

Energy Savings from Audits

Analysis from the Carbon Trust's Close Out database

Prepared for DECC

December 2013

A decorative graphic at the bottom of the page consisting of three overlapping, wavy bands in shades of blue and dark blue, curving across the width of the page.

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Introduction

- › This pack of slides presents in graphical form some outputs and conclusions from analysis undertaken by the Carbon Trust for DECC in December 2013 to support development of the ESOS mandatory audits policy
- › The analysis was jointly developed to provide estimates of the potential energy consumption reduction and associated financial savings that could result from mandatory energy efficiency audits, split by SMEs and Large companies, and also cut by sector, energy spend band, type of measure, payback period and upfront capital cost
- › The raw data used were all taken from the Carbon Trust's Close Out database. This database contains detailed records of all recommendations made to Carbon Trust customers following the provision of energy efficiency audits or similar services between 2001 and 2011 (with significant volumes between 2003 and 2010). The database combines detail of recommendations of energy efficiency measures to businesses, and subsequent implementation (or not) of recommended measures post-audit and totals 17,000 separate accounts and around 175,000 separate measure recommendations (in total around 225,000 recommendations).
- › More specifically, after each energy audit a consultant completed a data capture sheet detailing the recommendations and expected outcome (cost, savings, CO2 saving etc.) of various carbon abatement measures. Subsequently, at circa 6 monthly intervals account managers would follow up with customers to check their progress in implementation (and whether they needed additional support) – This means CT tracked which identified carbon abatement recommendations had been implemented (and where possible updated the estimated figures with actuals).

Analysis of energy and financial savings identified

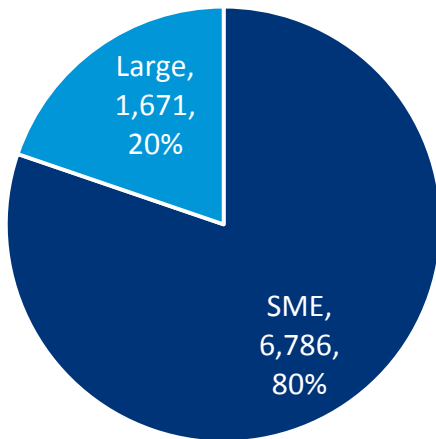
IDENTIFIED SAVINGS

The Close Out database includes over 200,000 energy efficiency recommendations made to thousands of public and private sector entities from 2002 to 2011

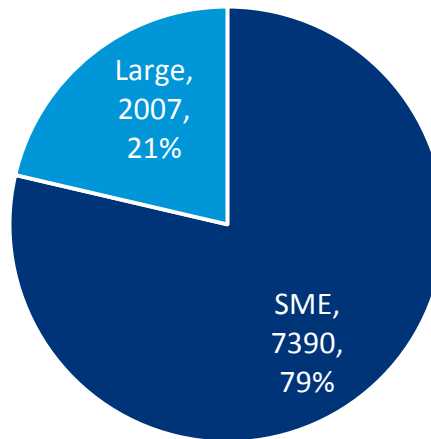


- For this analysis we focused only on private sector companies in the UK
- We extracted a total of 8,457 individual company accounts, which received 9,397 audits comprising 64,070 energy efficiency (EE) recommendations made between 2006 and 2011
- The companies were divided between SMEs and large companies using postcode information from Close Out matched against DECC's analysis of Companies House data.

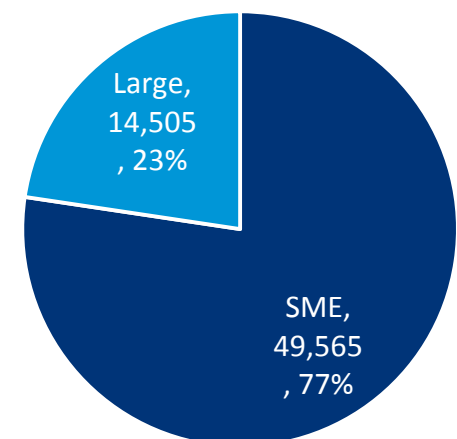
of companies



of audits

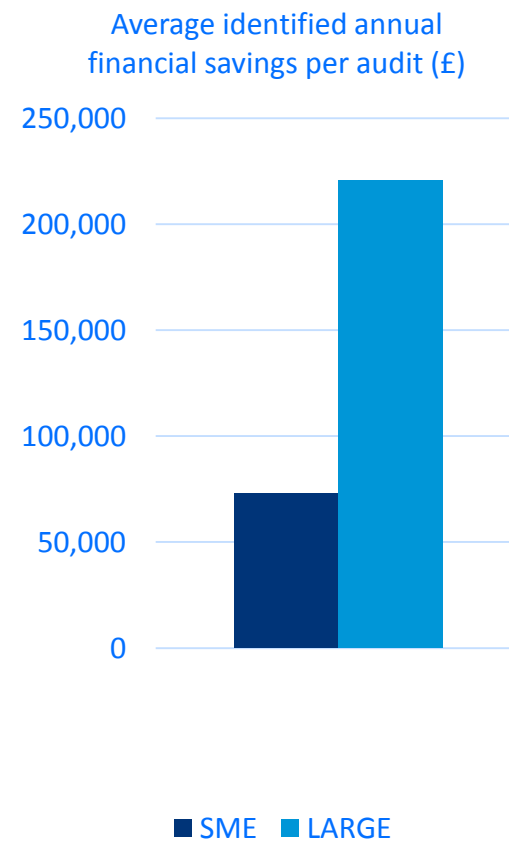
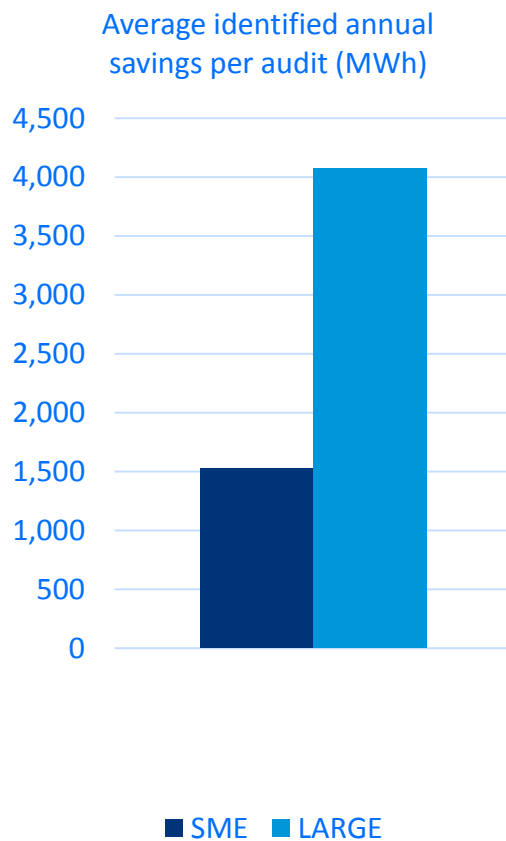
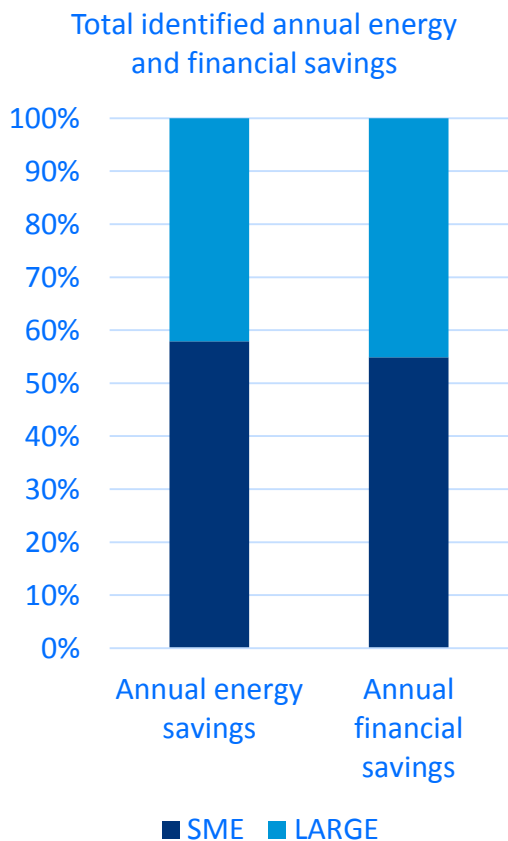


