| | |
|---|---|
| **Title:** ***Strengthening the Energy Savings Opportunity Scheme (ESOS)***<br>**IA No: BEIS027(C)-21-EEL**<br>**RPC Reference No: BEIS-5088(1)**<br>**Lead department or agency: BEIS**<br>**Other departments or agencies: Department for Transport** | **Impact Assessment (IA)**<br>**Date:** 02/07/2021<br>**Stage:** Consultation<br>**Source of intervention:** Domestic<br>**Type of measure:** Secondary legislation<br>**Contact for enquiries:** yano.moussavi@beis.gov.uk (analysis) or gary.shanahan@beis.gov.uk (policy) |
| **Summary: Intervention and Options** | **RPC Opinion:** Awaiting Scrutiny |

| **Cost of Preferred (or more likely) Option** (in 2019 prices) | | | |
|---|---|---|---|
| **Total Net Present Social Value** | **Business Net Present Value** | **Net cost to business per year** | **Business Impact Target Status** |
| £1.0bn | £907m | EANDCB £60m | Qualifying provision |

**What is the problem under consideration? Why is government action or intervention necessary?**

To address the information failures and behavioural barriers that disincentivise energy efficiency uptake, ESOS was implemented in 2014. The scheme requires large businesses to carry out a 4-yearly audit which provides cost-effective recommendations that are tailored to the organisation and are required to be signed off by a board member. However, lack of clarity due to sub-standard ESOS audits undermines the uptake of energy efficiency among in-scope parties. Government intervention can address this by coordinating across business to produce common standards and strengthen audit requirements.

**What are the policy objectives of the action or intervention and the intended effects?**

The objectives of the policy are to:

- improve clarity for complying organisations around the content of their ESOS audit and recommendations.
- raise the scope of potential energy savings from ESOS through public disclosure, due to raising reputational pressure which can drive increased board-level engagement in energy efficiency.

Together, the intended effect of these interventions is to increase the proportion of firms undertaking action on energy efficiency due to ESOS, as well as increase the total number of recommendations being taken up.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

A wide set of options are considered in the IA, but the shortlisted options are:

- Policy option 0: Do nothing
- Policy option 1: **Preferred option**. Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits.
- Policy option 2: Amend ESOS regulations so that audits focus on business readiness for Net Zero.
- Policy option 3: Amend ESOS regulations to mandate public disclosure of energy consumption and energy efficiency recommendations.

Policy option 1 is the preferred option. It addresses issues around clarity which inhibit compliers from fully engaging with their ESOS recommendations. This option would also address myopic behaviour that undermines private action on long-term climate objectives, as well as applying reputational pressure to incentivise greater action on energy efficiency.

**Will the policy be reviewed?** It will be reviewed. **If applicable, set review date:** 12/2026

| | | | | |
|---|---|---|---|---|
| Is this measure likely to impact on international trade and investment? | | No | | |
| Are any of these organisations in scope? | **Micro**<br>No | **Small**<br>No | **Medium**<br>No | **Large**<br>Yes |
| What is the $CO_2$ equivalent change in greenhouse gas emissions? (Million tonnes $CO_2$ equivalent) **(2023-2037)** | | **Traded:**<br>-2.6 | **Non-traded:**<br>-5.6 | |

***I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits, and impact of the leading options.***

Signed by the responsible Minister: Lord Callanan Date: 05/07/21

# Summary: Analysis & Evidence

Policy Option 1 (Proposed)

**Description: Implement new standards and strengthen requirements of ESOS audits, mandate public disclosure of ESOS audits and introduce a Net Zero element to ESOS.**

**FULL ECONOMIC ASSESSMENT**

| Price Base Year 2019 | PV Base Year 2021 | Time Period Years 15 | Net Benefit (Present Value (PV)) (£m) | | |
|---|---|---|---|---|---|
| | | | **Low:** -900 | **High:** 4250 | **Best Estimate:** 1,020 |

| COSTS (£m) (2023-2037) | Total Transition (Constant Price) Years | | Average Annual (excl. Transition) (Constant Price) | Total Cost (Present Value) |
|---|---|---|---|---|
| **Low** | N/A | | 103 | 1,550 |
| **High** | N/A | | 133 | 1,990 |
| **Best Estimate** | N/A | | 114 | 1,710 |

**Description and scale of key monetised costs by 'main affected groups'**

Main affected groups are the large businesses in scope of the ESOS regulations that are required to comply with the proposed mandatory disclosure requirements and Net Zero audits. Capital and installation costs of undertaking measures in response to disclosure are the largest component (44%). Compliance costs, which includes the time taken to complete an ESOS audit as well as familiarisation and compliance with mandated disclosure form the second largest component of costs (44%). Hassle and operational costs account for the remaining costs (11%).

**Other key non-monetised costs by 'main affected groups'**

Wider non-monetised costs are the costs borne by the Scheme Administrator of establishing an appropriate database of ESOS reports, as well as publishing reports and enforcing the proposed regulatory changes. Additional costs include the cost to lead assessors of familiarising with the new regulations and acquiring sufficient training to deliver Net Zero audits. However, until the practicalities of a Net Zero audit are clear, the requisite upskilling remains unclear. Therefore, this additional cost has not been monetised.

| BENEFITS (£m) (2023-2037) | Total Transition (Constant Price) | | Average Annual (excl. Transition) (Constant Price) | Total Benefit (Present Value) |
|---|---|---|---|---|
| **Low** | N/A | | 44 | 660 |
| **High** | N/A | | 415 | 6,230 |
| **Best Estimate** | N/A | | 182 | 2,730 |

**Description and scale of key monetised benefits by 'main affected groups'**

Energy savings are the largest benefit (65%). These energy savings also yield significant benefits from non-traded CO2e emissions reductions (14%), traded CO2e emissions reductions (5%) and air quality improvements (16%).

**Other key non-monetised benefits by 'main affected groups'**

Increased demand for energy efficiency measures can support productivity growth and jobs within the green construction industry and the wider supply chain. Greater competition within these markets may also spur innovation and lower the end costs of installing measures. Reducing business energy demand is also likely to generate a benefit at the national level from improved energy security.

| Key assumptions/sensitivities/risks | Discount rate | 3.5 |
|---|---|---|

Benefits are dependent on disclosure incentivising energy efficiency. With low levels of response, it is likely that the proposed option would represent a net cost. Policy overlaps have been modelled according to published plans, but the scope of consumption this covers could change which would alter the split of costs and benefits from the policy. Costs of a Net Zero audit are speculative at this point. Energy and carbon prices reflect the IAG projections.

**BUSINESS ASSESSMENT (Option 1)**

| Direct impact on business (Equivalent Annual) £m: | | | Score for Business Impact Target (qualifying provisions only) £m: |
|---|---|---|---|
| **Costs:** | **Benefits:** | **Net:** | |
| 137 | 209 | -72 | 300 |

# Summary: Analysis & Evidence

Policy Option 2

**Description: Amend ESOS to require audits to focus on business readiness for Net Zero**

**FULL ECONOMIC ASSESSMENT**

| Price Base Year 2019 | PV Base Year 2021 | Time Period Years 15 | Net Benefit (Present Value (PV)) (£m) | | |
|---|---|---|---|---|---|
| | | | **Low:** Optional | **High:** Optional | **Best Estimate:** -644 |

| COSTS (£m) (2023-2037) | Total Transition (Constant Price) Years | Average Annual (excl. Transition) (Constant Price) | Total Cost (Present Value) |
|---|---|---|---|
| **Low** | N/A | N/A | N/A |
| **High** | N/A | N/A | N/A |
| **Best Estimate** | N/A | 47 | 700 |

**Description and scale of key monetised costs by 'main affected groups'**

Main affected groups are the large businesses in scope of the ESOS regulations that are required to undertake Net Zero audits. The monetised costs of this option are compliance costs, which includes the administrative burden (57%), as well as the cost to the firm of hiring and paying an auditor to conduct a Net Zero audit (43%).

**Other key non-monetised costs by 'main affected groups'**

Non-monetised costs include the capital and installation costs of Net Zero audit recommendations. These costs have not been monetised as the policy is under design and there is limited evidence on what recommendations a Net Zero audit could include. Wider non-monetised costs include the opportunity cost of capital, as well as the cost to auditors of familiarisation with the new regulations and acquiring sufficient training to deliver Net Zero audits.

| BENEFITS (£m) (2023-2037) | Total Transition (Constant Price) | Average Annual (excl. Transition) (Constant Price) | Total Benefit (Present Value) |
|---|---|---|---|
| **Low** | N/A | N/A | N/A |
| **High** | N/A | N/A | N/A |
| **Best Estimate** | N/A | N/A | N/A |

**Description and scale of key monetised benefits by 'main affected groups'**

The benefits of this proposal have not been monetised. There is limited evidence on what recommendations a Net Zero audit could include, and therefore, the potential energy savings in scope. We aim to quantify the potential benefits of a Net Zero audit in the Final Impact Assessment once wider research has been conducted and the policy design is clearer.

**Other key non-monetised benefits by 'main affected groups'**

Non-monetised benefits include improved awareness around Net Zero and the wider low carbon transition. Greater awareness may lead to energy managers having larger influence on corporate boards, which could raise ambitions on energy efficiency and low carbon measures. Other key non-monetised direct benefits could include energy and carbon savings as firms undertake low carbon transition, as well as improved energy security that comes from reduced business energy demand.

| **Key assumptions/sensitivities/risks** | **Discount rate** | 3.5 |
|---|---|---|

The costs of a Net Zero audit are uncertain and are speculative and have been calculated by applying a percentage adjustment to the cost of an existing ESOS audit. These costs may differ to the estimates made here and will be greatly influenced by the design of the policy and the outcome of the consultation which seeks views on how the inclusion of a Net Zero element to ESOS audits would impact on audit cost. ESOS audits were calculated using an existing approach, incorporating data from ND-NEED. Evidence on the of compliance with the CRC Phase 1 was used to estimate the admin burden of complying with a Net Zero audit.

**BUSINESS ASSESSMENT (Calculated for Proposed Option)**

| Direct impact on business (Equivalent Annual) £m: | | | Score for Business Impact Target (qualifying provisions only) £m: |
|---|---|---|---|
| **Costs:** | **Benefits:** | **Net:** | |
| N/A | N/A | N/A | N/A |

# Summary: Analysis & Evidence

Policy Option 3

**Description: Mandated public disclosure of energy consumption and ESOS recommendations**

**FULL ECONOMIC ASSESSMENT**

| Price Base Year 2019 | PV Base Year 2021 | Time Period Years 15 | Net Benefit (Present Value (PV)) (£m) | | |
|---|---|---|---|---|---|
| | | | **Low:** Optional | **High:** Optional | **Best Estimate:** 1,730 |

| COSTS (£m) (2023-2037) | Total Transition (Constant Price) Years | | Average Annual (excl. Transition) (Constant Price) | Total Cost (Present Value) |
|---|---|---|---|---|
| **Low** | N/A | | N/A | N/A |
| **High** | N/A | | N/A | N/A |
| **Best Estimate** | N/A | | 67 | 1,000 |

**Description and scale of key monetised costs by 'main affected groups'**

Main affected groups are the large businesses in scope of the ESOS regulations that bear the capital and installation costs (76%) as they undertake energy efficiency improvements following public disclosure of their ESOS audits. Wider costs include hassle costs (14%) and operational costs (4%). Compliance with disclosure completes the monetised costs of this option (6%).

**Other key non-monetised costs by 'main affected groups'**

Non-monetised costs include the opportunity cost of capital, which is a potential cost to the large businesses in scope. Wider non-monetised costs are the costs borne by the Scheme Administrator of establishing an appropriate database of ESOS reports, as well as publishing reports and ensuring compliance with the new disclosure requirements.

| BENEFITS (£m) (2023-2037) | Total Transition (Constant Price) | | Average Annual (excl. Transition) (Constant Price) | Total Benefit (Present Value) |
|---|---|---|---|---|
| **Low** | N/A | | N/A | N/A |
| **High** | N/A | | N/A | N/A |
| **Best Estimate** | N/A | | 182 | 2,730 |

**Description and scale of key monetised benefits by 'main affected groups'**

Energy savings are the largest benefit (65%). These energy savings also yield significant benefits from non-traded CO2e emissions reductions (14%), traded CO2e emissions reductions (5%) and air quality improvements (16%).

**Other key non-monetised benefits by 'main affected groups'**

Increased demand for energy efficiency measures can support productivity growth and jobs within the green construction industry and the wider supply chain. Greater competition within these markets may also spur innovation, lower the end costs of installing measures, and help sustain jobs. Reducing business energy demand is also likely to generate a benefit at the national level from improved energy security.

| **Key assumptions/sensitivities/risks** | **Discount rate (%)** | 3.5 |
|---|---|---|

Energy savings are dependent on the impact of public disclosure as a driver for increased action on energy efficiency. Despite the low additional costs estimated in this policy option, very low levels of action following disclosure could result in negligible energy savings and as such, the policy representing a net cost. Energy and carbon prices have been modelled using IAG projections. Policy overlaps have been modelled according to published plans, but the scope of consumption this covers could change which would reduce the split of costs and benefits of this proposal.

**BUSINESS ASSESSMENT (Calculated for Proposed Option)**

| Direct impact on business (Equivalent Annual) £m: | | | Score for Business Impact Target (qualifying provisions only) £m: |
|---|---|---|---|
| **Costs:** | **Benefits:** | **Net:** | |
| N/A | N/A | N/A | N/A |

# Contents

# 1. Introduction and policy background

1. In 2018, large businesses in the UK consumed around 211TWh of gas and electricity. They also accounted for an average of approximately 113TWh of industrial process consumption, or 59% of the total industrial process consumption[1]. Buildings occupied by large businesses are estimated to consume around 98TWh of electricity and gas, which represents around 40% of the total business energy consumption in non-domestic buildings[2].

2. In 2014 under Article 8 of the European Union's Energy Efficiency Directive (2012/27/EU), the UK implemented the Energy Saving Opportunity Scheme (ESOS) which requires large enterprises to undertake an energy audit of the energy use by their buildings, industrial processes, and transport at least once every four years (beginning in 2015). The scheme was estimated to deliver energy savings through two channels: 1) by providing an accurate measurement of business energy use that would lead to consumption changes and therefore reduce energy demand; and 2) through providing a list of high-quality and tailored energy efficiency recommendations which enterprises could adopt to improve their energy efficiency, reduce energy demand, and increase cost savings through lower energy bills.

3. In 2020 an evaluation of ESOS was published alongside a Post Implementation Review (PIR) of the scheme. The evaluation indicated that compliance with the scheme was high, with around 99% of in-scope organisations participating in the scheme over the previous two compliance windows, it also highlighted several unintended consequences. These include[3]:

    - Higher than originally forecast ESOS assessment costs. It is possible that costs were inflated by the large demand for assessors created by participating businesses who delayed their compliance activities until the final year of the four-year compliance window.

    - Greater uptake of ESOS measures among participants who possess a Climate Change Agreement (CCA). This was not foreseen, it was estimated that there would be little uptake of ESOS measures among CCA participants, as CCA participants already have their energy consumption measured and receive recommendations on reducing their energy use.

[1] More detail on these figures is discussed in Section 7, below. 2018 used as the datapoint for large business consumption.

[2] ND-NEED, 2020 - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020.Gas and electricity use only, scaled to total UK consumption from England and Wales only. For more information on the scaling used see Annex 8.

[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/867853/research-on-energy-audits-and-reporting-including-ESOS-phase-1-report.pdf

- Anecdotal evidence of lower quality audits. Several of the interviewed participants reported that their audit was of low quality and provided limited information specific to their business such as the organisation structure and tenancy. There was also a sense that payback periods of floated recommendations were not credible.

- A low proportion (around 6%) of organisations that had undertaken or planned to undertake fuel or energy efficiency improvements attributed this solely to ESOS.

## 2. Rationale for Intervention

4. The evidence gathered from the first Phase of ESOS highlighted issues surrounding the poor quality of audits, as well as ESOS being widely perceived as a compliance-first exercise by participants, limited the scope and size of potential energy savings.

5. Whilst the evaluation found that 90% of participating organisations reported having planned or implemented an energy efficiency measure, only 6% of surveyed respondents directly attributed this to ESOS, with 38% of respondents indicating that ESOS was partially attributable to their decision to implement or plan to implement an energy efficiency measure[4].

6. The PIR, alongside the evaluation evidence, indicated that although ESOS had largely delivered its original policy objectives, there were several areas where the scheme could be strengthened and improved. The responses from organisations, described above, around the role that ESOS has in driving decisions to implement new measures suggest that there is a small proportion of enterprises in scope whose action under the scheme is sufficient to deliver the total estimated savings.

7. The rationale for Government intervention is that the market failures below are too pronounced and prevalent to be resolved through market dynamics alone. Relevant market failures include:

    - The **Negative Externality** of climate impacts associated with greenhouse gas emissions mean energy prices do not fully reflect the impacts of energy use,

[4] ibid

causing over-use of energy, and underutilisation of low carbon alternatives. This also applies to air quality impacts.

- **Incomplete Information** occurs where private agents lack quality and relevant information on the costs and benefits of energy efficiency, as well as future standards that they will need to achieve to hit Net Zero. Consequently, firms may not prioritise energy efficiency or behavioural changes that yield significant private and social benefits[5].

- Low salience of energy efficiency can present an additional **behavioural barrier**.[6] This can exacerbate the information failures and externalities, by causing organisations to fail to take potentially privately beneficial action because they perceive gains as too small to prioritise. For example, energy bills constitute only 3% of costs for most sectors, and as a small cost, this can limit engagement with lowering these costs.[7]

- **Misaligned or 'split' incentives** can occur in the rented sector when the costs of improving energy or fuel efficiency fall on owners, but the benefits of energy bill reductions go to tenants. Alternatively, costs incurred by current tenants may generate benefits for future tenants and not for themselves. Both issues disincentivise investment.

- **Embryonic markets** exist where industries are typically in the development stage usually dealing with products for which limited demand has been established. This is exacerbated by information failures, for example when customers do not have sufficient information about the potential future benefits that a novel technology might have.

  The existing ESOS scheme may do little to overcome embryonic markets for measures which typically carry higher payback periods. However, the policy could be adapted to raise awareness and demand for measures with higher payback periods, such as heat pumps.

8. The current ESOS scheme, whilst contributing to bridging information failures, could be strengthened to overcome these barriers more effectively.

