Evidence-based Study into the Benefits of EMSs for SMEs

By Dr Ruth Hillary and Paul Burr

WYG Environment

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Evidence-based Study into the Benefits of EMSs for SMEs

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Evidence-based Study into the Benefits of EMSs for SMEs (EV0440)

By Dr Ruth Hillary and Paul Burr

(With contributions from Heather Gallagher and Paul White, and assistance from Christine Searing, Helen Coulthard, James Tiernan and Susannah Parkin)

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September 2011

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## Glossary

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<tbody>
<tr>
<td>BS</td>
<td>British Standard</td>
</tr>
<tr>
<td>BTTG</td>
<td>British Textile Technology Group</td>
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<tr>
<td>CO₂e</td>
<td>Carbon Dioxide Equivalent</td>
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<tr>
<td>CSV</td>
<td>Comma-Separated Values</td>
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<td>EMAS</td>
<td>Eco-Management and Audit Scheme</td>
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<td>EMR</td>
<td>Environmental Management Representative</td>
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<td>EMS</td>
<td>Environmental Management System</td>
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<td>EU</td>
<td>European Union</td>
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<td>FSC</td>
<td>Forest Stewardship Council</td>
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<td>IIP</td>
<td>Investors in People</td>
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<tr>
<td>ISO</td>
<td>International Standards Organisation</td>
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<tr>
<td>MD</td>
<td>Managing Director</td>
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<tr>
<td>PPC</td>
<td>Pollution Prevention and Control</td>
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<tr>
<td>SME</td>
<td>Small and Medium-sized Enterprise</td>
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<tr>
<td>UKAS</td>
<td>United Kingdom Accreditation Service</td>
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0.0 Executive Summary

The purpose of this study was to deliver robust evidence on the environmental and financial benefits of certified environmental management systems (EMSs) for small and medium-sized enterprises (SMEs). The subsequent aim was to use this evidence to increase SME participation in EMSs as a method of unlocking the latent environmental and financial savings that are believed to exist in the SME sector as a whole. The reasons for this project were threefold. Firstly, SMEs are a vital part of the local and national economy accounting for 99.9% of all enterprises in the UK, at approximately 2.9 million, and providing 59.8% of all private sector jobs in 2009. Secondly, due to their sheer number SMEs collectively have the potential to exert significant pressures on the environment including the use of finite resources and generation of pollution and waste, but face a number of obstacles to addressing these pressures including lack of resources, specific expertise, information and awareness. Thirdly, there is some evidence to suggest that SMEs that implement formal EMSs are better placed to manage their environmental impacts and reap the associated market benefits and cost savings.

Despite the vast number of SMEs in the UK, a very small proportion hold a certified EMS. Only 5,699 organisations had certified EMSs in 2009 in the UK. This number comprises all organisations including large enterprises, public sector bodies and not for profit organisations. The low occurrence of SMEs with EMSs could, in part, be explained by market failures including the paucity of concrete data on the environmental and financial benefits of EMSs for SMEs, a failure which this project directly sought to address. The study’s objective was to survey SMEs from selected manufacturing and service sectors on the quantitative and qualitative benefits of their certified EMSs. During site visits, data was collected using a qualitative questionnaire to gather opinions on the drivers and barriers for EMS uptake, as well as the business benefits, including behavioural benefits. Quantitative data was collected using company records and invoices to measure the achieved environmental and financial savings, and EMS-related costs for the EMS implementation year (Year 1) and post-certification year (Year 2). These savings were measured in comparison to a baseline year (Year 0). In addition, in Year 2, data on the level of new business sales and EMS certification costs was also collected. In both cases businesses were asked to estimate the level of costs and benefits that could be attributed to the EMS.

31 SMEs were recruited to the study and is not statistically significant. Numerous avenues were taken to gain SME participation in the study, however the SMEs were not randomly selected and each chose to participate in the study and was therefore self-selected. These factors both influence the representativeness of the sample to the total population of SMEs with certified EMSs e.g. SMEs could have volunteered to gain
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the free external feedback on their EMS that the study offered or it is possible that those SMEs with more favourable experiences of EMSs were more likely to participate. It is also possible that those SMEs with less favourable experiences wanted to obtain the independent consultancy support offered through the study. Nevertheless, the study’s sample of 31 SMEs is the largest group of SMEs to undergo such a detailed investigation of its certified EMS in the UK, both from the point of view of the opinions of decision makers and those that implement and work with EMSs, and in terms of the verified evidence gathered on the actual environmental and financial benefits and savings of the sample’s EMSs.

The respondents were split almost equally between small enterprises (15) and medium-sized enterprises (16). More service sector SMEs (19) were recruited than manufacturing SMEs (12). Micro enterprises and the primary sector were excluded from the study because of the low occurrence of certified EMSs in both groups, the limited potential uptake and, in the case of micro enterprises, the difficulty of recruitment.

The international EMS standard ISO 14001 dominated the study’s sample, which tallies with the market dominance of this standard in the UK. EMAS did not feature in the sample echoing its lack of uptake in the UK. 9 of the 31 SMEs in the study had used BS 8555/Acorn: the staged approach to EMS implementation specifically targeted at SMEs; 6 of these had used it as a route to ISO 14001 certification with the remaining 3 staying at a particular BS 8555/Acorn phase. SMEs in the study could be said to have a ‘standards’ culture holding a number of other certifications in addition to their EMS, including quality (ISO 9001 held by 23 SMEs), health and safety (OHSAS 18001 held by 7 SMEs), working practices (Investors in People held by 5 SMEs) and specific product or industry standards.

Commercial and marketing opportunities were by far the most important initial trigger for SMEs’ decision to adopt an EMS suggesting that this is more important than cost savings in converting SMEs to the benefits of EMSs. However, given the low numbers of SMEs with a certified EMS compared with the total numbers of SMEs in the UK, SMEs must face many barriers to the adoption of EMSs otherwise more could be expected to have a certified EMS. Once the decision to adopt an EMS had been made, different drivers to retain an EMS were identified: legal compliance was an important driver for manufacturing SMEs and medium-sized enterprises, whereas sales and marketing opportunities were important drivers for service sector SMEs and small enterprises. These different drivers reflect the different pressures experienced by SMEs and the varied and diverse nature of the SME sector as a whole.

Encouragingly, the quantitative data in the study clearly demonstrated that certified EMSs delivered cost savings for the majority of the 31 SMEs in this study, with an annual average saving over 2 years of £4,875 per £m turnover. The costs of certifying and implementing the EMS were calculated at £1,362 per £m
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turnover (annual average over 2 years), therefore providing a payback period of 3 months for the cost savings alone. The savings were achieved across a range of environmental issues (waste, energy, travel, raw materials and water) and had generally increased over time, showing on average a 16% increase in the second year compared to the first. Not all SMEs in the study achieved savings and those SMEs that invested in 'spend to save' efficiency measures achieved the highest savings, i.e. investing upfront to achieve longer-term savings.

Energy, raw materials and business travel were the environmental issues which delivered the highest cumulative cost savings (i.e. aggregated savings for the first 2 years of the EMS) at £3,087, £3,037 and £2,875 per £m turnover respectively. However in terms of percentage reduction, waste to landfill contributed the highest average savings per enterprise with a Year 1 saving of 28% and a Year 2 saving of 43%. Unlike the other environmental issues, savings in travel and raw materials were largely attributed to other factors and were not mainly due to the EMS, despite the high savings in business travel. The cost of fuel was likely to have been a more significant driver of savings in business travel and factors such as process efficiencies were likely to have made a greater contribution to reductions in raw material use.

The study’s data also showed that 28 SMEs made an average cumulative saving in carbon dioxide equivalent (CO₂e) of 38.9 tonnes per £m turnover per SME and that the carbon savings improved over time, with Year 2 figures up 59% on Year 1 figures. However some SMEs, mainly medium-sized manufacturing enterprises, had a cumulative increase in carbon over the 2 years. Perhaps unsurprisingly, energy was by far the largest contributor to carbon reductions.

The quantitative data also demonstrated that new business sales were attributed to the EMS by SMEs in the study. The value of new business sales was greater than cost savings, with just over a third of SMEs in the study achieving new business sales as a result of their certified EMS at an average value of £14,961 per £m turnover in the year following certification (Year 2). This provides a payback period of just 1 month for the new business sales alone versus EMS costs. Another third confirmed that they expected new sales to be achieved as a result of their EMS, but could not put a value on it and the remaining third attributed no new business sales to their EMS.

The EMS implementation costs included staff time, as well as expenditure on consultants, third party certification and environmental improvement measures. These costs represented just 0.14% of average annual turnover, however small enterprises bore disproportionally heavier average costs at £2,781 per £m turnover, compared with medium-sized enterprises at £1,000 per £m turnover. The data on costs was variable and was not captured for all 31 SMEs. The level of certification fees varied depending on both size
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and sector. Small enterprises paid less (£1,150) than medium-sized enterprises (£2,124) and service sector SMEs paid less (£1,453) than manufacturing sector SMEs (£1,982). The sector type is believed to influence the level of certification fees because more complex environmental issues are likely to be found in the manufacturing sector compared to the service sector, thus requiring additional auditor time and higher fees. The medium-sized enterprises are likely to require more auditing time than the smaller enterprises due to the scale of operations. Nevertheless, the 31 SMEs in the study were universally positive about achieving a certified EMS believing that it was a necessary commercial advantage and a logical step to finishing off their EMS.

SMEs in the study were positive about additional benefits and the added value of a certified EMS. Benefits varied and related to enterprise size and sector with legal compliance a key benefit for manufacturing SMEs and medium-sized enterprises in the study. Energy/resource efficiency and better marketing credentials were key benefits for service sector SMEs, in particular small service sector enterprises. Cost savings, although not a trigger for EMS adoption, was seen as an important benefit, especially for small enterprises. Other benefits also derived from the EMS, for example, the majority of SMEs felt that the EMS assisted them in qualifying for public sector opportunities. Some SMEs also thought that it improved their general management approach such as creating a common goal and encouraging better communication. Over a third of SMEs, mainly from the service sector, believed their EMSs had become more rather than less important during the economic downturn.

An important feature of the study was that it investigated the attitudes and behavioural changes brought about by an EMS by interviewing members of staff within the 31 SMEs, e.g. the managing director (MD) or senior manager, the environmental management representative (EMR) and a general member of staff (staff). Based on the perceptions of these respondents, the study found that those SMEs that reported higher levels of staff engagement achieved the highest cost savings suggesting that staff involvement in an EMS appears to be a contributory factor in the delivery of its results. All 31 staff respondents surveyed were more positive towards their companies since the EMS was implemented and the majority had seen changes in their working practices. The majority of EMRs interviewed thought there had been a transfer of positive behaviour from the workplace to home whereas the staff in the SMEs were less sure of this. The EMRs may have been overly optimistic about the impact of the EMS on staff behaviour, but to some degree the staff surveyed were more advanced in their environmental actions than their employers.

Within the SMEs sampled for this study, the increased uptake of EMS has, in part been due to the supply chain pressures of customers on their suppliers to improve environmental performance. The study demonstrated that SMEs are actively engaged with their supply chains and are part of the pressure
contributing to the expansion of EMS uptake. All but one of the SMEs in the study had received requests for information from customers about their EMS and over a half of the SMEs had in turn contacted their suppliers. Unsurprisingly, given the supply chain pressures experienced by SMEs in the study, customers influenced the decision to adopt an EMS in the majority of SMEs, and as a result of achieving EMS certification the majority of the 31 SMEs believed their relationship with their customers had improved.

The study found that EMS implementation typically took between 7 and 12 months with the mode being 12 months. The majority of SMEs in the study implemented their EMS in this timeframe and achieved much higher cost savings at £2,401 per £m turnover than those that took either less or more time (average savings of less than £500 per £m turnover).

SMEs in the study did face problems with both their EMS implementation and certification, however were generally positive about overcoming these. This could be due to the self-selecting nature of the study’s participants in that they might be expected to hold positive views about EMSs or it could reflect a ‘can do’ attitude in the respondents. Just over half of those that did face implementation barriers cited employees not being engaged in the EMS process, complexity of the system, limited financial resources and lack of internal skill and knowledge as the main barriers. Some SMEs cited the importance of the availability of external funding in their decision to implement an EMS.

This study has delivered qualitative and quantitative evidence on the drivers, benefits and barriers of EMS in SMEs. The qualitative evidence shows that SMEs reap internal and external benefits, both in terms of behavioural issues such as staff engagement and awareness, and commercial issues such as increased sales and improved relationships with stakeholders. The quantitative data provides robust evidence that EMSs had generally delivered cost savings and new business sales for the majority of the study’s SME participants. For the cost savings alone, there was an average payback period of 3 months for the investment in EMS implementation. With the caveat that the study investigated just 31 SMEs that could not be considered representative of the whole population, these findings are encouraging for any SMEs that may be considering the business case for adopting an EMS. They also suggest that EMSs could have an important role to play in helping to unlock the latent cost savings potential within the SME population.
1.0 Introduction and Context

1.1 Project Context and Aims

Small and medium-sized enterprises\(^1\) (SMEs) are of great importance to the local and UK economies, accounting for 99.9 per cent of all businesses and providing 59.8 per cent of all private sector jobs in 2009\(^2\).

There are approximately 2.9 million SMEs in the UK representing a huge diversity of organisations working across all economic sectors. At the same time SMEs collectively have the potential to exert considerable pressures on the environment, including the use of finite resources and the generation of polluting emissions, discharges and waste. More so than larger companies, SMEs face a number of obstacles when addressing such pressures, for example lack of resources, specific expertise, information and awareness. However, there is some evidence to suggest that firms that implement environmental management systems (EMSs) such as the international standard ISO 14001, the EU's Eco-management and Audit Scheme (EMAS)\(^3\) or the BS 8555\(^4\)/Acorn Scheme\(^5\), are better placed to manage their environmental impacts and reap the associated marketing benefits and cost savings.

Given the vast number of SMEs in the UK, the size of the EMS market amongst SMEs could be large, but despite the potential benefits that, anecdotally at least, accrue to EMS participants, there is still an apparent lack of engagement by SMEs in EMS implementation. It is difficult to estimate the exact numbers of SMEs with EMSs because of the lack of published data on the names, size, nature and details of organisations that are certified to ISO 14001, and the absence of specific information on the size of organisations that are registered to EMAS and BS 8555/Acorn. However for this project it was estimated from available data sources that in 2009, a total of 126 SMEs were certified to EMAS and BS 8555/Acorn\(^6\). It was not possible to estimate ISO 14001 numbers with any confidence due to the lack of published data on ISO 14001.

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\(^1\) Commission adopted Recommendation 2003/361/EC regarding the SME definition states a small and medium-sized enterprise definition is based on employee numbers, turnover or balance sheet, and ownership. An SME has less than 250 employees. Full details at: [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm)


\(^3\) [http://ec.europa.eu/environment/emas/index_en.htm](http://ec.europa.eu/environment/emas/index_en.htm)

\(^4\) British Standard BS 8555: Guide to the phased implementation of an environmental management system including the use of environmental performance evaluation - published in April 2003.

\(^5\) The Acorn scheme uses UKAS-accredited Acorn Inspection Bodies to provide confirmation of successful implementation of the relevant Phases (6 in total) of the British Standard BS 8555 [http://www.iema.net/ems/acorn_scheme/bs8555](http://www.iema.net/ems/acorn_scheme/bs8555).