of recommendations



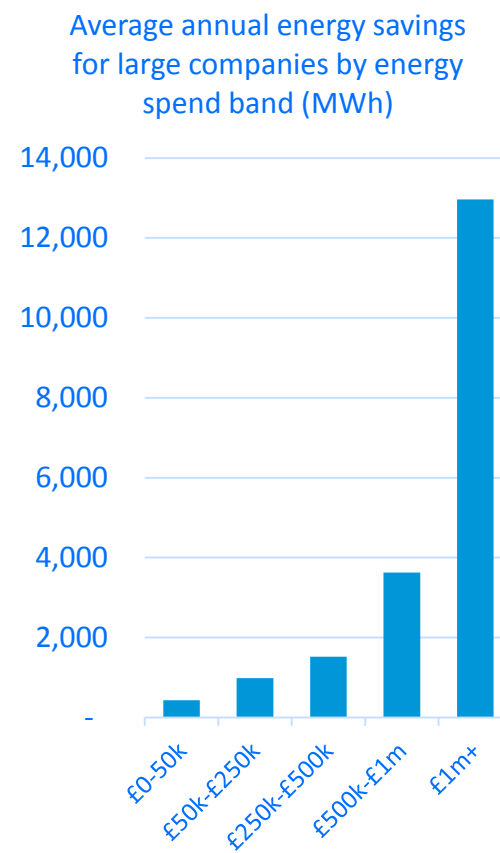
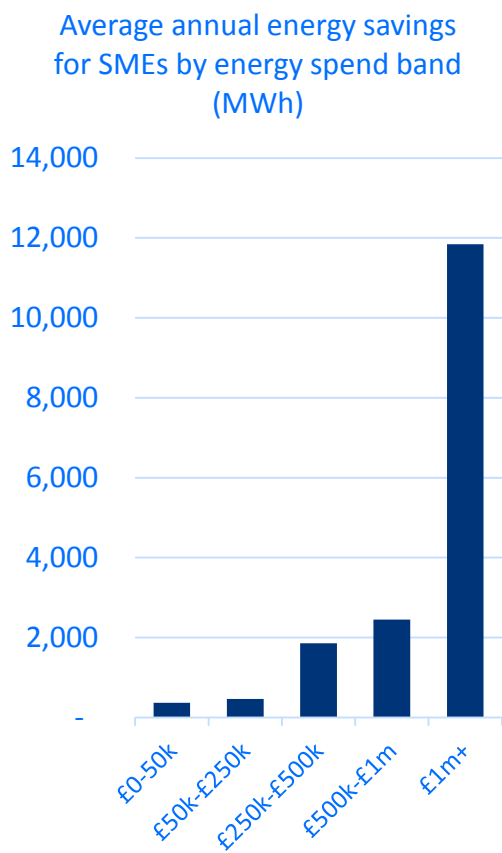
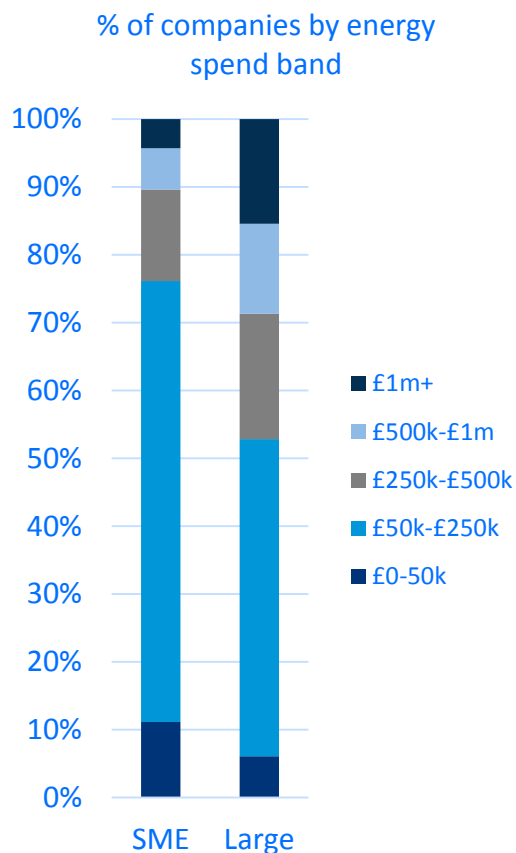
Large companies account for a greater share of total savings identified than number of audits, due to their greater size

- Large companies make up 20% of the sample but c. 40% of the identified savings
- Large companies have much larger average identified savings per audit



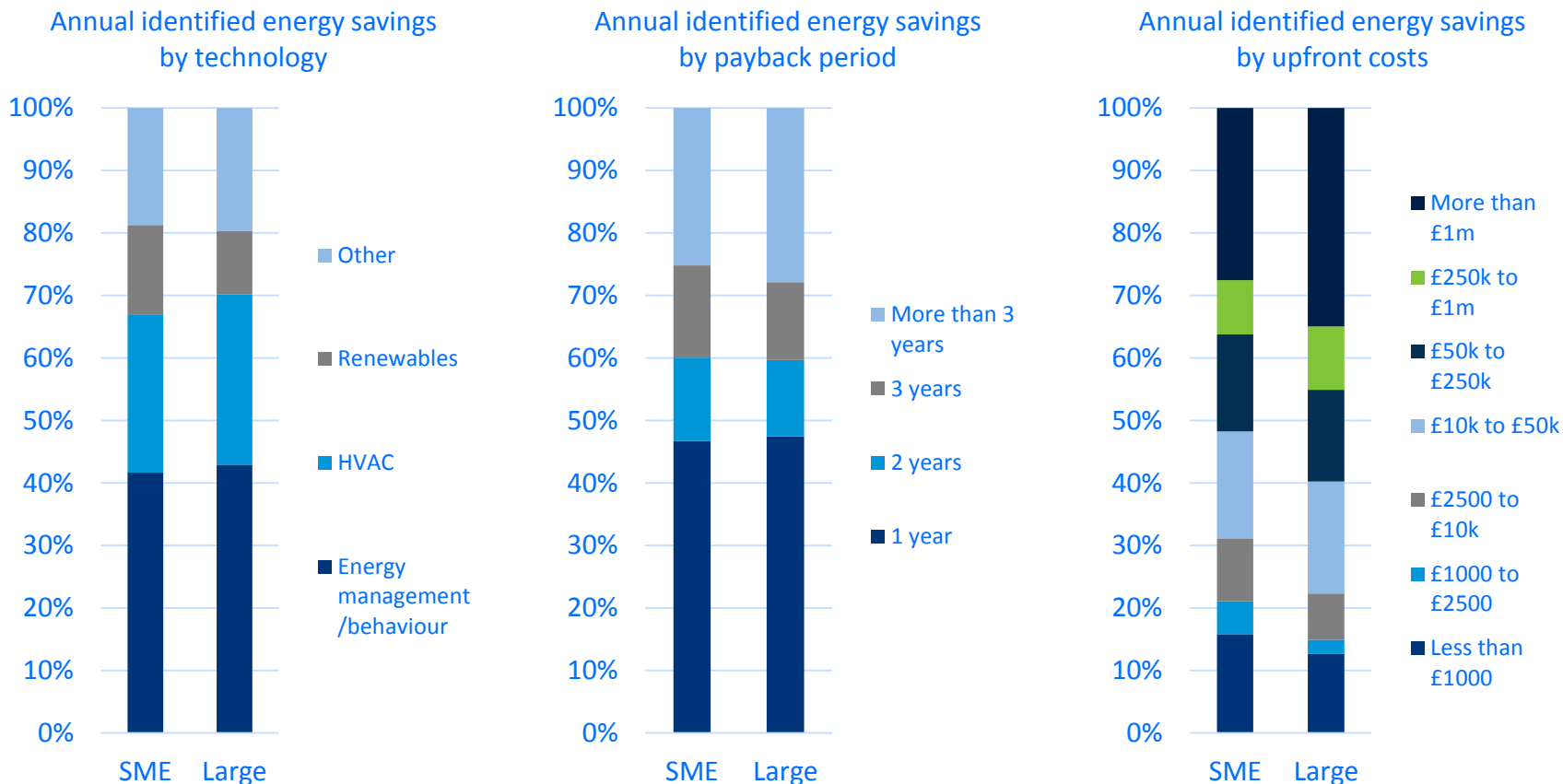
Most companies have an energy spend between £50k and £250k per year; companies with energy spend above £1m have substantially greater average savings potential in terms of absolute savings