---

[5] ESOS was implemented following Article 8 of the Energy Efficiency Directive. The scheme aimed primarily at overcoming information failures that concern lack of awareness around the opportunities that energy efficiency presents. Energy efficiency has large private and social benefits, such as the value of bill and carbon savings. Lack of quality information around energy efficiency can lead to its undervaluing and de-prioritisation within a firm as an investment and an inefficient allocation of resources.

[6] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65601/6925-what-are-the-factors-influencing-energy-behaviours.pdf p.7

[7] Business energy statistical summary https://www.gov.uk/government/publications/business-energy-statistical-summary page 17

# 3. Policy Objectives

9. In accordance with the Green Book, we have detailed the primary objectives of our policy as a SMART objective:

**Specific:**

The policy aims to increase the number of ESOS participants that act and improve their energy or fuel efficiency upon getting an ESOS audit. Specifically, this is estimated to deliver additional energy savings of 3.2TWh per year from 2023, from buildings and industrial processes[8]. These energy savings will be achieved through three prongs: 1) through improved clarity around the content of their ESOS audit; 2) through increased pressure within the firm to act via mandated public disclosure and 3) through providing greater information around the steps firms need to take to ensure their means of consuming energy are consistent with Net Zero.

**Measurable:**

All firms in scope will undertake the proposed policy recommendations by the Phase 3 compliance deadline (5 December 2023) and begin undertaking additional action from this point. We will monitor data between the point at which the policy is implemented and 2023, to understand the rate of compliance with the new requirements. We plan to measure the impact of the proposals through evaluating data gathered by the Scheme Administrator, which will shed light on the type and quality of information disclosed by compliant organisations. This will inform evaluations of the proposed policy and indicate whether the forecast impacts are reasonable.

**Achievable:**

The ESOS evaluation and PIR indicates there is scope for additional action from firms under the policy. Bridging clarity gaps through strengthened audit requirements can overcome confusion around what recommendations are in an ESOS report. Action taken by firms in scope is currently voluntary and compliance is demonstrated through completing an ESOS audit or similar assessment. Evidence suggests that mandated disclosure can drive board level engagement with energy efficiency, leading to greater adoption of measures[9].

[8] It was estimated that around 1.7TWh of annual energy savings would come from buildings, and 1.5TWh from industrial processes consumption.

[9] Evidence Review of the Impact of Central and Public Disclosure Methods for Reporting Energy Use and Energy Efficiency. DECC, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf. Although the sample size of studies investigating the link between mandated disclosure and corporate board interest in energy efficiency is small, there evidence gathered indicated that

The policies proposed here reflect the gathered evidence so far and sensitivity tests are conducted to model a series of scenarios around voluntary uptake of measures.

**Realistic:**

Based on the existing evidence, it is realistic to assume that some level of energy savings, and the wider benefits associated with this, could be delivered by the proposals. More importantly, whilst the evidence on the types of measures recommended in ESOS audits is unclear, it is unlikely that measures with long payback periods (e.g., greater than 2 years) would be proposed following ESOS audits. This means that the types of measures being recommended to firms are more likely to be well-established and relatively simple to adopt, rather than more complex options such as nascent heating technologies. Fundamentally, actual implementation of ESOS recommendations is voluntary, so even if measures with longer payback periods are recommended, they are unlikely to be implemented. Mandated disclosure does not change this aspect of the policy, and the wider proposals have been designed to reflect this fact.

**Time-limited:**

All firms within scope of ESOS should have acted by the end of the Phase 3 (2023) compliance window to disclose their energy consumption, take action to reduce their energy consumption and have completed a Net Zero audit. The proposed regulatory changes will be reviewed 5 years after implementation, most likely at the end of Phase 4 (2027) to determine whether they are achieving the intended objectives.

# 4. Policy Options and Alternatives to Regulation

10. The below list presents narrative on the options considered for the Impact Assessment. The preferred option is option I within which several sub-options have been analysed.

A. Do nothing – retain the existing approach.
B. Scrap ESOS – remove the current scheme and do not replace.
C. Amend ESOS – standardise and strengthen audit requirements.
D. Amend ESOS regulations so that audits focus on business readiness for Net Zero.
E. Mandated public disclosure of energy consumption and energy efficiency recommendations.

participating in a mandatory disclosure scheme can overcome lack of board engagement in energy efficiency. Moreover, several studies indicate that gaining board interest in energy efficiency is key to adopting measures.

F. Fiscal alternatives to amending ESOS.
G. Mandate measures within a certain payback period.
H. Extend ESOS to medium enterprises.
I. Amend ESOS – strengthen current Scheme through the measures outlined in section 5.2. ***Preferred*** option.

# 5. Long List Options Appraisal

## 5.1. **Multi-criteria analysis (MCA) of long list options.**

11. Before refining the options considered in the short-list, and therefore appraised, the long list of options was analysed through MCA. The scoring criteria used in the MCA were a combination of Green Book critical success factors and project specific objectives, such as improving clarity from ESOS audits to compliant parties[10]. Critical success factors included: the likelihood of supply side capability of achieving the option, as well as the value for money of the proposals.

12. Options were given a 0-2 rating against the stated objective, in ascending order of how well the option was estimated to achieve that objective. The analysis comprised 8 distinct objectives, with a total attainable score of 16. Options were then ranked by total scores achieved, and the top three options were short-listed. Table 1, below, outlines the approach to the discounting or short-listing of the long-listed options.

13. More information on the long-listed options as well as a qualitative assessment of the potential costs, benefits, risks and how well they achieve the aims of the overall intervention can be found in Annex 5. Option I is the preferred option, and is discussed in further detail, below.

[10] Business Case Guidance for Projects, HM Treasury and Government Finance Function, 2020. https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

## Table 1: Long-list options appraisal table

| Options | Option A | Option B | Option C | Option D | Option E | Option F | Option G | Option H | Option I |
|---|---|---|---|---|---|---|---|---|---|
| **Option description** | **Do nothing** | **Scrap ESOS** | **Amend - standardise and strengthen audit requirements** | **Amend - changes audit focus to ensure business readiness for Net Zero** | **Mandate public disclosure** | **Fiscal alternatives to amending ESOS** | **Mandate measures within a certain payback period** | **Extend ESOS to medium enterprises** | **Amend - strengthen Scheme through the measures outlined in section 5.2** |
| **Key policy intervention aims:** | | | | | | | | | |
| Improved clarity around the content of an ESOS audit | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 |
| Increase pressure on firms to adopt ESOS audit recommendations | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 0 | 2 |
| Provide greater information around the steps firms need to take to ensure their means of consuming energy are consistent with Net Zero. | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Green Book Critical Success Factors | | | | | | | | | |
| Strategic fit | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 2 |
| Potential Value for Money | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 2 |
| Potential achievability | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| Supplier capacity and capability | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 |
| Potential affordability | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| **Total score** | 6 | 8 | 9 | 10 | 11 | 6 | 5 | 5 | 13 |
| Rank | 6 | 5 | 4 | 3 | 2 | 6 | 8 | 8 | 1 |
| Discounted/shortlisted | Discounted | Discounted | Discounted | Shortlisted | Shortlisted | Discounted | Discounted | Discounted | Shortlisted |

### 5.2 Option I: Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits – *Preferred*.

14. The available evidence on the impact of mandatory disclosure suggests that this could have a significant impact on overcoming information failures and would help alleviate externalities which result in the undervaluing of energy efficiency[11]. The evidence indicates that reporting schemes requiring board-level approval and public disclosure, which is proposed in this consultation, can help to address misaligned incentives by generating reputational scrutiny and encouraging behavioural change.

15. Increasing demand for energy efficiency measures also attracts profit-seeking entrepreneurs and innovators to enter the market for energy efficiency, which can help to overcome the 'embryonic markets' barrier[12]. The proposed package of policies assessed in the Impact Assessment therefore aims to address the barriers outlined above:

- **Standardisation and strengthening audit requirements** can overcome information failures and improve corporate transparency around energy use and the potential for reductions.

- **Mandatory public disclosure of ESOS audits** could create reputational drivers for participating businesses to act on audit recommendations and improve their performance against their peers and wider social decarbonisation objectives, such as the Net Zero, which could lead to increased value being placed on energy efficiency at firm level.

- **Introducing a Net Zero element to audits** could assist participating businesses to overcome information failures that impede uptake of low carbon measures and assist them to shift their focus towards longer term decarbonisation and investment in low carbon options. This could also alter the current perception of ESOS from a compliance first exercise, to one that seeks to contribute to delivering to the strategic objective of Net Zero.

[11] Evidence Review of the Impact of Central and Public Disclosure Methods for Reporting Energy Use and Energy Efficiency. DECC, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf.

[12] Whilst not specific to energy efficiency nor low carbon heating options, there is a plentiful body of evidence that has reviewed the relationship between increased demand and technological cost reductions. Relevant examples include the case of solar photovoltaics (PV), the unit cost of which fell by around 99% between 1975 and 2020. More information on this can be found here: https://www.iea.org/data-and-statistics/charts/evolution-of-solar-pv-module-cost-by-data-source-1970-2020 and https://ourworldindata.org/cheap-renewables-growth.

# 6. Short List Options Appraisal

16. The options considered for the short list economic appraisal are:
    a. **Policy option 0: Do nothing**
    b. **Policy option 1: Preferred option. Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits[13].**
    c. **Policy option 2: Amend ESOS regulations so that audits focus on business readiness for Net Zero**.
    d. **Policy option 3: Amend ESOS regulations to mandate public disclosure of energy consumption and energy efficiency recommendations.**

17. These options have been included in the cost-benefit analysis and Option 1 and Option 2 have been quantified.

18. A detailed logic map of how the amendments to the ESOS regulations would work in practice can be seen in Annex 4, theory of change. This also captures the way in which Net Zero audits (proposed in both Option 1 and Option 2) could contribute to transforming business energy use to align with long-term climate objectives.

# 7. Analytical Approach

## 7.1 Counterfactual

19. For the counterfactual we assume the energy savings that ESOS has already delivered persists in future years, as without any intervention the current policy framework would continue, and we assume would have stable impacts over time[14]. The Energy and Emissions Projections (EEP)[15] reference case therefore provides suitable estimates for the energy consumption in the counterfactual scenario. The EEP provides time-series estimates of energy use for commercial services, industrial energy, and transport.

[13] In addition to the current audit requirements, the consultation proposes that the ESOS audit should also include an overall assessment of carbon emissions and other greenhouse gas emissions resulting from energy use in buildings, transport, and industrial processes which the organisation will need to address to be carbon neutral or Net Zero by 2050. In particular, this should include an assessment of current fossil fuel use and direct greenhouse gas emissions from the business, along with the potential for decarbonisation and when relevant investment might occur.

[14] Detail on a scenario wherein ESOS is scrapped is provided in the long-list options appraisal and annex 1.

[15] Annex F, Updated Energy and Emissions Projections, 2019. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/931205/Annex-F-final-energy-demand__EEP2019_.ods.

20. However, also incorporated in the counterfactual scenario are the overlaps that ESOS has with other policies that incentivise reductions in energy use. More detail on the policy overlaps with ESOS is provided in Annex 1. Detail on how the consumption in scope was identified is outlined in section 9.2, below.

### 7.2 Identifying energy consumption in scope.

21. For this impact assessment, the impact on transport energy consumption has not been modelled alongside the relevant consumption of buildings and industrial processes. The overlaps within the current transport policy landscape mean that there is limited scope for additional emissions savings beyond the impact of rules on emissions at the manufacturer, which builds vehicles to a certain standard. It is possible that a future ESOS scheme could impact reduction of overall levels of fuel demand at a firm level, for example through encouraging better driver training and logistical management of fleets. We welcome evidence on this during the consultation and intent on improving the estimated impact on the transport sector in the final stage Impact Assessment.

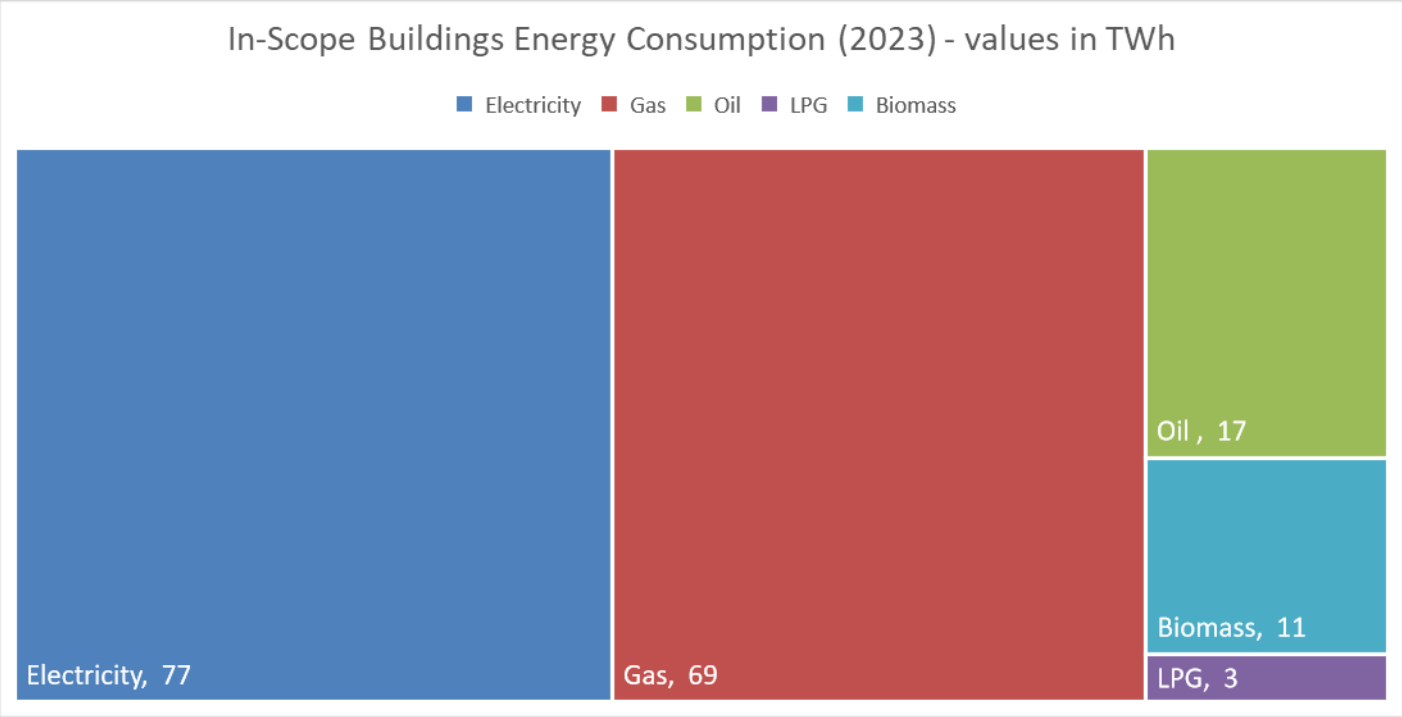
#### 7.2.1 Buildings

22. Figure 1 shows the buildings energy consumption in scope, once the projected 7% energy reduction has been achieved by 2023. Post 2023 consumption is assumed to remain constant over the appraisal period[16]. Under this estimate, electricity is the single largest fuel consumed, accounting for around 77 TWh in 2023, or around 44% of total buildings consumption. This is followed by gas consumption, which accounts for around 69TWh, or 39% of the total[17].

[16] Energy consumption is flatlined from 2023 to account for the locking-in of energy savings from current and future policies. This potentially under-estimates the gains of energy efficiency in absolute terms since consumption is forecast as lower than in the EEP reference case.

[17] Data calculated using the Non-Domestic Buildings Model, which uses BEES (2016) data to estimate the buildings consumption in scope of the policy.

**Figure 1: in-scope non-domestic buildings energy consumption in 2023.**




### 7.2.2 Industrial processes

23. In 2018, large and very large businesses consumed around 55% of all industrial electricity consumption and around 63% of all industrial gas consumption. Since ND NEED provides gas and electricity consumption only, a weighted average of the gas and electricity consumption of large and very large businesses has been used to estimate the proportion of other fuels which are consumed by these businesses[18]. This weighted average is the electricity + gas factory consumption from large and very large businesses, divided by total electricity + gas factory consumption from all business sizes (with business size information).

**Table 2: Large and very large businesses factory electricity and gas consumption**

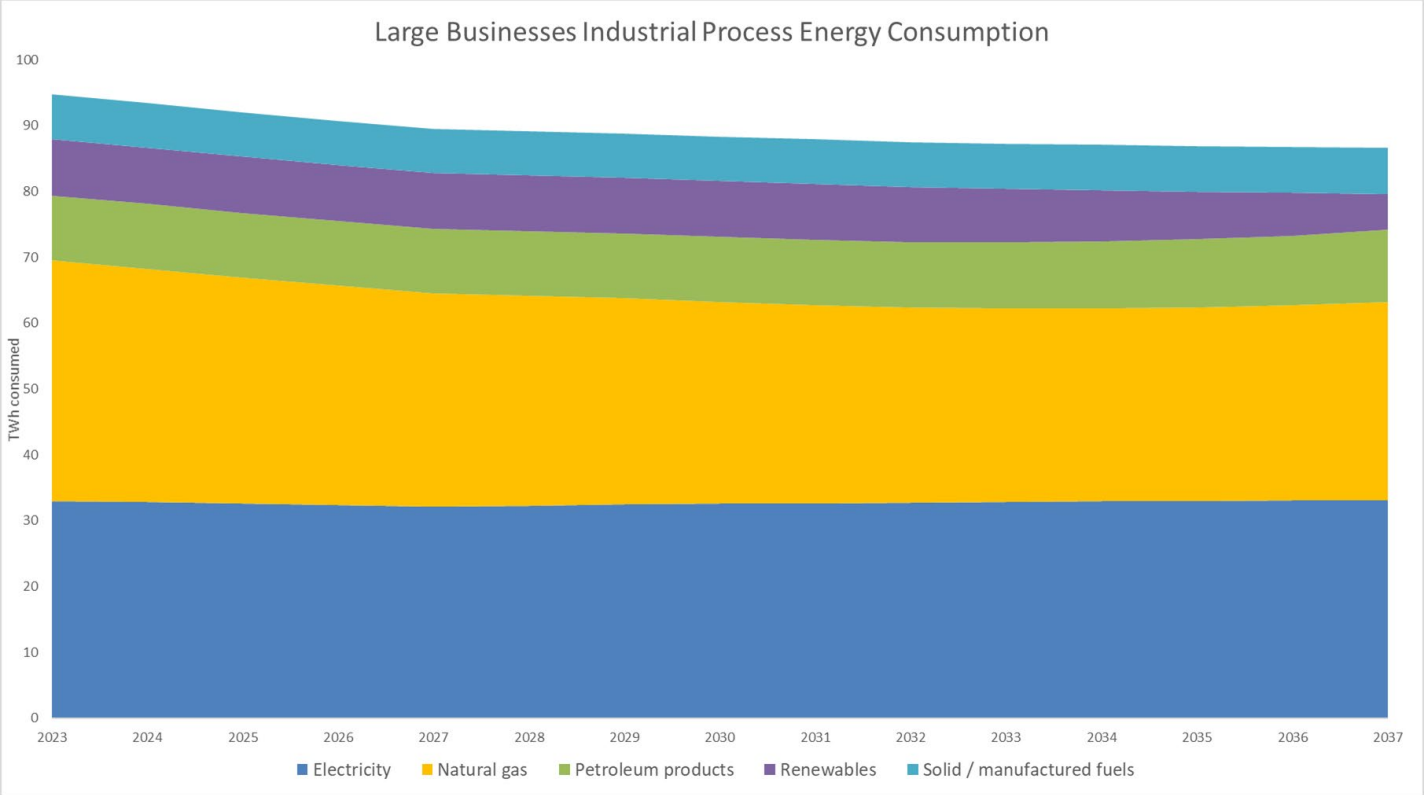
| Business size | Electricity (%) | Gas (%) | Other fuels (weighted average) |
|---|---|---|---|
| Large businesses | 28% | 27% | |
| Very large businesses | 27% | 36% | |
| Total | 55% | 63% | 59% |

[18] ND-NEED factories category has been used as a proxy for industry. Large businesses defined as any business with between 249-999 employees. Very large businesses defined as any business with a1000 or more employees. These proportions consumed by large and very large businesses have been applied to the whole of the UK to account for Scotland and Northern Ireland in the absence of more robust evidence.

