the findings from the 2016 and 2018 surveys suggests that the impact of ESOS has increased over time. The 2016 survey found that 27% of organisations agreed that changes made as a result of ESOS had already led to net costs savings in their organisation. This increased to 37% of organisations in 2018³³. The 2018 survey also found that at the time of interview (during November and December 2018), some organisations still had plans to implement further energy or fuel efficiency measures that they at least partly attributed to ESOS.

This suggests that savings delivered in the first year after compliance may not have represented the full impact of ESOS. The evidence suggests that almost three years after the Phase 1 compliance deadline, ESOS was continuing to have impact for some organisations, with potential for further savings to occur in future. This may indicate a potential time lag between notification of compliance and the implementation of some measures and the associated savings.

Therefore, while there is emerging evidence to suggest ESOS has gone some way towards meeting its objectives, it is likely to be too early for the full impact of the policy to have been

³³ Respondents were asked to what extent they agreed or disagreed with the statement 'changes made as a result of ESOS have already led to net cost savings in the organisation'. In 2016, 27% reported that they 'strongly agree' or 'tend to agree' with the statement, 54% that they 'strongly disagree' or 'tend to disagree', 13% reported they 'neither agree or disagree', and 6% reported that they don't know. In 2018, 37% reported that they 'strongly agree' or 'tend to agree' with the statement, 37% that they 'strongly disagree' or 'tend to disagree', 24% reported they 'neither agree or disagree', and 2% reported that they don't know.

realised. Energy efficiency measures can take time to be financed, approved, and implemented within an organisation, and while there is evidence of uptake of some recommended measures in some organisations, it is likely other recommendations will be implemented in future. Most organisations have also completed only one audit at the time of this review, with potential for future ESOS audits to result in further energy efficiency action. Understanding the full extent of the impact of the policy could therefore be revisited in any future research.

Another factor potentially affecting the future impact of ESOS and for consideration in any future review, is that the policy may have encouraged organisations to bring forward energy efficiency actions that would have happened in the future anyway. The original Impact Assessment assumed that some of the recommendations implemented due to ESOS would have happened in the future, even if ESOS had not existed.

The evaluation was unable to test whether, and to what extent, ESOS brings forward the implementation of measures that would have happened in the future anyway. We did not think that survey respondents would be able to tell us what would or would not have happened in the absence of ESOS. There is some limited qualitative evidence from case studies to suggest ESOS was at times attributed to having brought forward the timing of energy efficiency actions, but the magnitude of this and any impact on savings is unknown.

There is also considerable uncertainty around other factors that could affect the future impact of ESOS, such as potential development of new energy saving measures, or changes to the costs of energy saving technologies. As discussed above, this could also potentially open up new energy savings opportunities to be identified by ESOS audits.

Impact on UK based businesses relative to other EU Member States

Phase 1 of the impact evaluation reviewed the approach taken by other EU Member States (MS) to transpose the audit obligation requirements of Article 8 (4-6) of the Energy Efficiency Directive. It found that implementation was broadly similar across Member States. Most MS adhered to the EU definition of non-SME to act as the eligibility criterion for the audit obligation, although the inclusion or not of SME subsidiaries varied (noting that Article 8 also encourages Member States to develop programmes for SME energy audits and implementation of recommendations). In addition, the implementation of audit recommendations was not generally required although many MS incentivised follow-up actions, for example with grants or concessional loans.

Other differences in emphasis in the approach taken by MS included:

- Including a minimum energy consumption threshold in eligibility criteria;
- Mandating energy efficiency action plans for the most energy intensive organisations with a requirement to implement measures deemed cost-effective;
- Requiring organisations to report on the total identified and planned energy savings and costs to improve the government's understanding of potential savings;
- Extensive provision of guidelines, including detailed sectorial FAQs;
- Providing long timeframes or incentives for implementing alternatives to audits, for example, energy management systems;
- Providing clear guidance on responsibility for building audits (addressing landlord/tenant divide);
- Additional support for audits by SMEs;

- Penalising employees of non-compliant companies or auditors³⁴;
- Systematic collection and publication of audit results for benchmarking purposes;
- Follow-up implementation and knowledge sharing support, for example via published databases or the creation of networks of businesses.

While it was possible to identify different approaches to implementation, a lack of published data on the impact of the scheme in other Member States has restricted the ability to identify the most effective elements of other policy approaches and draw direct comparison with the UK. This corresponds with the findings of the European Commission study which brought together information and evidence from stakeholders across EU member states involved in implementation of Article 8 of the EED, including National Authorities, auditors and companies in scope. This study recognised that information on impact and achieved energy savings was not yet available, due to insufficient time for implementation of improvements following the audit process, making it very difficult to compare the impact and costs to business in the UK to other Member States.

Unintended consequences

There is limited evidence to test whether the ESOS process has influenced broader outcomes, beyond increased priority levels given to and action taken on energy and fuel efficiency.³⁵

Complier organisations surveyed during the impact evaluation were asked about indirect benefits of ESOS. Some limited indirect benefits were identified, with 16% agreeing that complying with ESOS had enhanced their organisation's reputation. In qualitative interviews, a few organisations reported additional co-benefits of ESOS compliance, such as improved indoor conditions for staff, customers and clients.