- Over 70% of SMEs spend less than £250k per year on energy, while 45%+ of large companies spend more than £250k
- Average savings follow a similar curve for both SMEs and large companies when allocated by energy spend band; companies with more than £1m in energy spend have considerably higher average savings potential per audit (energy and financial)



The distribution of identified savings by technology, payback period and upfront costs is similar between SME and large companies

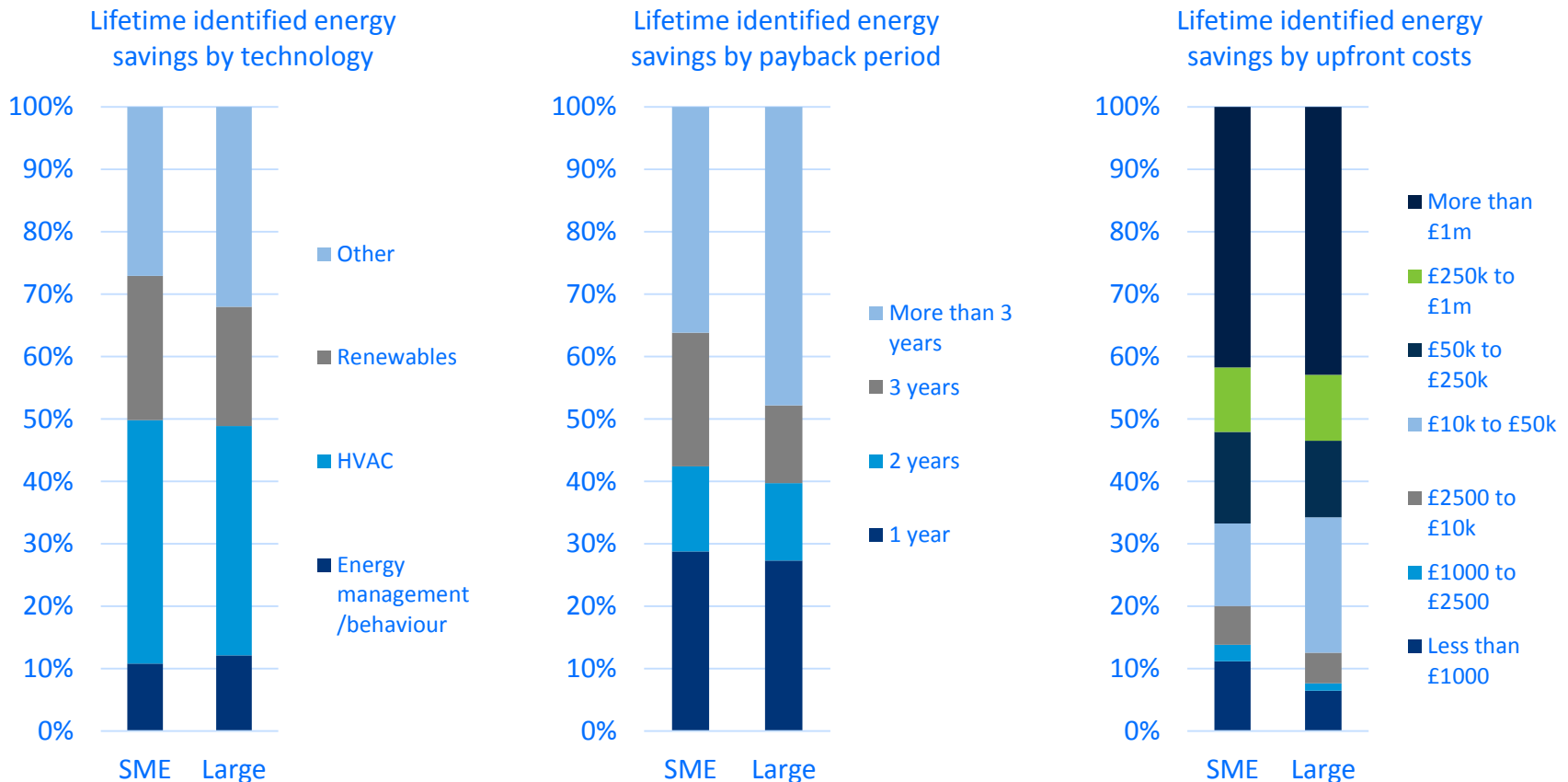
- 80% of the savings come from three technology groups: Energy management/behaviour (e.g. implementing behaviour change initiatives to encourage a reduction in energy consumption); Heating, ventilation and air conditioning (HVAC); and renewables (including biomass boilers)
- More than 70% of the savings identified have a payback period of less than 3 years
- C.25% of SME savings and almost 35% of large companies' recommendations cost more than £1m to implement



Other includes: Appliances/IT, lighting, fabric, building management, waste, electricity & water distribution, new buildings, water & wastewater, water heating

The importance of energy management and behavioural measures decreases substantially when lifetime rather than annual savings are considered; HVAC and renewables are much more important

- HVAC measures generate the highest share of potential lifetime savings at 40% of the total
- The percentage of potential lifetime savings with a payback of less than 3 years decreases to 63% for SMEs and 52% for large companies
- Expensive measures become much more important, with over 40% of potential lifetime savings coming from £1m+ interventions



Other includes: Appliances/IT, lighting, fabric, building management, waste, electricity & water distribution, new buildings, water & wastewater, water heating

Analysis of energy and financial savings implemented

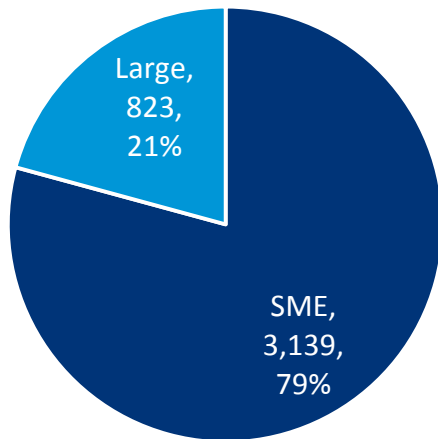
IMPLEMENTED SAVINGS

Almost half of the companies receiving an audit went on to implement at least some of the energy efficiency measures recommended