24. Although splitting out the consumption in this way provides an indicator of the industrial energy in scope, it includes non-process energy, such as buildings consumption. To avoid double counting, the process-share of energy was split out using BEES and comparing this to the ND NEED data on factory energy consumption. This was then applied to the EEP dataset to determine the baseline for process energy consumption[19].

25. Further detail on the energy consumption in scope for buildings and industrial processes can be found in Annex 8.

**Figure 2: estimated large businesses industrial process energy consumption between 2023-2037**




[19] Internal BEIS analysis of ND NEED, 2020. ND NEED publication: https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020.

### 7.3 Appraisal period

26. The policy proposal would potentially require participants to make changes to their ESOS reporting from their Phase 3 (which runs between 2019 and 2023) report onwards. 2023 has therefore been taken as a suitable starting point for the appraisal period.

27. The impacts of the policy have been modelled between 2023 and 2037. This captures the costs of measures from action taken following disclosure as well as the costs of Net Zero audits. Disclosure and Net Zero audits are assumed to be completed by the end of 2023, and then at the end of the following compliance period, in 2027.10 years is added to this period, which extends the appraisal period to 2037, reflecting Green Book guidance[20].

#### 7.3.1 Timing of costs and benefits

28. Since compliance with the new scheme would need to occur by the end of Phase 3 (compliance deadline 5 December 2023), costs and benefits have been monetised from this start date. The approach to modelling the costs and benefits has been to assume that costs are incurred up front, such that benefits also start from 2023.

29. This front-loads the costs and benefits of the policy proposals, and a smoother rollout would see the impact of costs and benefits more evenly spread out over the appraisal period. It may be the case that an ESOS audit and subsequent disclosure is completed in 2023, but measures are not implemented until after this. However, considering that disclosure is the primary channel through which the policy is expected to deliver benefits, it is expected that these measures will have some impact on behaviour and uptake of energy efficiency measures from 2023.

30. Front-loading the costs and benefits of the policy proposed takes a relatively conservative approach to the economic appraisal. As up-front costs are not reduced as much by discounting and a larger proportion of the benefits are quantified in the relative near-term when carbon and energy costs are lower.

[20] The 15-year appraisal period The 15-year appraisal period, where 2023 is, for discounting purposes, considered year 0, is consistent with methodologies applied in other similar Impact Assessments, such as the Performance-Based Framework Impact Assessment: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970368/performance-based-policy-framework-office-impact-assessment.pdf. Wider guidance and background information on appraisal in Government can be found in The Green Book, available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf.

31. The impact of cost and benefit timings will be explored further in the final IA.

### 7.3.2 Categories of costs and benefits analysed.

32. The costs and benefits considered in this Impact Assessment are outlined in Table 3 below.

33. The main monetised additional costs are the capital and installation costs that are incurred by firms who undertake energy efficiency improvements in response to disclosing their energy consumption. Other monetised costs include: the administrative cost of complying with disclosure requirements, the administrative cost of complying with a Net Zero audit, and the cost of getting the Net Zero audit.

34. Wider non-monetised costs include the cost to ESOS auditors for undertaking the requisite training to perform a Net Zero audit as well as the cost of familiarising with the new regulations. Some of these costs would plausibly be passed on to the businesses who are obtaining Net Zero audits, in the form of higher fees. Since the nature of the Net Zero element included in the proposals is currently under design, the additional cost of undergoing the necessary training to complete this has not been quantified.

35. The main benefits considered which are monetised can be split into private and social benefits. The private benefit which has been monetised is the reduced expenditure on energy bills that is a result of businesses installing more efficiency measures or changing behaviour to lower their energy consumption[21]. The main quantified social benefits include the social value of energy savings[22] and the associated carbon savings and air quality improvements. All private and social benefits have been appraised using the 2020 Green Book Supplementary guidance[23].

[21] The value of private bill savings has been calculated by multiplying the consumption savings by the relevant fuel retail energy price.

[22] Calculated using the Long-Run Variable Costs of the relevant fuel in question, multiplied by the consumption saving. The LRVCs are used to reflect the social value of energy savings, as per Green Book Supplementary Guidance.

[23] Green Book Supplementary Guidance can be found here: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal. Tables 1-19 were used to quantify the value of bill, energy, carbon savings as well as air quality improvements.

**Table 3: costs and benefits analysed in the Impact Assessment.**

| Affected party | Costs | Benefits |
|---|---|---|
| Large firms in scope of ESOS | **Monetised**<br>- Compliance<br>- Capital<br>- Installation and hassle<br><br>**Not Monetised**<br>- Possible opportunity cost of capital | **Monetised**<br>- Energy Bill savings<br><br>**Not Monetised**<br>- Comfort and Productivity<br>- Improved health of building occupants<br>- Improved clarity around ESOS audit recommendations<br>- Improved information around measures aligned with Net Zero ambitions |
| ESOS auditors | **Not Monetised**<br><br>- Additional costs of gaining relevant skills to conduct a Net Zero audit as well as the additional cost of familiarising with the new standards on ESOS audits | **Not monetised**<br><br>- Improved productivity because of better guidance provided on what needs to be completed in an ESOS audit |
| Scheme administrator | **Not Monetised**<br><br>- Additional cost of monitoring and ensuring compliance with disclosure requirements. | **Not Monetised**<br><br>- Improved information around ESOS participants recommendations |
| Society | **All costs that are faced by the groups described above** | All preceding benefits plus:<br><br>**Monetised**<br>- Carbon savings<br>- Air quality improvements<br>- Social value of energy savings<br><br>**Not Monetised**<br>- Increased security of energy supply<br>- Increase in high-skilled jobs in the low-carbon economy |

# 8. Policy Impacts

## 8.1 Results from the cost-benefit analysis

**Table 4: discounted costs and benefits of the short-listed options (£m, 2019, appraised between 2023-2037)[24].**

| Costs and benefits | Option 1 | Option 2 | Option 3 |
|---|---|---|---|
| **Description** | **Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits** | **Net Zero audits only** | **Mandated disclosure** |
| **Costs** | | | |
| Capital and installation costs | 760 | - | 760 |
| Hassle costs | 150 | - | 150 |
| Operational costs | 40 | - | 40 |
| Familiarisation and compliance with disclosure | 60 | - | 60 |
| Familiarisation and compliance with Net Zero audits | 700 | 700 | - |
| Total costs (A) | 1,710 | 700 | 1,000 |
| **Benefits** | - | - | - |
| Value of energy savings | 1,780 | - | 1,780 |
| Value of air quality improvements | 430 | - | 430 |
| Value of greenhouse gas emissions avoided | 520 | - | 520 |
| Total benefits (B) | 2,730 | - | 2,730 |
| **Net Present Value (B - A)** | 1,020 | - 700 | 1,730 |
| **Benefit Cost Ratio (B/A)** | 1.6 | - | 2.7 |

36. The table above summarises the main quantified aspects of the short-listed options. All costs and benefits are based on 2019 prices and have been monetised and discounted in line with the Green Book and supplementary

[24] Figures in the table are rounded to the nearest £10m, therefore total costs and benefits may not sum up from individual components.

guidance on valuing energy use and greenhouse gas emissions[25]. A full table of the assumptions used to estimate the costs and benefits of the short-listed options can be found in Annex 2. This informed the sensitivity analysis conducted, which is discussed in section 8.3.

37. Option 1 is the preferred option. The Net Present Value (NPV) of this option is around £1.0bn, with a benefit-cost ratio of 1.6. The benefits delivered under this option are dependent on additional action being taken following disclosure[26]. This option is preferred to Option 3, despite the latter option having a higher estimated NPV of around £700m. The lower NPV of Option 1 is due to the inclusion of the Net Zero audit element to ESOS. The main costs incurred in this option are capital and installation costs, and the costs of complying with a Net Zero audit., However, given the MCA scoring in Table 1, Option 1 has better strategic fit with Government priorities overall.

38. The inclusion of a Net Zero element to ESOS contributes to achieving wider strategic climate objectives and aligns with the government's policy of encouraging businesses to commit to achieving Net Zero emissions by 2050 by signing up to the UN's Race to Zero campaign. We have not been able to monetise the benefits of a Net Zero audit as the detail of the policy continues to be refined. Ultimately, the audits should be designed in a way that ensures that their benefits exceed their costs.

39. However, the costs associated with conducting a Net Zero audit are highly illustrative. In the central cases for all options analysed above, these costs are derived from the assumption that it would take roughly double the time for an ESOS auditor to conduct a Net Zero audit. This is based on evidence gathered highlighting the potential for a substantial increase in the costs of audits, should a Net Zero element be included[27]. This is to be tested within the wider response to the consultation and the costs of a Net Zero audit are varied in the sensitivity analysis, below.

40. The impact of disclosed energy consumption and energy efficiency recommendations yields gross benefits of £2.7bn over the period 2023-2037. Under these options, the total value of greenhouse gas emissions avoided,

[25] More detail on the modelling is outlined in Annex 1 and 3. Major modelling outputs used include data from the Non-Domestic Buildings Model and the Energy and Emissions Projections.

[26] The uncertainty around the size of the response following disclosure is captured in the sensitivity analysis, which is explored in 10.3 and Annex 2. If very little action materialises following disclosure, the policy is likely to represent a net cost.

[27] Net Zero audits: state of the market and potential for action, BEIS, 2021. The costs associated with conducting a Net Zero audit are highly illustrative. In the central cases for all options analysed above, these costs are derived from the assumption that it would take roughly double the time for an ESOS auditor to conduct a Net Zero audit. This is based on evidence gathered highlighting the potential for a substantial increase in the costs of audits, were a Net Zero element included.

and air quality improvements are £430m and £517m, respectively, over the appraisal period[28].

41. The analysis provided for Option 2 looks at the impact of only introducing a Net Zero audit element to ESOS. Given the uncertainty around the way this policy would work in practice, benefits have not been monetised and the costs provided demonstrate an illustrative sense of the additional compliance burden that would be involved with getting a Net Zero audit done.

### 8.2 Emissions and Energy Savings Summary

42. The below table shows the emissions savings that could be delivered over Carbon Budget 5 and Carbon Budget 6. It also includes the potential energy savings that could be delivered over the appraisal, by 2037. The analysis presented below covers the preferred option (Option 1) but reflects the savings that could occur in Option 3, since this mandates public disclosure. As above, given the uncertainty around the design or implementation of a Net Zero audit, the emissions and energy savings impact of Option 2 has not been quantified.

43. To capture the uncertainty around the impact of public disclosure on energy consumption and the overlaps with other policies, the emissions and energy savings impacts have been presented as a range. The figures in the table below reflect the range of outcomes that could occur under a High or Low NPV scenario. More detail on the sensitivity tests undertaken to account for uncertainty is expanded upon below[29].

44. Energy savings of between 19.0 and 93.0 TWh could be achieved across building and industrial processes between 2023 and 2037 under Option 1 and Option 3. Under these options, between 1.0 and 5.1 MtCO2e could be saved over Carbon Budget 5. Of this, most of the savings come from non-traded emissions, reflecting the greater carbon intensity of non-traded fuels. Similarly, between 0.8 and 4.2 and MtCO2e could be saved over Carbon Budget 6. Again, most of this comes from reductions in non-traded emissions. Note that the traded emissions reductions fall between CB5 and CB6, reflecting ongoing decarbonisation of the electricity grid.

[28] The benefits in option 1 and option 3 are derived from the impact of disclosure on energy consumption. A central estimate of a 4% energy reduction due to disclosure was used, which was then adjusted to account for buildings and industrial energy policy overlaps. The size of the energy savings are a source of uncertainty and sensitivity analysis has been conducted to test the scenarios under which the policy would represent a net cost.

[29] More information on the overlaps and the analytical approach followed is outlined in Annex 1 and Annex 2.

**Table 5: Table of Energy and Emissions Savings**

| Summary of Energy and Emissions Savings | Range of potential savings - Low to High NPV scenario, central in brackets |
|---|---|
| **Carbon budget 5 (2028-2032)** | |
| Traded emissions (MtCO2e) | 0.3 - 1.6 (0.8) |
| Non-traded emissions (MtCO2e) | 0.7 - 3.5 (1.9) |
| Total emissions saved (MtCO2e) | 1.0 - 5.1 (2.7) |
| **Carbon budget 6 (2033-2037)** | |
| Traded emissions (MtCO2e) | 0.1 - 0.7 (0.3) |
| Non-traded emissions (MtCO2e) | 0.7 - 3.5 (1.8) |
| Total emissions saved (MtCO2e) | 0.8 - 4.2 (2.1) |
| | |
| Energy saved (2023-2037) - TWh | 19.0 - 93.0 (48.0) |

### 8.3 Sensitivity Analysis

45. To capture the uncertainty around the impact of disclosure on delivering energy savings, sensitivity analysis has been undertaken. The preferred option in the Impact Assessment was tested against a range of optimistic, central, and pessimistic assumptions. The core variables tested include but are not limited to:

- The potential annual energy savings that a disclosure policy could deliver.
- The extent of policy overlaps with other schemes targeting large businesses energy consumption, such as the Performance-Based Framework and the Private Rented Sector regulations.
- The percentage increase on existing costs of complying with a Net Zero audit and the costs passed on from auditors in completing a Net Zero audit.
- The value of future carbon and fossil fuel prices.
- Capital costs[30] have not been adjusted in the sensitivity analysis. This is traditionally incorporated into sensitivity analysis to capture the uncertainty around the costs of installing energy efficiency measures. However, since undertaking any efficiency upgrades following an ESOS audit is entirely voluntary, the emphasis in this Impact Assessment has been placed on the likelihood of policy leading to a response. This is best captured by the range of assumptions applied to the size of disclosure savings as well as the scale

[30] Capital and installation costs have been calculated by applying a £m/TWh estimate to the energy savings. This is described in further detail in Annex 6.

of policy overlaps. The results from the sensitivity analysis are outlined in table 5. This shows the range of outcomes which could occur which affect the

- overall impact of the proposed package of measures.

**Table 6: breakdown of costs and benefits under the sensitivity tests outlined in Annex 2[31].**

| | NPV scenario | | |
|---|---|---|---|
| **Costs and benefits - present value, £m, 2019** | **High** | **Central** | **Low** |
| Description | | | |
| **Costs (A)** | | | |
| Capital and installation costs | 1,260.00 | 762.00 | 356.00 |
| Hassle costs | 244.00 | 146.00 | 68.00 |
| Operational costs | 72.00 | 37.00 | 14.00 |
| Familiarisation and compliance with disclosure | 59.00 | 59.00 | 59.00 |
| Familiarisation and compliance with Net Zero audits | 352.00 | 705.00 | 1,057.00 |
| Total costs (A) | 1,987.00 | 1,708.00 | 1,554.00 |
| **Benefits (B)** | - | - | - |
| Value of energy savings | 3,931.00 | 1,783.00 | 380.00 |
| Value of air quality improvements | 814.00 | 430.00 | 175.00 |
| Value of greenhouse gas emissions avoided | 1,487.00 | 517.00 | 102.00 |
| Total benefits (B) | 6,232.00 | 2,730.00 | 656.00 |
| **Net Present Value (B - A)** | 4,250.00 | 1,020.00 | - 900.00 |
| **Benefit Cost Ratio (B/A)** | **3.1** | **1.6** | **0.4** |

46. Under the high NPV scenario, which reflects a 'best case'; policy overlaps are lowest and disclosure savings are estimated to be 6% per year, before any adjustments are made. This scenario also applies optimistic assumptions around the additional cost of completing a Net Zero audits, implying that this aspect of the policy changes would not be overly complex to either the firms complying with the scheme, or the auditors carrying out the audits. This scenario assumes that the additional cost of a Net Zero audit is around half of the cost of conducting an ESOS audit under the current policy framework.

[31] NPV figures in Table 6 are rounded to the nearest £10m, therefore NPV totals may not sum up from individual components.

47. The combined effect of limiting the policy overlaps and applying optimistic assumptions around the impact of disclosure and the cost of Net Zero audits, is to deliver a Net Present Value of £4.1bn. Under both the high scenario and the central scenario, where policy overlaps are more pessimistic and the starting point for the impact of disclosure is reduced to 4% per year in energy savings, the preferred option delivers a net social benefit, reflected by the positive NPV in these scenarios. In the central NPV scenario, the proposed option delivers an NPV of approximately £1.0bn over the appraisal. The largest driver of benefits in these sensitivities comes from the value of energy savings, which use the high and central Long-Run Variable Cost price series, in the respective cases.

48. The scale and value of emissions savings in the high scenario, which contributes around 13% to the gross benefits that could be achieved are driven by both the larger energy savings obtainable in this scenario, as well as applying the high carbon price series.