As set out above, the original ESOS Impact Assessment³⁶ predicted that ESOS would have no significant impact on organisations covered by Climate Change Agreements (CCAs). However, uptake of energy efficiency measures at least in part due to ESOS was higher amongst CCA participants than non-participants. This is despite ESOS-driven action generally likely to be lower where prior energy management certification, goals or plans were already in place and where energy maturity was already high. This indicates that there is scope for ESOS to influence CCA participants and there may be potential synergy between the two policies. Following this review, consideration will be given to whether further synergies with CCAs and other schemes (such as SECR) could be delivered to encourage additional efficiency action.

Costs and benefits

Original assumptions on costs, benefits and effects on business

³⁴ Non-compliance with Article 8 (4-6) of the EED, and related legislation, is in general treated consistently across all EU Member States: fines ranging from €10,000 to €200,000 can be issued to companies that do not adhere to the auditing and reporting requirements. A few countries have also decided to penalise company directors for up to €10,000, and Hungary also issues a penalty directly to auditors of €320.

³⁵ Due to surveys with ESOS compliers taking place with parent-level organisations only, it is possible that there may have been some unintended consequences of ESOS for subsidiary-level organisations which were not captured by the impact evaluation.

³⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf

The original assumptions made about the costs and benefits of ESOS and the anticipated effects on business are detailed in full in the scheme's Impact Assessment³⁷.

Costs

ESOS was assumed to create the following direct costs to business:

1. Assessment costs

ESOS assessments of buildings were assumed to cost £500 per day (£1000 for industrial processes). The number of days required to complete an assessment was assumed to depend on the size of the site. The assessment of a standard sized transport fleet was assumed to be 5 days at £500 per day. For undertakings specifically in the transport sector with complex operations this was extended to 10 days at £1000 per day. These assumptions were based on discussions with industry stakeholders.

2. Administrative Burden

The average administrative cost per undertaking for the first round of ESOS assessments was estimated at £21,000 with subsequent rounds costing £13,000 (including the costs of the assessors' visits and the administrative burden). However, this varies depending on the size and complexity of its operations. The administrative cost component was calculated based on wage rates data and estimates of the hours required to carry out tasks needed to comply with the regulations.

The assumed indirect costs associated with ESOS were capital and hassle costs. Capital costs (the cost of the installing of measures highlighted by ESOS assessments) were calculated based on the expenditure required to achieve the energy savings assumptions noted previously. For the period 2015-30 this was £57m for buildings and £187m for industrial processes. For transport, capital costs were assumed to be based on firms changing their fleet to more fuel-efficient vehicles, totalling £458m over the same period.

Hassle costs, the cost of the business managing the implementation of measures was assumed to be 20% of capital cost for buildings and industrial processes. Hassle costs were not included for transportation measures.

Benefits

The Impact Assessment assumed ESOS would address an information failure, leading previously unaware firms to invest in energy efficiency measures and reduce energy costs. It anticipated non-estimated indirect benefits including improvement to the energy efficiency of UK businesses, increasing productivity, lower non-traded CO2 emissions, better air quality and a reduced number of EU Emissions Trading System allowances UK businesses need to buy.

Estimated direct benefits in the form of energy savings were calculated using three illustrative assumptions:

1. For undertakings that are currently not measuring their energy use in detail, an ESOS assessment will result in an average annual energy saving of 1% of consumption from measurement alone.
2. In addition, the presentation of detailed recommendations on what undertakings could do to improve their energy efficiency will lead to an additional annual energy saving of 1%.

³⁷https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf

3. ESOS assessment will have a lower impact on energy intensive undertakings as the information market failures are likely to be less significant in these sectors.

Based on these assumptions, the Impact Assessment estimated that ESOS assessments could save 2.3TWh per year in the buildings and industrial processes sector. This segments into 1.3 TWh per year in buildings and 1.0TWh in industrial processes.

In the transportation sector, ESOS assessments were assumed to:

- Have no impact on the energy consumption by rail, aviation, shipping or business travel in household-owned cars;
- Lead to a 1% reduction in energy consumption by vans, heavy goods vehicles, buses and coaches;
- Lead to a 2% reduction in energy consumption for business travel in company car fleets.

Based on these assumptions the Impact Assessment estimated that ESOS assessments could result in 0.7TWh of annual energy savings in the transportation sector.

Overall, it was estimated that the total annual energy savings from ESOS assessments for buildings, industrial processes and transport could be 3.0TWh.

The Impact Assessment noted that there was a level of uncertainty over the savings that could be delivered as it was reasonable to assume that some of the recommendations implemented as a result of an ESOS assessment would have been implemented in the future anyway.

Actual costs and benefits, and how and why these differed from the original assumptions

Costs

The evidence from the interim evaluation suggests that overall costs of compliance were broadly in line with those estimated in the initial Impact Assessment. Internal costs (mostly staff time) were lower than anticipated in the Impact Assessment, but external costs (external assessor costs, plus software and monitoring equipment) were higher than expected. The external costs were potentially inflated by high demand for external auditor services in the final months of the scheme due to many obligated organisations delaying their audits.