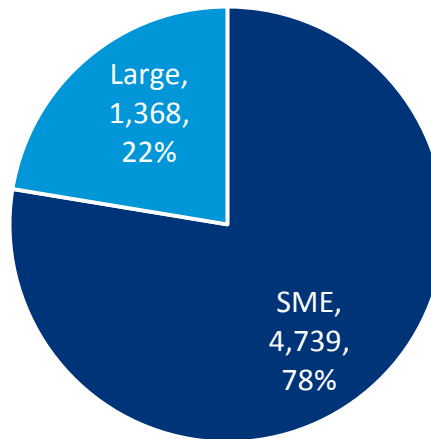
- Close Out distinguishes between interventions that have been recommended but not implemented and those that have been implemented, since the Carbon Trust followed up with companies to verify the savings obtained – this is broken down at the recommendation level, so a single audit with several recommendations might only be partially implemented
- A total of 3,962 companies implemented at least some of the recommendations received
- The ratio between SMEs and large companies remains similar to the overall sample

of companies



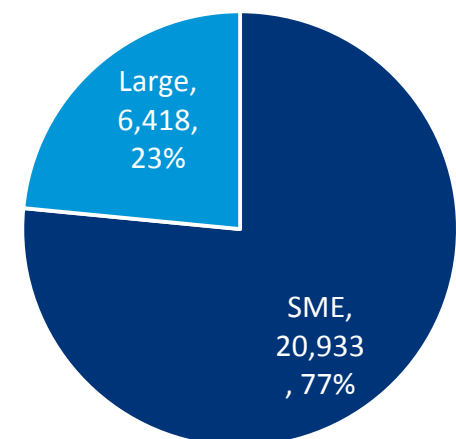
Total identified + implemented: 8,457

of audits



Total identified + implemented: 9,397

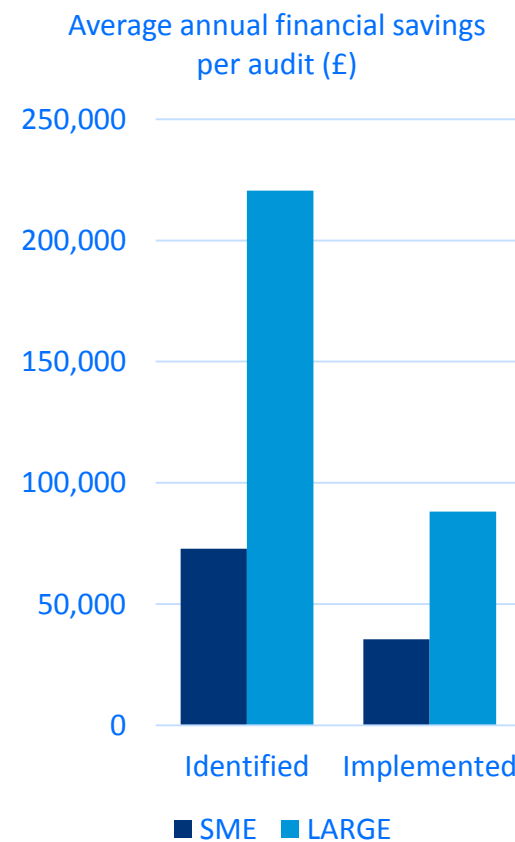
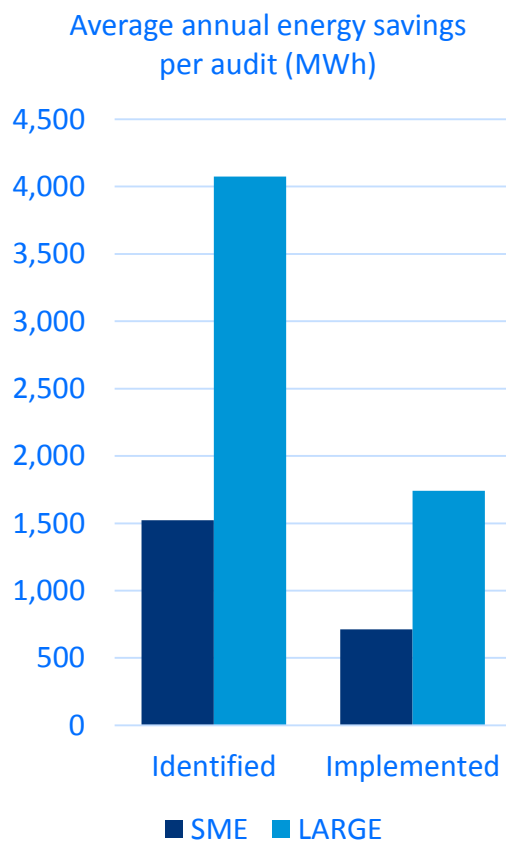
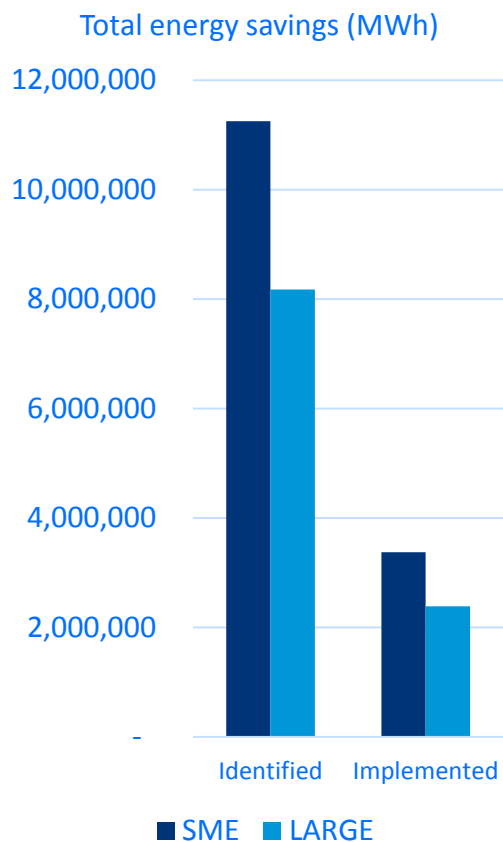
of recommendations



Total identified + implemented: 64,070

The implementation rate is the same for both SMEs and large companies at roughly 30% of identified savings