49. In the low NPV scenario, the core assumptions have been adjusted to highlight a 'worst case' scenario. This reflects large policy overlaps, which eat into the potential consumption where ESOS can deliver energy savings. An example of this is the performance-based energy rating scheme which in this scenario covers all large private offices (those greater than 1000sqm) from 2022, and all large buildings from 2025[32]. This results in around 70% of the in-scope consumption of non-domestic buildings falling into scope of the performance-based energy rating framework, where it is expected little impact from ESOS could occur. Under this scenario, the scale of the compliance costs, combined with the muted impact of disclosure on delivering additional benefits, leads to a negative NPV of around £900m[33].

### 8.4 Qualitative Impacts not accounted for in the Cost-Benefit Analysis

50. As outlined in Table 3, there exist a range of unquantified impacts which could be delivered due to the proposed options. Major impacts include, but are not limited to[34]:

[32] The current plans outlined in the Performance-Based Framework involve the scheme being extended to all private large offices (>1000sqm) from 2023. However, to provide a sense of a 'worst case' scenario for the policy options, this scheme was extended to 2025. This results in around 20% of the in-scope consumption being covered by the performance-based energy rating framework between 2023-2024, rising to 70% from 2025. This mutes the potential for future savings in buildings where the performance-based energy rating and ESOS overlap.

[33] More detail on the performance-based energy rating and how it is incorporated into the Cost Benefit analysis is discussed in the Annexes.

[34] Discussion of the qualitative benefits of energy efficiency and public disclosure is also outlined in the Domestic Private Rented Sector Regulations Impact Assessment as well as the Streamlined Energy and Carbon Reporting Framework Impact Assessment. Both can be found here:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760313/IA_-

- **Impacts on transport fleets:** the original ESOS impact assessment estimated that the current ESOS policy could deliver between a 1% and 2% reduction in fuel use. The policy landscape has evolved since the original regulations were implemented with tougher regulations coming into force from 2020, including average emissions standards that vehicle manufacturers must produce to. Given the presence of more onerous regulations, the additionality from a future ESOS scheme is estimated to be small and is unquantified. It is possible that ESOS recommendations could lead to improved driver training, which would reduce fuel use (and subsequent emissions savings). However, the evidence on this is unclear, and so has not been quantified.

- **The rebound effect:** bill savings due to energy efficiency improvements may be spent on other energy-using goods and services. This reduces the estimated overall energy savings resulting from energy efficiency policies.

- **Comfort improvements**: for occupants of buildings owned or rented by large businesses. If the policy proposals deliver improvements to energy efficiency, such as the installation of double glazing, this can yield improvements to occupants in the form of comfort. Moreover, low temperatures pose health risks. Improvements to energy efficiency can therefore reduce the risk of illnesses posed by working in low temperature environments.

- **Improved productivity:** increased demand for energy efficiency measures is likely to support productivity growth and jobs within the green construction industry and the wider supply chain. Greater competition within these markets may also spur innovation, lower the end costs of installing measures, and help sustain jobs. There could be benefits in the wider macro-economy associated with some of the bill savings experienced by businesses being spent on other goods and services. Energy efficiency also reduces business costs, meaning they can deliver more for less.

- **Accreditation and upskilling:** these additional costs could materialise as energy auditors are required to gain new skills to conduct a Net Zero audit. Since the Net Zero element of an ESOS audit is currently undergoing scoping, these additional costs have not been estimated.

- **Costs to the scheme administrator:** this includes the additional cost of setting up a satisfactory database to ensure that disclosure returns are

_Energy_Efficiency__Private_Rented_Property___England.pdf and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725912/SECR_and_CRC_Final_IA__1_.pdf

regularly monitored and published in a suitable format. This is a key aspect of the policy change since how disclosure is delivered greatly influences the impact of changing behaviour at company level[35]. It is possible that the Scheme Administrator already possesses the knowledge and database management to deliver this function, but this would likely need to be updated to facilitate the proposed changes as to what is disclosed.

- **Security of supply:** reducing energy demand through energy efficiency also improves security of supply. It reduces the UK's exposure to volatile international energy markets and means less energy infrastructure is required, lowering the overall costs of the energy system.

- **Benefits from publishing disclosure reports online:** improving publicly available information on energy efficiency opportunities, by publishing reporting data could: (i) attract entrepreneurs and innovators to enter the market for energy efficiency, helping to overcome the 'embryonic markets' barrier; (ii) improve the evidence base available for policy development.

- **Opportunity cost of capital:** businesses will incur an opportunity cost on capital allocated towards adoption of energy efficiency measures. The opportunity cost would be equivalent to the return businesses could have earned by allocating capital to alternative uses (e.g., investing elsewhere). This cost is an indirect impact of the policy package, however, since businesses are still ultimately responsible for deciding whether and which measures to adopt.

- **ESOS vs. Companies Act 2006 definitions of large company (Streamlined Energy and Carbon Reporting definition):** the analysis assumes negligible difference between these two definitions. A comparison of the criteria indicates that each definition has the potential to bring some companies in scope whilst excluding others that may meet the criteria of the other definition (e.g., the Companies Act requires the fulfilment of two or more criteria but has comparatively lower financial thresholds). Given the similarity of these definitions and the difficulty of estimating population numbers (particularly at the threshold) they are treated as equivalent for the purposes of the analysis in this IA. This is explored in further detail in Annex 1.

[35] Evidence Review of the Impact of Central and Public Disclosure Methods for Reporting Energy Use and Energy Efficiency. DECC, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf.

### 8.5 Distributional impacts

51. The size of the costs of complying with the regulation as well as the benefits of lower energy costs is likely to vary across the organisations in scope. The costs of undertaking a Net Zero audit for example, will depend on an individual organisation's size and complexity of operations. Firms with more complex or more diverse sites would likely face higher assessment costs due to the greater time required by ESOS assessors to undertake audits. The costs of disclosing energy consumption and ESOS recommendations will likely be greater for firms that do not already have requisite IT and operational systems in place to deliver this.

52. Similarly, the benefits from energy savings depends on the number of ESOS recommendations implemented. Some enterprises may undertake an assessment, disclose their consumption and recommendations, but not undertake any energy efficiency improvements. The benefits of reduced energy consumption and corresponding bill savings will be lower for those firms that undertake very little action following disclosure relative to those that implement recommendations fully.

53. Whilst we have factored in the increased costs of auditing more complex sites, such as factories where industrial processes are located, we currently lack the requisite granularity of data to undertake distributional analysis across the firms in scope of ESOS. Engagement with the Environment Agency is intended to contribute to bridging this data gap, such that a distributional and geographical analysis of ESOS impacts can be undertaken at the final stage Impact Assessment.

## 9. Business Impacts

### 9.1 Equivalent Annual Net Direct Cost to Business

54. The proposed regulatory changes to ESOS will incur additional costs to participating businesses. The extent of these costs ranges from a scenario in which there is a low uptake of measures (implying a low impact from disclosing energy consumption and recommendations) to one in which uptake is high. However, at a minimum, large businesses in scope of ESOS would face the additional administrative costs associated with familiarising with regulatory changes, publicly disclosing information in ESOS audits, and undertaking a Net Zero ESOS assessment. The scale of these additional costs incurred from undertaking a Net Zero audit ranges from a total of approximately £350m to £1.1bn in Present Value terms. This is likely to be the greatest driver of

additional compliance costs, owed to the added complexity of undertaking a Net Zero audit.

55. The private benefits of the policy proposals are the bill savings that result from consuming less energy, in turn a result of action following disclosure. However, this is a second-order benefit since there is no mandated requirement for ESOS participants to undertake improvements. Therefore, we have not included the benefits from energy and bill savings in the EANDCB calculations.

56. The direct costs in scope are the costs of complying with disclosure and undertaking a Net Zero audit. These are direct costs levied onto firms in scope of ESOS and this is mandatory. Failure to comply can result in fines being issues by the Environment Agency. Capital, hassle, and operational costs that result from undertaking energy efficiency improvements are second round costs (indirect) and are therefore not included in the EANDCB estimates.

57. The main assumptions and evidence sources used for each cost are set out in Annex 3. Using Departmental Guidance on calculating the Equivalent Annual Net Direct Costs to Business (EANDCB) and on calculating Business NPV of the short-listed policy options, the impact to businesses is outlined in the table below. Also included is an estimate of the additional annual compliance costs incurred by businesses. The EANDCB and Business NPVs have been calculated using the central NPV scenario assumptions, applied to all short-listed options.

**Table 7: EANDCB and Business Net Present value**[36]

| **Business impact table** | **Policy option** | | |
|---|---|---|---|
| **All values in £2019 prices, discounted to 2021** | | | |
| | **Option 1 - Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits- *preferred*** | **Option 2 – Net Zero audits only** | **Option 3 – Mandated disclosure** |
| EANDCB (£m) | 60 | 55 | 5 |
| Business NPV (£m) | 910 | -700 | 1610 |
| Score against BIT target (£m) | 300 | 280 | 20 |
| Estimated annual admin cost per business (£)[37] | 4,300 | 4,000 | 300 |

58. The EANDCB of all options is positive, ranging between £5m and £60m. However, this is because the bill savings, which are captured by businesses, have not been included in the calculation. Overall, options 1 and 3 have a positive private NPV, since the costs incurred by complying with the policy and undertaking measures in response to disclosure are offset by the bill savings delivered. Option 2 also has a positive EANDCB and has a negative private NPV as no benefits of this option have been monetised. However, this could change once the evidence base on the potential energy and carbon savings from Net Zero audits develops.

[36] Business NPV calculated as the sum of all private benefits (bill savings) from the policy option minus the private costs incurred. All values have been calculated using BEIS Impact Assessment guidance and HMT Green Book appraisal guidance. EANDCB and score against the BIT target has been calculated using the BEIS BIT calculator, available here: https://www.gov.uk/government/publications/impact-assessment-calculator--3.Figures in the table are rounded to the nearest 10.

[37] Estimated annual admin cost per business was calculated as the sum of all administrative and compliance costs relevant to the policy option. Option 1 involved has the largest admin burden as this requires both Net Zero audits and public disclosure. Admin burdens were discounted and divided by the number of firms in scope of the policy (11,900). This was then divided by the years the policy has been appraised over (15) to produce annual admin costs per business.

### 9.2 Small and Micro Business Assessment (SAMBA)

59. Currently, the ESOS scheme only applies to large businesses and their corporate groups, meaning Small and Medium-Sized Enterprises (SMEs) are only subject to ESOS if they are part of a corporate group within a large corporation. The ESOS evaluation exercise produced limited information on how ESOS has affected SMEs included within the scheme, due to difficulties identifying the relevant subsidiaries from group-level reports.

60. Although there will be some Small and Micro businesses which comply within the broader structure of a large business's corporate group, it has not been possible to obtain the level of granularity required to robustly assess the degree to which this occurs. Data from the Environment Agency suggests there are a number of SMEs that fall within scope of ESOS due to the requirement to report under the corporate group. However, at this stage it is unclear to what extent compliance costs are levied across SMEs that are part of a large undertaking, or the extent to which they undertake energy efficiency improvements. Thus far the analysis has assumed compliance costs are levied at the large business level, and energy efficiency actions undertaken by the parent organisation. However, we plan on refining our approach at the Final Stage Impact Assessment, since it could be that a substantial number of SMEs not only bear compliance costs but also undertake improvements in line with their ESOS recommendations.

## 10. Risks, uncertainties, and unintended consequences

61. The impacts of the proposed changes to the ESOS regulations are uncertain due to a range of factors. The quantitative assessment of these impacts is outlined in section 10, which covers the sensitivity tests that have been undertaken within this Impact Assessment. A discussion of the major risks and uncertainties in the cost benefit analysis is outlined below, with more detail on the wider evidence and modelling limitations provided in Annex 6. This section also includes discussion of the ways in which we plan to mitigate against risks and unintended consequences.

### 10.1 Impact of disclosure

62. As outlined in the sensitivity analysis, the impact of disclosure on delivering energy savings has been modelled under different scenarios. This incorporates a range of possibilities governing the percentage reduction in energy use that disclosure can deliver. The evidence on this has been compiled using estimates from other current policy measures that depend on

behavioural change from disclosure to deliver energy savings. However, there could be a substantive number of large businesses for whom energy costs represent a small proportion of their overall overheads and so opt not to undertake any further action following disclosure. At an aggregated level, this would diminish the quantified benefits of the policy options and reduce the related NPV.

### 10.2 Net Zero audit costs

63. Assumptions around the cost of Net Zero audits represent an additional uncertainty. At this point it is unclear how this element of the proposed changes will be delivered. The Net Zero audit could be an entirely additional ESOS audit, in which case the assumptions around the additional costs would be in the pessimistic range (representing 100-150% of an existing ESOS audit). However, if this materialised as a lighter-touch assessment, wherein the full extent of an ESOS audit targeting Net Zero opportunities were not conducted, the more optimistic assumptions around compliance costs would be more accurate (where a Net Zero element costs 50% of an existing ESOS audit). Ultimately, the costs of the Net Zero audit element will be determined by the policy's requirements. We intend to use stakeholder feedback to inform the final policy design and to ensure that the benefits of Net Zero audits outweigh their costs.

### 10.3 Compliance risks

64. One risk that has not been integrated into the modelling, concerns the rate of compliance. Current and historic estimates suggest compliance with the current ESOS policy is high[38] with around 99% of obligated organisations notifying the Scheme administrator of their compliance in 2019. However, compliance with the current ESOS scheme involves conducting an ESOS audit or having an equivalent energy assessment undertaken. There is no requirement to undertake a more comprehensive Net Zero-type assessment, nor an obligation to disclose the information gathered as part of the ESOS audit. There is, therefore, a risk that placing substantial additional costs on large businesses could deter their compliance with the scheme. Concurrently, this would reduce the potential benefits of the policy proposals.

65. To mitigate the risks of lower compliance, we aim to use the consultation to gather evidence on an appropriate design of the Net Zero element to ESOS. This would incorporate stakeholder feedback to ensure that benefits of this policy outweigh the costs of compliance.

[38] Review of the Energy Savings Opportunity Scheme Regulations 2014. Post Implementation Review BEIS, 2020. Available here: https://www.legislation.gov.uk/uksi/2014/1643/pdfs/uksiod_20141643_en.pdf

### 10.4 Delivery risks

66. The benefits from the proposed policy improvements are dependent on the impact of disclosure. Therefore, a major risk concerns how public disclosure is designed and implemented. To mitigate this, the policy delivery model would need be designed in a way that maximised the reputational impact on firms, so that disclosure incentivises greater action on ESOS recommendations[39] and realise potential/expected energy savings.

# 11. Monitoring and Evaluation

67. A full evaluation of the first phase of ESOS was conducted between 2015 and 2020[40]. Given the evidence available from the existing evaluation a proportionate approach to the evaluation would be to focus on the regulatory changes and the impact on participating businesses. Monitoring of the scheme is already in place with the scheme administrator.

68. If implemented, the Government plans to carry out a robust evaluation of the policy improvements which will demonstrate the impact and outcomes of the proposed changes to the ESOS regulations[41]. A thorough evaluation plan will be developed in advance of the implementation of the regulations and will be integral into the delivery of the policy. This will draw on the approaches of the evaluations to the existing ESOS scheme and SECR[42].

69. It is expected that the evaluation will seek to answer questions such as:

- To what extent have the improvements to the scheme affected the overall cost-effectiveness of the scheme?
- What are the outcomes and impacts of the revisions to the scheme?[43]

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[39] More evidence on the relationship between energy efficiency and disclosure schemes can be found here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf. This study investigates some of the ways in which disclosure can be an effective tool in raising corporate board interest in energy efficiency, which is identified as a key barrier to businesses energy efficiency improvements. One of the major findings was that a small amount of high-quality information, which can be accessed easily and presented in a comparable format is more likely to have an impact on raising energy efficiency action than dissemination of large quantities of raw data.

[40] Review of the Energy Savings Opportunity Scheme Regulations 2014. Post Implementation Review BEIS, 2020. Available here: https://www.legislation.gov.uk/uksi/2014/1643/pdfs/uksiod_20141643_en.pdf

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[41] More information on our monitoring and evaluation strategy will be provided in the final impact assessment. This will include proposed timelines for evaluation.

[42] SECR evaluation plan can be found on p.37, here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725912/SECR_and_CRC_Final_IA__1_.pdf.

[43] This includes evaluating the success of the amendments against the estimated annual energy and carbon savings outlined in Section 4 on Policy Objectives.

- What is the wider learning from the evaluation?

- What can we learn from the introduction of further Net Zero focused policies for businesses?

- To what extent has disclosure impacted the uptake of energy efficiency recommendations?

70. **Potential methodologies:** The exact nature of the main evaluation will be determined during the scoping phase of an evaluation. However, the key methodologies and approaches that are expected to be used across the evaluation include:

- Theory-based approach - to address questions about whether the intervention caused an impact, how and why it occurred, how the context (e.g., external factors) may have influenced outcomes, and help understand to what extent results are generalizable. Although this approach would allow attribution of causality, this approach by itself would not allow the scale of the effects to be determined.
- Modelling of energy savings – similar to the modelling used in the first ESOS evaluation but focused on the new elements of the policy.
- Surveys of participants/ assessors – to allow the collection of sufficient data to compare subgroups of the population and understand the response to the new elements of the scheme.
- Qualitative research with key stakeholders especially assessors and scheme participants – to understand in-depth whether they have responded differently to the scheme with the changes, and why.

# 12. Public Sector Equality Duty

71. The changes proposed to the scheme are unlikely to have differential impacts on individuals or groups with protected characteristics, as the proposals appear to solely affect participating businesses and should not extend to individuals.

72. The policy relates to the production of energy audits that provide high-quality energy efficiency recommendations for participating businesses. We have no reason to believe that the proposed improvements would be applied unequally across any protected characteristic[44]. ESOS audits are carried out by a specific section of the UK business population and are unlikely to have an impact on individuals with protected characteristics.

73. The proposed creation of a website where participating businesses can disclose their audit recommendations should provide improved facilities for those with protected characteristics, such as people with disabilities, as the development process ensures that the website will meet Government Digital Service guidelines for accessibility.

[44] More detail on protected characteristics can be found here: https://www.gov.uk/discrimination-your-rights.

## Annex 1: Approach to policy overlaps

74. There are several major policies that incentivise improved energy efficiency in businesses. This annex outlines the existing policy landscape and provides clarity on how this was incorporated into the cost benefit analysis. Discussion of the scale of the policy overlaps is considered in section 8.3. This is also noted in the long-list options appraisal in section 5, where a qualitative assessment of different policy options is made against the 'do nothing' counterfactual.