\(^6\) In 2009, 5 of 60 EMAS registered companies were taken to be SMEs (through analysis of the EMAS register) and 121 of 239 companies on the Acorn register were taken to be SMEs (The Acorn scheme is aimed at SMEs, its register was reviewed and all non-businesses removed, i.e. educational organisations, NGOs, public sector organisations etc, as well as any obviously larger companies. The remaining companies were all assumed to be SMEs). In 2006/07, 5,400 organisations were certified to ISO 14001 but because there is no centrally held or administered list of ISO 14001 certified organisations, it was not possible to estimate the number of SMEs certified to ISO 14001.
certifications. The low numbers of SMEs with EMS certification, in comparison with the total number of UK SMEs could, in part, be explained by market failures such as the paucity of concrete data on the actual environmental and financial benefits of EMSs for the sector. It could also be because SMEs experience cultural barriers such as a resistance to change, even when it is financially beneficial to do so, or an unwillingness to adopt new processes due to difficulties in estimating up-front costs compared to longer-term benefits.

The main aim of this study was to address this lack of concrete data and deliver robust evidence on the environmental and financial benefits of EMS implementation for SMEs. By addressing this data gap, the results could be used to help present the business case for SMEs participation in EMSs as a way of unlocking the latent environmental and financial savings that are believed to exist in the SME sector as a whole. In turn, this could contribute to the Government’s aims for sustainable economic growth, a low carbon and resource efficient economy, and a strong sector for the delivery of environmental goods and services, i.e. the green economy. It could also have the potential to lessen the need for public funding in the delivery of future environmental support.

The objective of this study was to undertake a survey to gather both quantitative and qualitative data from SMEs with certified EMSs through a series of on-site visits. This survey aimed to identify the drivers and barriers for EMS uptake, the achieved environmental and financial savings, and other business benefits including behavioural benefits from EMS implementation. The project also sought to determine the reasons for the relative effectiveness of EMS implementation so that lessons learned could be applied to the future delivery of EMS implementation support to SMEs.
2.0 Conclusions and Interpretation

The study’s key findings and conclusions are presented as answers to a series of questions derived from the investigation into the qualitative and quantitative benefits of certified EMSs in 31 SMEs. These questions, grouped in themes, address what are seen as important issues of interest to policy makers, intermediate organisations such as trade associations and SMEs.

The final sample of 31 SMEs is not statistically significant. Numerous avenues were taken to gain SMEs participation in the study, however the SMEs were not randomly selected and each SME chose to participate and was therefore self-selected. These factors influence the representativeness of the sample to the total population of SMEs with EMSs. For example, SMEs could have volunteered to gain the free external feedback on their EMS that the study offered or it is possible that those SMEs with more favourable experiences of EMSs were more likely to participate. Conversely, it is also possible that those SMEs with less favourable experiences joined the study to obtain the independent consultancy support offered through the study.

Nevertheless, the study’s sample of 31 SMEs is the largest group of SMEs to undergo such a detailed investigation of its certified EMS in the UK, both from the point of view of the opinions of decision makers and those who have been responsible for implementing EMSs, and in terms of the verified quantitative evidence gathered on the actual environmental and financial benefits of the sample’s EMSs.

2.1 EMS Standards and their Implementation

*Which EMS standards did the SMEs use and why?*

The UK has three main EMS certification standards: ISO 14001, EMAS and BS 8555/Acorn, all of which were considered in this study. Unsurprisingly, given the dominance of ISO 14001 in the UK, this study’s sample was also dominated by ISO 14001 (held by 28 of the 31 SMEs). The remaining 3 SMEs held BS 8555/Acorn – a scheme specially designed with SMEs in mind. Six of the 28 SMEs had used BS 8555/Acorn as a route to achieving ISO 14001, which confirms that 9 of 31 SMEs in the study had used the BS 8555/Acorn phased approach to implement their EMS.

Although popular in some EU member states, in particular Germany, EMAS is not popular in the UK, with only 60 EMAS registered organisations in the UK in 2009 compared to 5,400 ISO 14001 certified organisations in 2006/7. EMAS did not feature in this study therefore no conclusions can be drawn on the
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relative success of EMAS compared to ISO 14001 or BS 8555/Acorn at delivering qualitative and quantitative benefits to SMEs. Two SMEs had however since gone on to achieve EMAS and another had let EMAS lapse following a change in company structure.

What other standards did the SMEs use and did they influence environmental and cost savings?

In addition to their certified EMSs, the 31 SMEs in this study generally held a number of other certifications including those for quality (ISO 9001 held by 23 SMEs), health and safety (OHSAS 18001 held by 7 SMEs), working practices (Investors in People held by 5 SMEs) and specific product or industry standards. This appeared to reflect a ‘standards’ culture amongst the study’s sample. This may have meant that the SMEs in the study were willing to adopt an EMS because they were already familiar with, and therefore open to, the systems approach, due to their experiences with other standards. Alternatively it could mean that their experience with other standards had been positive and had satisfied a specific business need, so they therefore more readily understood the potential business benefits of an EMS.

In general, the data from this study revealed that holding certification to one or more standards in addition to a certified EMS did not translate into higher environmental and cost savings. In fact, the 7 SMEs in the study with certification to no standards other than their EMS achieved higher cost savings (£2,271 per £m turnover) than those with certification to at least one other standard (£1,668 per £m turnover). This result could have been due to bias in the data or possibly because these 7 SMEs had focused on performance first and then developed their EMS around a more performance-based approach. However the majority of SMEs (23 of 31) in the study had ISO 9001 and achieved slightly higher average cost savings (£1,761 per £m turnover) than those without ISO 9001 (£1,462 per £m turnover) suggesting the two standards can work in concert to deliver slightly better cost savings.

What was the optimum time period to implement an EMS for the SMEs?

SMEs embarking on EMS implementation typically want to know how long the process should take. This study found that not only was the most frequently cited implementation time period between 7 and 12 months – the mode being 12 months - but also that the 20 SMEs which implemented their EMS within this time frame achieved significantly higher cost savings at £2,401 per £m turnover than those that took either less or more time (average savings of less than £500 per £m turnover). Whilst this relationship is drawn with some caution, there are some reasons why it might exist. Firstly, the 7 to 12 month implementation period indicates that sufficient time had been allocated to effectively implement the requirements of the EMS and to engage with staff, whereas a shorter time period may indicate the opposite. Secondly, a longer
implementation time period (up to 30 months in one case) possibly indicates a stop start approach and a lack of management commitment/resources to completing the process. This may thus represent an underachievement in terms of fulfilling the requirements of the EMS and its potential benefits.

2.2 Drivers for EMS Adoption

What drove the SMEs to implement an EMS?

Two aspects of EMS implementation were investigated in the study: firstly what triggered the initial decision to implement an EMS and secondly what drove the EMS implementation process. Although multiple reasons were given by the 31 SMEs in the study as the initial trigger for the decision to implement an EMS, commercial and marketing opportunities were by far the most important for the majority of SMEs in the study. Cost savings was not an important trigger for the decision to adopt an EMS in SMEs, but it became an important driver of EMS implementation, a finding that supports other studies in the Literature Review (see Annex A and references Abeliotis 2005, ENDS 2006, Massoud et al 2009, NIEA 2009 and Zorpas 2009). This finding has implications for how EMSs are promoted to SMEs in that selling an EMS on the strength of its cost savings potential may not be as powerful a driving factor at encouraging SMEs to adopt an EMS for its potential commercial and marketing benefits.

The study identified enterprise size and sector differences to the drivers of EMS implementation. EMS implementation in manufacturing SMEs and medium-sized enterprises was more driven by legal compliance (regularly cited in the Literature Review, see Annex A). This possibly reflects the greater number of legal requirements applying to such enterprises and may be due to pressures from regulatory bodies to have systems in place to ensure compliance. The 19 service sector SMEs in this study were driven more by the publicity and reputational gains and the sales and marketing opportunities derived from an EMS. The former was frequently cited in the Literature Review as a driver of EMS implementation, whereas the latter was cited in only one report by Iraldo et al, 2005 (see Annex A). Sales and marketing opportunities were also an important driver for EMS implementation in small enterprises, together with cost savings.
Evidence-based Study into the Benefits of EMSs for SMEs

2.3 Benefits of EMS: Cost Savings, Carbon Reduction and New Business Sales

Did the EMS deliver cost savings for the SMEs?

The quantitative data in this study clearly demonstrated that certified EMSs delivered cost savings for the 31 SMEs, with average cost savings (per £m of turnover) of £4,518 in Year 1 and £5,231 in Year 2, or average cumulative savings of £9,749 per £m turnover for the first 2 years of the EMS. These cost savings were realised across a range of environmental issues (energy use, water use, raw materials use, waste to landfill and business travel). A 16% increase in savings was evident in the second year (i.e. the year immediately following certification) relative to the first year. This confirms a time lag in savings between the implementation year (Year 1) and the post-certification year (Year 2), possibly indicating that the attention shifts from the initial EMS implementation/certification in Year 1 to environmental performance improvements in Year 2. This also supports the hypothesis that a certified EMS will deliver stronger performance over the medium to longer term in line with the continual improvement model that is followed by formal EMS standards.

The study also found that not all SMEs reported savings and 4 SMEs actually increased their costs over this period. This finding about lack of savings may be due to any number of factors, including seasonality (e.g. higher energy use due to colder winters or higher water use due to drier, warmer summers), poor performance, technical problems (e.g. water and gas leaks, machinery downtime/malfunction) or variable workload (e.g. greater or lesser travel requirements owing to changes in customer locations).

The percentage savings for some SMEs were impressively high, e.g. a small manufacturing enterprise reduced its energy use by 79% and a small service enterprise reduced its raw materials use by 42%. In some cases, despite the high percentage savings, the associated cost savings were quite small due to the relatively low baseline costs, a situation that was particularly true for small service enterprises.

Perhaps unsurprisingly, those SMEs that invested in ‘spend to save’ efficiency measures tended to achieve the highest savings. SMEs that had more robust monitoring of their environmental performance also tended to achieve better results, supporting the ‘what gets measured gets managed’ maxim. Most SMEs did not collect data on all their relevant environmental issues and two were unable to produce any records due to loss of data (i.e. because they had moved sites or lost files). Also, very few SMEs used normalisation factors to make their performance data more meaningful (e.g. dividing performance data by turnover, employee numbers, production units, etc), thus preventing them from accurately identifying any true efficiency savings. This study helped to demonstrate the importance of normalising performance data for these SMEs.
Evidence-based Study into the Benefits of EMSs for SMEs

What environmental issues delivered the highest cost savings for the SMEs?

It is a requirement of EMS standards that implementing organisations focus on the significant - not all - environmental aspects of their operations. In this study, data was collected on waste to landfill, energy use, business travel (distance and fuel), raw materials use and water use across the sample; the main areas that an EMS usually addresses in its early years of implementation. Quantitative data was not collected on supply chain and product/service as they are typically tackled in more mature EMSs.

Energy use was the environmental issue which contributed the highest average cumulative cost savings at £3,087 per £m of turnover (confirming studies by Abeliotis, 2005, ENDS 2006 and Milieu, 2009 – see Annex A), with raw materials use a close second at £3,038 per £m turnover and business travel fuel use third at £1,598 per £m turnover. Business travel distance (£607 per £m turnover), water (£590 per £m turnover) and waste (£315 per £m turnover) lagged well behind the other data sets in cost savings. However in terms of the average percentage reduction of the environmental issue, waste to landfill delivered the highest savings per SME with a 28% saving in Year 1 and a 43% saving in Year 2. Business travel distance delivered savings of just 2% and 5% respectively for the same two years and energy use delivered savings of 6% and 10% for the same periods, showing that the high costs of energy use helps to ensure higher cost savings, despite relatively low percentage improvements.

Each SME in the study did not focus on every environmental issue covered by the study in their EMS, but rather on those environmental issues (aspects) that were highlighted as significant for their operations. This study captured data for those environmental issues where a saving could be expected because of the effort placed in that area. For those issues that savings data was collected for, each SME needed to attribute a proportion of the identified saving to their EMS. For waste to landfill, water use and energy use, SMEs attributed a high percentage of the savings achieved (85% and above) to the EMS, suggesting that these environmental issues were effectively targeted by an EMS and that the EMS had been a major factor in achieving the savings. Business travel and raw materials were given much lower attribution values indicating that other factors had contributed to the achieved savings in these areas. In the case of business travel, other factors may have driven the improvements such as rising fuel costs and the sensitivity of tackling staff business travel habits. In the case of raw materials, other factors such as process efficiency measures could have already been introduced and made a greater contribution to raw material savings than the EMS.
Evidence-based Study into the Benefits of EMSs for SMEs

What is the payback period for EMS implementation?

The quantitative study identified encouraging payback periods for EMS implementation. The average total annual EMS costs in the study were £1,362 per £m turnover which was significantly lower than the average annual cost saving of £4,875 per £m turnover and the average new business sales of £14,961 per £m turnover. For the cost savings alone this provides a payback period of 3 months and for the new business sales, a payback period of 1 month. Again for cost savings alone, the payback period was much longer for small enterprises at 23 months than for medium-sized enterprises at 5 months, and also for service sector SMEs at 15 months compared to 4 months for manufacturing SMEs.

Did the EMS deliver carbon savings for the SMEs?

The SMEs in the study achieved an average cumulative saving in carbon dioxide equivalent (CO₂e) of 38.9 tonnes per £m turnover, which was attributed directly to the EMS. These CO₂e savings were calculated for waste to landfill, water use, energy use and business travel. No suitable conversion factors were available for raw materials, hence the true CO₂e savings would actually be higher than reported if suitable (i.e. consumption-based) conversion factors had also been available for raw materials. Carbon savings also increased over time with the average Year 2 savings of 23.9 tonnes per £m turnover being 59% higher than the average Year 1 savings of 15.0 tonnes per £m turnover. This again highlights the possible time lag effect whereby savings had a tendency to increase in Year 2 relative to Year 1, again perhaps suggesting that the SMEs tended to shift focus from the initial EMS development/certification process to performance improvement as time progressed. Energy use was by far the biggest contributor to CO₂e savings with a few manufacturing SMEs making substantial savings in this area, i.e. two manufacturing SMEs made cumulative CO₂e savings of 3.161 and 2.063 tonnes per £m turnover through their energy use alone.

CO₂e savings were not universal amongst the study's SMEs: some had increases in CO₂e emissions in Year 1 and others in Year 2, whilst 5 SMEs, 4 of which were medium-sized manufacturing SMEs, had a cumulative increase in CO₂e emissions over the 2 years. This increase may have been due to a number of factors such as cultural or behavioural differences between medium-sized enterprises and small enterprises, and between manufacturing and service sector SMEs, or due to other factors such as reduced scope for savings due to a stronger environmental starting position.

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Evidence-based Study into the Benefits of EMSs for SMEs

Did the EMS deliver new business sales for the SMEs?