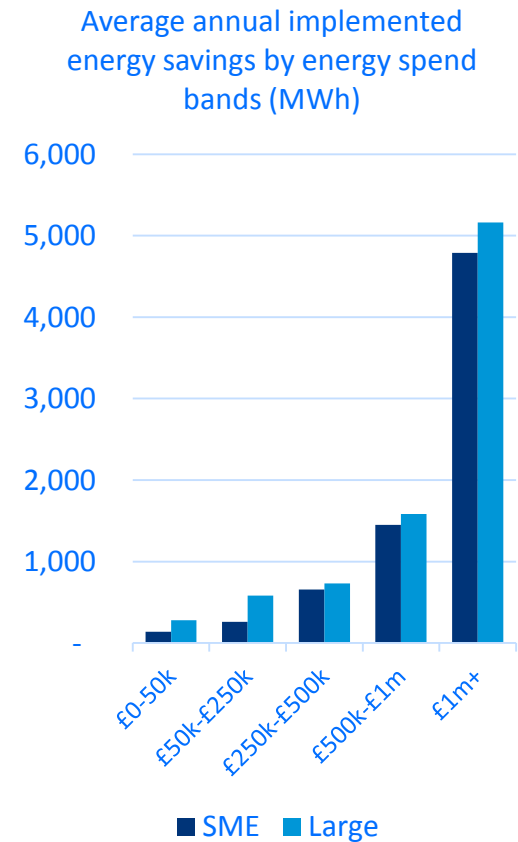
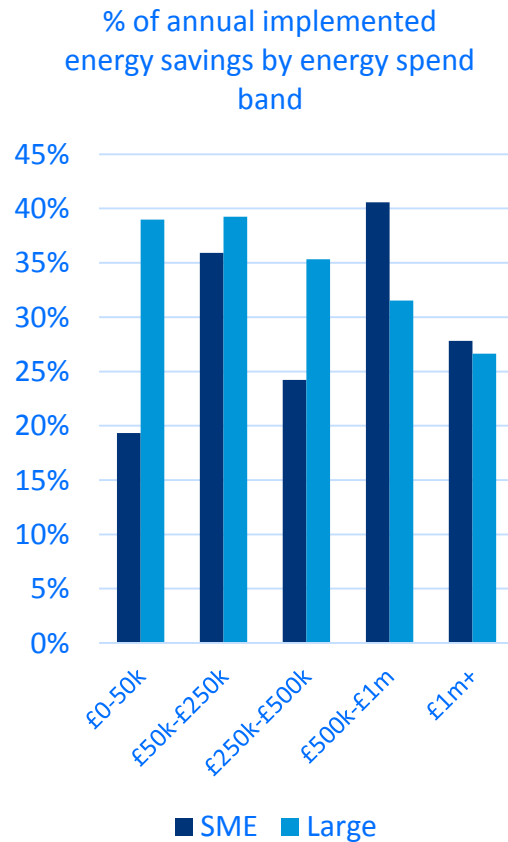
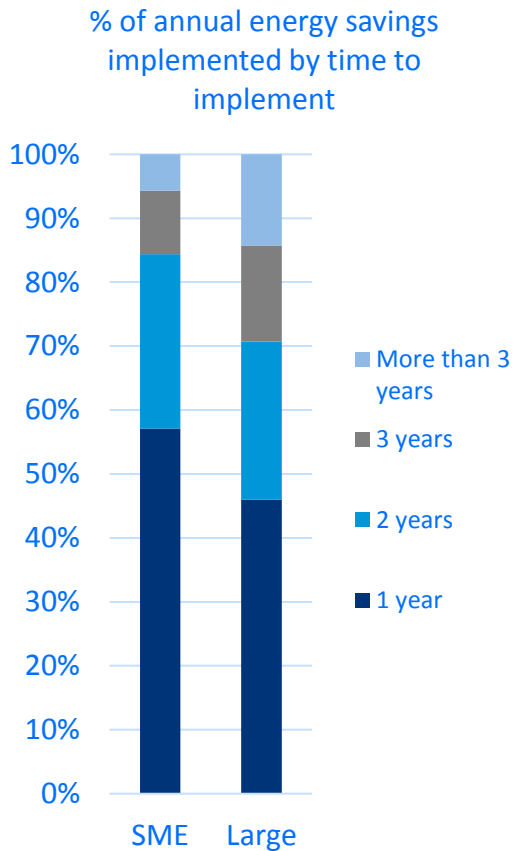
- Only 30% of identified energy savings go on to be implemented; the proportion is similar for SMEs and large companies
- The average value of the savings *implemented*, both for energy and finance and for SMEs and large companies, is much smaller than the average of the savings *identified*; about half as much for SMEs, and around a third for large companies



Among SMEs almost 60% of the implemented measures happen within 1 year of receiving the recommendation; for large companies the percentage is around 45%



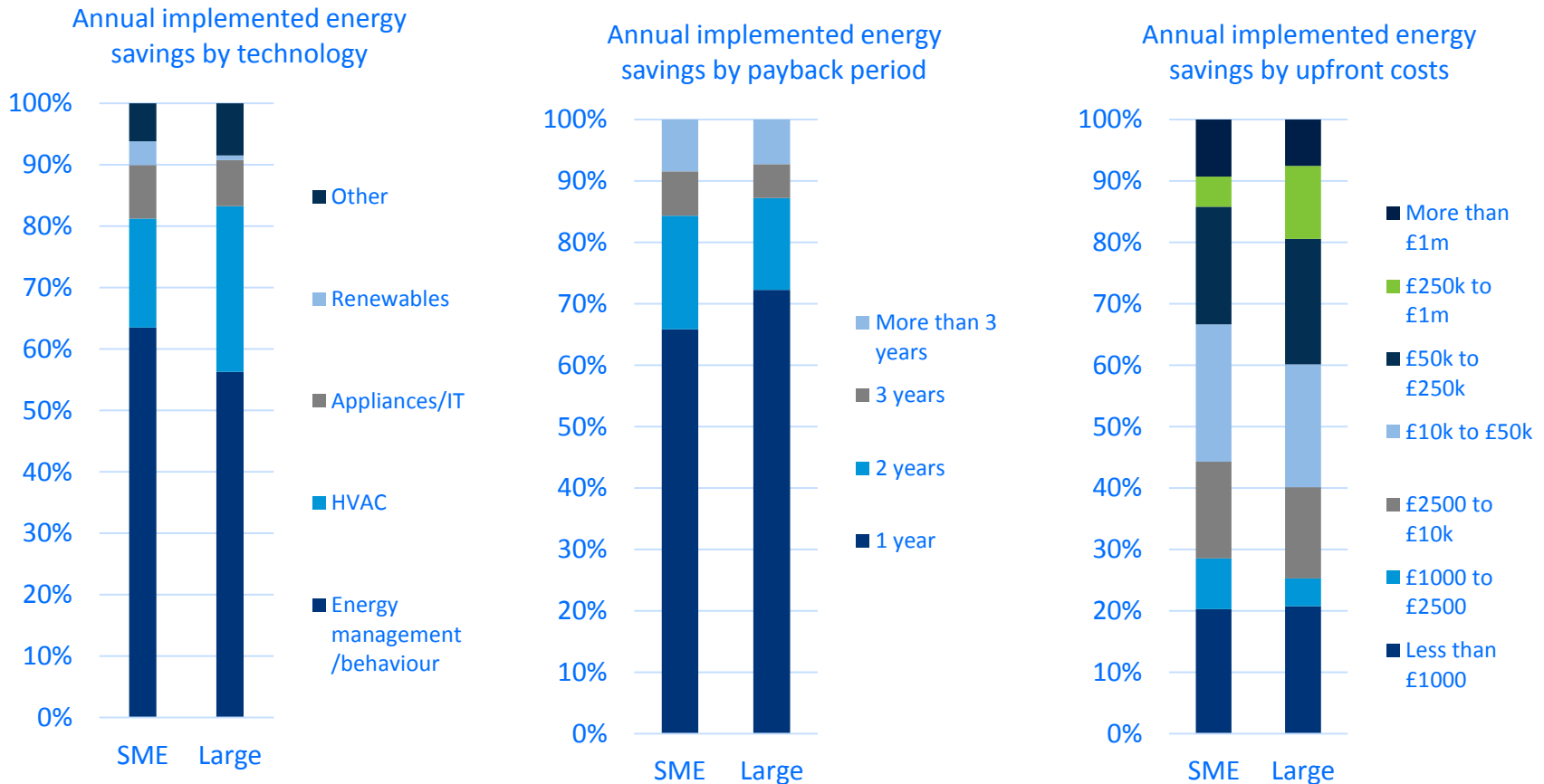
- For large companies, implementation rates decline with increasing energy spend, while SMEs show no apparent trend
- Average annual energy savings per audit are roughly double for large companies than for SMEs in the two lowest energy spend bands, but they are similar in the higher spend bands