75. Table 8 notes some of the major policies which have been factored into the quantitative analysis[45]. A further description of how these policies have been implemented into the modelling is below.

[45] This list is not exhaustive: there may be levers which are not considered in this IA that overlap with ESOS. The evidence on this is under development and the major drivers of energy savings in the buildings and industrial sectors have been outlined here. Work is ongoing to improve the understanding of the impact of the proposed changes on the transport sector, but this has not been incorporated into the analysis. The impacts on transport are discussed in the qualitative impacts section (section 8.4). A more comprehensive list of the policies which overlap with ESOS can be found in the original IA, here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf.

**Table 8: outline of major policies targeting energy use reductions that overlap with ESOS.**

| Policies incentivising energy use reductions | Aspect of ESOS-related consumption targeted | Description |
|---|---|---|
| Streamlined Energy and Carbon Reporting (SECR) | Whole business energy consumption for quoted companies and gas and electricity consumption as well as grey fleet for unquoted companies. | Requires public disclosure of measured energy consumption as well as planned or implemented energy efficiency measures. |
| Private Rented Sector - Minimum Energy Efficiency Standards (PRS MEES) | Buildings | Requires improvements to building fabric or heating measures to achieve a specific Energy Performance Certificate (EPC) standard. |
| Performance-based energy ratings for large commercial and industrial buildings | Buildings | Requires monitoring of actual energy consumption at a building level and energy efficiency improvements to be undertaken for star rating to be raised. |
| Climate Change Agreements (CCAs) | Industrial Processes | Climate change agreements are voluntary agreements made between UK industry and the Environment Agency to reduce energy use and carbon dioxide (CO2) emissions. An operator that has a CCA must measure and report its energy use and carbon emissions against agreed targets over 2-year target periods up to the end of 2022. In return, operators receive a discount on the Climate Change Levy (CCL). |

**Overlaps with Streamlined Energy and Carbon Reporting (SECR)**

76. Using estimates from the Environment Agency, the SECR Impact Assessment determined that roughly 95% of large businesses in scope of SECR also conduct an ESOS audit. Since it requires several of the same disclosure elements that are proposed in this Impact Assessment, it is one of the key

policies to incorporate in the analysis [46]. The 95% overlap occurs despite SECR using a slightly different definition of what constitutes a large business compared to ESOS. The risks of assuming that there is little difference in the definitions used are outlined in the qualitative impacts in section 8.4.

77. The original rationale for introducing ESOS was that businesses did not have the information available to allow them to understand what cost-effective energy efficiency opportunities were available to them and that an ESOS energy assessment would resolve this. Some of these information failures are now also addressed through the new reporting requirements brought in by SECR, which requires companies to report annually on their energy use and carbon emissions, thereby increasing awareness of energy and fuel consumption and cost[47]. ESOS however still has a unique role to play in providing large businesses with cost effective recommendations for energy efficiency improvements and for the majority of businesses in scope of both schemes, ESOS covers wider energy use.

**Inclusion in the Cost Benefit Analysis**

78. Given the overlaps with the number of businesses which would be required to report under both schemes, we have incorporated the SECR requirements within the cost benefit analysis. The SECR Impact Assessment provided a central estimate of approximately 4% in annual energy savings that could be achieved through requiring large businesses to report on their gas and electricity consumption as well as energy efficiency actions taken[48]. The disclosure requirements under SECR broadly overlap with those in the proposed option. Core differences include reporting on non-electric and non-gas use, such as solid fuels[49] and reporting of recommendations for reducing energy consumption that are provided within an ESOS audit including disclosure of targets for energy reduction and progress against these.

**Inclusion in the benefits calculations**

[46] Streamlined Energy and Carbon Reporting Framework (SECR), Final Impact Assessment, 2018. Total large businesses in scope of ESOS was estimated to be 11,900 in 2018 (based on data provided by the Environment Agency). Of these, around 11,300 were estimated to fall in scope of the SECR framework. Although there are slight differences in the definition of the firms that need to comply with each regulation, for practical purposes it was assumed that the type of firms in scope was the same. This led to an estimated 95% of firms in scope of both policies.

[47] SECR requires UK registered unquoted large companies to report their energy use and emissions relating to gas, electricity and transport and an intensity metric, through their company reports as well as reporting on their energy efficiency actions taken. Given ESOS covers all energy consumption, opportunities for reducing consumption of non-gas or non-electricity fuels, benefits around reducing energy consumption of other fuels could be missed as the reporting requirements do not cover this.

[48] The range of starting point estimates for disclosure energy savings incorporated into the analysis can be observed in table 8 below. More detail on this is provided in Annex 4 on evidence and data sources used.

[49] Solid fuels such as coal represented around 7% of all business industrial energy consumption in 2019. 2019 Updated Energy and Emissions Projections, BEIS. Annex F. https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2019.

79. The centrally estimated energy savings rate of 4% is the starting point for estimating the benefits of the proposed option in this IA. Given the similarities in the reporting requirements under the two schemes[50], this savings rate is adjusted for the actions that would occur anyway (for 95% of the firms in scope) and those that are currently out of scope of the SECR requirements. As ESOS is more comprehensive in nature, the analysis in this IA assumes there are additional savings to disclosing the information that is compiled in an ESOS audit, where disclosure has already been undertaken due to overlaps with SECR[51].

80. This yields a revised centrally estimated energy savings rate of approximately 2.1%. The high and low NPV scenarios for the proposed option take a starting point of 6% and 2% in annual energy savings, respectively. This is revised down to 3.2% and 1.1% in the high and low NPV scenarios, respectively[52].

81. The savings rates can be seen in the table below, pre-, and post-adjustment for SECR overlaps.

**Table 9: Annual disclosure savings rate pre and post adjustment for SECR overlaps**

| | Scenario | | |
|---|---|---|---|
| | High NPV | Central NPV | Low NPV |
| Starting point annual energy savings | 6% | 4% | 2% |
| Revised annual energy savings (accounting for overlaps) | 3.2% | 2.1% | 1.1% |

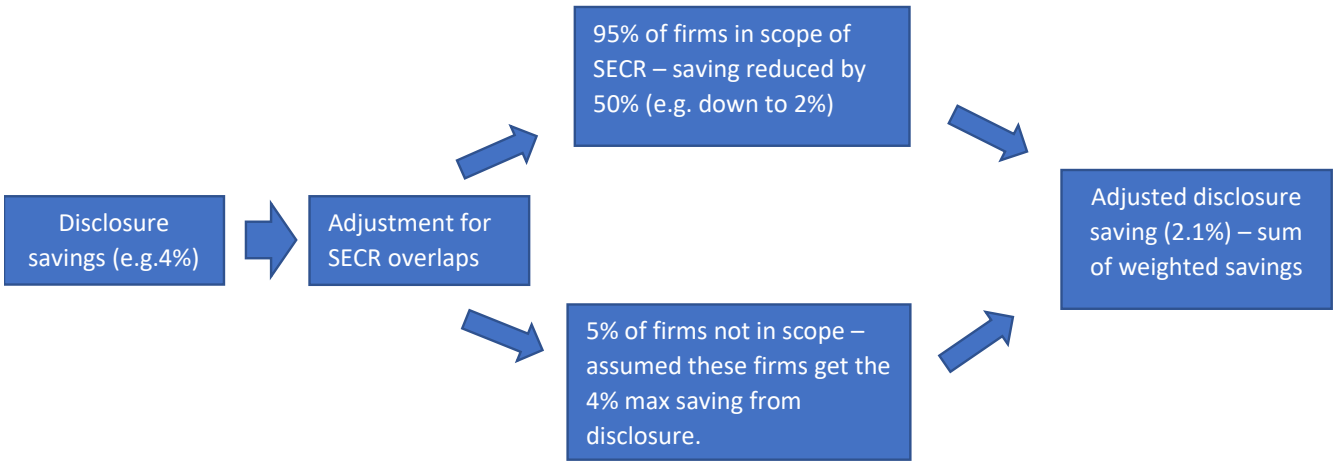
82. The flow chart in figure 3 provides insight into how the disclosure savings rates were adjusted to account for the SECR policy overlaps. This assumes a 4% energy saving reduction to reflect the adjustments made to the central estimate.

[50] The reporting requirements under SECR and ESOS overlap closely, but since ESOS is more comprehensive in gathering both energy use data and energy efficiency recommendations, there is scope for potential additional savings on top of the savings that occur in the counterfactual.

[51] See footnote above. If the savings rate from ESOS disclosure was 4% in absence of any policy overlaps, the savings are reduced by 50% (down to 2%) for the firms in scope of SECR, which account for 95% of the population. The remaining 5% of firms achieve the full 4% annual energy saving.

[52] The revised savings rates are calculated as the sum of the additional energy savings that parties already in scope of SECR as well as those not already in SECR could achieve. This gives a weighted average energy saving which accounts for the policy overlaps between a future disclosure scheme and SECR.

**Figure 3: flow chart demonstrating the adjustments made to the headline disclosure savings rate.**




## Inclusion in the disclosure costs calculations

83. One of the key components of the additional cost of the proposed option (and option 3 in the short list) concerns the admin burden of complying with the disclosure requirements. Using the approach outlined in the SECR final Impact Assessment, which used data from the CRC costs of compliance survey[53], it is possible to estimate the potential additional costs of complying with a new disclosure scheme, as proposed in this IA. The additional cost of compliance is revised down to account for the firms already in scope of SECR. This reflects the fact that many of the costs which would need to be incurred to comply with disclosure, have already been incurred by most of the businesses in scope of the regulations. This follows the same approach taken for adjusting disclosure benefits as outlined above.

84. The table below provides a breakdown of the costs of complying with an ESOS disclosure scheme, pre- and post-adjustment for SECR overlaps. The total costs of complying with the disclosure scheme fall from approximately £21m in up-front and recurrent costs, to below £8m.

[53] Assessment of Costs to UK participants of compliance with Phase 2 of the CRC energy efficiency scheme, BEIS, 2017. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/651109/Research_-_Assessment_of_costs_to_UK_participants_of_compliance_with_Phase_2_of_the_CRC_Scheme.pdf.

**Table 10: costs of complying with disclosure requirements pre- and post-SECR adjustment[54]**

| **Costs all in £m, 2019 values, undiscounted** | Costs of complying with ESOS disclosure | Adjusted costs - accounting for firms in SECR |
|---|---|---|
| One-off costs | 7.0 | 3.0 |
| Recurrent costs | 14.0 | 5.0 |

**Overlaps with performance-based energy rating for large commercial and industrial buildings.**

85. The Government has consulted on a proposal to introduce a performance-based energy rating for commercial and industrial buildings over 1,000m$^2$. This scheme seeks to improve awareness of energy use at a building level by requiring the public disclosure of a rating based on metered energy use and carbon performance. This is different to the Energy Performance Certificates (EPC)-based system which looks at the fabric and services of a building and cannot model the behaviour of those who use it[55].

86. The performance-based rating will be benchmarked against similar buildings to enable comparison and greater public scrutiny/ The scheme has been designed to complement ESOS – the framework would require businesses to get a rating which provides information on how a building is performing, while the organisational level ESOS report can provide recommendations for reducing energy use, which if carried out would have the effect of improving the rating. [56].

87. Since this scheme would involve regular monitoring of energy consumption as well as submitting information publicly, it acts as a potentially powerful incentive to drive reductions in energy consumption[57]. Given the incentive of the performance-based

[54] The figures in this table are rounded to the nearest £m.

[55] There are several issues with the use of EPCs for non-domestic buildings that result from the heterogeneity of the building stock. Whilst EPCs may be a reliable indicator of building energy use and energy efficiency potential in the domestic sector, the relationship in the non-domestic space is less clear. For more information on EPCs see the performance-based energy rating Impact Assessment: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970368/performance-based-policy-framework-office-impact-assessment.pdf.

[56] More information on the design of the scheme can be found here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970519/performance-based-policy-framework-ci-buildings--strategy-paper.pdf.

[57] A range of evidence was compiled to accurately estimate the impact of energy ratings and disclosure schemes on improving building operational performance. A key source of information is evidence from the NABERS scheme in Australia. For more information on this, see the Impact Assessment linked above.

energy rating is improving performance, it is plausible that energy savings from the proposed ESOS option are minimal where the two policies overlap. The performance-based energy rating arguably provides the stronger incentives to act to improve building energy efficiency.

88. This also impacts the counterfactual as well as the 'scrap ESOS' option in the long-list appraisal. It is likely that future ESOS-driven savings are picked up by the performance-based energy rating, which mitigates the energy savings lost if ESOS were scrapped.

89. Although the performance-based energy rating scheme is currently expected to apply only to private offices over 1000m$^2$ from 2022, this represents around 23% of the energy consumption of buildings occupied by large businesses in the UK[58]. If ESOS were scrapped, as discussed in the long-listed options appraisal, it is possible that the potential energy savings would be retained anyway for this proportion of the buildings stock.

90. Section 8 on the cost benefit analysis outlined a range of scenarios in which the performance-based policy framework is applied to all large offices from 2023 and extended to all large buildings from 2025. Under this scenario, around 70% of large businesses' buildings energy consumption would be covered under the performance-based policy[59] and therefore it is likely that a large proportion of the ESOS-delivered energy savings would continue to be delivered if ESOS were removed. Overlaps with the performance-based policy constitute a key source of uncertainty in the economic appraisal and is described in further detail in section 8.4.

**Overlaps with Private Rented Sector (PRS) Minimum Energy Efficiency Standards**

91. A further policy overlap is where large businesses that comply under ESOS occupy buildings that fall in scope of the Private Rented Sector regulations. The private rented sector represents around 34% of all energy consumption of buildings occupied by large businesses in the UK[60]. These regulations use the EPC as regulatory framework to improve the worst performing buildings. Since 2018, these regulations have required landlords of all non-domestic properties

[58] Figures weighted for Scotland and Northern Ireland using Building Energy Efficiency Survey (BEES) data and scaling factors calculated using the Non-Domestic Buildings Model, an internal BEIS model. As of May 2021, there have been no announcements on plans to implement Performance-Based regulations for buildings in Scotland and Northern Ireland and therefore the proportion of consumption covered by the performance-based energy rating policy falls when weighting to account for these Devolved Administrations.

[59] Figure calculated using BEES data and scaling factors from the NDBM, as above. It has been assumed that no like-for-like regulations exist in Scotland and Northern Ireland.

[60] Figure calculated using BEES data and scaling factors from the NDBM, as above. It has been assumed that no like-for-like regulations exist in Scotland and Northern Ireland.

to achieve at least an EPC E before they are permitted to grant a new tenancy or to extend or renew an existing tenancy if their property had an EPC rating of an F or G (the EPC scale ranges from A-G)[61].

92. The Government is consulting on tightening these regulations. Under current plans, all landlords will be required to present a valid EPC by 2028. By 2030, landlords will be required to present another EPC showing that the building has achieved EPC B, or that they have achieved as much as possible with a valid exemption from the rest[62]. Given the existence of these mandatory regulations, it is likely that a policy option involving removing ESOS entirely would not fully lose energy savings that had been achieved so far, since large businesses which rent out buildings to other large businesses would continue to face regulatory requirements to undertake improvements that affect their EPC score. Moreover, where 'shell and core' buildings are concerned, the landlord largely leaves the core of the unit untouched, with the tenant organising the fit-out of the core of the building to suit their needs[63].

93. However, since PRS covers measures that affect the EPC score, it does not include measures such as behavioural change and awareness, which could deliver energy savings. Therefore, whilst removing ESOS would not necessarily result in a return to pre-ESOS levels of energy consumption, it is possible the total potential energy savings would not be retained.

94. The flow chart in Figure 4 captures the process of factoring in the buildings-related policy overlaps into the analysis. The starting point in the flow chart below is the 2.1% energy savings rate which was calculated in Figure 3, to account for the action that is undertaken anyway due to firms in scope of SECR. The savings rate is then adjusted according to the segments of the building stock which are in scope: where large businesses occupy buildings that are in scope of the performance-based energy rating, the potential savings rate is reduced to zero, reflecting minimal additional action that could occur from ESOS in this space[64]. The final savings rate is derived from all the

[61] Consultation Stage Impact Assessment for amending the Private Rented Sector Regulations, 2019, BEIS. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839565/non-domestic-prs-consultation-ia.pdf.

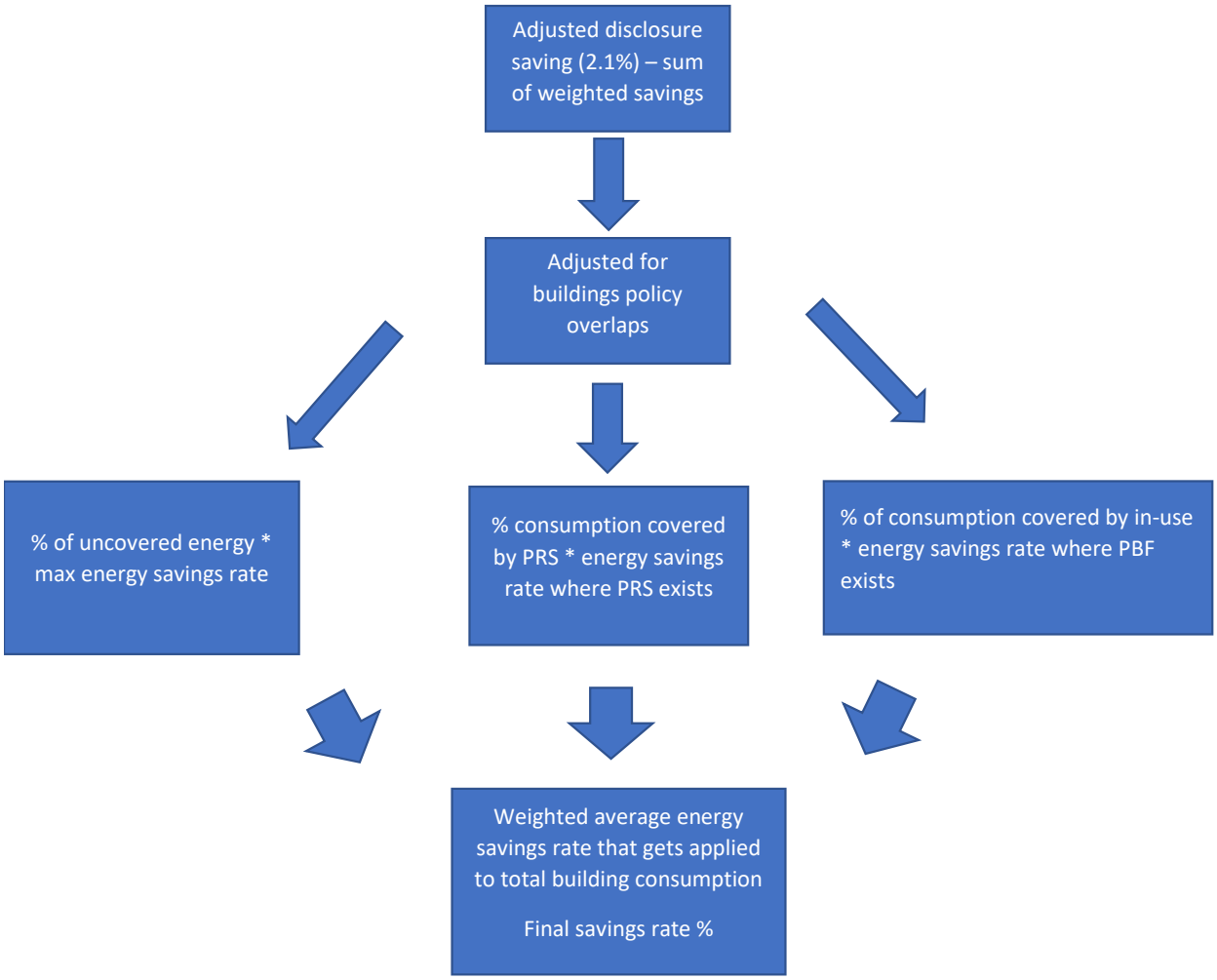
[62] The Non-Domestic Private Rented Sector Minimum Energy Efficiency Standards: Implementation of the EPC B future target, 2021, BEIS. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970192/non-domestic-prs-mees-epc-b-future-trajectory-implementation.pdf.