Just over a third of SMEs in the study achieved new business sales as a result of their certified EMS at an average value of £14,961 per £m turnover. A further third said they gained new business sales as a result of their EMS, but could not put a value to it. Many SMEs also confirmed that their new business sales had increased to a greater degree beyond Year 2 and that this trend was strengthening with each additional year. This trend could be expected to continue as awareness and uptake of EMS increases, so for many SMEs the EMS is seen as a positive supporting factor for future growth. More service sector SMEs could identify new business sales as a result of their certified EMS than manufacturing SMEs, possibly because the service sector SMEs in the study were more orientated to marketing their EMS certification. This ties in with the finding that service sector SMEs had identified increased sales and marketing as a key driver for their sector. However just under a third of the SMEs in the study stated that they could not attribute any new business sales to their certified EMS.

The value of new business sales at an average of £14,961 per £m turnover for Year 2 was 53% higher than the average cumulative cost savings of £9,749 per £m turnover achieved by SMEs in the study and 207% higher than the cost savings as an annual average for Years 1 and 2. This clearly demonstrates the importance of EMSs as a marketing tool, as well as a source of environmental improvements and cost savings. However a higher number of SMEs reported cost savings than reported new business sales, suggesting that not all SMEs in this study were able to gain clear marketing benefits from their EMS. A certified EMS is considered a business marketing tool and this study confirmed that new business sales were generally credited to the marketing value of the certificate itself, rather than increased sales related to the development of new products and services with improved environmental performance features. These latter issues are generally not well tackled via an EMS, particularly in the early years of EMS implementation that were the focus of this study.

What additional benefits did the EMS bring and did it have added value for the SMEs?

SMEs in the study were generally positive about the benefits and added value of a certified EMS. The benefits were varied and related to enterprise size and sector: manufacturing SMEs and medium-sized enterprises cited improved legal compliance as a key benefit, whereas service sector SMEs, in particularly small service sector enterprises, cited energy and resource efficiency savings, and better marketing credentials as key benefits. Cost savings, although not a trigger for EMS adoption, was seen as an important benefit, especially for small enterprises compared to medium-sized enterprises, confirming findings by a number of authors (see for example Rennings 2005 and Sieffert, 2008 in the Literature...
Evidence-based Study into the Benefits of EMSs for SMEs

Review in Annex A). The importance of cost savings for small enterprises may be because of the relatively high implementation costs for these enterprises and the more pressing need to recoup these costs by making savings. Interestingly, those SMEs that had ranked cost savings as a benefit of the EMS in the qualitative survey achieved higher cost savings than those that had not ranked this as a benefit. This could be either because this group of 14 SMEs had better monitoring and records of their achieved cost savings (i.e. greater awareness) or because this group focused their EMS on delivering cost savings and were more actively engaged in achieving results.

SMEs in the study found added value from the EMS, both externally and internally. The majority stated that the EMS had assisted them in qualifying for new opportunities in the public sector with some considering these opportunities to have been significant to their overall success. For example, one SME stated that the EMS had made it easier for them to complete pre-qualification questionnaires. Over a third of SMEs, mainly from the service sector, believed that their EMSs had become more rather than less important during the economic downturn. Also the majority of SMEs agreed that there had been benefits to their companies’ general management approach, citing for example, that the EMS had led to more proactive management of key cost areas, created a common goal and encouraged better communication. One small service sector enterprise summed up the added value of an EMS by stating: “There are a lot of intangible benefits to having put the EMS in place, from changing cultures, which was one of the best outputs, to helping promote self esteem as it’s an internationally recognised scheme.”

What is the significance of this study for larger enterprises?

When scaled up per £m turnover for larger enterprises, the cost savings and new business sales data show that significant value could be added by an EMS. For an enterprise with a £100m turnover, the extrapolated annual cost savings would be £487,460 and the new business sales would be £1.496 million. This highlights the potential for larger organisations to achieve financial benefits from EMS implementation. Again, these figures should be considered with the caveat that the sample is not necessarily representative of all the UK SMEs.

2.4 Engagement, Attitudes and Behaviour

Did the level of staff engagement influence environmental and cost savings results for the SMEs?

This study suggests that the more successful EMSs were linked to higher levels of staff engagement and awareness. Those SMEs in the study with higher levels of staff engagement delivered the highest cost savings.
savings. This result appears to be logical in that the EMS objectives, targets and programmes for environmental improvement were more likely to be delivered if staff were aware what was required of them in delivering results, and were more engaged in the process and therefore able to affect outcomes. Small enterprises in the study had a greater level of staff awareness and engagement than the medium-sized enterprises, possibly because a fewer number of employees (i.e. less than 50 for small enterprises) allowed for more direct communication and interaction between managers and staff on the EMS.

*Did the EMS change attitudes and behaviour for the SMEs?*

The majority of staff respondents in the study had changed their attitudes and behaviour since their company’s EMS was implemented, i.e. they were more positive toward their companies and their working practices had changed since the EMS was implemented. In addition, the majority of environmental management representatives (EMRs) in the study believed there had been a transfer of positive environmental behaviour from the workplace to home. EMRs’ views contrasted with staff views that were less positive about the transfer of environmental behaviour between both work and home, and home and work. This may be due to the fact that staff in the study had already made changes to their environmental behaviour at home and believed that their employers were merely catching up with their own attitudes by implementing an EMS. It is possibly to be expected that the EMR would have a more positive attitude towards environmental behaviour changes and would therefore tend to overestimate the degree to which environmental behaviours transfer between work and home. This is partly because the EMR is more directly involved in the day-to-day running of the EMS, and partly because the EMR is more aware of the types of behaviour changes possible. However, it was encouraging that implementing an EMS appeared to impact positively on the attitudes of staff towards their employers.

### 2.5 Suppliers and Stakeholders

*Were the SMEs engaged with their supply chains?*

The study found that SMEs were actively engaged with their supply chains not only by encouraging their suppliers and contractors to have certified EMSs, but also by responding to customer requests for details on their own certified EMSs. Requests from customers were received by all but one of the 31 SMEs in the study, whereas just over half of the SMEs engaged with their suppliers, with the service sector SMEs being more active in contacting their suppliers than manufacturing SMEs. Generally service sector SMEs have more environmental impact upstream of their sites in comparison to manufacturing SMEs, therefore see the need to influence supply chain environmental performance to reduce their overall environmental impact and
Evidence-based Study into the Benefits of EMSs for SMEs

This may explain the study’s result. It could also be due to attitudinal or behavioural factors between the two sectors. Supply chain pressure is considered an important factor in encouraging environmental improvements and the uptake of EMSs (ENDS 2006 and Experto Crede, 2009); and this study confirmed that SMEs, to varying degrees, were playing their part in promoting EMSs in the supply chain.

Were stakeholders important for the SMEs’ EMS implementation?

A variety of stakeholders were rated as important to the SMEs in the study, in that they influenced the decision to implement an EMS and their relationships had changed as a result of the EMS. Unsurprisingly, given the supply chain pressures that the SMEs experienced, customers influenced the decision to implement an EMS for the majority of SMEs in the study, and as a result of achieving EMS certification the majority of SMEs also believed their relationship with their customers had improved. Regulators were a very important stakeholder for manufacturing SMEs, echoing the result that legal compliance was an important driver of EMS adoption for this group and supporting findings from earlier studies (see Table 6 in the Literature Review in Annex A).

Management and employers were also important stakeholders to SMEs in the study and the EMS was believed to have improved internal relationships, possibly because the EMS had brought about better communication and greater involvement. One SME summed this up by stating that the EMS: ‘created a common goal, got everyone involved and encouraged communication’. For the majority of SMEs, EMS certification had not improved their relationships with competitors, local community, insurers and lenders or shareholders and investors. Although suppliers and contractors were not as important as stakeholders in the decision to adopt an EMS, both small enterprises and service sector SMEs found that their relationships had improved with these stakeholder groups once EMS certification was achieved. A possible reason for this was because these enterprises had improved their credentials as a result of the EMS and thus garnered more credibility and possibly respect.

2.6 Costs and Benefits of Certification

What were the costs of implementing an EMS in the SMEs?

EMS implementation costs in this study included: staff time spent implementing and maintaining the EMS, expenditure on consultancy support, third party certification fees and capital expenditure on environmental improvement measures. These costs were relatively low as a percentage of turnover with the average for the study being 0.14% or £1,362 per £m turnover. However, when looked at by enterprise size, the burden...
of costs fell more heavily on small enterprises (average cost £2,781 per £m turnover) than medium-sized enterprises (average cost £1,000 per £m turnover). This is because the costs for EMS implementation do not fall proportionally in line with turnover, meaning that smaller enterprises have to spend a higher proportion of their turnover for the same output and thus struggle more with affordability. The highest cost category was capital expenditure with an average over the 2 years of £13,470 per SME, followed by internal staff resource at £11,744. These expenditure figures have not been normalised at the individual category level. However the majority of SMEs did not report any capital costs and 9 SMEs could not identify their staff costs. The quality of data on costs is considered to be variable.

**What were the benefits and costs of certification for the SMEs?**

The benefits for SMEs having EMSs certification could be divided into two themes: the first related to commercial imperatives summed up best by a small service sector SME that stated: “There is zero marketing potential for a non-certified EMS”. The second relates to certification being a logical conclusion to the EMS implementation process and a chance to obtain third party feedback on the quality and effectiveness of the EMS. A few SMEs in the study also mentioned that certification brings credibility to the EMS, thus adding value with clients and differentiating them from competitors.

Although 12 certification bodies featured in this study, data was not analysed by certification body as the SME numbers per certification body were too small to draw any meaningful conclusions.

As expected, the average certification fees reported in the study varied depending on the size of the enterprise: small enterprises paid less (£1,150) than medium-sized enterprises (£2,124). Certification fees also varied based on sector with service sector SMEs paying less (£1,453) than manufacturing SMEs (£1,982). Variations in certification fees are typically related to the size of an organisation in terms of employee numbers as well as the complexity of environmental issues and processes being audited. This explains why medium-sized manufacturing enterprises paid the highest certification fees at £2,381. The availability of public funding to help reduce or eliminate certification fees was important to some SMEs, in particular small enterprises. This is considered to be because the certification costs represent a much higher proportion of turnover for these SMEs, and are thus felt more pressingly. Any opportunity to avoid or reduce these costs can therefore provide a stronger incentive to undergo third party certification.
2.7 EMS Implementation and Certification Problems

What barriers did the SMEs face in EMS implementation?

A positive feature of the study’s results was that nearly half of the SMEs stated that they did not face any barriers to EMS implementation, and that if there were barriers, they were generally considered easy to overcome. Of course this may be explained by the self-selecting nature of the study’s participants that could hold more positive views about EMSs. Alternatively, it could be a reflection of the ‘can do’ attitude expressed by the SME respondents in the study.

Those SMEs, which did face barriers to EMS implementation, highlighted employees not being engaged in the EMS process, the complexity of the system, limited financial resources (in a few cases respondents specifically mentioned access to funding as critical to their EMS implementation) and lack of internal skills and knowledge, with the latter being particularly important to medium-sized enterprises. These barriers are confirmed in the literature (see Table 7 in the Literature Review in Annex A).

What problems did the SMEs face in attaining EMS certification?

SMEs in the study did not generally state that they faced many challenges in achieving certification. The most frequently cited certification challenge faced by SMEs, in particular by small enterprises, was that of addressing nonconformities raised by third party certification auditors. The difficulty in meeting the requirements of EMS standards was more keenly felt by medium-sized enterprises. These two challenges indicate that EMS standards tax the skills and management of some SMEs. Nevertheless, no SMEs considered relinquishing their EMS certification and all believed that the benefits of an EMS outweighed the barriers.

2.8 Recruitment

Why was it difficult to recruit the SMEs for this research?

Despite a comprehensive SME recruitment strategy, involving the Institute of Environmental Management and Assessment (IEMA), trade associations, certification bodies and direct approaches to SMEs, recruiting SME participants still proved difficult for this study. The final sample was 31 SMEs split almost equally between small enterprises (15) and medium-sized enterprises (16). A number of factors contributed to the
Evidence-based Study into the Benefits of EMSs for SMEs

recruitment difficulties, some related to SMEs themselves and others to the intermediate organisations contacted for this study.

There were three SME factors which affected recruitment: firstly, there was a low number of SMEs with certified EMSs; secondly, the time-poor nature of many SMEs prevented them from allocating the time needed to participate in the study and thirdly there was a lack of understanding or perception of the benefits of participation. Identifying SMEs with certified EMSs was further complicated by the lack of a centralised register detailing organisations with ISO 14001 certification and other basic information such as their size. UK EMAS registrations and BS 8555/Acorn certifications are held on centralised registers but with no details of company size. To find out which organisations were certified to ISO 14001, each certification body had to be approached directly and many were found to be unwilling to share this information.

A centralised register is needed which holds basic certification information for ISO 14001 including organisation size and the registers for EMAS and BS 8555/Acorn need to be extended with more details on organisational characteristics, particularly size. This register would have a number of functions: it would help with the recruitment for studies such as this, but, more importantly it would help customers find suppliers with certified EMSs and help organisations with EMSs to promote their achievement. This would help to curtail the misuse of unaccredited EMS certificates as well as give recognition to those organisations that had used a United Kingdom Accreditation Service (UKAS) accredited certification body to undertake their EMS certification.

There were numerous factors with intermediate organisations that affected recruitment. Some trade associations had not given the key environmental issues for their sectors too much attention or priority and some lacked an advanced understanding of the issues meaning they were reluctant to communicate with their members on this study's aims and benefits. There was also a reluctance to participate on the part of some trade associations due to their own limited resources to respond to the recruitment requests made by the project.

Certification bodies presented a mixed response to requests for help in recruiting SMEs despite the fact that the project findings, if positive, could clearly benefit their businesses. Some certification bodies had effective communication channels and contacted their clients or provided the project with client names very willingly, whilst others were bureaucratic and slow to respond, or did not respond at all. This may have been because they were nervous about revealing client details for commercial reasons, despite the fact that the project had clearly defined confidentiality procedures in place, or it may have been because of previous exposure of poorly performing certified EMSs and the associated criticism levelled at certification bodies.
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3.0 Methodology

The project collected robust data from SMEs across a range of sectors on the quantitative and qualitative benefits of certified EMSs. The method employed had a number of stages: a literature review, sector and sample selection, a recruitment strategy, development of data collection tools, on-site data collection and data analysis. Each stage is described below.

3.1 Literature Review

An initial literature review was undertaken of selected publications\(^8\) within the previous five years (2005 to 2009) to capture existing data and/or findings of relevance to this study and inform the selection of sectors and sample of participants SMEs. This has been included as Annex A.

This literature review confirmed a lack of quantitative data on the benefits of EMS implementation by SMEs. All 14 studies reviewed identified the benefits, barriers and drivers for EMS implementation by enterprises, but in general contained little quantitative data on these issues beyond selected individual company case studies. The most frequently cited drivers for EMS adoption were improved reputation, cost reduction and legal compliance. The most frequently cited barriers were lack of skills, knowledge and expertise within the organisation to implement and maintain an EMS, together with the implementation and certification costs. Only 6 of the 14 studies reviewed referred to any social and behavioural benefits.

The 14 studies reviewed did not identify those sectors with potential for growth in EMS uptake or any potential contacts for the recruitment of SMEs to this study. In addition, none of the studies reviewed described an attribution method and consequently provided no information for this project’s choice of attribution method.

The literature review indicated that few of the 14 studies analysed their findings by enterprise size e.g. micro, small, medium or large. The review did however identify some evidence of the breakdown by sector of EMS implementation by SMEs. There was a greater emphasis on the secondary and tertiary sectors, and only limited mention of the primary sector in the form of agriculture. This finding informed the project’s selection of sectors.