Table 1 compares the estimated costs from the Impact Assessment with the estimated costs from the interim evaluation. The £73.8 million total cost estimated in the Impact Assessment falls within the £48.6m to £101.1m range estimated from the interim evaluation evidence.³⁸

Table 1 – Compliance costs: Comparison of Impact Assessment estimates with interim evaluation estimates

	Impact Assessment estimates³⁹	Interim evaluation estimates (median cost values)	Interim evaluation estimates (mean cost values)
Internal costs	£43.3m	£11.2m	£20.8m

³⁸ The range between median and mean values from the interim evaluation has been used for comparison with the Impact Assessment as the mean values are influenced by some significant outliers.

³⁹ Re-scaled to an updated assumption on the size of the obligated population and taken for one ESOS cycle

External costs	£30.4m	£37.4m	£80.2m
Total	£73.8m	£48.6m	£101.1m

Steps have already been taken to aim to reduced costs further for future phases of ESOS. Phase 2 communications have reminded participants of the ability to carry out audits across the phase and highlighted the risks of leaving activity until close to the compliance deadline, to encourage earlier compliance and prevent unnecessary additional costs. Improvements already made to Phase 2 guidance and the checklist for Assessors currently being developed are also intended to reduce misunderstanding and save time and cost spent interpreting the ESOS requirements. In addition, organisations who have complied with Phase 1 are expected to already have established processes to collate the energy use information required in order to comply with ESOS, and so the time and associated costs of collating this data are expected to be reduced for future phases.

Benefits

The data modelling in Phase 2 of the impact evaluation estimated the actual energy savings resulting from ESOS. The modelling included in the impact evaluation suggests that, so far, the annual energy savings from ESOS are broadly in line with the overall saving of 3.0TWh per year which the Impact Assessment estimated could be realised, with some variation across sectors.

The data available for this modelling had some limitations (see Annex 2 for more details) and the estimates are therefore based on a number of assumptions⁴⁰. For this reason, the estimated savings have been presented as ranges, and they should be considered as indicative only. The savings have been compared with the estimated savings from the original Impact Assessment for illustrative purposes, whilst noting that the underlying methodology and assumptions used in the Impact Assessment differ from those used in the evaluation modelling.

Table 2 – Annual energy savings resulting from ESOS Phase 1: Comparison of Impact Assessment estimates with interim evaluation estimates

Estimated Annual Energy Savings	Impact Assessment estimate	Impact evaluation central estimate (range shown in brackets)
Buildings	1.3TWh	1.65TWh (0.47-3.17TWh)
Industrial Processes	1.0TWh	1.51TWh (0.38-4.04TWh)
Transport	0.7TWh	0.52TWh (0.36-0.68TWh)

For transport, the central estimate from the impact evaluation modelling is lower than the 0.7TWh the ESOS Impact Assessment predicted could be achieved, although the upper limit of the range is similar. As stated above, the estimates from the modelling should be considered indicative only and comparisons between the modelling and Impact Assessment should be treated with caution⁴¹. Nevertheless, further consideration of the impact of ESOS on fuel savings and potential opportunities for increasing the current savings would be considered as part of future policy development.

⁴⁰ Full details of the modelling methodology and limitations can be found in the technical report [link to be added once published]

⁴¹ To note, limitations to the estimated transport saving in the Impact Assessment were acknowledged when this estimate was produced, as there was no comprehensive data available on the potential for further energy efficiency improvements in the transport sector, or the proportion of this that might be in scope of existing policy.

Modelling was also done to estimate future savings still to be realised from the first phase of ESOS compliance. This was based on survey responses around future planned actions as a result of ESOS and the likelihood of their implementation.

This modelling estimated future savings from buildings of 0.05-0.68TWh, with a central estimate of 0.33TWh, and from industrial process of 0.01-0.49TWh (with a central estimate of 0.2TWh). The modelling also estimated savings from transport as a result of future implementation of planned fuel efficiency measures due to compliance with the first phase of ESOS. It estimated future savings from transport of 0.02-0.03TWh (with a central estimate of 0.025TWh).

ESOS implementation, compliance and enforcement

Assumptions about how ESOS would be implemented

ESOS was designed to provide multiple routes to compliance for obligated organisations: conducting ESOS energy audits, via an ISO 50001 certified Energy Management System, through Display Energy Certificates, or via Green Deal Assessments. Each route would require organisations to measure their total energy consumption, to conduct energy audits to identify cost-effective energy efficiency recommendations, to report their compliance, and to do so in four-yearly compliance phases.

Awareness raising activity was implemented to communicate scheme requirements and participant eligibility, and to raise awareness and understanding of the scheme. These included direct mails, roadshows, scheme guidance publication and a helpdesk service.

For ESOS to function effectively, the development of an external assessor market was required to support compliance activity. A process was put in place to approve industry bodies and other organisations to host registers of accredited assessors. Register holders and assessors would be required to meet specific standards, with assessors often required to undertake training in order to be accredited to a register.

It was intended through this process that a pool of skilled and trusted external assessors would be created which organisations could use to appoint an assessor to lead their compliance activity who had the relevant qualifications and experience. Lead Assessor would be appointed to undertake, oversee or review ESOS Energy Audits (or Display Energy Certificate assessments or Green Deal Assessments), and to sign-off the overall assessment once complete, confirming it met requirements and that notification of compliance could be submitted.