[63] Up to 380,000 and 270,000 retail and office premises, respectively. BEIS, 2021, BEES data (2015). The number of large businesses which occupy 'shell and core' units has not been estimated.

[64] The range of assumptions around the proportion of the stock covered by PRS and performance-based energy rating as well as the savings that could occur are outlined in Annex 2 on sensitivity analysis.

savings rates that could occur where there are policy overlaps, multiplied by the relevant consumption shares[65].

**Figure 4: flow chart capturing the adjustments made to the potential energy savings once policy overlaps are accounted for.**




## Mapping the buildings overlaps

95. As outlined above, a crucial input for deriving the energy savings that could occur from buildings is the scale and size of the overlaps across the stock. The analysis for this IA used BEES data to split out the relevant segments of buildings consumption and mapped this against the definitions of the main

policies outlined in table 7[66]. Splitting the stock in this way presented a picture of the proportions of the relevant consumption which were covered by PRS and the performance-based energy rating scheme as well as that which could be considered uncovered[67]. The starting point for the analysis was to look at only those buildings relevant to large private businesses by tenure[68]. This provided an initial estimate of the consumption share covered by PRS (around 55% of known tenure total consumption[69]). To estimate the share of consumption covered by the performance-based energy rating, the BEES data was split out by tenure into large offices (>1000sqm). This was analysed for both rented and owned offices, with the rented share net off from the total consumption covered by PRS[70]. The resulting consumption shares can be visualised in the below figure, which is the result of cutting the BEES data and mapping this against the policies which incentivise energy efficiency upgrades or behaviour changes that result in lower energy use.

[66] BEES (2016) data allows one to split the stock into the necessary categories for this analysis - https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees This includes tenancy information (Figure 3.17)(not obtainable from the larger ND NEED dataset), building size (Figure 3.14) and building sector (Figure 3.1).

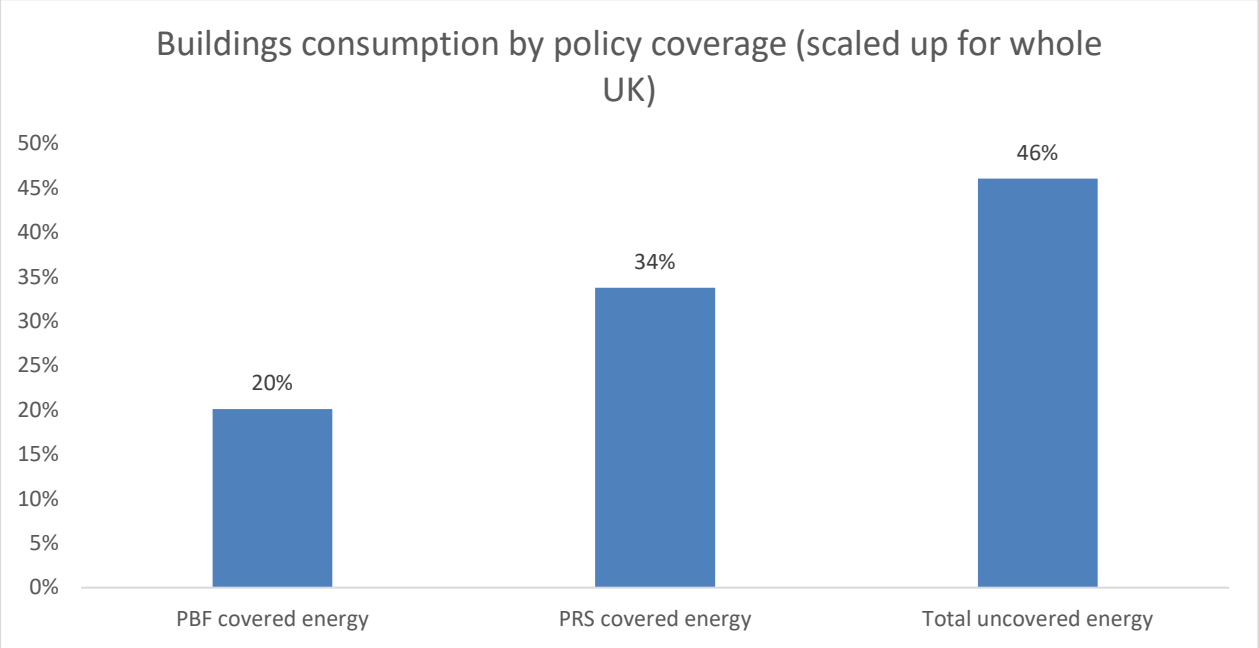
[67] The extent to which other buildings policies overlap is unclear and further evidence gathering is ongoing to clarify this. In this analysis, the consumption that is not clearly covered by PRS and performance-based policy regulations is considered uncovered, and so this is where the largest proportion of savings can occur.

[68] All unknown tenure information was removed, as this could have distorted results. Scaling the unknown consumption proportionately across the 'known' tenure information would not have changed the final adjusted savings rate as this relies on the proportion which is rented or owned. With improved evidence on tenure information, these consumption shares could vary, which will impact the overall results from the Cost Benefit Analysis.

[69] Internal BEIS analysis of BEES (2016) data.

[70] The rented share was net off from the PRS covered consumption to adjust the PRS share down, reflecting the view that buildings will likely be required to comply with the performance-based energy rating regime rather than PRS.

**Figure 5: chart showing proportions of the non-domestic stock covered by different policies (calculated on a consumption basis)[71].**




## Overlaps with Climate Change Agreements

96. Since ESOS covers energy consumed from industrial processes, to provide a robust estimate of the potential savings the proposed options could deliver, the relevant policy overlaps have been incorporated. As outlined in Table 7, one of the major policy overlaps concerning large business industrial energy consumption is where the firms in scope possess Climate Change Agreements (CCAs). These are voluntary agreements made between industrial firms and the Environment Agency to reduce energy use and carbon dioxide (CO2) emissions. An operator that has a CCA must measure and report its energy use and carbon emissions against agreed targets over 2-year target periods up to the end of 2022. In return, operators receive a discount on the Climate Change Levy (CCL)[72].

97. The ESOS PIR determined that one of the unintended outcomes from the current policy was greater savings from CCA participants in scope of ESOS than non-CCA participants. This could imply that where firms are already incentivised to reduce their energy consumption under a CCA, an ESOS audit

[71] The consumption shares have been calculated using BEES data and scaled up from the sample size to reflect the total consumption across the UK. These shares vary according to the sensitivity analysis undertaken, which is outlined in Annex 2.

[72] The Climate Change Levy (CCL) is a tax levied on business energy users. It is designed to encourage energy users to be more efficient as well as helping to reduce their overall consumption. For more information on the CCL and CCAs: https://www.gov.uk/green-taxes-and-reliefs/climate-change-levy and https://www.gov.uk/guidance/climate-change-agreements--2.

can improve the possibility of achieving relevant targets by providing detailed information on energy efficiency recommendations. A possible conclusion from this evidence is that the benefits in the original IA were underestimated. The original IA assumed that firms in scope of CCA already had robust knowledge of their energy consumption as well as opportunities for energy efficiency, and therefore estimated that there would be zero additional savings from ESOS where CCAs are possessed[73].

98. However, the impact of the existing ESOS framework has already been embedded within the baseline industrial energy consumption, so any additional savings to CCA-covered consumption would be captured in the counterfactual, outlined in section 7.1.1 and 7.2.2, above. There may be scope for the Net Zero element in the proposed option to provide greater information on the potential opportunities for achieving CCA targets, which could raise the potential savings delivered where CCAs and ESOS overlap. However, since this is currently under development, it has not been factored into the policy overlaps, nor the Cost Benefit Analysis.

99. The approach to this analysis has been to apply the same assumptions from the original IA made about the additional savings where CCAs and ESOS overlap, because the monetised benefits in this IA focus on the potential savings from disclosure. It is assumed there will be no additional energy saving where consumption is covered by a CCA. Arguably, the savings that could be delivered from a strengthened ESOS policy on top of the CCA covered consumption would be delivered through the 'improved information' channel, rather than via the means of reputational pressure on the firm in scope[74]. But as noted above, once a Net Zero element is more clearly defined, this could deliver additional savings from ESOS, even factoring in CCA overlaps. Therefore, the approach in this IA could be considered conservative.

### Inclusion in the Cost Benefit Analysis

100. Using evidence from Energy Consumption in the UK tables, it was estimated that approximately 28% of electricity and approximately 18% of non-electric fuels were covered by a CCA[75]. These proportions are point estimates for 2018 and have not been calculated to account for variations in CCA participation across different business sizes. These estimates therefore reflect

[73] Energy Saving Opportunity Scheme, DECC, 2014 and Review of the Energy Saving Opportunity Scheme, Post-Implementation Review, BEIS, 2020.

[74] Further evidence is needed to clarify this, but it is expected that the combination of the presence of a CCA combined with the requirement to comply with the existing ESOS policy leaves little additional scope for savings. The higher than forecast savings determined in the PIR originated from improved information around energy efficiency opportunities, compared to the information gathered as part of the drive to achieve specific emissions and energy consumption targets under the CCA. Given this channel, there could be potential for a Net Zero audit element to deliver emissions savings despite the overlaps with CCAs, but this has not been quantified.

[75] 2018 ECUK – Consumption data tables (BEIS, 2020). Available here: https://www.gov.uk/government/statistics/energy-consumption-in-the-uk.

a substantive source of uncertainty, but in the absence of robust business-size information, they have been used to adjust down the industrial energy consumption where benefits could occur.

101. The remaining consumption is then adjusted to account for the large business share of total industrial energy consumption[76] to provide the total in-scope energy consumption. The final step applied is to split out the proportion of consumption, which is related to industrial processes, since the buildings share of consumption is captured in the buildings baseline[77]. The benefits that are derived from disclosing industrial process consumption are calculated by multiplying the adjusted disclosure savings rate by the consumption in scope[78].

[76] See section 7.2.2 for more detail on this.

[77] See above source for more information on how this was calculated.

[78] More detail on the adjusted savings rates is described in Table 8.

# Annex 2: Sensitivity tests and assumptions

**Table 11: matrix of assumptions included in the sensitivity tests.**

| Scenario | Description | High NPV | Central NPV | Low NPV |
|---|---|---|---|---|
| **Disclosure savings** | The max potential savings rate to energy consumption from disclosing energy use and EE recommendations. | 6% | 4% | 2% |
| **Performance-based energy rating overlaps** | What proportion of the buildings stock is covered by performance-based energy ratings? | Large offices from 2023 | Midpoint of the two weighted average savings rates | Large offices from 2023, all large buildings from 2025. |
| **Private Rented Sector overlaps** | Energy savings that can occur when the building is rented or rented out by large businesses. | Max potential energy savings reduced by 25% | Max potential energy savings reduced by 50% | Max potential energy savings reduced by 75% |
| **Streamlined Energy and Carbon Reporting overlaps** | The proportion of large businesses which already disclose energy consumption and planned/implemented energy efficiency actions under SECR. | 95% | 95% | 95% |
| **Admin burden of NZ audits** | The percentage increase on the cost of traditional ESOS audits. | 50% | 100% | 150% |
| **NZ audit costs (time)** | The percentage increase on the cost of traditional ESOS audits. | 50% | 100% | 150% |
| **Fossil fuel and carbon price assumptions** | Value of future energy and carbon prices | High fossil fuel and carbon prices | Central fossil fuel and carbon prices | Low fossil fuel and carbon prices |

# Annex 3: Modelling approach

### Modelling the counterfactual

102. As described in section 7, the counterfactual was modelled to incorporate current ESOS policy. The energy savings that ESOS has delivered are embedded within the EEP reference case, which is used as the starting point for modelling in-scope buildings energy consumption and industrial energy consumption. Although the EEP provides enough granularity to model the impacts of the proposed options on the transport sector, these benefits and costs have not been modelled in the IA because of a lack of robust evidence.

103. The buildings baseline has been modelled using the Non-Domestic Buildings Model, where a 7% energy reduction target was set between 2015 and 2023. Since the EEP does not provide consumption at the business-size level, it has been assumed that this represents the wider trajectory of buildings occupied by large businesses. Consumption was then flatlined, which is a difference to the EEP trajectory, where consumption is estimated to rise following 2025. However, this is because EEP takes a more conservative approach to including savings from policies, and the resulting rise in consumption is due to the expiry of policies[79]. It is possible that the outturn energy consumption is higher than the baseline estimated, in which case the potential savings from the proposed policies are currently underestimated.

### Using the Non-Domestic Buildings Model

104. The Non-Domestic Buildings Model (NDBM) is a BEIS model that uses evidence from BEES and wider sources to model the impacts of energy efficiency and heat decarbonisation technology pathways on the non-domestic buildings stock. The model was used to determine the EEP-consistent baseline for buildings consumption and was also used to estimate the capital costs required to deliver disclosure-based energy savings.

### Capital, hassle, and operational costs:

105. The capital, hassle and operational costs estimated in this IA were calculated by applying a £m-per-TWh rate to the energy savings achieved in each scenario. This is therefore a function of the energy savings and is extremely sensitive to the assumptions applied to calculating benefits. This is described

[79] Various publications have provided information on the NDBM, so this is not included specifically within this IA. More detail on this was outlined in the Performance-Based Framework Impact Assessment. For more information on the Non-Domestic Buildings Model, see Annex 2 of the performance-based energy rating IA: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970368/performance-based-policy-framework-office-impact-assessment.pdf

in detail in Section 11, where the risks and uncertainties with this approach were covered.

### Disclosure costs

106. The costs to the businesses of complying with the mandated disclosure element of the proposals has been estimated using data from the CRC phase 2 evaluation. Data on the costs per compliance activity was gathered, including the costs of familiarising with the requirements of the new regulations. This was then scaled up for the total number of businesses in scope and was then adjusted to account for the proportion of firms that are already in scope of SECR, which involves many of the proposed activities[80].

### Estimating Net Zero audit costs

107. The cost of a Net Zero audit was estimated based on assumptions for the additional time it would beyond that required for a conventional ESOS audit. These assumptions have significant uncertainties and the assumptions provided in Annex 2 reflect a range of scenarios that could apply, depending on the design of the Net Zero element itself. The estimated cost of a Net Zero audit has two components: 1) the additional admin burden this constitutes; and 2) the cost in auditor time of conducting the more complex audit.

108. The methodology used to estimate the costs of these two stages is consistent with the 2014 Impact Assessment[81]. Given the speculative nature of the assumptions around the additional cost this imposes, at this stage it was determined to be disproportionate to gather additional evidence on the split of administrative costs, nor to investigate the assumptions around the time it takes to conduct an ESOS audit. However, using ND-NEED data the number of sites in scope of an ESOS audit has been revised.

### Estimating auditor time requirements

109. ND NEED data was gathered on the number of buildings occupied by large businesses in England and Wales[82]. However, the number of buildings with business size information is only available for a fraction (32%) of the buildings

[81] Firm level information on the hours required per employee was gathered as part of the CRC Phase 1 evaluation. This was used to estimate the administrative costs to businesses of complying with an ESOS audit in the 2014 Impact Assessment. This method has not been changed, so further detail is provided here: Energy Saving Opportunities Scheme, DECC, 2014: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf and here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/42934/4759-kpmg-assessing-admin-costs-crc-scheme.pdf.

in the ND NEED database[83]. Building numbers were therefore scaled up to account for the missing business size information. To do this the proportion of non-domestic buildings with business size information that were occupied by large of very large businesses was calculated (17%). This proportion was then applied to the total number of non-domestic buildings in ND-NEED (1,656,000). This gave an estimate of around 289,000buildings occupied by large and very large businesses in England and Wales.

110. Data on the building stock can be segmented to provide a sectoral overview as well as a breakdown by size bands using ND NEED. Missing size band information was split across the observed categories to provide an estimated breakdown of the buildings occupied by large and very large businesses. Sectors were split into two categories: factories and other buildings, where other buildings included all non-factory sectors[84]. The data was cut in this way to differentiate between the costs incurred as part of auditing industrial sites, which are expected to be more complex in nature, compared to buildings in other ND NEED sectors. Once building bands had been calculated to account for missing information, results for England and Wales were scaled up to cover buildings in Scotland and Northern Ireland[85].

111. A breakdown of the sites in scope is provided in the table below.

**Table 12: buildings occupied by large and very large businesses in the UK.**

| Building use | 0 - 50 m2 | 51 - 100 m2 | 101 - 250 m2 | 251 - 500 m2 | 501 - 1000 m2 | 1001 - 5000 m2 | 5000+ m2 | Total count |
|---|---|---|---|---|---|---|---|---|
| Factories | 143 | 325 | 1,342 | 2,263 | 2,244 | 2,820 | 3,029 | 12,166 |
| Other sectors | 10,762 | 49,843 | 102,964 | 65,103 | 41,217 | 43,338 | 11,249 | 324,476 |

112. To estimate the time cost of an ESOS audit being conducted, we incorporated assumptions made in the previous IA about the proportion of sites that would be audited as well as the daily cost of an ESOS audit for buildings and more complex sites, and the time required to audit sites with differing levels of complexity. Moreover, the assumptions which estimated the proportion of commercial, industrial and transport firms in scope of the policy proposals were held constant with the previous IA[86].