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\(^8\) 37 studies were identified of which 14 were selected as relevant to this study’s aims, i.e. they were published within the stated time frame; were easily accessible, referenced sources; and covered EMSs and qualitative and/or quantitative findings related to SMEs.
3.2 Sample and Sector Selection

3.2.1 Enterprise Size

The project’s focus was SMEs (see Table 1). Micro enterprises were excluded from this project for three main reasons: firstly, because of the difficulty of reaching such firms, secondly because of the likelihood of them not having the data records required by this study and thirdly because of the likely low number of micro-enterprises with a certified EMS. Consequently, the project sample of SMEs was equally divided between small enterprises and medium-sized enterprises.

<table>
<thead>
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<th>or</th>
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<td>≤ € 50 million</td>
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3.2.2 Sector Selection

Sector selection was based on the following factors: findings of the literature review on the level of EMS uptake within a sector and the occurrence of EMS within the sector, the severity of environmental impacts within a sector and Defra’s priority sectors.

The main sectors selected for the study were:

- Secondary/manufacturing (hereafter referred to as manufacturing); and
- Tertiary/service (hereafter referred to as service).

The primary sector was excluded from this study because the literature review showed few examples of EMS uptake in this sector (except for limited cases in mining and agriculture) and there was considered to be less potential for future EMS uptake.

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A company which employees less than 250 employees and either has a turnover not exceeding ECU 40 million or an annual balance-sheet total not exceeding ECU 27 million. The European Commission definition of SME can be found at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm.
Five sub-sectors were selected for each of the two main sectors, each identified by NACE code. For the manufacturing sector, the sub-sectors were:

- Manufacture of motor vehicles, trailers and semi-trailers (C29);
- Specialist construction activities (F43);
- Manufacture of chemicals and chemical products (C20);
- Manufacture of food products (C10); and
- Manufacture of textiles (C13).

For the service sector the sub-sectors were:

- Catering (I56);
- Services to buildings and landscape activities (N98);
- Printing and reproduction of recorded media (C18);
- Tourism accommodation (I55); and
- Warehousing and support services for transportation (H22).

### 3.2.3 EMS Type Selection

In the UK, organisations predominantly hold three different types of certified EMS: ISO 14001, EMAS and BS 8555/Acorn. The remit of this study was to select SMEs that had been certified to one of the three third party certifiable EMS standards, hence other EMSs were excluded. EMAS featured prominently in the literature due to one large EMAS survey, however is not widely adopted in the UK with only an estimated 5 registrations held by SMEs in 2009. Therefore although EMAS was not excluded from this study’s sample, the likelihood that an SME with EMAS would fall into the study’s sample was low.

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10 NACE coding is the system used to number and name distinct business sectors and is used by the EU and Defra.

11 Phases 3, 4 and 5 of BS 8555/Acorn were included as these were deemed to provide adequate data collection opportunities for the study’s aims.

12 A company may self declare its adherence to one of the three published EMSs however for the purpose of this study it was important that the SMEs’ EMSs and their implementation had been assessed by a UKAS-accredited third party certification body.
3.2.4 Sample Size

A sample of 50 SMEs was targeted for participation in this study: equally divided across the two business sectors (manufacturing and service) and the two enterprise sizes (small and medium).

3.3 Recruitment Strategy

Recruitment for the project followed a planned approach using the following stages:

- Stage 1: Recruitment of SMEs by the Institute of Environmental Management and Assessment (IEMA), principally via publication of articles in ‘The Environmentalist’ and ‘IEMA Downloaded’; sources that were expected to reach the large number of SME environmental managers within the IEMA membership.

- Stage 2: Recruitment of SME members of trade associations or industry bodies representing sectors of interest to this study. Each trade association/industry body was approached and asked to promote the project to any of its SME members which might be eligible for participation in the study.

- Stage 3: Recruitment of SMEs via United Kingdom Accreditation Service (UKAS) accredited third party certification bodies involved in certifying UK companies to ISO 14001 and/or BS 8555/Acorn, and/or registering companies to EMAS. This involved relevant certification bodies (33 in total) being approached and asked to promote the project to their SME clients with EMS certification.

- Stage 4: Direct recruitment of SMEs known to WYG or known to be interested in participating in the study. This also captured SMEs which expressed interest via the IEMA annual conference at which WYG presented details of the study.

The four stages above took place broadly sequentially between June and December 2010 with some slight overlap in stages to minimise project delays.

3.4 Data Collection

Using a quantitative and qualitative questionnaire, data was gathered from SMEs during on-site visits between July 2010 and January 2011. Two days were allowed for data collection per SME. During the site visits, key staff were interviewed, company records and invoices scrutinised and a site tour undertaken. After the site visit, data was written up and subjected to a quality control process. If any questions arose
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from this quality control inspection, the relevant SME or consultant was contacted to enable outstanding questions to be resolved. The selection of which environmental issues to collect data for from each SME was based around an initial discussion with and site tour of the SME to identify the areas where EMS objectives and targets had been set and/or where it could have been expected to have achieved savings. This enabled the data collection process to be focused and efficient in its approach.

3.4.1 Qualitative Questionnaire

A questionnaire was developed to gather qualitative evidence (see Annex B). The questionnaire was designed to gather the opinions of three different people within the SMEs: the Managing Director or a senior manager (hereafter referred to as MD), the Environmental Management Representative\(^{13}\) (EMR) and a general member of staff. Questions were tailored to the specific audience but all sought to gain an insight into the different views of the respondents about their company’s EMS and its impact on the company and its people and operations. The qualitative questionnaire was divided into the following seven sections: company information; details on the company’s EMS; drivers for EMS implementation including stakeholder influence (asked specifically to the MD); barriers to the company’s EMS implementation; benefits - including behavioural changes - achieved from the EMS implementation; staff views (asked to a general member of staff); and certification experiences. The majority of information about the EMS was gathered from the questions directed at the EMR.

3.4.2 Quantitative Questionnaire

A questionnaire was developed to gather quantitative evidence on the benefits of EMS implementation. This questionnaire required the collection and verification of achieved savings data in any of six environmental metrics of interest to the study, as follows:

- Waste to landfill (tonnes);
- Energy (kWh);
- Business travel fuel (litres);
- Business travel distance (km);
- Water (m\(^3\)); and
- Raw materials (tonnes)

\(^{13}\) A requirement of an EMS (ISO 14001, EMAS and BS 8555/Acorn) is that the implementing organisation needs to nominate an EMR.
Alongside the environmental issues, data was also collected to identify the financial benefits of the EMS, as follows:

- Financial savings (£) (calculated using current unit prices for each SME and derived from the identified savings for each environmental theme); and

- New business sales (£) (calculated according to the SME respondents’ best estimates of the level of increased sales that could be attributed to the EMS).

Data was also collected on the costs of the EMS relating to capital expenditure and expenditure on third party certification, internal staff resource and consultancy support. Data was not collected on the costs of any marketing activity to promote successful EMS certification.

For all data collected, the pre-EMS year (i.e. the year before EMS implementation work began) was used as the baseline against which any improvements could be measured. This baseline year was referred to as ‘Year 0’. Data for the year leading up to EMS certification was known as ‘Year 1’ and data for the year following certification as ‘Year 2’.

The rationale for this three year data collection strategy was to check and allow for the effects of any ‘quick win’ savings in Year 1 and a subsequent decrease of savings in Year 2, or alternatively a time lag in savings which may occur due to the focus on certification and system development in Year 1 and a shift in focus to performance improvement in Year 2. The collection of data for Year 2 also allowed for new business sales data to be recorded, as it is suggested that only after certification do the majority of SMEs begin to see increased sales due to their improved credentials and tendering abilities from their certified EMSs.

The process of collecting and processing the quantitative data involved three key stages as follows:

1. Collection of raw data for Years 0, 1 and 2;

2. Normalisation of data by turnover for Years 0, 1 and 2 (this involved dividing the savings by the turnover in million pounds (£m) to smooth the data for the effect of business growth or shrinkage); and,
3. Attribution of normalised savings data (this involved each SME providing an opinion as to the proportion of each measured saving that was due solely to the EMS, using a scale of 0, 0.25, 0.5, 0.75 and 1, and then each saving being multiplied by the assigned value)\textsuperscript{14}.

### 3.5 Data Analysis

A data collection and analysis tool was developed using Microsoft Office Excel 2003 for the SMEs’ data. Data collection was based on the structure and content of the qualitative and quantitative questionnaires, which the study used during the on-site visits. Analysis of the collected data made use of the inbuilt mathematical and logical functions afforded by Excel, with data and outputs supplied in Comma-Separated Values (CSV) format to support use on other platforms.

To analyse the answers in the qualitative and quantitative questionnaires, the tool allowed querying of submitted answers in 4 distinct ways:

1. Simple output of specified answers from qualitative answers;
2. Output of specified qualitative data within specified bands;
3. Output of specified quantitative data within specified values; and,
4. Combination of qualitative data within specified bands and associated quantitative data.

Results from different queries were then exported into Excel spreadsheets for additional data manipulation to produce tabulated information and graphs on the extracted data. The results for each query were presented as Year 1 and Year 2 in environmental units and financial equivalent as well as cumulative and percentages presented for each year and weighted averages for each category. Any notable outliers have been mentioned within the relevant quantitative sections.

\textsuperscript{14} A variety of attribution methodologies exist but none are totally satisfactory. Following considerable discussion, it was decided to use the attribution method that had been used and tested by delivery bodies within Defra’s BREW programme.
4.0 Results

31 SME site visits were undertaken over 6 months between July 2010 and January 2011. Throughout the presentation of results, this report seeks to highlight the range of experiences of the SMEs. The results have been analysed by enterprise size (small versus medium), sector (service versus manufacturing) and EMS type, and reported on where salient features could be identified. Analysis by sub-sector was not undertaken because the numbers of SMEs in each sub-sector were too low and varied considerably between sub-sectors. Analysis by certification body was also not undertaken as the numbers of SMEs per certification body were in many cases too low to provide meaningful results. Links have been made between the two data sets: qualitative and quantitative, where important relationships were identified.

The presentation of quantitative savings and cost data has been expressed as normalised attributed data, for Years 1 and 2, as well as cumulatively for both years against Year 0 baseline data. The presentation of quantitative new business sales data is for Year 2 only using normalised attributed data. To provide headline quantitative values for comparison with various features of the qualitative data, the following metrics were used to best represent the annual value of an EMS in financial terms:

- **Total cost savings benefit**: calculated from all the financial savings as an annual average for the Year 1 and 2 savings.
- **Total new sales benefit**: calculated by each SME for Year 2 only (i.e. the year after third party certification was achieved).

Any notable outliers have been mentioned within the relevant quantitative sections.

The study’s final sample of 31 SMEs is not statistically significant. Numerous avenues were taken to gain SMEs’ participation in the study, however the SMEs were not randomly selected for the study and each SME chose to participate and was therefore self-selected. These factors influence the representativeness of the sample to the total population of SMEs with an EMS. Nevertheless, the study’s sample of 31 SMEs is the largest group of SMEs to undergo such a detailed investigation of its certified EMS in the UK, both from the point of view of decision makers and those that implement and work with EMSs, and in terms of the verified evidence gathered on the actual environmental and financial benefits of the sample’s EMSs.
4.1 Recruitment and Sample

The recruitment of SMEs for this project proved more difficult and time consuming than originally estimated. The target project sample was revised down from 50 to 30 SMEs due to the difficulties experienced during the recruitment process. A number of salient features became apparent during the recruitment process, including:

- The scarcity of SMEs holding EMS certification in some sectors, particularly when the imposition of other study eligibility criteria, i.e. data required for one year after certification and UKAS-accredited EMS certification further restricted the possibility of participation;

- A reluctance on the part of some trade associations, industry bodies and third party certification bodies to share information about their members and/or clients, and to spend time contributing to the study, in some cases due to a lack of perceived need for action on environmental issues; and

- A lack of strong incentive for many SMEs to participate in the study, an effect which was perhaps more pronounced because of the economic downturn.

The project’s final sample was 31 SMEs, which was almost equally split between small enterprises and medium-sized enterprises, but was more heavily weighted to the service sector than the manufacturing sector (see Table 2). The project sample was fairly small and therefore not considered to be statistically significant.

### Table 2 – Sample by Enterprise Size and Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Small Enterprise (&lt;50 employees)</th>
<th>Medium Enterprise (50 to 249 employees)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Service</td>
<td>12</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>16</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

Table 3 shows the sub-sector breakdown by NACE code\(^{15}\). These results show the difficulties that were experienced when attempting to recruit for the study, with better results clearly experienced within the service sector compared to the manufacturing sector. Despite significant recruitment efforts, no SMEs were

\(^{15}\) Difficulties in recruitment meant that certain sub-sectors needed to be substituted for those initially selected for the study (see Section 3.2.2).
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recruited from either the automotive or legal and accounting sectors. The reasons for this were due to the difficulty of engaging the automotive sector in the project, and the apparent lack of SMEs with EMS certification in the legal and accounting sector, where larger companies appear more likely to have a certified EMS. Similar difficulties with engaging individual sectors were also true of the food and construction sectors.

Table 3 – Sample by Sector

<table>
<thead>
<tr>
<th>Manufacturing Sector</th>
<th>Number of SMEs</th>
<th>Service Sector</th>
<th>Number of SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>C29 – Automotive manufacture</td>
<td>0</td>
<td>N81 – Facilities management, cleaning and landscaping</td>
<td>4</td>
</tr>
<tr>
<td>F43 – Specialised construction</td>
<td>2</td>
<td>M69 - Legal and Accounting</td>
<td>0</td>
</tr>
<tr>
<td>C20 - Chemicals manufacture</td>
<td>3</td>
<td>C18 - Printing</td>
<td>4</td>
</tr>
<tr>
<td>C10 - Food manufacture</td>
<td>1</td>
<td>M71 - Architectural and engineering</td>
<td>4</td>
</tr>
<tr>
<td>OMS - Others Manufacturing Sector</td>
<td>6</td>
<td>OSS - Others Service Sector</td>
<td>7</td>
</tr>
<tr>
<td><strong>Manufacturing Sector Total</strong></td>
<td><strong>12</strong></td>
<td><strong>Service Sector Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Recruitment and Sample Findings:

- Recruitment difficulties were due in part to the reluctance of some organisations to participate in the project.

- Recruitment was difficult amongst SMEs as they are generally time-poor and needed to be convinced of the benefits of participation in the study.

- The study’s sample of 31 SMEs was not statistically significant because participants were not randomly selected.

- Due to recruitment difficulties which resulted in a study sample of 31 SMEs, the low numbers of individual SMEs in the manufacturing and service sectors or their sub-sectors meant that data analysis could not be meaningfully undertaken at a sectoral level.

4.2 EMS Details

4.2.1 EMS Types

The sample was dominated by ISO 14001 (see Table 4), which tallies with the market domination of this standard in the UK. The 28 ISO 14001 certified SMEs comprised 12 of the 15 small enterprises and all 16 of the medium-sized enterprises in the study. The sector split for ISO 14001 certified companies was 11 of the
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12 manufacturing sector SMEs, and 17 of the 19 service sector SMEs in the study. Six of the 31 SMEs used Acorn/BS 8555 as a route to achieve ISO 14001; with these equally split between small enterprises (3) and medium-sized enterprises (3) and between the service sector (3) and manufacturing sector (3).