Lower cost and short payback measures are more likely to get implemented by both SMEs and large companies



- 63% of implemented savings for SMEs and 57% for large companies come from energy management and behavioural interventions
- Over 80% of implemented annual energy savings for both SMEs and large companies come from measures with a payback period of less than 2 years
- Most implemented energy savings come from lower cost interventions, with 80% costing less than £250k and 60% costing less than £50k for both SMEs and large companies
- Renewables, being more expensive and with longer paybacks, represent just 1% of implemented savings for large companies compared to c.20% of identified savings

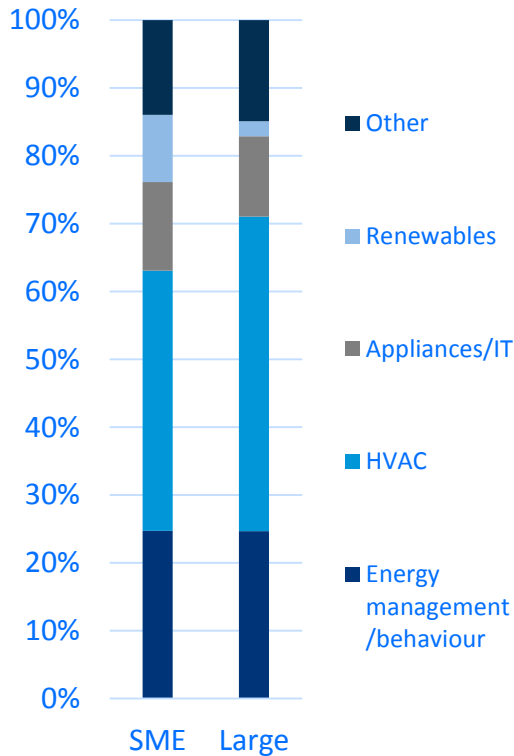


Other includes: renewables, lighting, fabric, building management, waste, electricity & water distribution, new buildings, water & wastewater, water heating

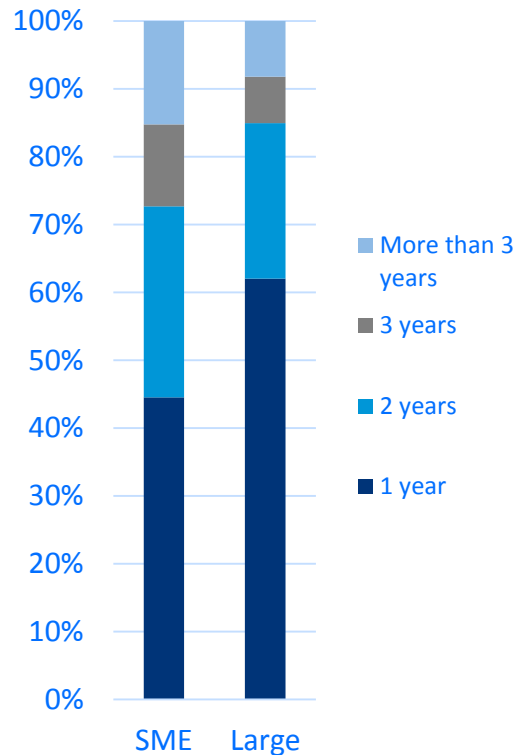
As for identified savings, HVAC measures make up the largest share of implemented lifetime savings, due to their greater persistence compared to behavioural measures which account for c. 25%

- Renewables increase slightly but still account for a far smaller proportion than of identified savings;
- The percentage of savings with payback within 2 years decreases by about 10 percentage points for SMEs, and around 5 for large companies
- There is an overall increase in the savings implemented in higher cost bands, especially for SMEs
- HVAC measures have greater persistence (last longer) than behavioural measures which typically only stay in place a few years, compared to 7-10 years when equipment is installed.

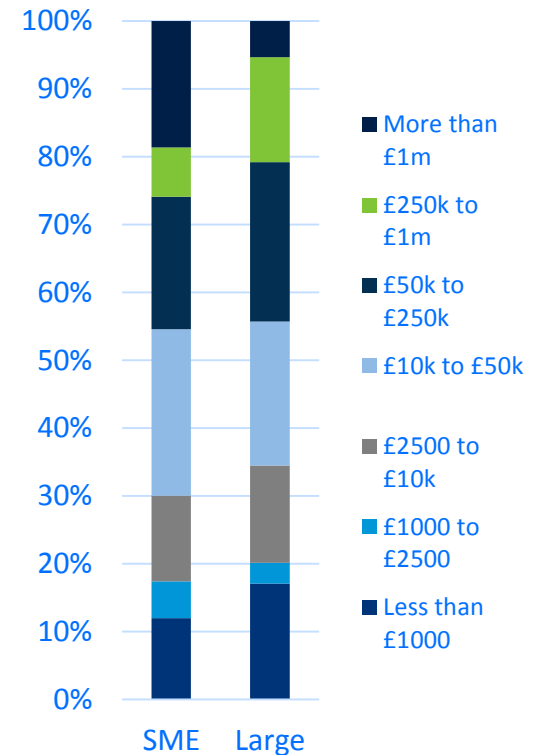
Lifetime implemented energy savings by technology



Lifetime implemented energy savings by payback period



Lifetime implemented energy savings by upfront costs



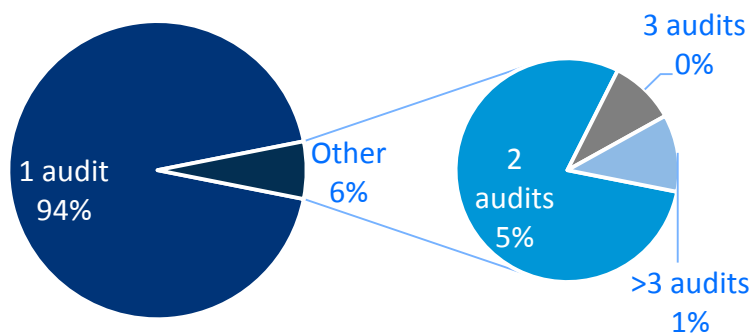
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Analysis of energy and financial savings identified by follow up audits

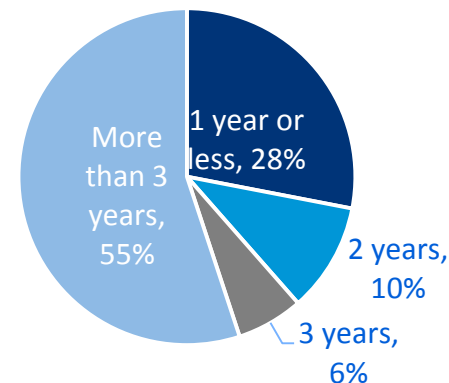
FOLLOW UP AUDITS IDENTIFIED SAVINGS

Only 6% of SMEs and 11% of large companies have had more than one audit, with the vast majority of those stopping at 2; roughly half had the second audit 3 years after the first, but 28% of SMEs and 34% of large companies had a second audit in one year or less