It was predicted that if organisations chose to comply with ESOS via externally commissioned audits then a high quality and sustainable audit and energy services market would develop more quickly because of demand for audits in turn encouraging ongoing commissioning of services.

Actual implementation of ESOS

The interim evaluation reported that awareness of ESOS was high among organisations in scope, with 88% of non-SMEs aware of ESOS by March 2015. Most organisations interviewed reported becoming aware of ESOS through non-official sources, such as industry press or word-of-mouth at industry events, rather than official sources such as guidance and direct mail. For organisations who did use official scheme guidance and helpdesk services, these were

generally considered helpful and easy to use, although some organisations felt the guidance was not tailored sufficiently for those notifying compliance via ISO 50001.

Qualitative evidence from the interim evaluation suggests that the route which organisations chose to comply with ESOS was often linked to a perception of ESOS as principally a regulatory requirement. Analysis of the Environment Agency's published notification data (from June 2019) shows that most compliant organisations commissioned external energy auditing services (83.7%), with much lower proportions complying via an internal assessor (2.1%), or using ISO 50001 (c. 5.7%), Display Energy Certificates (c. 3.5%) or Green Deal (0.1%)⁴². The dominance of audits, and in particular commissioning an external auditor, is linked to a perception that this was the least burdensome way of reaching compliance. Cost was also a driving factor in the choice of compliance route, often leading to the selection of the external assessor with the lowest quote.

For organisations who opted to comply through ISO 50001, many were already certified prior to beginning the ESOS process, making it a simple means of meeting the ESOS requirement. However, there were some instances where the ESOS regulation had helped to provide the impetus for organisations to pursue ISO 50001 certification, or to reach the certification faster than would have happened in the absence of the regulation. There was also some evidence from case studies of organisations opting for the ISO 50001 route driven by a belief that their organisation would benefit in the longer-term, either in energy savings or reputational benefits. The process of notifying compliance with ESOS was generally reported as intuitive and straightforward by obligated organisations. However, confusion over eligibility criteria was experienced by some organisations, with some responses to the SECR consultation indicating the inclusion criteria could be difficult to understand and the interim evaluation finding evidence of organisations feeling uncertain of their eligibility status, particularly those in the charity or education sectors.

A large and high-quality supply of assessors was required to support organisations with their ESOS compliance activity. During the first phase of ESOS, over 900 ESOS Lead Assessors were accredited to 15 approved assessor registers. The interim evaluation found that there was a sufficient overall quantity of Lead Assessors to assist organisations in reaching compliance. However, concentration of the demand for their services in the final months in the lead up to the compliance deadline did lead to pressure on services at this time and corresponding price increases. The impact evaluation confirmed these findings, with some auditors reporting pressure and even having to turn down work in the run up to the deadline due to too much demand, exacerbated by organisations leaving it late to commission auditing services.

An independent contractor appointed by the Environment Agency led the process of approving ESOS registers. Qualitative interviews with assessor market firms found that overall views of the register approval process were positive, although some firms did suggest the application process was too flexible, resulting in the need for clarification questions. Preliminary quality assurance checks conducted by the Environment Agency found register holders and assessors to generally meet the required standards

Approved registers provided a means for obligated organisations to procure an accredited Lead Assessor with the relevant qualifications and experience. Accreditation to most registers required completion of training. Assessors described the training courses as 'light touch', which was considered appropriate given the long-term experience of many assessors. In a few cases, gaining new skills from becoming an ESOS assessor was reported, particularly where

⁴² In addition, approximately 4% of notifications were from organisations that used multiple compliance routes across their total energy consumption

professional experience was expanded into transport auditing. However, a few assessors felt the training could have offered more specific advice on understanding corporate structures, and in the application of ESOS guidelines in particular circumstances, such as for organisations with large transport fleets or where complex site sampling may be required.

The impact evaluation found that ESOS generated substantial volumes of business for the assessor market in the short term. There was some evidence of medium-term impacts, with one in four complier organisations surveyed in late 2018 reporting that they had commissioned follow-on work from their Phase 1 assessor. The most frequently procured service was further audit work, with demand for additional audit services likely to be driven by the December 2019 Phase 2 compliance deadline. Overall, the impact evaluation found no evidence of a significant long-term effect on the assessor market. Most practitioners who became certified Lead Assessors were already working in the field, with ESOS resulting in a short-term spike in energy audits rather than sustained demand.

Compliance

The Environment Agency were appointed as scheme administrator and, along with regulators in Devolved Administrations⁴³, were given responsibility for compliance and enforcement with ESOS. This includes the power to impose penalties on non-compliant organisations and to conduct quality assurance checks of register holders and assessors.

Compliance activity was compressed in the immediate period ahead of the first ESOS compliance deadline of 5 December 2015, with a significant spike in compliance in the month leading up to this. By the deadline, the Environment Agency had received approximately 4,000 compliance notifications, 2,500 intent to comply late notifications, and 400 do not qualify notifications. A further 30% of compliance notifications were logged by the end of January 2016. Since then, the Environment Agency and devolved administrators have continued to work to bring organisations into compliance. As of the end of June 2019, the latest data available, 7,075 compliance notifications had been received, representing over 99% of obligated undertakings.