Table 4 – EMS Type

<table>
<thead>
<tr>
<th>EMS Type</th>
<th>Manufacturing (12 SMEs)</th>
<th>Service (19 SMEs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
<td>Medium</td>
<td>Small</td>
</tr>
<tr>
<td>ISO 14001</td>
<td>2</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>BS 8555/Acorn (Phase 3)</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BS 8555/Acorn (Phase 5)</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

Three of the 31 SMEs sampled were BS 8555/Acorn certified, with one medium-sized manufacturing SME at Phase 3 and two small service SMEs at Phase 5. EMAS did not appear in the sample, however two SMEs had achieved EMAS beyond the timeframe of this study and another indicated that it had ceased registration to EMAS in favour of ISO 14001 certification. The EMS type proved unsuitable for data analysis because of the dominance of ISO 14001 in the sample.

EMS Type Findings:

- ISO 14001 dominated the study’s SMEs sample, which tallies with the UK dominance of the standard.
- Six SMEs used BS 8555/Acorn as a route to achieving ISO 14001 and in general this group did not show markedly different characteristics in the data analysis compared to those SMEs that implemented ISO 14001 directly.
- Three SMEs were still using BS 8555/Acorn as their chosen certification type.
- EMAS was not represented in the study’s sample however since the completion of this study 2 SMEs have gone on to achieve EMAS.

4.2.2 Duration of EMS Implementation

The study determined the time that it took SMEs to implement their EMSs. The majority of SMEs (25 of 31) took 12 months or less to implement their EMSs and 20 of these took between 7 to 12 months (see Figure 1 a & b). Twelve SMEs took exactly one year to implement their EMSs; with half of these from the service sector and the other half from the manufacturing sector. Six SMEs took 18 months or more to implement
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their EMSs with two of these small service sector SMEs taking 2 years or more. The shortest period of time taken to implement an EMS cited by 3 service sector SMEs was 4 months and the longest 30 months, cited by a small service sector SME.

**Figure 1 a & b - Months Taken to Implement an EMS by Enterprise Size and Sector (31 SMEs)**

The study showed that approximately two thirds of both small enterprises (10 of 15) and medium-sized enterprises (10 of 16) took between 7 and 12 months to implement their EMSs, with the service sector SMEs surveyed (13 of 19) more likely to take between 7 and 12 months to implement their EMSs than the manufacturing SMEs (7 of 12).
The three SMEs in the study that held BS 8555/Acorn took 6, 7 and 11 months respectively to implement their EMS. There was no identifiable trend in implementation time for the 6 SMEs that used BS 8555/Acorn as a route to ISO 14001.

**Duration of EMS Implementation Findings:**

- The majority of SMEs surveyed took 7 to 12 months to implement their EMS with the mode being 12 months.
- The study found no evidence that BS 8555/Acorn as a route to ISO 14001 either increased or decreased EMS implementation time.

### 4.2.3 Other Standards and Awards

The study determined which other standards the SMEs used in addition to EMS standards and found 23 of the 31 SMEs had achieved certification to the international quality management system standard ISO 9001. This standard was more prevalent in the service sector SMEs (14 of 15) than the manufacturing SMEs (9 of 16). All 16 medium-sized enterprises held ISO 9001 certification compared to only 7 of the 15 small enterprises.

Only 7 of 31 SMEs - 5 medium-sized and 2 small enterprises - had the international occupational health and safety management system standard OHSAS 18001 and all 7 of these also held both ISO 14001 and ISO 9001. More service sector SMEs (5) than manufacturing SMEs (2) had both OHSAS 18001 and ISO 14001.

Investors in People (IiP) was not frequently cited in the study with only 6 of 31 SMEs adopting the standard, however 5 of these (2 small and 3 medium-sized) were in the service sector and only 1 (medium-sized) from the manufacturing sector. Three SMEs were considering IiP or working towards it, however perhaps more telling was that 7 SMEs previously had IiP but had let it lapse; 5 of these had ISO 9001 with one specifically mentioning dropping IiP because of ISO 9001. Two of the 7 SMEs surveyed mentioned that, although they no longer had IiP, they had held onto the good practices embodied in the scheme.

Eighteen SMEs cited other standards or awards related either to their sector e.g. the British Textile Technology Group’s (BTTG) Confidence in Textiles, or health and safety issues e.g. British Safety Council Health and Safety 5 Star Scheme, or particular product requirements, e.g. Forest Stewardship Council (FSC).
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Other Standards and Awards Findings:

- The majority of SMEs in the study were certified to ISO 9001; size and sector impacted on the uptake of this standard with it being more prevalent in the service sector than manufacturing and being held by all 16 medium-sized enterprises.

- Investors in People was held by only a small number of the SMEs surveyed but about the same number of enterprises had previously tried the scheme and let it lapse.

- Awards were of interest and value to SMEs in the study, particularly where they related to specific aspects of their business operations and/or products.

- Some SMEs surveyed referred to ‘awards fatigue’ in that they had achieved many awards, and had seen little long term value, hence had moved away from seeking to achieve such awards.

4.2.4 EMS Responsibility, Awareness and Engagement

EMS Responsibility

The survey sought to determine where responsibility for the EMS resided in the study’s 31 SMEs. Slightly more SMEs surveyed cited ‘a person’ (18 of 31) as having responsibility for their EMS than an ‘EMS team’16 (13 of 31). This preference was mirrored in both the service and manufacturing sectors, as well as in small enterprises, but not in medium-sized enterprises where there was a greater preference (10 of 16) for employing a person to have sole responsibility for their EMS (see Table 5).

Table 5 – Who is Responsible for EMS Implementation in the 31 SMEs?

<table>
<thead>
<tr>
<th>EMS Implementation Resource</th>
<th>Total</th>
<th>Size</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small</td>
<td>Medium</td>
</tr>
<tr>
<td>A Person</td>
<td>18</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>An EMS Team</td>
<td>13</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

16 There may be some variation in how an EMS team was interpreted by both consultants and SMEs, which could have distorted the results.
Staff Awareness

The study asked the SMEs’ MDs and Environmental Management Representatives (EMRs) about the level of staff awareness of the environmental issues their companies faced; 22 of 31 MDs and 20 of 31 EMRs thought ‘greater than 75%’ of their company’s staff were aware of its main environmental issues. Generally, MD and EMR opinions on staff awareness were aligned or only one awareness category apart, and in these cases the EMR was always more positive about staff awareness than the MD. However there were exceptions to this with one medium-sized manufacturing enterprise’s MDs response being significantly different (‘less than 25%’) to its EMRs response (‘greater than 75%’). A small pocket of MDs surveyed (5 of 31) were more negative about staff awareness and thought that ‘less than 25%’ of their staff were aware of the environmental issues their company faced (see Figure 2).

Figure 2 – MD and EMR Opinions on the Level of Staff Awareness of the Environmental Issues Faced by their Companies (31 SMEs)

The MDs from the small enterprises in the study attributed the highest level of awareness to their staff with 13 of 15 believing that ‘greater than 75%’ were aware of their company’s main environmental issues. This contrasted to the MDs of the medium-sized enterprises who attributed the lowest level of staff awareness
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with only 7 of 16 believing that ‘greater than 75%’ of their staff were aware of their company’s main environmental issues. This pattern in the study was not repeated either between the manufacturing and service sectors or between those SMEs that used the BS 8555/Acorn route to ISO 14001 and those that achieved ISO 14001 directly.

*Engagement*

The study asked MDs to estimate the level of staff engagement with their company’s EMS and just over half (17 of 31) believed staff engagement was ‘high’. The small enterprises surveyed believed their staff were more highly engaged compared to the responses from medium-sized enterprises (see Figure 3a) as were staff in service sector SMEs compared to manufacturing SMEs (see Figure 3b).

The study determined how engaged SMEs were with their supply chain in terms of EMS encouragement. Just under a third of the study’s sample (10 of 31 SMEs, 9 of which were service sector) ‘always’ encouraged their suppliers and/or contractors to have certified EMSs. Combining these with the SMEs that ‘sometimes’ encouraged their suppliers to have certified EMSs confirmed that over half of the sample engaged with its supply chain in this manner, with slightly more medium-sized enterprises than small enterprises (see Figure 4a).

Twelve of the 19 service sector SMEs surveyed compared to only 6 of the 12 manufacturing SMEs encouraged certified EMSs in their supply chain (see Figure 4b). Respondents reported various ways in which they engaged with their suppliers including retaining copies of suppliers’ EMS certificates, sending out questionnaires, asking for EMS certification in tendering processes, setting EMS targets to monitor a proportion of their suppliers and having informal awareness-raising discussions with their suppliers.
Figure 3 a & b – MD Opinions on the Level of Staff Engagement by Enterprise Size and Sector (31 SMEs)
Figure 4a & b – Encouragement of Supplies and Contractors to have Certified EMS (31 SMEs)

Figure 4a

![Bar graph showing EMS encouragement to suppliers and contractors for different SME sizes: Total, Small, Medium.]

Figure 4b

![Bar graph showing EMS encouragement to suppliers and contractors for different sectors: Total, Service, Manufacturing.]

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EMS Responsibility, Awareness and Engagement Findings:

- There was no clear trend in the study, either for the total sample or for the sample broken down by sector, about who (either a single person or a team) had responsibility for the EMS, except in the medium-sized enterprises surveyed which tended to assign EMS responsibility to a single person.

- Generally the study’s MDs and EMRs broadly agreed on the percentage of staff that were aware of their company’s environmental issues however the EMRs surveyed were slightly more positive about staff awareness.

- The MDs of the small enterprises surveyed were more positive about the level of staff awareness of company environmental issues and the level of their staff engagement in the EMS than those of medium-sized enterprises.

- Half of the SMEs surveyed engaged with their supply chain however the service sector appeared to be more actively engaged with its supply chain than the manufacturing sector.

4.3 Environmental Behaviour

The study was interested to learn if there had been a transfer of positive environmental behaviour from work to home and asked both the EMR and a member of staff from each SME for their opinions (see Figure 5).

Over two thirds of the EMRs surveyed (22 of 31) ‘agreed’ that there had been a transfer of positive environmental behaviour from work to home and over a half (17 of 31) supported the idea that positive environmental behaviour had transferred from the company to other places as well. When asked about this transfer of behaviour, respondents gave, amongst others, these examples: ‘customers have approached the company specifically to learn how to improve their own environmental credentials’; ‘the company now offers more technical solutions to clients to help them become more resource efficient’; ‘suppliers are influenced to improve their environmental performance’ and ‘the company has hosted best practice visits for others in the same sector’.
The survey was also interested to learn about staff environmental behaviour in general and found that the majority of the study’s staff respondents (29 of 31) ‘strongly agreed’ or ‘agreed’ that they ‘do green things at home’. However, the individual employees surveyed were less positive than the EMR with only 12 of 31 saying they ‘strongly agreed’ or ‘agreed’ that they had taken green ideas from work and tried them at home. These 12 respondents came from 8 service sector and 4 manufacturing sector SMEs. In fact, the study’s staff respondents were generally more negative about the transfer of green ideas both from work to home and home to work as shown in Figure 6.

The majority (27 of 31) of staff respondents surveyed either ‘strongly agreed’ or ‘agreed’ that they had a more positive attitude towards their companies since an EMS was implemented (see Figure 7).
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Figure 6 – Staff Views on whether they had Taken Green Ideas from Work to Home and Home to Work (31 SMEs)

Figure 7 – Staff Attitudes towards their Companies since EMS Implementation (31 SMEs)
4.3.1 Staff Working Practices

The study was interested to learn about staff working practices and if and how these had changed since EMS implementation. All 31 staff respondents surveyed were aware that they worked for a company that had a certified EMS. The majority of those surveyed (24 of 31) positively confirmed that their working practices had changed since EMS implementation and a further 4 stated they had changed ‘somewhat’. Staff members cited examples such as: ‘colour coded recycling bins at each work station’; ‘better routing of vehicles and reduced idling times of vehicles’; ‘screensavers removed from computers’ and ‘greater use of electronic media to reduce paper use’.

Environmental Behaviour Findings:

- The study’s EMRs were confident that positive environmental behaviour was not only transferred from work to home but also to other places outside their companies.
- The majority of staff surveyed did ‘green things’ at home but were less positive that they had taken green ideas from work to home or home to work.
- The majority of staff surveyed agreed that they had a more positive attitude to their companies since the EMS was implemented.
- All staff respondents surveyed were aware that they worked for a company with a certified EMS and the majority had changed their working practices as a result of the EMS.

4.4 Drivers and Stakeholders

4.4.1 Drivers for EMS Implementation

The study not only determined the initial triggers for the decision to implement an EMS by SMEs, but also the drivers that encouraged the EMS implementation. MDs were asked to describe what the initial trigger was and many cited multiple reasons. However there was a clear sense that the commercial opportunities presented by having a certified EMS (requirements of clients, retention of clients, access to contracts and to a lesser extent public sector contracts) were by far the most important triggers for EMS implementation. Sales and marketing opportunities and the competitive edge that an EMS could bring were also considered important triggers. Interestingly, only one respondent mentioned cost savings as a trigger for EMS adoption. Specific triggers such as the Pollution Prevention and Control (PPC) (now Environmental)
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permitting regime were cited by a few manufacturing enterprises. Company ethos and values also featured as a trigger for a small proportion of the study’s respondents. Other triggers listed were: the recognition that a certified EMS brought to the SME; the risk management potential of an EMS; the increased importance of EMS in the trade press and the fact that competitors had EMSs.

The overwhelming majority of MDs surveyed (30 out of 31) either ‘strongly agreed’ or ‘agreed’ with the statement: ‘The reasons our company implemented an EMS are still as relevant as they were initially’.

The study asked all SMEs to rank the top three drivers/reasons for implementing an EMS (see Figure 8). The driver ranked first by 10 of 31 SME respondents was ‘compliance with legislation and other requirements’. The majority of these respondents were from medium-sized manufacturing SMEs (6 of 10). ‘Increased sales/market’ was ranked first by 7 of 31 respondents with the majority of these being small service sector SMEs (5 of 7).

Both ‘cost savings’ and ‘reduced environmental impact’ were ranked in second place by 7 of 31 respondents and ‘publicity/reputational gain/brand enhancement’ was ranked third by 7 of 31 respondents.

The picture changed somewhat when ranking positions 1, 2 and 3 were combined. ‘Increased sales/market’ and ‘publicity/reputational gain/brand enhancement’ were jointly the most frequently ranked drivers (15 of 31) whereas ‘compliance with legislation and other requirements’ had slipped to third place (14 of 31).

The study’s 8 SMEs that ranked ‘ethos & values – particularly of owners’ at either 1, 2 or 3 positions also stated that they had ‘high’ levels of staff engagement in their companies. The MDs and EMRs of the 5 SMEs that ranked ‘ethos and values – particularly of owners’ in first place thought ‘more than 75%’ of their staff were aware of company environmental issues.

Drivers for EMS Implementation Findings:

- The MDs surveyed gave multiple initial triggers for adopting an EMS but cited commercial and marketing opportunities as the most important of these triggers.

- ‘Cost savings’ was not an important initial trigger for EMS adoption in this study but became an important driver of EMS implementation for the SMEs surveyed.