[83] ND-NEED 2021 - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2021

[84] A fuller breakdown of the non-factory sectors can be seen in the main ND NEED report, here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936797/ND-NEED.pdf.

[85] For more information on the scaling process see Annex 8.

[86] More detailed information on the method behind determining the number of ESOS audits that would be carried out can be found here:

113. For example, the analysis assumes that for all sites at least one site per enterprise is visited. Additionally, for non-factories, at least one and 5% of all other buildings is assessed. For industrial firms, at least one factory and 10% of all other sites are audited.

114. Given the total number of firms has changed since the original IA, the absolute number of commercial, industrial, and transport-related firms has changed correspondingly. Together, these factors constitute the main driver of the different costs of an ESOS audit between this and the previous IA.

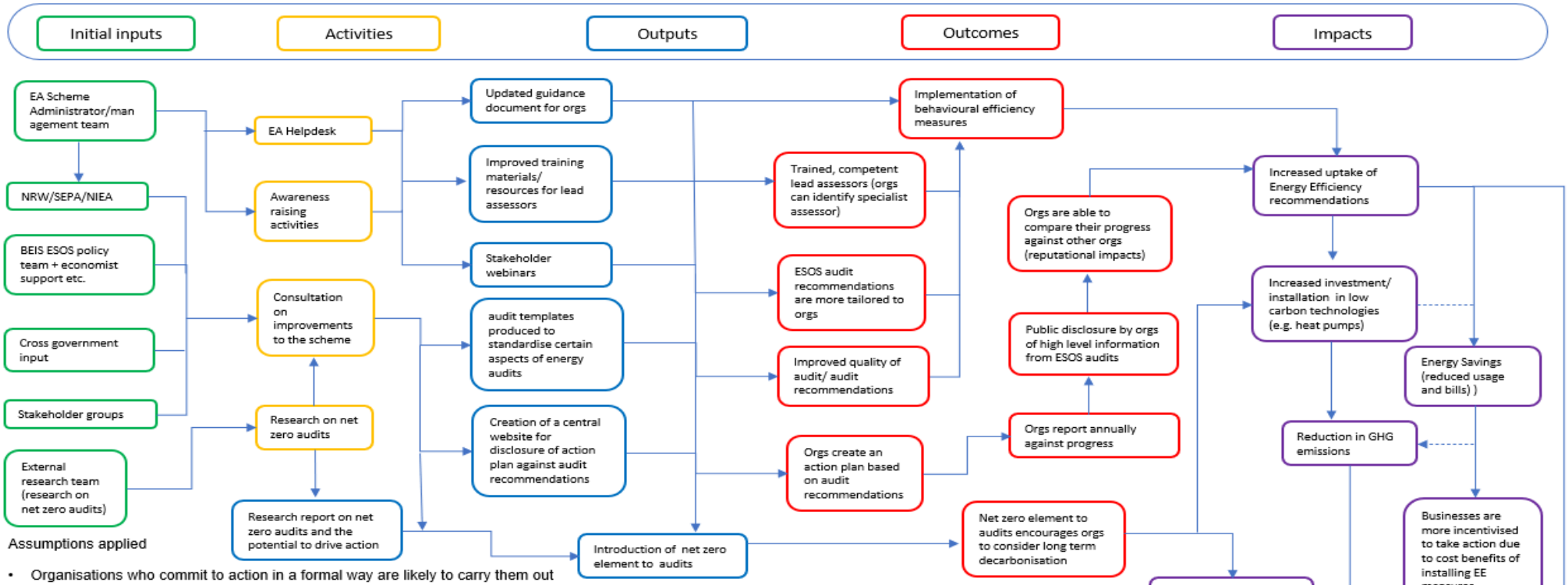
**Table 13: the estimated total cost of carrying out an ESOS assessment over the appraisal period:**

| **£m, 2019, costs are in present value terms** | **Cost of a Net Zero audit (carrying out the audit)** |
|---|---|
| Optimistic | 200 |
| Central | 400 |
| Pessimistic | 600 |

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf

# Annex 4: Theory of Change and Logic Map

**ESOS Logic Map**




Assumptions applied

- Organisations who commit to action in a formal way are likely to carry them out
- Organisations will take action on their audit recommendations as a result of pressure from public disclosure
- Suppliers of measures correctly interpret recommendations
- Suitable measures exist to meet the needs identified in audit reports
- There is sufficient supply of installers for energy efficiency improvements
- Those making purchasing decisions see benefits of implementation
- Behavioural changes are energy efficient
- Organisations seek reputational benefits from publishing compliance/ high level information from ESOS audits
- That organisations view energy efficiency, net zero and decarbonisation as a priority
- ESOS lead assessors have the required skills to include a net zero element to ESOS audits
- Organisations have the required expertise to implement recommendations from a net zero element to ESOS audits

Rationale

- ESOS aims to improve the awareness of energy efficiency in UK businesses and drive energy efficiency savings through the implementation of energy efficiency savings given in ESOS audits.

# Annex 5: Detail on policy options considered.

115. Further information on several of the policy options considered in this IA is outlined below.

**Option A: Retain the existing approach ("do nothing").**

116. This would mean continuing with the ESOS scheme as it is currently designed. Whilst savings made to date from in-scope consumption (buildings, transport, and industrial processes) would most likely persist[87]. The issues around lack of organisational interest in active monitoring or implementing of ESOS recommendations identified in the PIR would remain. ESOS would continue to be perceived as solely a compliance exercise by a significant number of participants, with a minority of compliant organisations undertaking substantive action to reduce their energy consumption under the scheme.

117. In the absence of other policies to drive energy efficiency the do-nothing option implies no additional pressure on ESOS-compliant firms to increase their uptake of ESOS recommendations. There would therefore be no additional regulatory burden on businesses. However, this could lead to firms continuing to absorb compliance costs but only receiving limited additional benefits from participation in the scheme.

**Option B: Scrap ESOS – remove current scheme.**

118. This would involve removing the ESOS scheme, and therefore, the requirement for large enterprises to undertake energy audits at least once every four years. Although we cannot robustly predict the outcomes if ESOS was removed, as the impact would depend on the wider policy framework in place, likely outcomes might include firms no longer undertaking regular energy audits, or assessments of their energy efficiency potential and therefore missing opportunities for savings.

119. Since ESOS was first introduced, and in light of the UK legislating to achieve Net Zero emissions by 2050, the policy landscape has evolved, with multiple policies now addressing reduction of business energy use and emissions across buildings, industrial processes, and transport. It is therefore possible that if ESOS was removed, these new policies would deliver some of the savings.

120. Although the PIR set out several areas of improvement for the scheme, the evaluation of ESOS showed that the scheme delivered the forecasted energy savings. ESOS covers a wide energy use, and it is unlikely that removing the

[87] This can be understood as: future energy consumption is likely to be lower than in the no-policy scenario.

scheme would be consistent with achieving the Net Zero target. Although other policies exist in this landscape, there is not currently a comprehensive policy framework across buildings, industrial process, and transport energy use that could be implemented in the absence of ESOS.

**Option C: Amend ESOS to standardise and strengthen audit requirements.**

121. As the ESOS evaluation and PIR indicated, the inconsistencies in the quality of ESOS audits remains a central barrier to wider adoption of ESOS recommendations. Raising the overall quality of audits through increased standardisation could mitigate this and raise the corresponding potential energy and carbon emissions savings.

122. Introducing standardisation and strengthening audit requirements could assist participating businesses to overcome information failures through improving access to high-quality tailored energy efficiency recommendations.

123. Although increased standardisation would likely increase potential benefits of the existing ESOS policy, through encouraging greater uptake of recommendations, this option alone would not resolve wider market failures, or encourage businesses to alter their focus to consider long term decarbonisation that will be needed to achieve Net Zero. This option as the sole approach to improving ESOS has therefore been discounted.

**Option D: Amend ESOS regulations so that audits focus on business readiness for Net Zero**.

124. ESOS currently focuses on improving access to information on energy efficiency and fuel efficiency opportunities through measuring energy consumption and providing participating businesses with energy efficiency recommendations, with the intention of lowering energy use and therefore the cost of energy bills for participating businesses. The focus is therefore often on short term cost savings from energy efficiency and audits may not consider longer term decarbonisation[88].

125. Including a Net Zero element to ESOS audits would alter the focus and structure of ESOS audits, from centring on short term energy saving opportunities, to longer term investments that will be required to get businesses on a trajectory to meet UK Net Zero targets, for example investment in zero carbon technologies or switching transport fleets away from traditional petrol and diesel-fuelled vehicles to hybrids, and eventually to entirely electric vehicles.

[88] For example, under the current scheme fossil fuel boilers would continue to be recommended in ESOS audits as they represent an efficiency upgrade on a heating system approaching the end of its lifetime. Although the upgraded boiler would deliver bill savings due to increased efficiency, recommendations of this nature that are focused on short term cost savings are largely incompatible with Net Zero.

126. Although there appears to be desire from market participants for amending ESOS to align with Net Zero[89], there is concern about the additional cost this could potentially represent. Additional costs could include: 1) the additional time for businesses to familiarise and comply with new and potentially more complex audit requirements; 2) the time taken for a Net Zero audit to be conducted, and 3) the additional cost of accreditation and upskilling lead assessors.

127. Given that any uptake of measures is voluntary, this option creates the risk of significant additional compliance costs to participating business, with little additional benefit. However, given the strategic role Net Zero audits could play in achieving climate objectives, this option has been explored in more detail in the Cost-Benefit analysis in section 10.

**Option E: Mandated public disclosure of energy consumption and ESOS recommendations.**

128. The benefits of this option are outlined in section 4 on the preferred option. Only introducing new requirements to publicly disclose large business energy consumption and recommendations provided within ESOS audits would provide reputational incentives for participating businesses to act on audit recommendations. It would also provide investors with transparency around company decision making and equip them as well as wider stakeholders with the information needed to pressure companies to act.

129. Evidence suggests that mandated disclosure is a more powerful driver of action than voluntary options[90]. Mandating public disclosure of audit recommendations could therefore reduce energy consumption, increase uptake of energy efficiency recommendations, and deliver quantifiable and wider benefits through energy bill savings and reputational impacts for participating businesses.

130. Although mandated disclosure alone could deliver energy and carbon savings, it would not overcome the wider issues that currently inhibit ESOS, as outlined above. Moreover, this option would not necessarily raise the quality of ESOS audits and thereby alter the perception of ESOS from a compliance-first exercise, to one that enables participating businesses to take advantage of the

[89] Net Zero audits: state of the market and potential for action, BEIS, 2021.

[90] Evidence Review of the Impact of Central and Public Disclosure Methods for Reporting Energy Use and Energy Efficiency. DECC, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf.More evidence can be found in Annex 1 of the attached IA: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725912/SECR_and_CRC_Final_IA__1_.pdf.

low carbon alternatives that Net Zero requires. This option has been explored in the Cost-Benefit analysis in Section 10.

**Option F: Fiscal alternatives to amending ESOS.**

131. Fiscal measures could address market failures relevant to energy efficiency. Taxes charged to energy consumption to raise the social costs of carbon emissions, could increase the incentive to invest in energy efficiency, or fuel switching.

132. Tax changes would not necessarily overcome information failures that ESOS aims to bridge, as without sufficient information firms may allocate capital sub-optimally or simply absorb additional administrative and hassle costs[91] in identifying appropriate measures. Subsidies for energy efficiency may drive uptake but do little to overcome the behavioural barriers that can stifle improved operational efficiency.

133. We are not proposing additional intervention via fiscal measures, as spend or tax measures would only partially achieve the core objectives of ESOS, which were to stimulate adoption of cost-effective measures and to minimise the compliance burden of the policy.

**Option G: Mandate measures within a certain payback period.**

134. There is evidence that the uptake of ESOS recommendations could be increased, and that there is discrepancy among businesses between best and worst practice in relation to energy management and investment in energy efficiency. Mandating the implementation of ESOS recommendations would aim to bring all large businesses up to a minimum level of energy efficiency investment and energy management whilst ensuring that this pays for itself through energy bill savings.

135. Options for mandating could include requiring participants to carry out all ESOS recommendations which are estimated to pay back within a certain time. As this could be seen as constraining businesses to particular technology options and not allowing businesses freedom to choose the best solution for them, an alternative option could be to allow businesses to meet their ESOS obligation by carrying out alternative actions with the same level of savings as those recommendations made by the ESOS assessor that have a 3-year payback or less.

[91] Hassle costs can be defined as the opportunity cost to compliers of having to do the research on suitable energy efficiency measures, finding an appropriate installer, and any disruptions to normal working patterns owed to having measures installed. The additional hassle cost of undertaking an audit has been calculated within the Net Zero audit compliance costs.

136. However, there is concern that there could be disputes between participants and ESOS assessors if payback periods are deemed incorrect or if predicted energy savings do not materialise. There is further concern that participants commissioning an ESOS audit may put pressure on an ESOS assessor to include or exclude certain recommendations. Conversely, ESOS assessors may use ESOS to push particular energy savings measures which they or their company can then profit from, rather than provide a balanced assessment of options.

137. A wider consideration is the fact that currently, it is unclear what types of measures are recommended within ESOS reports, so it would be difficult to robustly determine what the impact of mandating would be.

138. Although there would be benefits from mandating the implementation of ESOS recommendations, this would substantially change the aim of the scheme from a relatively light touch information gathering scheme to one requiring major energy efficiency investment. Likely outcomes from mandating could include higher compliance costs, one driver of which would be the increased cost to regulators from monitoring, auditing, and ensuring the adoption of ESOS recommendations. Given the additional costs as well as the substantial changes to the policy this would involve, this option has been discounted for the current phase and we are seeking views through the consultation on its appropriateness for future phases.

**Option H: Extend ESOS to medium-sized enterprises.**

139. Currently, ESOS only applies to large businesses and their corporate groups, meaning Small and Medium-Sized Enterprises (SMEs) are only subject to ESOS if they are part of a corporate group with a large corporation. The ESOS evaluation exercise produced limited information on how ESOS has affected SMEs included within the scheme, due to difficulties identifying the relevant subsidiaries from group-level reports.

140. Although extending ESOS to all Medium-Sized Enterprises (MEs) or to a subset of MEs[92] could produce benefits in terms of reduced carbon emissions and reduced energy costs, extending ESOS to all MEs would increase the number of participating organisations which would likely increase compliance costs. Extending the scheme would also create substantial demand for ESOS assessors, which the current market may not be able to meet.

[92] Options for extending ESOS to MEs could include extending to all MEs, extending to MEs based on an energy consumption threshold, or only extending to Industrial MEs.

141. The increase in compliance costs combined with the lower potential for savings in some MEs may mean that that extending ESOS to all MEs would not result in a proportionate increase in benefits from the scheme in comparison with increased costs. This option has therefore been discounted in the short term[93].

**Option I: Strengthen ESOS through increased standardisation of audits, public disclosure of ESOS data, and inclusion of a Net Zero element to ESOS audits– *Preferred*.**

142. The available evidence on the impact of mandatory disclosure suggests that this could have a significant impact on overcoming information failures and would help alleviate externalities which result in the undervaluing of energy efficiency[94]. The evidence indicates that reporting schemes requiring board-level approval and public disclosure, which is proposed in this consultation, can help to address misaligned incentives by generating reputational scrutiny and encouraging behavioural change.

143. Increasing demand for energy efficiency measures also attracts profit-seeking entrepreneurs and innovators to enter the market for energy efficiency, which can help to overcome the 'embryonic markets' barrier[95]. The proposed package of policies assessed in the Impact Assessment therefore aim to address the barriers outlined above:

- **Standardisation and strengthening audit requirements** can overcome information failures and improve corporate transparency around energy use and the potential for reductions.

- **Mandatory public disclosure of ESOS audits** could create reputational drivers for participating businesses to act on audit recommendations and improve their performance against their peers and wider social decarbonisation objectives, such Net Zero, which could lead to increased value being placed on energy efficiency at a firm level.

- **Introducing a Net Zero element to audits** could assist participating businesses to overcome information failures that impede uptake of low carbon

[93] More detail on this option and how it could work in practice is outlined in Annex 5.

[94] Evidence Review of the Impact of Central and Public Disclosure Methods for Reporting Energy Use and Energy Efficiency. DECC, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323114/ESOS_-_Research_on_Impact_of_Reporting_Energy_Use_FINAL_.pdf.

[95] Whilst not specific to energy efficiency nor low carbon heating options, there is a plentiful body of evidence that has reviewed the relationship between increased demand and technological cost reductions. Relevant examples include the case of solar photovoltaics (PV), the unit cost of which fell by around 99% between 1975 and 2020. More information on this can be found here: https://www.iea.org/data-and-statistics/charts/evolution-of-solar-pv-module-cost-by-data-source-1970-2020 and https://ourworldindata.org/cheap-renewables-growth.

measures and assist them to shift their focus towards longer term decarbonisation and investment in low carbon options. This could also alter the current perception of ESOS from a compliance first exercise, to one that seeks to contribute to delivering to the strategic objective of Net Zero.

# Annex 6: Risks and Uncertainties

## Data and Evidence

### BEES

144. Due to sample size restrictions, the estimates of the energy consumption accounted for by buildings that fall within scope of the ESOS regulations are subject to a large degree of uncertainty. The BEES sample includes granular data on approximately 3,000 buildings compared to an estimated total 1.6m non-domestic buildings in England and Wales[96].

145. These estimates are used to map the buildings consumption in scope and from this the overlaps with other policies have been calculated. Since the size of potential energy savings is adjusted down where other policies overlap, potential revisions to the underlying building stock data could impact the benefit calculations and as such, the additionality of the policy. There is, however, work being undertaken internally to improve the evidence base and refine the understanding of non-domestic building stock.

146. A further limitation is that the estimates from BEES are a point estimate from 2014/15. This means that the actual proportions of the buildings stock which falls in scope of different policies may differ compared to the breakdown in the BEES data.

### ND NEED

147. The Non-Domestic National Energy Efficiency Data-Framework (ND NEED 2020) provides data on the energy use of non-domestic buildings. It uses data from the Valuation Office Agency (VOA) on buildings such as size and sector, alongside data on metered energy use and data on businesses characteristics. Some of the risks of using this dataset are discussed below[97].