The interim evaluation found that factors contributing to delayed compliance were mostly internal to organisations and often reflected a low priority placed on ESOS. In a few cases external factors played a part, notably the availability of assessors. Among those who had not notified compliance at the time of the 2016 study, the most common reason for this was not considering their organisation to be eligible.

ESOS was largely perceived by obligated organisations as compliance activity first and foremost, rather than as an energy saving opportunity. This had consequences for approaches to compliance, including a preference to commission an external assessor as this was seen as the least burdensome way to comply. There was also a preference to seek the lowest price compliance option.

Enforcement

⁴³ SEPA (Scottish Environment Protection Agency), NRW (Natural Resources Wales) and NIEA (Northern Ireland Environment Agency)

The Environment Agency may issue civil sanctions including financial penalties if an organisation does not meet the scheme's obligations⁴⁴. Other scheme regulators in the Devolved Administrations apply a similar approach.

Organisations that are subject to ESOS, but do not meet the requirements of the scheme, may be liable to compliance and enforcement activities. Three types of notice are available under the ESOS Regulations. These are:

- a compliance notice – this is an information request from the regulator to the participant. The compliance notice asks for information so the regulator can determine if the participant is complying with its obligations under ESOS
- an enforcement notice – this tells you what you must do to comply with a requirement of ESOS
- a penalty notice – this imposes civil penalties for breaches of the ESOS regulations. For example, failure to undertake an energy audit could result in a fixed penalty of up to £50,000 and an additional £500 for each working day starting on the day after service of the compliance notice, until the breach is remedied, subject to a maximum of 80 days.

As of the end of June 2019 over 700 enforcement notices had been issued to Phase 1 participants and 35 civil penalties imposed, with a highest individual penalty of £45,000.⁴⁵ The high compliance rates for Phase 1 of ESOS suggest enforcement activities have been successful in encouraging compliance.

The Environment Agency has also carried out an extensive audit programme of organisations who submitted compliance notifications and a number of those who submitted notifications that they did not qualify. This has led to a significant number of organisations being required to address either minor or major non-compliance issues. The Environment Agency have shared their experience from the audit programme, through the ESOS community newsletter and through lead assessor workshops, and have also developed a checklist for assessors, to encourage better quality ESOS audits in Phase 2.

Conclusions and next steps

The evaluation found the policy to have broadly met its objectives, with scope for further impacts to be realised over time.

Compliance levels with ESOS were high (over 99%), with many organisations conducting audits of their energy and fuel use for the first time and accessing tailored information about how they could make energy savings. Information provided in audit reports was at times found to highlight new areas of potential energy savings, and in other instances to provide external validation for actions already under consideration.

⁴⁴ The Environment Agency's approach to ESOS regulation and penalties is found in their enforcement and sanctions policy (annex 2, section D): <https://www.gov.uk/government/publications/environment-agency-enforcement-and-sanctions-policy/environment-agency-enforcement-and-sanctions-policy>

⁴⁵ This data refers to enforcement action by the Environment Agency only and applies only to organisations in England. It does not take into account enforcement action taken by the scheme administrators in the Devolved Administrations. The Environment Agency publish a summary of the penalties imposed on data.gov.uk: <https://data.gov.uk/dataset/13c0893a-049a-4608-9f9b-7f268a71f15a/climate-change-civil-penalties>

A large majority of organisations reported implementing energy or fuel efficiency measures since the start of ESOS. For a small proportion of measures installed, ESOS was considered the primary driver for that action. More commonly, ESOS was considered as contributing towards the decision to implement the measure, alongside other factors outside of the scheme. A considerable proportion of measures were also implemented solely due to other factors.

These findings are expected given the policy landscape includes a number of existing energy efficiency schemes. This landscape presents challenges in accurately quantifying the benefits of ESOS in isolation. However, while it comes with a number of caveats, modelling conducted as part of the impact evaluation estimated that the annual energy savings attributable to ESOS so far are broadly in line with the savings which the original Impact Assessment estimated could be achieved, with some variation across sectors.

It should be reiterated that the full benefits of ESOS are unlikely to have been realised at the time of the study that informed this review. While there is evidence of uptake of some recommended energy and fuel efficiency measures, measures are likely to take time to be financed, approved, and implemented, and it is likely that further measures will continue to be implemented in future, with additional energy savings made. Additional compliance phases also have potential for ESOS to result in further energy efficiency action.

Overall, the costs of compliance with ESOS were broadly in line with those anticipated. Costs were found to be higher than expected for some organisations who left compliance to the last minute, and communication of this risk has already been adopted. For the second phase of ESOS, it is assumed that cost will be reduced as one-off set-up costs will not be incurred again.

Organisations who had previously undertaken energy data collection and reporting generally had a lower perception of burden from ESOS, suggesting participation in other schemes helped make the ESOS process easier to navigate. In particular, the evidence suggested a synergy between ESOS and CCAs. ESOS was expected to have minimal impact on organisations covered by CCAs, who are likely to have a high pre-existing level of energy maturity. Unexpectedly, the evaluation found that ESOS did still have an impact on uptake of energy efficiency measures for these organisations, at times identifying new energy saving opportunities in areas of business that were not covered by their CCAs.