- A single driver for EMS implementation did not stand out in the study but ‘compliance with legislation’ and ‘increased sales/market’ were both ranked highly by the surveyed SMEs.
Evidence-based Study into the Benefits of EMSs for SMEs

- Sector differences on the drivers for EMS implementation appeared in the study’s sample. ‘Compliance with legislation’ was a primary driver for the manufacturing SMEs surveyed whereas ‘increased sales/market’ and ‘publicity/reputational gain/brand enhancement’ were more important for the service sector SMEs.

- Enterprise size made a difference to SMEs’ selection of drivers for EMS implementation in the study. ‘Compliance with legislation’ was a primary driver for the medium-sized enterprises surveyed whereas ‘cost savings’ and ‘increased sales/market’ were more important for the small enterprises.

- There was a link between those SMEs within the study that ranked ‘ethos and values’ as a driver for EMS implementation and those citing ‘high’ levels of staff engagement.

Figure 8 – Ranked Drivers/Reasons SMEs Implemented their EMS (31 SMEs)
4.4.2 Stakeholders Influence

In light of the SMEs decision to adopt an EMS, the study was interested to learn the relative importance of 10 different stakeholder groups to MDs (see Figure 9). The majority of MD respondents surveyed rated ‘customers/consumers’ (19 of 31) and ‘management’ (14 of 31) as ‘extremely important’. This pattern was mirrored in the study for both enterprise size and sector. The ‘family/children of owners etc.’ was rated as an ‘unimportant’ stakeholder by 14 of 31 of which the majority were from manufacturing SMEs, and ‘insurers/lenders’ were cited as ‘unimportant’ by 15 of 31 respondents, two thirds of which were from small enterprises. ‘Regulators’ were unimportant to the small enterprises surveyed (10 of the 11 that cited this being small enterprises) whereas they were either ‘extremely important’ or ‘very important’ to medium-sized enterprises (10 of 14). ‘Suppliers/contractors’ were considered ‘unimportant’ by two thirds of all manufacturing SMEs surveyed.

Figure 9 – The Importance of the Various Stakeholders to SMEs in Light of their Decision to Adopt an EMS (31 SMEs)
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SMEs were asked ‘what proportion of customers asked for details of their company’s certified EMS’ (see Figure 10). All but one SME surveyed said they received requests for information from customers with 10 respondents said ‘all’ or ‘most’ of their customers asked for EMS details and of these 7 were service sector SMEs. These 10 SMEs also rated ‘customers/consumers’ as either ‘extremely important’ or ‘very important’ stakeholders. The pattern of requests from customers was broadly mirrored in the study for both enterprise size and sector with the study’s manufacturing SMEs and medium-sized enterprises citing fewer requests from ‘all’ or ‘most’ of their customers. Only one medium-sized manufacturing SME had no requests for information on its EMS from its customers.

Figure 10 – Proportion of Customers that Asked SMEs for Details on their Certified EMSs (31 SMEs)

Stakeholder Influence Findings:

- In light of the decision to adopt an EMS, ‘customers/consumers’ and ‘management’ were cited as the most important stakeholders for the majority of SMEs surveyed with this pattern mirrored for both enterprise size and sector.
- ‘Regulators’ were a very important stakeholders for manufacturing SMEs in the study but unimportant for small enterprises.
Evidence-based Study into the Benefits of EMSs for SMEs

- Customers of SMEs in the study had requested details of the SMEs’ certified EMSs; all service sector SMEs surveyed had received requests for details and only one manufacturing SME had received no requests at all.

4.5 Barriers

The study identified the barriers that SMEs faced when implementing their EMSs but not how the enterprises had overcome these barriers. Only 16 of the 31 respondents stated that they had to overcome specific barriers when implementing their companies’ EMS. This group comprised half the manufacturing SMEs and just over half the service sector SMEs and slightly more medium-sized enterprises (9 of 16) than small enterprises (7 of 15).

The 16 respondents, which stated that they did face barriers, were asked to rank the top three barriers to EMS implementation (see Figure 11). ‘Employees not engaged in the process’ was the barrier ranked first by 5 of 16 SMEs surveyed, with 4 of these being medium-sized enterprises. Interestingly, respondents from 7 medium-sized enterprises ranked ‘lack of skills/knowledge/experience within the company’ first or second as a barrier compared with only 1 small enterprise.

The barrier to EMS implementation ranked in second place by 5 of 16 respondents was ‘limited financial resources/budget for EMS implementation’, with 4 of these 5 being medium-sized enterprises.

The study asked SMEs about the ease of overcoming implementation barriers and if they still faced barriers, but not how they had overcome these barriers. The majority of respondents surveyed (23 of 31) ‘agreed’ or ‘strongly agreed’ with the statement ‘the barriers we faced implementing our EMS were easy to overcome’ with this pattern being similar for enterprise size and sector. Although over a half of SMEs surveyed (17 of 31) ‘agreed’ or ‘strongly agreed’ with the statement that ‘we still face barriers in maintaining our company’s EMS’, 13 of 31 SMEs ‘disagreed’ or ‘strongly disagreed’ with this statement. Respondents from the medium-sized enterprises surveyed were more likely to say they still faced barriers than those from the small enterprises.
Barriers Findings:

- Just under half of the SMEs in this study stated that they faced no barriers when implementing their company's EMS.

- The top ranked barrier to EMS implementation in the study was 'employees not being engaged in the process', however the medium-sized enterprises surveyed highlighted 'lack of skills, knowledge and experience' as a particularly important barrier.

- The majority of SMEs surveyed considered EMS implementation barriers easy to overcome and this finding was similar when analysed by enterprise size and sector, however over half still said they faced barriers maintaining their company's EMS with medium-sized enterprises being more likely to face such barriers.
4.6 Quantitative and Qualitative Benefits

4.6.1 Environmental and Cost Savings for Environmental Issues

The data presented in the following sections show the environmental and financial savings that were achieved by each SME on a normalised attributed basis, for each environmental issue evaluated as follows:

- Waste to landfill;
- Energy use;
- Business travel (distance and fuel use);
- Raw materials use; and
- Water use.

To normalise the data, the savings values were divided by the turnover in million pounds (£m) for each SME in each year, as explained in Section 3.4.2. The attributed savings values were then calculated by applying the attribution methodology to the normalised savings data, which is also explained in Section 3.4.2. Hereafter in the report, these normalised attributed savings are typically referred to as ‘savings’.

For each environmental issue, the savings data are presented as environmental units (e.g. tonnes for waste, litres for fuel, etc), financial units (£) and percentages. They are also presented separately for Years 1 and 2, as well as cumulatively to show the aggregated savings over both years in comparison to the pre-EMS baseline (Year 0). Percentages are not used in relation to the cumulative data. Averages are also provided for the sample. Any significant outliers are discussed within each of the sections below.

Waste to Landfill Savings

Waste to landfill savings reflect a combination of efforts in both waste reduction and waste recycling, however the data available across the sample was insufficient to calculate both as separate metrics. The financial savings from the reduction in waste to landfill will therefore vary according to whether there was expenditure or receipt of revenues for recycling, so the net saving may actually be higher or lower than the figures quoted below.

Table 6 shows that 13 SMEs returned data for savings in waste to landfill with half of the manufacturing SMEs and just over a third of the service sector SMEs doing so. The other 18 SMEs either did not focus on waste as a targeted savings area within their EMS or had insufficient records in place for the relevant years.
Table 6 – Waste to Landfill Savings

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type:</th>
<th>Waste to Landfill Savings (per £m turnover)</th>
<th>Cumulative</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
<td>Year 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tonnes</td>
<td>£f</td>
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<td>Service</td>
<td>ISO 1401</td>
<td>0.049</td>
<td>£6.35</td>
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</table>

Number of SMEs: 13

Average Savings for Sample (13 SMEs): £153.26

Total Aggregated Savings: £5,058.00

Average % Savings per SME: 43.19

---

f. All cost savings were calculated using the current unit price for waste to landfill for each SME.

g. The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
h. The average savings for the sample of 13 SMEs were calculated by dividing the total sum of savings for all SMEs by the sum of the average turnover for the baseline year and applicable savings year for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

Table 6 shows that the average reduction in waste to landfill was 1.55 tonnes per £m turnover in Year 1 (28%), which represented a financial saving of £130 per £m turnover. In Year 2, the average reduction in waste to landfill was 2.26 tonnes per £m turnover (43%), which represented a financial saving of £185 per £m turnover. In Year 1, the highest percentage reduction in waste to landfill was 76% and in Year 2 was 89%, both by the same SME.

On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average reduction in waste to landfill was 3.8 tonnes per £m turnover, which represented a financial saving of £315 per £m turnover. Only 1 SME delivered a cumulative increase in waste to landfill over the two year period. There was one high outlier in row 9 of Table 6, which had the effect of increasing the average savings values for both years.
Table 6 also shows that the average savings in waste to landfill for the 13 SMEs had escalated in that they were 46% higher in Year 2 than in Year 1. The 13 SMEs’ responses confirmed that 98% of the cumulative waste to landfill savings were attributed to the EMS.

Waste to Landfill Findings:

- 13 SMEs provided data for waste to landfill, a sample that would have been much larger if complete waste data sets had been provided for other SMEs. Waste was still therefore seen as a key area of improvement focus within the context of an EMS.

- The average waste to landfill saving for the 13 SMEs was 1.55 tonnes per £m turnover in Year 1 and 2.26 tonnes per £m turnover in Year 2.

- The Year 2 waste to landfill savings (43%) were much higher than in Year 1 (28%) suggesting that there was an escalation of savings in waste to landfill over the first two years of the EMS, rather than a ‘quick win’ exhaustive approach. It is assumed that the ‘quick win’ savings were more likely to result from increased recycling and the savings which lag behind were more likely related to waste minimisation.

- Given that 98% of the identified cumulative savings were attributed to the EMS by the 13 SMEs surveyed, the EMS was clearly seen as instrumental in realising savings in waste to landfill.

- The percentage savings were quite high for this environmental issue at 28% and 43%, however the cost savings at £130 and £185 per £m turnover were relatively minor in comparison to other environmental issues in the study. If the cost savings had also accounted for the avoided ‘hidden’ cost of the materials that were no longer being wasted, the financial savings would have significantly increased.

- All 13 SMEs in the study achieved overall savings in waste to landfill, suggesting that this was a relatively successful area to focus improvement efforts on within an EMS.

**Energy Savings**

Table 7 shows that 21 SMEs returned data for savings in energy use. The other 10 SMEs either did not focus on energy as a targeted savings area within their EMS or had insufficient records in place for the relevant years.
Evidence-based Study into the Benefits of EMSs for SMEs

Table 7 – Energy Savings

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type</th>
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<td>kWh</td>
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Number of SMEs: 21
Average Savings for 21 SMEs: £49,468
Total Aggregated Savings: £1,946,433
Average % Savings per SME: 6.13

a. All savings were reported against the baseline year (Year 0).
b. Phase 5 of BS 8555/Ascon.
c. Red font = represents a non-saving or increase in energy. Only SMEs which delivered a saving in at least one of the two years were reported.
d. All savings reported were normalised per £m turnover and attributed using a 0, 0.25, 0.5, 0.75 and 1.0 scale.
e. For energy, 85% of the total measured normalised savings were attributed to the EMS.

Table 7 shows that the average reduction in energy use for the 21 SMEs was 49,468 kWh per £m turnover in Year 1 (6%), which represented a financial saving of £1,208 per £m turnover. In Year 2, the average reduction in energy use was 81,734 kWh per £m turnover (10%), which represented a financial saving of £1,879 per £m turnover. In Year 1, the highest percentage reduction in energy use was 59% and in Year 2 was 79%, both for the same SME.

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Evidence-based Study into the Benefits of EMSs for SMEs

On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average reduction in energy use was 131,203 kWh per £m turnover, which represented a financial saving of £3,087 per £m turnover. There were 5 SMEs that delivered a cumulative increase in energy use for the two years, with 4 of these being medium-sized enterprises. There were two high outliers in rows 8 and 12 of Table 7, which had the effect of increasing the average savings values for both years.

Table 7 also shows that the average savings in energy use had escalated in that they were 65% higher in Year 2 than in Year 1. The SMEs’ responses confirmed that 85% of the cumulative energy use savings were attributed to the EMS.

Energy Findings:

- 21 SMEs provided data for energy use, suggesting that this was a key area of focus for environmental improvement under an EMS.
- The average energy saving for the 21 SMEs was 49,468 kWh per £m turnover in Year 1 and 81,734 kWh per £m turnover in Year 2.
- The Year 2 savings (10%) were higher than in Year 1 (6%) for the 21 SMEs surveyed suggesting that there was a progression of improvement in this area over the first two years of the EMS, rather than a ‘quick win’ exhaustive approach.
- Given that 85% of the identified cumulative savings were attributed to the EMS, the EMS was clearly seen as instrumental in realising savings in energy use.
- The percentage savings were relatively moderate for this environmental issue at 6% and 10%, however the cost savings at £1,208 and £1,879 per £m turnover were relatively high in comparison to other environmental issues. This highlighted the importance of energy use as a relatively high cost issue for the 21 SMEs that provided energy data.
- Given that 5 of the 21 SMEs providing energy data in the study achieved an overall non-saving in energy use (i.e. increased their consumption), this suggested that other factors could be influential. For example, the aspect of seasonality/weather in the form of cold winters was specifically mentioned by some SMEs from this group. It was not possible to investigate this any further within the study due to the variation in time between the relevant study years for SME participants.
Savings in Business Travel

Business travel savings were split into two different categories to reflect the two different ways of recording travel data at each SME. Given that some SMEs paid their drivers for the distance they travelled (e.g. mileage rate) and some paid for the fuel used, the only means of capturing fully representative savings in this area was to record it both ways, but to only use one measure for financial savings calculations to avoid any double-counting. A total of 9 SMEs reported travel savings in either category, with 2 of these reporting savings in both categories. For the 2 SMEs, which reported against both categories, both the distance travelled and fuel consumption savings were retained, as they represented different (albeit related) environmental savings, but the cost savings were calculated using the business travel fuel category. This section on business travel is therefore split into business travel distance and business travel fuel.

Savings in Business Travel Distance

Table 8 shows that 6 SMEs – 5 service sector SMEs and 1 manufacturing SME - returned data for savings in business travel distance. The other 25 SMEs either did not focus on business travel distance as a targeted savings area within their EMS, had used business travel fuel use to represent this environmental issue or had insufficient records in place for the relevant years. Of the 6 SMEs which reported savings in business travel distance, financial savings were only calculated for the 4 SMEs which did not also report against business travel fuel use. This avoided any double counting of the financial savings, given that SMEs either pay their staff for fuel used or distance travelled, rather than both.

Table 8 shows that the average reduction in business travel distance was 2,107 km per £m turnover in Year 1 (2%), which represented a financial saving of £441 per £m turnover. In Year 2, the average reduction in business travel distance was 5,840 km per £m turnover (5%), which represented a financial saving of £166 per £m turnover. The highest percentage reduction in business travel distance was 11% in Year 1 and 10% in Year 2, both for the same 2 SMEs.