148. Data produced under ND NEED is gathered at the building level not the business level. As there is not a one-to-one relationship between buildings and businesses, this introduced some uncertainty into the data which could mean that the estimates of large business factory consumption, as well as data on the number of sites in scope need to be revised.

149. Moreover, ND NEED data cannot be split out by public or private organisations or by tenure. For this reason, the smaller BEES sample size has been relied

[96] Figures used in the cost benefit analysis have been scaled up to reflect total UK building stock numbers. 1.6m building estimate is from ND NEED, BEIS, 2020 and covers England and Wales only.

[97] More information about the limitations of the ND-NEED dataset can be found in the limitations section of the report - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020

on to generate estimates of the proportions of the non-domestic building stock which fall into different policies.

150. As outlined in this IA, ND NEED only includes data on metered electricity and gas consumption in England and Wales. Estimates therefore miss non-metered consumption, such as on-site generation and consumption estimates need to be scaled up to reflect the total energy use in Scotland and Northern Ireland.

**Modelling assumptions**

151. For the building stock, capital cost requirements have been modelled using a combination of the Non-Domestic Buildings Model (NDBM). The NDBM estimates a cost-effective package of technologies to deliver a certain level of energy savings. To generate the estimated capital costs which would be incurred due to ESOS reports being disclosed, a model run was calibrated to only install measures with a lower than 2-year payback period. This was then net off from the baseline, yielding both a net capex required in 2023 as well as the potential energy savings that could be delivered in this year.[98][99] The corresponding £m/TWh rate was applied to the energy savings estimated per year, to calculate the net capital cost requirements.

152. This is consistent with the evidence in the original ESOS Impact Assessment, which outlined that it was unlikely businesses would adopt any measures with a greater than 2-year payback period[100][101].

153. However, this is a source of uncertainty as in reality businesses may take up measures with greater than 2-year payback periods, which could raise the capital cost requirement resulting from disclosing ESOS reports. Since ESOS is a voluntary scheme and compliance under the proposed regulations does not require installation of new measures, the uncertainty around the capital and installation costs has been captured through sensitivity analysis depicting a range of scenarios around the probable energy savings that could be delivered through mandated disclosure.

154. As it concerns industrial process, a similar method has been applied to determine the capital costs required. However, the rate of capital cost needed per TWh of energy savings achieved has been derived from modelling undertaken for the SECR Impact Assessment. In the absence of more robust evidence, this rate has been applied to the energy savings which have been

[98] Hassle and operational costs have been inferred from the size of capital cost. Using assumptions made in the Streamlined Energy and Carbon Reporting (SECR) IA, it is assumed that for non-domestic buildings, hassle and operational costs are around 20% and 2% of capital costs, respectively.

[99] Additional detail on the use of the Non-Domestic Buildings Model in the analysis is included in Annex 3, on the modelling approach. The NDBM uses BEES data to estimate the capital costs of measures.

[100] Payback period here is defined as the time taken for the private bill savings delivered by the measures installed to exceed the costs incurred from purchasing, installing, and operating the measure. A lower than 2-year payback period implies that the bill savings from the measure installed exceed the costs incurred within 2-years of installation.

[101] Energy Saving Opportunity Scheme (ESOS) – Final Impact Assessment, DECC, 2014. Available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/323116/ESOS_Impact_Assessment_FINAL.pdf.

estimated. As outlined, hassle and operational costs have been inferred as fixed proportion of the capital costs needed[102].

155. The response rate to the policy may be slower than has been modelled. The existing approach is to front-load the costs resulting from compliance and subsequent adoption of measures. As a result, the analysis potentially overestimates the capital, hassle, and operational costs. These costs may be spread out more evenly over the appraisal period, which reduces their net present value. Similarly, the benefits that could be delivered may be spread more evenly across the appraisal period, reflecting delayed action following ESOS audit disclosure.

**Policy overlaps**

156. An additional uncertainty concerns the modelling of the consumption in scope across the UK. BEES data on buildings consumption was used to estimate the policy coverages across England and Wales. This was then scaled up to account for UK-wide consumption. However, at this point the evidence on non-domestic buildings policies in Scotland and Northern Ireland is unclear and therefore the consumption is assumed to be out of scope of PRS or performance-based energy rating policies[103]. Revising this would alter the net impact of the policy, as it could reduce the potential savings from disclosure if comparative policies that incentivise fabric and operational performance are in place in Scotland and Northern Ireland.

[102] Industrial process capital, hassle and operational cost assumptions were taken from the modelling behind the SECR impact assessment, published in 2018. The ratios of hassle and operational costs to capital cost were 19% and 3%, respectively.
[103] Evidence gathering is underway to clarify this and we intend to refine our approach at final IA stage.

## Annex 7: Further Background to ESOS

157. The policy rationale for the original ESOS scheme included tackling barriers to adopting energy efficiency measures by large businesses such as:

- Lack of awareness of the potential for energy efficiency cost savings.
- Lack of detailed information on energy efficiency measures that would be relevant for their organisation.
- Lack of commitment to energy efficiency.

158. The original objectives of the ESOS scheme were:

- To provide large enterprises with organisation-specific information about how they could make energy savings.
- To stimulate the take-up of cost-effective energy efficiency measures by participating businesses.
- Minimise the cost to businesses of complying with the regulations.
- Maximise the synergies with existing policies.

159. The original Impact Assessment estimated that ESOS would deliver around 3.0TWh in annual energy savings between 2015 and 2030[104], with the largest portion of energy savings accrued to buildings energy efficiency measures (around 1.3TWh)[105]. A Post-Implementation Review (PIR) of ESOS, published in 2020, reviewed the effectiveness of the policy and confirmed that the energy savings forecast in the IA were largely being delivered[106].

[104] The analysis in the final ESOS Impact Assessment (2014) appraised the impact of the policy between 2016 and 2030.

[105] Energy Saving Opportunity Scheme, Final Impact Assessment, Department of Energy and Climate Change, 2014.

[106] As part of the PIR, an impact evaluation was commissioned to determine the actual energy savings which had accrued due to ESOS policy. It found that businesses in scope had reduced their annual energy consumption by around 3.5TWh, around 0.5TWh larger than the IA had forecast. *Review of the Energy Savings Opportunity Scheme Regulations 2014*, Department for Business, Energy, and Industrial Strategy, 2020.

# Annex 8: Further detail on identifying energy consumption in scope.

160. For this Impact Assessment, the impact on transport energy consumption has not been modelled alongside the relevant consumption of buildings and industrial processes. The overlaps within the current transport policy landscape mean that there is limited scope for additional emissions savings beyond the impact of rules on emissions at the manufacturer, which builds vehicles to a certain standard. It is possible that a future ESOS scheme could impact reduction of overall levels of fuel demand at a firm level, for example through encouraging better driver training and logistical management of fleets. We welcome evidence on this during the consultation and intent on improving the estimated impact on the transport sector in the final stage Impact Assessment.

## Buildings

161. The energy consumption of buildings occupied by large businesses has been estimated using the trajectory outlined in the 2019 Energy and Emissions Projections (EEP) reference case. This captures the impact of existing policies on energy consumption and so any impact of the proposed measures in the consultation is additional to the policies already planned and implemented.

162. Our EEP consistent trajectory estimates a 7% energy consumption reduction for all commercial service firms between 2015 and 2023[107]. Since the level of granularity needed to isolate the large business-share of consumption is not attainable from the EEP, the Non-Domestic Buildings Model (NDBM) was used to estimate this. The NDBM was assigned a target of a 7% reduction in buildings energy consumption between 2015 and 2023. This provided an estimate of the total TWh consumed by large businesses buildings in 2023, which is the baseline for the analysis of impacts.

163. Figure 1 shows the buildings energy consumption in scope, once the projected 7% energy reduction has been achieved by 2023. Post 2023 consumption is assumed to remain constant over the appraisal period[108]. Under this estimate, electricity is the single largest fuel consumed, accounting for around 77 TWh in 2023, or around 44% of total buildings consumption. This is followed by gas

[107] Commercial services gas and electricity consumption is used as a proxy for business buildings energy consumption. Gas and electricity account for the largest proportion of all fuel consumption and so are a reliable indicator of the broader consumption pathway. The trajectory for large business energy consumption is inferred from the wider pathway of commercial service consumption between 2015 and 2023.

[108] Energy consumption is flatlined from 2023 to account for the locking-in of energy savings from current and future policies. This potentially under-estimates the gains of energy efficiency in absolute terms since consumption is forecast as lower than in the EEP reference case.

consumption, which accounts for around 69TWh, or 39% of the total consumption[109].

### Industrial processes

164. To estimate the proportion of energy consumption from industry that is used for industrial processes (rather than building processes such as heating or lighting) ND-NEED[110] and BEES[111] data are used. In the ND-NEED dataset energy consumption from industry includes both energy consumption from industrial processes and energy consumption from building processes. By contrast, in the BEES dataset industrial energy consumption covers energy from building processes only. We can therefore estimate the proportion of industrial energy consumption that is used for industrial processes by comparing industrial energy consumption between these datasets. This comparison is meaningful because the ND-NEED[112] and BEES[113] datasets have very similar coverage (both at the building level, both cover England and Wales only, both exclude the same building types). Using BEES and ND-NEED we can estimate that 25% of industrial energy consumption is from building processes (26 TWh/96 TWh = 25% (rounded to the nearest 5%)).

165. This means that 75% of industrial energy consumption is from industrial processes (rounded to the nearest 5%).

**Table 14: Industrial Process Energy Consumption (ND NEED vs BEES comparison)[114] [115]**

| | Energy consumption 2016 (TWh) |
|---|---|
| BEES | 26 |
| ND-NEED | 96 |

166. The EEP provides projected energy consumption of businesses within the industrial sector. To determine the suitable consumption in scope, the EEP reference case data on 'iron and steel' and 'other industry sectors' has been combined to reflect the total industrial energy consumption. However, since the

[109] Data calculated using the Non-Domestic Buildings Model, which uses BEES (2016) data to estimate the buildings consumption in scope of the policy.

[110] ND-NEED 2020 - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020. In ND-NEED industrial consumption is consumption from factories (Table 3.1 & Table 4.1).

[111] BEES - https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees. In BEES industrial consumption is consumption from the industrial sector (Figure 3.1).

[112] For further information on ND-NEED coverage see the ND-NEED building stock section of the ND-NEED Methodology - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020

[113] For further information on BEES coverage see Section 2: Sampling and Scope of the BEES Technical Annex - https://www.gov.uk/government/publications/building-energy-efficiency-survey-bees

[114] Note, the BEES data covers 2016 only so ND-NEED 2016 consumption is used. The BEES data covers energy consumption from all fuel types, ND-NEED just covers electricity and gas consumption. It is estimated that over 80% of energy consumption in non-domestic buildings is from electricity or gas.

[115] DUKES 2020, Aggregate energy balances (DUKES 1.1 – 1.3), 2019. Final consumption. Industry, Public administration, Commercial and Misc are used as a proxy for non-domestic buildings. https://www.gov.uk/government/statistics/energy-chapter-1-digest-of-united-kingdom-energy-statistics-dukes.

EEP does not provide business-size information, ND-NEED has been used to estimate the large business share of consumption (see Table 2.)

167. Some of the limitations of the EEP have been outlined above and are relevant to industrial process consumption. To estimate the large and very large business share of industrial process consumption, large and very large factories consumption data was gathered from ND NEED. However, ND NEED only provides consumption data for metred electricity and gas, so in the absence of other evidence, a weighted average of the electricity and gas proportion was applied to determine the share of other fuels consumed by large and very large businesses. The above approach revealed that in 2018, large and very large businesses consumed around 55% of all industrial electricity consumption and around 63% of all industrial gas consumption. Since ND NEED provides gas and electricity consumption only, a weighted average of the gas and electricity consumption of large and very large businesses has been used to estimate the proportion of other fuels which are consumed by these businesses[116].

### Scaling England and Wales figures to the whole UK

168. As ND-NEED covers non-domestic buildings in England and Wales only, alternative data sources have been used to obtain estimates on the non-domestic building stock/non-domestic energy consumption in Scotland and Northern Ireland. These estimates are then combined to give UK-wide estimates that can be used to calculate an England and Wales to whole-UK scaling factor.

### Building number

**Table 15: Estimated Non-Domestic Buildings Across the UK**

| | Number of Non-Domestic buildings | Data source |
|---|---|---|
| England and Wales | 1,656,000 | ND-NEED 2020[117] |
| Scotland | 196,000 | Scotland's non-domestic energy efficiency baseline: report, 2018[118] |

[116] BEIS analysis of ND NEED datasets. Large businesses defined as any business with between 249-999 employees. Very large business defined as a business with more than 1000 employees. ND NEED applies to metred consumption in England and Wales only, so may miss non-metred consumption such as on-site generation. These proportions consumed by large and very large businesses have been applied to the whole of the UK to account for Scotland and Northern Ireland in the absence of more robust evidence.

[117] ND-NEED 2020 - https://www.gov.uk/government/statistics/non-domestic-national-energy-efficiency-data-framework-nd-need-2020

[118] https://www.gov.scot/publications/scotlands-non-domestic-energy-efficiency-baseline/

| | | |
|---|---|---|
| Northern Ireland | 77,000 | NI Department of Finance, 2012/13 and 2020[119] |
| Whole UK | 1,929,000 | n/a |

169. These figures can be used to calculate an England and Wales to whole UK scaling factor (1,929,000/1,656,000 = 1.16). This scaling factor can then be applied to any segment of the building stock to scale England and Wales building number figures to the whole UK.

## Energy consumption

**Table 16: Estimated Non-Domestic Building Consumption Splits Across the UK**

| | Proportion of UK non-domestic building energy consumption | Data source |
|---|---|---|
| England and Wales | 87% | BEIS Non-Domestic Building Model (NDBM) based on BEES 2016 data. |
| Whole UK | 100% | BEIS Non-Domestic Building Model (NDBM) based on BEES 2016 data. |

170. These figures can be used to calculate an England and Wales to whole UK scaling factor (100%/87% = 1.15). This scaling factor can then be applied any segment of the building stock to scale England and Wales consumption figures to the whole UK.

171. An England and Wales to whole UK energy consumption scaling factor could also be calculated using the subnational electricity and gas consumption statistics which contains information on non-domestic electricity and gas consumption for England, Wales, Scotland, and Northern Ireland[120]. This approach gives very similar results to the method outlined above.

[119] Business properties - https://www.finance-ni.gov.uk/articles/reval2020-frequently-asked-questions, Public buildings - https://www.finance-ni.gov.uk/publications/public-sector-energy-report-2012-2013

[120] Regional and local authority electricity consumption statistics 2019 - https://www.gov.uk/government/collections/sub-national-electricity-consumption-data, Northern Ireland sub-national electricity consumption 2009 – 2019 - https://www.gov.uk/government/statistics/sub-national-electricity-consumption-statistics-in-northern-ireland. Regional and local authority gas consumption statistics - https://www.gov.uk/government/statistical-data-sets/gas-sales-and-numbers-of-customers-by-region-and-local-authority. Northern Ireland subnational gas consumption 2015–2019 - https://www.gov.uk/government/statistics/sub-national-gas-consumption-statistics-in-northern-ireland.

## Annex 9: Further detail on the *preferred* approach

172. The preferred approach is expanded upon in the long-list options appraisal. This is option I in the long-list appraisal and option b in the short-list appraisal.

- **Improvements to the standard and quality of audits through strengthening the requirements for audits and increasing standardisation.** Anecdotal evidence from the ESOS PIR and evaluation highlighted that one obstacle to uptake of ESOS audit recommendations was the inadequate level of information included and the poor quality of some audits. By standardising and improving the quality of audits, more businesses are expected to act on ESOS audit recommendations.

- The range of audit and report quality cuts both ways. Some enterprises may currently be undertaking audits that are too detailed, whilst others may do too little. Standardising could therefore deliver a net neutral cost impact, as time and cost of reports becomes more uniform. However, the degree to which this will occur is uncertain as we currently have little quantifiable evidence on the distribution (of audit quality) across enterprises and how individual participants approach ESOS audits.

- **A requirement to publicly disclose the results of ESOS audits.** Mandated disclosure would require enterprises to publicly disclose high-level information from their ESOS report on a central website and to set a target or action plan which they would be required to report their progress against annually. This could deliver additional energy savings through multiple channels:

    a. Provide large enterprises with a better understanding of how they compare on EE with their competitors and drive action amongst those behind the rest of the market[121].

    b. As ESOS reports are made widely available, public pressure could emerge as a driving force for businesses to increase their action to meet sustainability and decarbonisation commitments[122].

    c. It could also provide information to energy efficiency providers on the range of opportunities available to businesses and help them target

[121] For the theoretical and empirical underpinnings of this argument, see Thaler and Sunstein's work on Nudge theory (2009). It essentially implies that public policy can shift organisational behaviour without a mandated requirement to act in a specific way. This occurs through framing choices, where shaping an environment is key. In the case of the proposed policy, disclosure enables firms to determine their relative position among their peers, which can drive action through competitive desires to move up a league table for example.

[122] This is equivalent to the arguments underpinning Taskforce Related Climate Financial Disclosure (TCFDs) as well as the EU's taxonomy for sustainable activities.

services. This could also grow the market for energy efficiency suppliers and drive down the cost of energy efficiency improvements[123].

- **Introducing a Net Zero element to the existing audit.** This option would alter the focus and structure of ESOS audits, to shift away from centring on energy saving opportunities, to include recommendations around how enterprises can adapt their energy use to be compatible with a Net Zero world. As an illustrative example, ESOS auditors could provide recommendations on fuel-switching measures to align with future regulations on conventional heating systems. Moreover, recommendations could concern switching transport fleets away from traditional petrol and diesel-fuelled vehicles to hybrids, and eventually to entirely electric vehicles.

173. These options are outlined in Section 10, where a thorough appraisal of the costs, benefits and wider impacts of these options has been conducted.

174. Although splitting out the consumption in this way provides an indicator of the industrial energy in scope, it includes non-process energy, such as buildings consumption. To avoid double counting, the process-share of energy was split out using BEES and ND NEED data which suggests that around 75% of industrial energy use is process related. This figure has been applied to the EEP dataset to determine the baseline for process energy consumption[124].

[123] Research due to be published by BEIS highlights a gap in the non-domestic supply chain for 'deep retro-fits'. A strengthened ESOS policy could crowd-in demand for such services as businesses adopt energy efficiency improvements following public disclosure.

[124] For more detail on how the industrial processes consumption portion was derived please see Annex 8.