Phase 1 of the evaluation found that businesses are unlikely to carry out an energy audit unless mandated, and so the need for ESOS remains given that energy audits are considered to be an important, and cost-effective, lever in encouraging energy efficiency in business. The research also shows that organisations will not always respond to energy savings opportunities identified through their audits and whilst the original policy objective of increasing awareness and take up energy efficiency measures have been met, the evaluation also points to a significant potential to improve this further and thereby deliver greater energy and carbon savings required for our commitment to net zero emissions. A number of aspects of ESOS requirements warrant further attention to ensure implementation levels are increased in the future, including:

- Addressing the cyclical nature of four-yearly audit cycles to improve levels of sustained activity between audits;
- Delivering on potential further synergies with other schemes such as CCAs and SECR to create additional drivers for energy efficiency action such as requirements for public disclosures and target setting;
- Improving levels of implementation of energy efficiency recommendations by reframing the scheme's requirements and improving quality of audits.

What next steps are proposed for the regulation (e.g. remain/renewal, amendment, removal or replacement)?

While ESOS has positively impacted energy efficiency in organisations and delivered on the key policy objectives relating to energy savings, the evaluation findings also confirm stakeholder feedback about the limitations of the schemes which may have restricted the take up of energy efficiency implementation in some organisations. It is therefore recommended that the ESOS regulations are kept as they are for the Phase 2, which is already underway and has a compliance deadline of 5 December 2019, noting that some steps have already been taken with the aim of reducing the burden on obligated organisations and encouraging better understanding of the obligations by both organisations and assessors. However, consideration is being given to future amendments to the regulations to address some of the issues identified by this review for future compliance phases. Possible opportunities to address existing limitations include:

1. Mandating implementation of ESOS recommendations
2. Requiring public disclosure of ESOS recommendations and/or action
3. Changing the scope of organisations required to carry out energy audits

These are some of the themes around which refinements to the scheme will need to be considered in order for ESOS to remain relevant in the context of Government's ambition to reduce business energy use by at least 20% by 2030 and, longer term, our commitment to net zero emissions. They also align with the recommendations in a July 2019 report from the Business, Energy and Industrial Strategy Select Committee⁴⁶. The report found that ESOS could go further to encourage business investment in energy efficiency and recommended that the Government should require ESOS audits to be publicly available and mandate that obligated organisations demonstrate that they have acted on the energy saving opportunities identified.

The findings and conclusions from this evaluation will inform a potential consultation on proposals for future reform, which will need to consider the potential requirement for primary legislation, timing of the future ESOS phase and the wider policy context which includes schemes such as Streamlined Energy and Carbon Reporting, Climate Change Agreements, the Industrial Energy Transformation Fund and our work on energy efficiency in SMEs and the public sector.

⁴⁶ Business, Energy and Industrial Strategy Committee, *Energy efficiency: building towards net zero*, 12 July 2019, HC 1730: <https://www.parliament.uk/business/committees/committees-a-z/commons-select/business-energy-industrial-strategy/news-parliament-2017/energy-efficiency-report-published-17-19/>

ANNEXES

Annex 1: Additional policy background to ESOS

The European Union (EU) has a target to reduce primary energy consumption by 20 percent by 2020 (against a business-as-usual projection made in 2007) through improvements in energy efficiency⁴⁷. In 2011, the European Commission estimated that the EU was half-way towards this target based on existing policies. The EU Energy Efficiency Directive (2012/27/EU) was introduced as part of a drive to establish a common framework of measures to promote energy efficiency across different sectors of the economy throughout the EU.

The 2012 EU Energy Efficiency Directive (2012/27/EU) established a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU Member States are required to use energy more efficiently at all stages of the energy chain, from production to final consumption⁴⁸. Article 8 (4-6) of the Energy Efficiency Directive requires Member States to establish an energy audits regime under which all large undertakings (or smaller organisations that are part of a large undertaking) must carry out audits, or a specified equivalent, at least once every four years, with the first compliance to have been notified by 5 December 2015. These audits were to cover energy used by buildings, industrial processes, and transport, as appropriate, and identify cost-effective energy saving measures.

In 2018, a new amending Directive on Energy Efficiency (2018/2002) came into force which Member States are required to transpose into national law by June 2020. The Directive continues to include energy audit requirements for large undertakings and also requires Member States to encourage energy efficiency action and audits by SMEs.

The UK government introduced the Energy Savings Opportunity Scheme (ESOS) in 2014 to implement the 2012 Directive in the UK. ESOS was developed by the Department of Energy and Climate Change (now part of BEIS) with a key aim of providing flexible and cost-effective routes to compliance, but with quality assurance through an accredited assessor market. It is a mandatory energy assessment scheme for organisations in the UK that meet the qualification criteria. An ESOS assessment needs to cover an undertaking's significant energy consumption including, as appropriate, buildings, industrial processes and transportation operations, and include recommendations around what the undertaking can do to reduce its energy consumption. Obligated organisations are required to notify compliance with the scheme administrator, the Environment Agency (EA), though implementation of the energy saving measures identified is voluntary. The EA, along with the other UK compliance bodies⁴⁹, are empowered to monitor and enforce compliance with ESOS.