On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average reduction in business travel distance was 7,947 km per £m turnover, which represented a financial saving of £607 per £m turnover. Of the 6 SMEs which provided data for this issue, only 1 showed a cumulative increase in travel distance over the two year period. There was one high outlier in row 2 of Table 8, which had the effect of increasing the average savings values for both years.
Evidence-based Study into the Benefits of EMSs for SMEs

Table 8 shows that the average savings in business travel distance for the 6 SMEs were 177% higher in Year 2 than Year 1 confirming a strong escalation in savings. The SMEs' responses confirmed that 26% of the cumulative business travel distance savings were attributed to the EMS.

**Table 8 – Business Travel Distance Savings**

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<td>Year 1 a</td>
<td>Year 2 a</td>
<td>%</td>
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<th>6</th>
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<td>£441</td>
<td>5,840</td>
<td>£166</td>
<td>7,947</td>
<td>£607</td>
</tr>
<tr>
<td>Total Aggregated Savings</td>
<td>33,396</td>
<td>£7,588</td>
<td>42,540</td>
<td>£4,724</td>
<td>75,936</td>
<td>£12,312</td>
</tr>
<tr>
<td>Average % Savings per SME</td>
<td>1.99</td>
<td>5.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of SMEs</th>
<th>6</th>
<th>4</th>
<th>6</th>
<th>4</th>
<th>6</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total % Savings per SME</td>
<td>1.99</td>
<td>5.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. All savings were reported against the baseline year (Year 0).
b. Red font = represents a non-saving or increase in business travel distance. Only SMEs which delivered a saving in at least one of the two years were reported.
c. All savings reported were normalised per £m turnover and attributed using a 0, 0.25, 0.5, 0.75 and 1.0 scale.
d. For business travel distance, 26% of the total measured normalised savings were attributed to the EMS.
e. All cost savings were calculated using the current unit price for business travel distance for each SME.

Business Travel Distance Findings:

- 6 SMEs provided data for business travel distance, 2 of which also provided business travel fuel use. A further 3 SMEs provided data for business travel fuel use alone, showing that 9 SMEs in total focused on business travel savings as a category. This suggested that business travel was a relatively low area of focus for environmental improvement under an EMS for the study’s participants.

- The average business travel distance saving for the 6 SMEs was 2,107 km per £m turnover in Year 1 and 5,840 km per £m turnover in Year 2.

- The Year 2 savings (2%) were very similar to those in Year 1 (5%), suggesting that there was little variation in the level or speed of improvement for the 6 SMEs for the two years.
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- Just 26% of the identified cumulative savings were attributed to the EMS by the 6 SMEs, suggesting that other factors were more influential at delivering savings in business travel distance.

- The percentage savings were relatively low for this environmental issue at 2% and 5% as were the cost savings at £441 and £166 per £m turnover. Given the low attribution percentage, this could be seen as an area with good scope for financial savings, as it suggests that costs are significant.

- 5 of the 6 SMEs – all service sector firms - achieved an overall saving in business travel distance (i.e. reduced their travel distance), suggesting that this was an area where savings could be expected on the back of any improvement efforts put in.

Savings in Business Travel Fuel

Table 9 shows that 5 SMEs - all in the service sector - returned data for savings in business travel fuel. The other 26 SMEs either did not focus on business travel fuel as a targeted savings area within their EMS, had used business travel distance to represent this environmental issue or had insufficient records in place for the relevant years.

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type:</th>
<th>Business Travel Fuel Savings (per £m turnover)</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Year 1 *</td>
<td>Year 2 *</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>litres</td>
<td>£</td>
</tr>
<tr>
<td>1</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>367</td>
<td>£371.57</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>-82</td>
<td>-£83.32</td>
</tr>
<tr>
<td>3</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>1,394</td>
<td>£1,764.13</td>
</tr>
<tr>
<td>4</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>8</td>
<td>£7.76</td>
</tr>
<tr>
<td>5</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>3</td>
<td>£3.56</td>
</tr>
</tbody>
</table>

Number of SMEs: 5

Average Savings for 5 SMEs: £288, £356, £1,226, £1,242, £1,413, £1,598

Total Aggregated Savings: £1,690, £2,064, £6,362, £7,032, £8,051, £9,096

Average % Savings per SME: 3.43, 10.37, 14.32

- All savings were reported against the baseline year (Year 0).
- Red font = represents a non-saving or increase in business travel fuel. Only SMEs which delivered a saving in at least one of the two years were reported.
- All savings reported were normalised per £m turnover and attributed using a 0, 0.25, 0.5, 0.75 and 1.0 scale.
- 52% of the total measured normalised savings were attributed to the EMS.

- All cost savings were calculated using the current unit price for business travel fuel for each SME.
- The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
- The average savings for the sample of 5 SMEs were calculated by dividing the total sum of savings for all SMEs by the sum of the average turnover for the baseline year and applicable savings year for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.
Table 9 shows that the average reduction in business travel fuel was 288 litres per £m turnover in Year 1 (3%), which represented a financial saving of £356 per £m turnover. In Year 2, the average reduction in business travel fuel was 1,126 litres per £m turnover (14%), which represented a financial saving of £1,242 per £m turnover. The highest percentage reduction in business travel fuel was 16% in Year 1 and 27% in Year 2, both for the same 2 SMEs.

On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average reduction in business travel fuel for the 5 SMEs was 1,413 litres per £m turnover, which represented a financial saving of £1,598 per £m turnover. None of the 5 SMEs, which provided data for this issue, showed a cumulative increase in business travel fuel use for the two years.

Table 9 also shows that the average savings in business travel fuel were 291% higher in Year 2 than Year 1. The SMEs’ responses confirmed that 52% of the cumulative business travel fuel savings were attributed to the EMS.

Business Travel Fuel Findings:

- 5 SMEs provided data for business travel fuel, with 2 of these also providing data for business travel distance. With 4 SMEs focusing on business travel distance alone, 9 SMEs in total focused on business travel savings as a category. This suggested that business travel was a relatively low area of focus for environmental improvement under an EMS for the study’s participants.

- The average business travel fuel saving for the 5 SMEs was 288 litres per £m turnover in Year 1 and 1,126 litres per £m turnover in Year 2.

- The Year 2 savings (14%) were higher than those in Year 1 (3%), suggesting that there was a progression of improvement in this area over time, rather than a ‘quick win’ exhaustive approach.

- Given that 52% of the identified cumulative savings were attributed to the EMS by the 5 SMEs, this suggested that other factors were similarly influential at delivering savings in business travel fuel. A focus on cost savings because of rising fuel prices was cited as the most common reason for this.

- The percentage savings were relatively low to moderate for this environmental issue at 3% and 14%, however the cost savings at £356 and £1,242 per £m turnover were relatively high in comparison to other environmental issues in the study given the low percentages involved. This suggested that
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business travel fuel was an area of relatively high costs for the study’s SMEs and that given the 52% attribution value was an area with good scope for savings.

- All 5 service sector SMEs achieved an overall saving in business travel fuel, suggesting that this was an area where savings could be expected on the back of any improvement efforts put in.

**Raw Materials Savings**

Table 10 shows that 9 SMEs returned data for savings in raw materials, which could be represented by items ranging from component raw materials for manufacturing operations to paper use for offices. The savings measured under this category reflected reductions in the quantity of raw materials purchased by the SME. The other 22 SMEs either did not focus on raw materials as a targeted savings area within their EMS or had insufficient records in place for the relevant years.

**Table 10 – Raw Materials Savings**

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type:</th>
<th>Raw Materials Savings (per £m turnover)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>tonnes</td>
</tr>
<tr>
<td>1</td>
<td>Medium Service</td>
<td>ISO 14001</td>
<td>0.0403</td>
<td>0.0329</td>
</tr>
<tr>
<td>2</td>
<td>Small Service</td>
<td>ISO 14001</td>
<td>0.0204</td>
<td>0.0468</td>
</tr>
<tr>
<td>3</td>
<td>Small Service</td>
<td>ISO 14001</td>
<td>0.0019</td>
<td>0.0007</td>
</tr>
<tr>
<td>4</td>
<td>Medium Manufacturing</td>
<td>ISO 14001</td>
<td>0.0007</td>
<td>0.0007</td>
</tr>
<tr>
<td>5</td>
<td>Small Service</td>
<td>Phase 5</td>
<td>0.1689</td>
<td>0.1240</td>
</tr>
<tr>
<td>6</td>
<td>Small Manufacturing</td>
<td>ISO 14001</td>
<td>53.00</td>
<td>43.04</td>
</tr>
<tr>
<td>7</td>
<td>Small Service</td>
<td>ISO 14001</td>
<td>0.1317</td>
<td>0.1240</td>
</tr>
<tr>
<td>8</td>
<td>Medium Manufacturing</td>
<td>ISO 14001</td>
<td>23.17</td>
<td>21.51</td>
</tr>
<tr>
<td>9</td>
<td>Small Service</td>
<td>ISO 14001</td>
<td>0.0176</td>
<td>0.0417</td>
</tr>
</tbody>
</table>

| Number of SMEs | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
|----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Savings for 9 SMEs | 9.11 | £1,542 | 8.76 | £1,496 | 17.87 | £3,038 |
| Total Aggregated Savings | 76.55 | £5,660 | 64.94 | £5,162 | 141.49 | £10,822 |
| Average % Savings per SME | 20.05 | 20.08 |

a. All savings were reported against the baseline year (Year 0).
b. Phase 5 of BS 8555/Acorn.
c. Red font = represents a non-saving or increase in raw materials. Only SMEs which delivered a saving in at least one of the two years were reported.
d. All savings reported were normalised per £m turnover and attributed using a 0, 0.25, 0.5, 0.75 and 1.0 scale.
e. For raw materials, 30% of the total measured normalised savings were attributed to the EMS.
f. All cost savings were calculated using the current unit price for raw materials for each SME.
g. The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
h. The average savings for the sample of 9 SMEs were calculated by dividing the total sum of savings for all SMEs by the sum of the average turnover for the baseline year and applicable savings year for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

Table 10 shows that the average reduction in raw materials use was 9.11 tonnes per £m turnover in Year 1 (20%), which represented a financial saving of £1,542 per £m turnover. In Year 2, the average saving in
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raw materials was 8.76 tonnes per £m turnover (20%), which represented a financial saving of £1,496 per £m turnover. The highest percentage reduction in raw materials use was 42% in Year 1 and 35% in Year 2, values returned for two different SMEs.

On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average saving in raw materials was 17.87 tonnes per £m turnover, which represented a financial saving of £3,038 per £m turnover. Only 1 of the 9 SMEs that provided data for this issue showed a cumulative increase in raw materials use over the two year period. There were two high outliers in rows 6 and 8 of Table 10, which had the effect of increasing the average savings values for both years.

Table 10 shows that the average savings in raw materials use were 4% lower in Year 2 than Year 1. The SMEs’ responses confirmed that 30% of the cumulative raw materials savings were attributed to the EMS.

Raw Materials Findings:

- 9 SMEs in the study provided data for raw materials suggesting in general that raw materials use was a relatively low area of focus for environmental improvement under an EMS; however service sector SMEs and small enterprises were more focused on this issue than either medium-sized enterprises or manufacturing SMEs.

- The average business raw materials saving was 9.11 tonnes per £m turnover in Year 1 and 8.76 tonnes per £m turnover in Year 2.

- The Year 2 savings (20%) were equal to those in Year 1 (20%), suggesting that this was a consistent area for savings achievement.

- Given that only 30% of the identified cumulative savings were attributed to the EMS by the 9 SMEs surveyed, this suggested that other factors were more influential at delivering savings in raw materials use.

- The percentage savings were relatively high for this environmental issue at 20% in both years and the cost savings were also relatively high at £1,542 and £1,496 per £m turnover.

- 8 of 9 SMEs surveyed achieved an overall saving in raw materials use, suggesting that this was an area where savings could be expected on the back of any improvement efforts put in.
**Water Savings**

Table 11 shows that 7 SMEs (6 of which are from the service sector) returned data for savings in water use. The other 24 SMEs either did not focus on water as a targeted savings area within their EMS or had insufficient records in place for the relevant years.

### Table 11 – Water Savings

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type:</th>
<th>Water Savings (per £m turnover)</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>m³</strong></td>
<td><strong>£</strong></td>
<td><strong>%</strong></td>
<td><strong>m³</strong></td>
</tr>
<tr>
<td>1</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>11.62</td>
<td>25.86</td>
<td>4.58</td>
<td>28.96</td>
</tr>
<tr>
<td>2</td>
<td>Small</td>
<td>Service</td>
<td>Phase 5 ¹</td>
<td>4,120.03</td>
<td>8,930.32</td>
<td>24.67</td>
<td>281.99</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>23.99</td>
<td>40.29</td>
<td>3.01</td>
<td>47.33</td>
</tr>
<tr>
<td>4</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>6.05</td>
<td>10.03</td>
<td>2.58</td>
<td>100.78</td>
</tr>
<tr>
<td>5</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>-9.03 ²</td>
<td>-18.14 ²</td>
<td>-8.24 ²</td>
<td>1.23</td>
</tr>
<tr>
<td>6</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>71.47</td>
<td>80.76</td>
<td>24.21</td>
<td>80.56</td>
</tr>
<tr>
<td>7</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>9.24</td>
<td>10.45</td>
<td>3.15</td>
<td>100.78</td>
</tr>
</tbody>
</table>

- **Average Savings for 7 SMEs**: £494 per £m turnover in Year 1 (20%), which represented a financial saving of £494 per £m turnover. In Year 2, the average saving in water use was 62m³ per £m turnover (5%), which represented a financial saving of £96 per £m turnover. The highest percentage reduction in raw materials use was 25% in Year 1 and 43% in Year 2, from two different SMEs.

- On a cumulative basis (i.e. aggregated for the first two years of the EMS), the average saving in water use for the 7 SMEs was 305m³ per £m turnover, which represented a financial saving of £590 per £m turnover. Only 1 of the 7 SMEs, which provided data for this issue, showed a cumulative increase in water use over the two-year period. There was one high outlier in row 2 of Table 11, which related to Year 1 only. This had the effect of increasing the average savings values for Year 1 and cumulatively for both years.
Table 11 shows that the average savings in water use were 74% lower in Year 2 than Year 1. The 7 SMEs’ responses confirmed that 96% of the cumulative water use savings were attributed to the EMS.

**Water Findings:**

- 7 SMEs provided data for water use suggesting that this was a relatively low area of focus for environmental improvement under an EMS; however 6 of the SMEs were from the service sector and only 1 from the manufacturing sector suggesting the issue is of more importance to the service sector.

- The average business water use saving for the 7 SMEs was 243 m$^3$ per £m turnover in Year 1 and 62 m$^3$ per £m turnover in Year 2.

- The Year 1 savings (20%) were significantly higher than those in Year 2 (5%), suggesting at face value that there was a ‘quick win’ exhaustive approach, although once a single outlier was removed from the data set, the trend was reversed to 9% in Year 1 and 13% in Year 2.

- Given that 96% of the identified cumulative savings were attributed to the EMS by the 7 SMEs, this clearly suggested that the EMS was a major factor at delivering savings in water use.

- The percentage savings were relatively high for this environmental issue in Year 1 at 20% and relatively low in Year 2 at 5% (but relatively moderate with the outlier removed at 9% and 13% respectively). The cost savings were also relatively moderate at £494 and £96 per £m turnover for Years 1 and 2 respectively (and £44 and £65 per £m turnover with the outlier removed).

- 6 of 7 SMEs surveyed achieved an overall saving in water use, suggesting that this was an area where savings could be expected on the back of any improvement efforts put in.