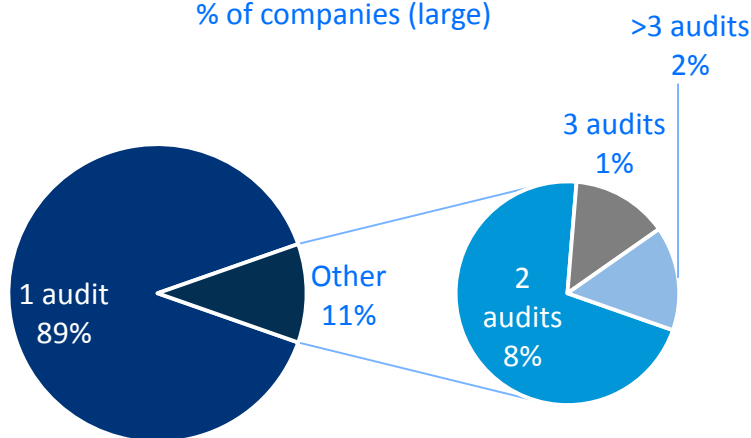
% of companies (SME)



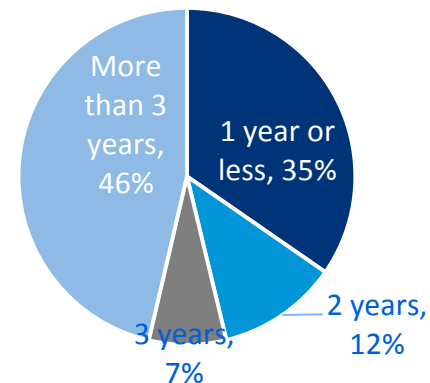
Time between first and subsequent audits (SMEs)



% of companies (large)



Time between first and subsequent audits (SMEs)

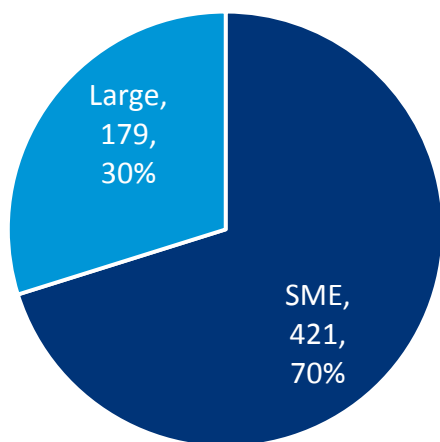


Where there is a second audit for the same organisation this may indicate either multiple audits at the same site, or audits of different sites owned by the same company.

Large companies were more likely to have additional audits than SMEs

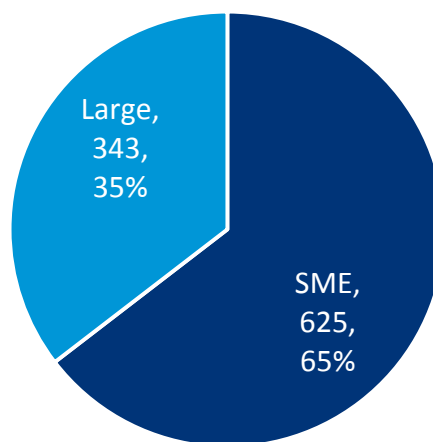
- A total of 600 companies had more than one audit; large companies represent 30% of the sample, up from 20% from the total population
- The proportion of audits and recommendations received by large companies also increases substantially when compared to the total sample

of companies



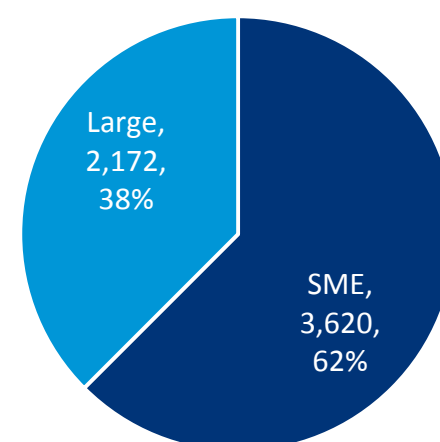
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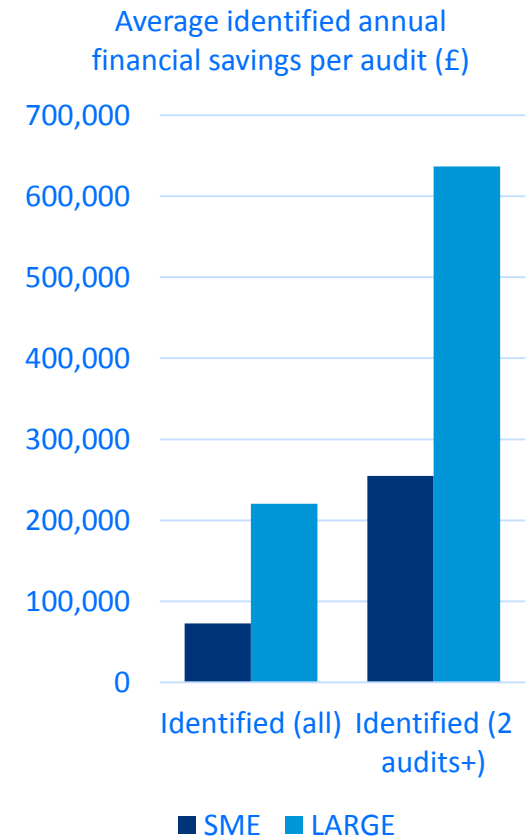
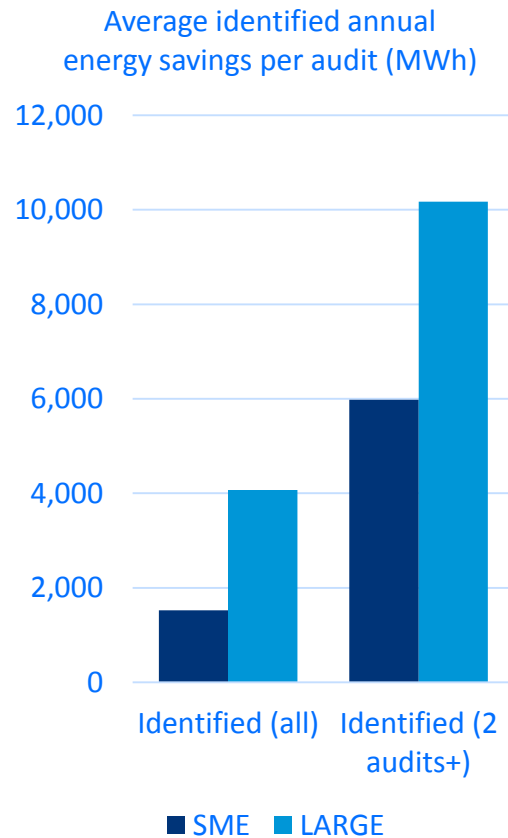
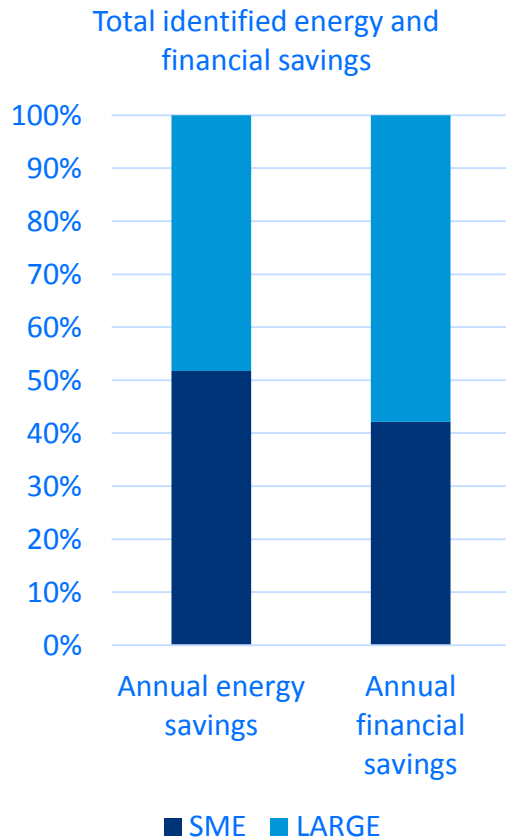
of recommendations