In addition to meeting a compliance obligation under the EU Energy Efficiency Directive, ESOS is also closely linked to the UK Government's strategic aims. A move to cleaner economic growth is identified as a great industrial opportunity in the Government's Industrial Strategy⁵⁰. There are a wide range of benefits from improving the energy efficiency of the UK economy. Cost-effective energy efficiency measures reduce energy bills and for companies this translates

⁴⁷ In 2018, a new amending Directive on Energy Efficiency (2018/2002) was agreed which established a headline EU energy efficiency target for 2030 of at least 32.5% and which needs to be transposed into national law by Member States by 25 June 2020.

⁴⁸ <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive>

⁴⁹ SEPA (Scottish Environment Protection Agency), NRW (Natural Resources Wales) and NIEA (Northern Ireland Environment Agency)

⁵⁰ <https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future>

into financial savings that can be reinvested for different purposes such as growing the business, leading to enhanced competitiveness.

Improving energy efficiency is also a cost-effective way to reduce carbon emissions. Energy efficiency will need to play a significant role in meeting the Government's long-term carbon emission reduction targets. In its Clean Growth Strategy⁵¹, the Government set out policies and proposals for driving down carbon emissions and meeting our commitments under the Climate Change Act, while at the same time growing the economy. The strategy includes a commitment to developing a package of measures to support businesses to meet an ambition to improve their energy efficiency by at least 20% by 2030.

Business energy efficiency is central to the Government's energy policy and ESOS operates within a complex policy landscape. Within this context, ESOS was implemented in a way which minimised the cost to business and looked to maximise synergies with other energy efficiency schemes. There are however a number of other policies which interact, and in some cases overlap, with ESOS. This makes it difficult to estimate the impact of ESOS over and above these policies.

⁵¹ <https://www.gov.uk/government/publications/clean-growth-strategy>

Annex 2: Additional methodological details including limitations

This annex provides details of the various data collection approaches adopted to maximise the amount of robust information available about the implementation and impact of the ESOS regulations. A balance has been sought throughout between the quality of data collected and the ease of providing this information for responding organisations. As a result of efforts to achieve this balance, and due to the structure and complexities of the policy, some limitations to the data collection and analysis were inevitable. This annex acknowledges these limitations, and the steps taken, where possible, to mitigate limitations and ensure robust analysis.

Interim process and early impact evaluation (2015-17)

The interim evaluation involved a number of different data collection approaches:

- A representative quantitative telephone survey of 871 ESOS-obligated organisations;
- Qualitative interviews with 40 ESOS-obligated organisations (25 pre-compliance and 15 post-compliance) and 10 assessor market firms;
- In-depth case-studies with 10 organisations;
- Familiarisation interviews with stakeholders at BEIS and the Environmental Agency, other involved government departments and devolved administrations;
- Review of key policy and operational documents, applicant guidance documents and related research and evaluation reports.

Limitations of the interim evaluation

The baseline survey sampled parent-level organisations only, limiting the evaluation's understanding of both process and impact issues across subsidiary-level organisations. This was due to challenges identifying individual subsidiaries due to complexities in company hierarchy data. These challenges resulted in the Environment Agency analysing compliance data at the ultimate parent group level, an approach the evaluation team replicated.

The findings on costs of compliance were based on self-reported estimates from ESOS-obligated organisations of the time involved and costs incurred complying with the scheme. Potentially this may have included limitations such as: duplication of time across categories; poorer recall of earlier stages of the compliance process; or the inclusion of time that was not truly additional (i.e. they would have incurred part of the time or cost anyway even in the absence of the scheme). In addition, a simplified approach to collecting employee seniority information and the use of an average gross hourly pay rate are likely to have reduced the accuracy of the data collected.

Further details of the evaluation methodology and limitations can be found in the evaluation report and technical annex⁵².

Impact Evaluation (2017 – 2019)

The impact evaluation took a theory-based approach alongside wide-ranging quantitative and qualitative data collection to assess the outcomes and impacts of the scheme. This included using a theory of change and a Context-Mechanism-Outcome (CMO) framework to explore how

⁵² <https://www.gov.uk/government/publications/energy-savings-opportunity-scheme-esos-evaluation-of-the-scheme>

the influence of ESOS varied for who, in what ways, and in which contexts. The evaluation comprised of two distinct phases.

Phase 1 involved:

- A literature and evidence review to fill evidence gaps from the interim process and early impact evaluation
- Stakeholder engagement involving 25 interviews and six further workshops across the following stakeholder groups:
 - ESOS-obligated organisations;
 - ESOS organisations also participating in Climate Change Agreements (CCAs);
 - SMEs;
 - ESOS assessors;
 - Trade bodies.

Phase 2 involved:

- A quantitative telephone survey of 503 ESOS complier organisations;
- Qualitative telephone interviews with 20 ESOS Lead Assessors;
- Qualitative telephone interviews with 13 representatives from the energy efficiency supply chain;
- Qualitative case studies with organisations, made up of 8 ESOS complier organisations and 2 SMEs, including a mixture of face to face and telephone interviews across the organisations to gather a range of perspectives;
- Data modelling based on survey data to conduct energy and emissions savings analysis.

