Energy Savings Opportunity Scheme (ESOS) Evaluation

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We’re going to talk about…

1. How ESOS was implemented in the UK
2. The evaluation work we commissioned
3. The findings from our final evaluation
4. What next for policies to expand business energy efficiency?
What is ESOS?

• ESOS is an energy audit scheme which requires large businesses, at least once every 4 years, to have an assessor conduct an audit of energy use across the business and make recommendations for energy efficiency improvements

• Under Article 8 of Energy Efficiency Directive

• Introduced in 2014, with first compliance year ending in December 2015
What is ESOS?

• Audits of energy use in buildings, industrial processes and transport

• Policy objectives when ESOS was introduced in 2014:
  • 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.
ESOS: evaluation approach and methods
Two ESOS Evaluations

• 2015-2017 – Interim evaluation and feasibility study
  o Aim of this was to understand how effectively the ESOS scheme was being implemented, how businesses / assessors were responding; any unexpected burden / costs
  o Also to collect baseline evidence for a future longer-term impact evaluation
  o Feasibility study on how we might conduct an impact evaluation

• 2017-2019 – Impact evaluation / wider lessons on audits
  o Aim to understand what the policy achieved (i.e. what energy efficiency savings have resulted from the policy) and whether it met its objectives
Research questions

• **RQ1: Energy audits and reporting**: To what extent (in which ways and in which contexts) are energy audits and reporting effective in identifying and delivering energy efficiency savings across organisations?

• **RQ2: ESOS influence and impact**: To what extent (in which ways and in which contexts) has ESOS influenced organisational energy efficiency policy and practice? What impact has ESOS had on energy efficiency in organisations?

• **RQ3: ESOS lessons for future policy**: What are the lessons learned from implementing ESOS that could feed into future policies?
Evaluation challenges

• Universality of ESOS – applies to all large businesses
• Complex and overlapping policy landscape
• ESOS participants were not required to submit the content of their ESOS energy assessments to the scheme administrator
• Challenges identifying impact below ultimate parent level (hidden impact on subsidiaries)
Key methodological elements in the impact evaluation

• Theory-based evaluation
• Principles of a realist approach – Context Mechanism Outcome framework
• Follow-up survey of ESOS compliers (Parent level)
• Energy and emissions savings modelling
• Qualitative research with organisations, assessors and supply chain organisations
Evaluation methodology: data on impact

Stage 1: Gathering data on impact of ESOS

Survey of 503 ESOS compliers

Measures installed
Outcomes related to organisation EE culture

Modelling abatement

Modelling of self-reported measures implemented on energy use and emissions

Analysis of firm data

Analysis of business characteristics and energy consumption over time
# Evaluation methodology: attributing impact

## Stage 2: Attributing impact to ESOS

<table>
<thead>
<tr>
<th>8 ESOS case-studies</th>
<th>Self-reported influence of ESOS vs. other factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Non-ESOS case-studies</td>
<td>Identifying alternative drivers of similar impacts outside ESOS</td>
</tr>
<tr>
<td>13 Supply chain &amp; 20 assessor interviews</td>
<td>Understanding broader trends around EE, and perceptions of ESOS influence vs. other factors</td>
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Key findings on ESOS
ESOS one of the factors driving energy efficiency action

Organisations reporting implementing or planning measures at least partly as a result of ESOS:

1 measure 38%
2+ 29%

6% reported that at least one measure was implemented as a direct result of ESOS

Process-related measures (48%) & Lighting (46%) most commonly attributed to ESOS

Measures implemented or planned since 2015
Similarly ESOS contributed to transport measures

Fuel efficiency measures implemented or planned at least partly as a result of ESOS:

1 measure 32%

2+ 20%

4% reported that at least one measure was implemented as a direct result of ESOS.

Adjustments to journey or loading practices were most commonly influenced by ESOS (38%).

Proportion reporting their organisation’s car fleet to comprise some low carbon vehicles:

49% (2016) to 54% (2018)

“One of our subsidiaries created a new computer system to better capture their transport data. To be fair I think it was partly a Finance (team) push, but ESOS definitely helped them realise something was needed.”
Modelling ESOS energy & fuel efficiency savings: broadly comparable to original estimates

<table>
<thead>
<tr>
<th>Estimated savings as a result of measures implemented due to ESOS</th>
<th>Central Estimate</th>
<th>Lower Estimate</th>
<th>Upper Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial process changes</td>
<td>1.51TWh</td>
<td>0.38TWh</td>
<td>4.04TWh</td>
</tr>
<tr>
<td>Buildings changes</td>
<td>1.65TWh</td>
<td>0.47TWh</td>
<td>3.17TWh</td>
</tr>
<tr>
<td>Fuel efficiency changes</td>
<td>0.52TWh</td>
<td>0.36TWh</td>
<td>0.68TWh</td>
</tr>
</tbody>
</table>