Total identified + implemented: 64,070

Among both SMEs and large companies, additional audits identified greater savings than single audits – possibly because larger organisations are more likely to have a second audit

- Average annual energy savings identified by follow up audits much larger than those identified by the total sample
- The same increase applies to annual financial savings
- Savings from the first audit are excluded from the calculations



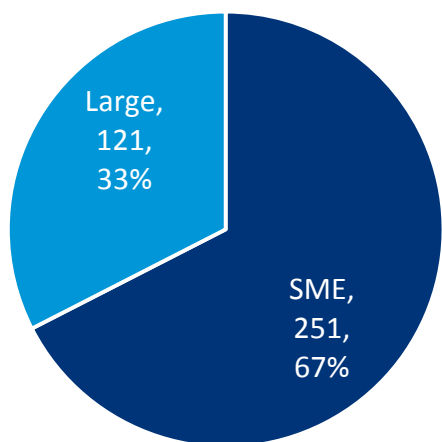
Analysis of energy and financial savings implemented by follow up audits

FOLLOW UP AUDITS IMPLEMENTED SAVINGS

Of the 600 companies that had more than one audit, c. 60% went on to implement the recommendations received in the follow up audits

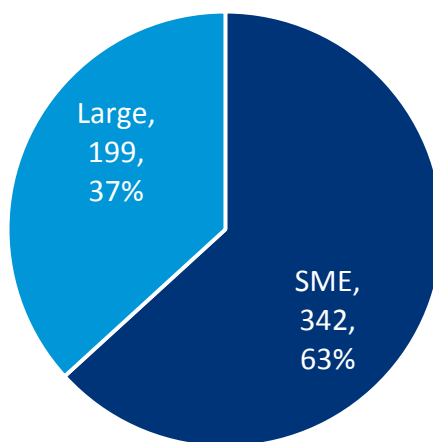
- Large companies accounted for more than 30% of the those implementing follow up audit recommendations, compared to 20% for the total sample

of companies



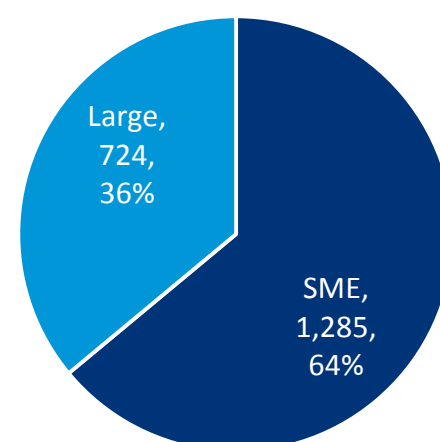
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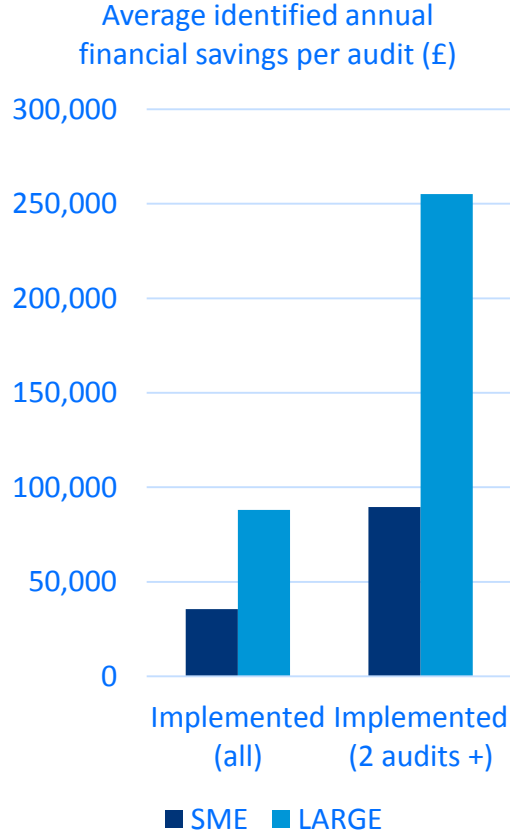
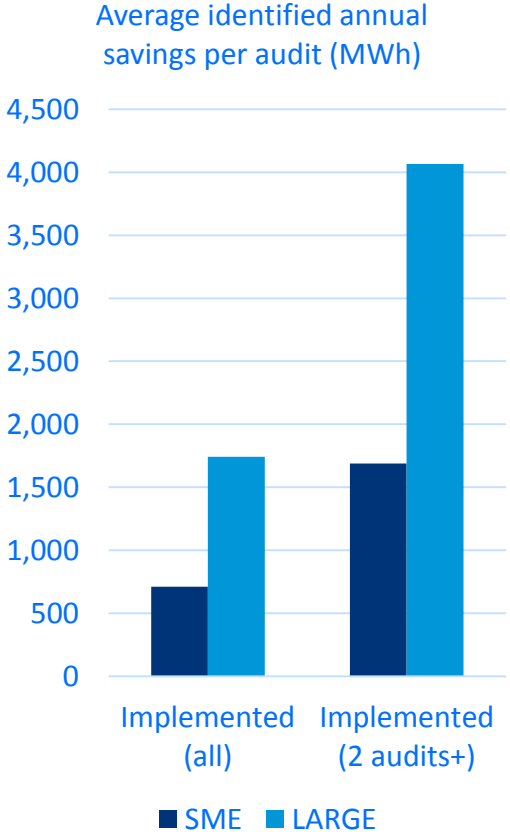
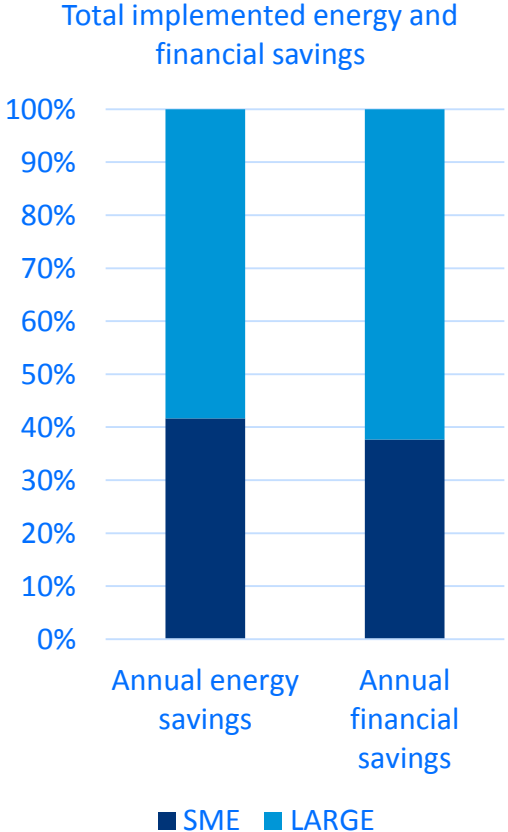



Total identified + implemented: 64,070

When only implemented savings from the follow up audits are counted the importance of large companies grows to 60%



- Actually implemented savings are about a third of those identified
- However they remain much larger than those implemented by the total sample
- Savings from the first audit are excluded from the calculations





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