The telephone survey conducted during Phase 2 was designed to be representative of the ESOS complier population as of August 2016 (to align with the 2016 baseline survey). It included interviews with 282 organisations who had been interviewed in 2016 and with 221 complier organisations not previously interviewed. The achieved interviews were representative of the main characteristics of ESOS organisations, e.g. by region, industry sector and date of original compliance notification.

Limitations of the impact evaluation

The key limitations of the impact evaluation are provided below. Further details of the evaluation methodology and limitations can be found in the Phase 1 evaluation report and Phase 2 evaluation report and technical annex⁵³.

1. The ESOS evaluation scoping study⁵⁴ recommended that it was not viable or efficient to collect data on subsidiary organisations given the challenges to identifying compliance status across company hierarchies. Therefore, the surveys with ESOS compliers were representative of parent-level organisations only, which limited the evaluation's understanding of subsidiary-level organisations, especially SME subsidiaries. However, qualitative evidence, in particular including subsidiary level organisations in the case-study research, helped support assessment of the potential impact of ESOS measures across the full obligated population.

⁵³ Links to be added once published

⁵⁴https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/650881/Evaluation_of_ESOS_Impact_evaluation_scoping_report.pdf

2. The ESOS population lacks an appropriate counterfactual, given the universality of the ESOS obligations across large organisations. The scoping study considered a number of options for a potential comparison group including:
 - Obligated SMEs compared to non-obligated SMEs: While most SMEs are not obligated under ESOS, some are by virtue of being a member of a corporate group with a large firm. A risk with this comparison however is that those firms with a large parent company may differ in systematic ways from those without. Findings under this option also could not be generalised beyond SMEs.
 - Notifiers compared to non-notifiers: Comparisons made between those who had and had not notified compliance at a previous set point in time could offer more generalisable findings regarding the impacts of ESOS. However, differences between these two groups were also likely to be systematic (for instance, those who had delayed their notification might be thought to give lower priority to energy efficiency issues, biasing comparisons between the two groups).

All options considered were found to have trade-offs around either robustness, feasibility, or representativeness and generalisability. As a result, the scoping study identified no single quasi-experimental approach to evaluate the impact of ESOS. This drove the decision to adopt a theory-based approach.

3. There is no central collection of ESOS energy audit reports and flexibility around report format, length and range of content. This restricted an assessment of the quality and relevance of energy efficiency recommendations made. However, the evaluation gathered views from complier organisations and assessors on the quality and relevance of the ESOS audits and recommendations. In addition, a small sample of energy audit reports undertaken by complier organisations were accessed through the case-studies.
4. In the survey, ESOS-obligated organisations were asked whether they attributed (in full or in part) their energy or fuel efficiency activities, priorities or planning to the ESOS process. The self-reported nature of the attribution to ESOS may mean the impact of the scheme could have been over or under reported by some organisations. The accuracy of this attribution cannot be verified, although where organisations received follow-up case-study visits these provided an opportunity to further explore how and why the ESOS process may have influenced the organisation compared to other factors.
5. Across all primary data strands, participants were required to recall information from around the time of ESOS compliance onwards. The most detailed information was requested of ESOS organisations that took part in the survey, including detail of energy and fuel efficiency measures implemented since going through the ESOS process. Participants may not have recalled accurately whether improvements have been made before or after this point, and/or whether these measures were implemented as a result of ESOS or not.
6. To reduce the burden on responding organisations and maximise response rates, the telephone survey was limited to 25 minutes. This restricted survey length and the survey design challenges involved in capturing data on the potential energy or fuel efficiency measures implemented across a large organisation limited the level of detail that could be reasonably gathered. To mitigate this, survey participants were asked to indicate whether they had implemented measures in up to eight broad energy efficiency categories. Further detail was then requested about the specific measures implemented

in a maximum of two of these categories. Data on a per measure basis is therefore based on a sub-sample of respondents only.

7. The modelling work to estimate the annual energy savings resulting from ESOS faced some limitations in the input data available. To work around these limitations some high-level assumptions had to be made. Subsequently, the estimated energy savings presented in this review come with a number of caveats and should be considered as indicative only. Limitations to the modelling include:

- Where participants indicated they had implemented buildings and industrial process measures in a category but were not asked follow-up questions about specific measures within that category, survey averages were substituted for missing individual values.
- For fuel savings measures, limited data was available about how widely measures were rolled out across an organisation's fleet of vehicles and therefore estimates had to be made about the level of coverage.
- Where organisations indicated that the measures were implemented in part due to ESOS and in part due to other measures, estimates had to be made about the proportion of the savings from such measures that could be attributable to ESOS.
- There was a lack of available data on the expected savings from implementing industrial process and transport measures. These savings had to be estimated using a number of different sources and in some cases the expert assessment of the contractors conducting the modelling, so there is considerable uncertainty around some of the estimates.
- The modelling uses floor area data for organisations to estimate the extent of the energy saving for an organisation which has implemented energy saving measures. Floor area data could only be matched to around half the addresses across all the companies responding to the survey. Where no data was available, the organisations were excluded from the modelling analysis, and where data was available for some but not all sites in an organisation, total floor area was estimated based on averages.