2014 ESOS Impact Assessment prediction

- 1.0TWh
- 1.3TWh
- 0.7TWh
Net cost savings and savings opportunities attributed to ESOS

37%  Agreed that changes made as a result of ESOS had led to net cost savings (cf. 27% in 2016)

Highlighted new saving opportunities in some cases - improved awareness of energy efficiency opportunities

Provided external validation of known opportunities - encouraging implementation by strengthening the case for action

“ESOS made us think about implementing higher efficiency lighting ahead of the curve of industry... we had already been moving to CFD but next stage of LED was due to ESOS”

“We weren’t looking for an auditor to come in and provide us with energy issues. We pretty much had a full list of them. It was a validation of what we were doing”
Other changes prompted by ESOS

• As a result of going through the ESOS process organisations introduced:
  o Energy efficiency related goals (17%)
  o Action plans (20%) and
  o Training (17%)

Plus

• Prompted certification with ISO 50001 (7%)

• A quarter reported that the level of priority placed on energy efficiency at board level had increased due to ESOS
Reputation or productivity benefits

- 16% agreed that ESOS compliance enhanced their reputation with clients

- 8% of organisations that had taken action due to ESOS reported staff productivity increases

Case study: Organisation whose ISO 50001 certification was expedited by ESOS believe it has helped them win work:

“Our clients have an expectation that we are certified”

Some organisations reported that ESOS had improved indoor conditions for staff, customers or clients
Improving awareness & discussion around energy

"[ESOS had] armed us with more information and knowledge” and to have “given us the opportunity to speak to subsidiaries, it was something to flag to them, it strengthened our dialogue as it was regulation"

ESOS-Compliant organisation

"Organisations are getting better at looking at it, managing and bringing it [energy data] as part of normal reporting... some have better hold on their data"

ESOS Assessor

29% of organisations within a corporate group shared their full ESOS audit report or recommendations
Organisational contexts and external factors

More likely to implement measures where ESOS had initially prompted action (ISO 50001 certification or energy efficiency plans or goals)
But less likely to implement if already energy mature.

External drivers of organisational decisions:
• Financial drivers
• Natural equipment lifespan
• Competing priorities
• Relocation/ consolidation
• Broader Corporate Social Responsibility
ESOS and the assessor market

Short term

• Compliance generated significant work for assessors

• ~ 900 assessors accredited to ESOS scheme

• Many were already engaged in energy or auditing services
  • Some new entrants
  • Expansion into transport auditing

• Demand peaked in late 2015

Longer term

26% of organisations commissioned further follow-on work

Most common additional commissions

• Comprehensive or investment grade audits (9%) or

• Implementation of energy efficiency measures (7%).

“I’m not a sales person. I should have done more but didn’t: after phase 1 everyone was so exhausted.”
What next for policies to increase business energy efficiency?
Clean Growth Strategy – our ambition

• The Clean Growth Strategy set an ambition to improve business productivity by enabling businesses to improve energy efficiency by at least 20% by 2030.

• This means that energy use would need to fall by 20% and energy intensity by 45% in 2030 compared to 2015 levels.

• This will deliver:
  • Up to £6bn in cost savings for businesses
  • Carbon savings of up to 22 MtCO$_2$e
  • An important contribution to reaching net zero
What more needs to be done?

**Creating Demand for EE**
- Businesses (particularly SMEs) don't typically think about EE (salience) or may not own buildings
- Businesses don’t have the expertise/time to look at what EE might be suitable for them
- Culture of “tick box” compliance with non-core activities
- Perception that EE projects do not compare well against returns from other investment opportunities

**Building capacity and capability in EE**
- Suppliers of EE technology/services don’t think the demand is there so don’t invest in building a business
- Business models which could work are held back by lack of reliable & accessible data for investment decisions
- Portfolios of EE projects carry financial & legal risks which are difficult to manage
Range of policy approaches to overcome barriers – non-domestic sector is not one size fits all

2015 final energy expenditure on energy by end use and fuel (£ billion, 2016 prices)
Options for strengthening ESOS

- Mandating implementation of ESOS recommendations
- Extending the scope
- Encouraging compliance via ISO 50001
- Public disclosure
Enforcement and design challenges

- Gaming
- Safeguarding Business
- Behaviour Change
- Maintenance
Thank you

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