**4.6.2 Total Carbon Dioxide Equivalent Savings**

Table 12 shows the total carbon dioxide equivalent (CO$_2$e) savings for each SME in the study. These were calculated from the CO$_2$e savings that were individually calculated for waste, water, energy and business travel for each SME. Raw materials were excluded on the basis that there were no consumption related CO$_2$e conversion factors available at the time of writing hence the true CO$_2$e savings would be higher than those provided if an accurate raw materials conversion factor was available. Of the study’s 31 participant SMEs, 29 reported environmental savings which permitted a CO$_2$e savings value to be calculated for the two year period.
Table 12 – Total Carbon Dioxide Equivalent Savings

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type</th>
<th>Total CO₂e Savings Year 1 (kg)</th>
<th>Total CO₂e Savings Year 2 (kg)</th>
<th>Total CO₂e Savings Cumulative (kg)</th>
<th>Total CO₂e Savings 2 Year Average (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>-34 *</td>
<td>60</td>
<td>25</td>
<td>13</td>
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<tr>
<td>3</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>2,937</td>
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</tr>
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<td>5</td>
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<td>Manufacturing</td>
<td>ISO 14001</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>5,840</td>
<td>4,363</td>
<td>10,204</td>
<td>5,102</td>
</tr>
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<td>7</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>1,089</td>
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<td>Service</td>
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<td>3,656</td>
<td>6,525</td>
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<td>5,091</td>
</tr>
<tr>
<td>9</td>
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<td>Manufacturing</td>
<td>ISO 14001</td>
<td>-591 *</td>
<td>-98 *</td>
<td>-688 *</td>
<td>-344 *</td>
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<td>10</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>173</td>
<td>202</td>
<td>374</td>
<td>187</td>
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<tr>
<td>11</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>194</td>
<td>-226 *</td>
<td>-32 *</td>
<td>-16 *</td>
</tr>
<tr>
<td>12</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>34</td>
<td>40</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td>13</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>2,640</td>
<td>-3,861 *</td>
<td>-1,221 *</td>
<td>-611 *</td>
</tr>
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<td>Manufacturing</td>
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<td>3,985</td>
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</tr>
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<td>16</td>
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<td>Service</td>
<td>ISO 14001</td>
<td>2,504</td>
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<td>8,522</td>
<td>4,261</td>
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<td>Service</td>
<td>Phase 5</td>
<td>2,049</td>
<td>-7,361 *</td>
<td>-5,312 *</td>
<td>-2,656 *</td>
</tr>
<tr>
<td>18</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>-217 *</td>
<td>4,845</td>
<td>4,628</td>
<td>2,314</td>
</tr>
<tr>
<td>19</td>
<td>Small</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>144,898</td>
<td>192,131</td>
<td>337,028</td>
<td>168,514</td>
</tr>
<tr>
<td>20</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>-1,148 *</td>
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<td>7,504</td>
<td>3,752</td>
</tr>
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<td>21</td>
<td>Medium</td>
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<td>ISO 14001</td>
<td>403</td>
<td>351</td>
<td>754</td>
<td>377</td>
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<td>22</td>
<td>Small</td>
<td>Manufacturing</td>
<td>Phase 3</td>
<td>-42 *</td>
<td>233</td>
<td>191</td>
<td>95</td>
</tr>
<tr>
<td>23</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>22,543</td>
<td>36,512</td>
<td>59,055</td>
<td>29,528</td>
</tr>
<tr>
<td>24</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>3,789</td>
<td>6,236</td>
<td>10,024</td>
<td>5,012</td>
</tr>
<tr>
<td>25</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>-10,749 *</td>
<td>18,783</td>
<td>8,034</td>
<td>4,017</td>
</tr>
<tr>
<td>26</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>369</td>
<td>-2,381 *</td>
<td>-2,013 *</td>
<td>-1,006 *</td>
</tr>
<tr>
<td>27</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>16,042</td>
<td>5,725</td>
<td>21,767</td>
<td>10,884</td>
</tr>
<tr>
<td>28</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>11,317</td>
<td>14,916</td>
<td>26,233</td>
<td>13,116</td>
</tr>
<tr>
<td>29</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>638</td>
<td>1,738</td>
<td>2,375</td>
<td>1,188</td>
</tr>
<tr>
<td>30</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>8</td>
<td>-6 *</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>1,950</td>
<td>1,826</td>
<td>3,776</td>
<td>1,888</td>
</tr>
<tr>
<td><strong>Total Aggregated Savings</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>512,814</strong></td>
<td><strong>746,451</strong></td>
<td><strong>1,259,265</strong></td>
<td><strong>687,193</strong></td>
</tr>
<tr>
<td><strong>Average Savings for 31 SMEs</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>51,011</strong></td>
<td><strong>23,895</strong></td>
<td><strong>38,907</strong></td>
<td><strong>19,453</strong></td>
</tr>
</tbody>
</table>

a. All savings were reported against the baseline year (Year 0) and calculated using greenhouse gas emissions conversion factors published by Defra in 2009.
b. Phase 3 of BS 8555/Acorn.
c. Phase 5 of BS 8555/Acorn.
d. The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
e. Red font = represents a non-saving or increase in CO₂e. Only SMEs which delivered a saving in at least one of the two years for each environmental issue were reported.
f. 82% of the total measured normalised CO₂e savings were attributed to the EMS.
g. The average savings for the study’s sample (31 SMEs) were calculated by dividing the total sum of savings for all SMEs by the sum of the average turnover for the baseline year and applicable savings year for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

Table 12 shows the total CO₂e savings for each of the 31 SMEs in the study for Years 1 and 2 separately, as well as cumulatively for both years and as an average for the two-year period. Two SMEs achieved no CO₂e savings.
Evidence-based Study into the Benefits of EMSs for SMEs

savings that could be captured, either due to insufficient records or lack of success in delivering any environmental savings through their EMS in the relevant years. These entries are shown as blanks in Table 12.

In Year 1, 23 SMEs achieved an overall CO₂e saving and 6 SMEs had an overall increase in CO₂e emissions or a non-saving (i.e. worsening of performance). For the 6 SMEs with an overall non-saving in Year 1, the range of additional CO₂e emissions because of their worsening performance was 34 kg to 10.749 tonnes per £m turnover. For the 23 SMEs which achieved an overall CO₂e saving in Year 1, the range was 8 kg to 294.832 tonnes per £m turnover.

In Year 2, 22 SMEs achieved an overall CO₂e saving and 7 SMEs had an overall increase in CO₂e emissions or a non-saving (i.e. worsening of performance). For the 7 SMEs with an overall non-saving in Year 2, the range of additional CO₂e emissions because of their worsening performance was 6 kg to 7.361 tonnes per £m turnover. For the 21 SMEs which achieved an overall saving in CO₂e in Year 2, the range was 40 kg to 439.734 tonnes per £m turnover.

The average CO₂e saving in Year 1 was 15.011 tonnes and in Year 2 was 23.895 tonnes representing a 59% improvement in Year 2 relative to Year 1.

On a cumulative basis, 5 SMEs – of which 4 were medium-sized manufacturing enterprises - achieved an overall increase in CO₂e emissions, with the level of additional CO₂e emissions ranging from 32 kg to 5.312 tonnes per £m turnover. There were 25 SMEs which achieved an overall cumulative CO₂e saving for the two year period, ranging from 0.002 tonnes to 734.6 tonnes per £m turnover. The average cumulative CO₂e saving was 38.91 tonnes with 82% of the average cumulative CO₂e savings being attributed to the EMS. There were two high outliers in rows 14 and 19 of Table 12, which had the effect of increasing the average savings values for both years.

Figure 12 shows the breakdown by environmental area for the average CO₂e savings across the two-year period. This confirms that energy use made the largest contribution to CO₂e savings by some distance in both years, with travel (grouped as one category combining the business travel fuel and business travel distance categories17) second in both years. Waste to landfill and water use both made relatively minor

17 The business travel fuel savings were used to calculate CO₂e savings in cases where the SME had reported both travel distance and travel fuel use.
contributions to the overall CO₂e savings. Figure 12 also shows the progression of CO₂e savings in Year 2 relative to Year 1 for all categories except water use.

**Figure 12 – Average Carbon Dioxide Equivalent Savings by Environmental Area**

![Bar chart showing average carbon dioxide equivalent savings by environmental area between Year 1 and Year 2 for Waste to Landfill, Energy Use, Travel, and Water Use categories.]

Carbon Dioxide Equivalent Savings Findings:

- 23 of 29 SMEs achieved a reduction in CO₂e emissions in Year 1 compared with 22 of 29 SMEs in Year 2.
- The average CO₂e emissions reduction in the study was 15.01 tonnes per £m turnover in Year 1 and 23.90 tonnes per £m turnover in Year 2.
- The main contributor to cumulative CO₂e savings for the 31 SMEs in the study was energy use at 86%. Travel was the second highest contributor at 13%, with waste to landfill and water use providing relatively minor contributions at less than 1%.
- The average CO₂e savings in the study were 59% higher in Year 2 than in Year 1, showing a clear escalation of performance across the 2 year period.

*Total Cost Savings Benefit*
Table 13 shows the total cost savings for each of the 31 SMEs in the study for Years 1 and 2 separately, as well as cumulatively for both years and as an average for the two years. These financial savings were a product of all the environmental savings (as detailed in Section 4.6.1) calculated at their unit prices based on the most recent unit price from invoices for each SME in 2010/2011.

**Table 13 – Cost Savings**

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type:</th>
<th>Cost Savings (per £m turnover) ( ^{a/e} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Cost Savings Year 1</td>
<td>Total Cost Savings Year 2</td>
</tr>
<tr>
<td>1</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£6,15 *</td>
</tr>
<tr>
<td>2</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,634.74</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,941.77</td>
</tr>
<tr>
<td>4</td>
<td>Small</td>
<td>Service</td>
<td>Phase 5 *</td>
<td>£8,930.32</td>
</tr>
<tr>
<td>5</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£4,996.42</td>
</tr>
<tr>
<td>6</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,634.74</td>
</tr>
<tr>
<td>7</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,941.77</td>
</tr>
<tr>
<td>8</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£713.80</td>
</tr>
<tr>
<td>9</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£21,006.57</td>
</tr>
<tr>
<td>10</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£765.99</td>
</tr>
<tr>
<td>11</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£2,932.19</td>
</tr>
<tr>
<td>12</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£25.29</td>
</tr>
<tr>
<td>13</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£713.80</td>
</tr>
<tr>
<td>14</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£21,006.57</td>
</tr>
<tr>
<td>15</td>
<td>Small</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£765.99</td>
</tr>
<tr>
<td>16</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£421.97</td>
</tr>
<tr>
<td>17</td>
<td>Small</td>
<td>Service</td>
<td>Phase 5 *</td>
<td>£490.98</td>
</tr>
<tr>
<td>18</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£800.69</td>
</tr>
<tr>
<td>19</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£29,323.19</td>
</tr>
<tr>
<td>20</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£191.15 *</td>
</tr>
<tr>
<td>21</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£390.23</td>
</tr>
<tr>
<td>22</td>
<td>Small</td>
<td>Manufacturing</td>
<td>Phase 3 *</td>
<td>-£53.98 *</td>
</tr>
<tr>
<td>23</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£5,809.61</td>
</tr>
<tr>
<td>24</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,792.36</td>
</tr>
<tr>
<td>25</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£2,100.79 *</td>
</tr>
<tr>
<td>26</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
<td>£99.60</td>
</tr>
<tr>
<td>27</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,979.19</td>
</tr>
<tr>
<td>28</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£1,412.17</td>
</tr>
<tr>
<td>29</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£125.54</td>
</tr>
<tr>
<td>30</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£10.45</td>
</tr>
<tr>
<td>31</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£219.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Savings</td>
<td>£81,053.22</td>
</tr>
</tbody>
</table>

**Average Savings for 31 SMEs \( ^{b} \)**

<table>
<thead>
<tr>
<th>Average Savings</th>
<th>£4,518</th>
</tr>
</thead>
<tbody>
<tr>
<td>£5,231</td>
<td>£9,749</td>
</tr>
</tbody>
</table>

**Notes:**

- a. All savings were reported against the baseline year (Year 0).
- b. Phase 5 of BS 8555/Acorn.
- c. Phase 3 of BS 8555/Acorn.
- d. The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
- e. Red font = represents a non-saving or increase in costs. Only SMEs which delivered a saving in at least one of the two years for each environmental issue.
- f. The average savings for the whole sample of 31 SMEs were calculated by dividing the total sum of savings for all SMEs by the sum of the average turnover for the baseline year and applicable savings year for each SME. Where a saving was not achieved, it has been calculated as zero.
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There were 2 SMEs that achieved no savings that could be captured, either due to insufficient records or a lack of success in delivering any savings through their EMS in Years 1 or 2. These entries appear as blanks in Table 13.

In Year 1, 23 SMEs achieved an overall financial saving and 6 SMEs had an overall increase in costs or a non-saving (i.e. worsening of performance). For the 6 SMEs with an overall non-saving in Year 1, the range of additional expenditure because of their worsening performance was £6 to £2,101 per £m turnover. For the 23 SMEs which achieved an overall financial saving in Year 1, the range was £10 to £29,323 per £m turnover.

In Year 2, 21 SMEs achieved an overall financial saving and 8 SMEs had an overall increase in costs or a non-saving (i.e. worsening of performance). For the 8 SMEs with an overall non-saving in Year 2, the range of additional expenditure because of their worsening performance was £8 to £718 per £m turnover. For the 21 SMEs which achieved an overall financial saving in Year 2, the range was £15 to £39,012 per £m turnover.

The average total financial saving in Year 1 was £4,518 and in Year 2 was £5,231, representing a 16% improvement in Year 2 relative to Year 1.

On a cumulative basis, there were 4 SMEs which achieved an overall non-saving, with the level of additional expenditure ranging from £9 to £481 per £m turnover. There were 25 SMEs which achieved an overall cumulative financial saving for the two year period, ranging from £3 to £68,335 per £m turnover. There were two high outliers in rows 14 and 19 of Table 13, which had the effect of increasing the average savings values for both years.

Figure 13 shows that energy use, travel (grouped as one category combining the business travel fuel and business travel distance categories) and raw materials provide the highest contributions to average cost savings for Year 1 and Year 2, with water use and waste to landfill lagging far behind in both years. The average cost savings from energy use and travel both significantly increased in Year 2 relative to Year 1, whilst water use significantly decreased in Year 2 relative to Year 1 (all be it with a clear outlier in Year 1).

The study investigated whether there was a relationship between the achieved cost savings data and the SMEs responses to certain qualitative questions: in particular the length of EMS implementation time; use of
Evidence-based Study into the Benefits of EMSs for SMEs

other standards; level of staff engagement; and SMEs which had specifically mentioned cost savings as a driver and/or benefit.

**Figure 13 - Average Cost Savings by Environmental Issue**

The study’s 31 SMEs identified the time it took them to implement their EMSs (see Section 4.2.2). A relationship was found between SMEs’ duration of EMS implementation and achieved cost savings (see Table 14). The 20 SMEs which took between 7 and 12 months to implement their EMSs achieved the highest average cost savings at £2,401 per £m turnover, sharply contrasting to those SMEs that took shorter or longer time periods. Since the number of SMEs in each time period was not the same and was heavily distorted to the 7 to 12 month category, this relationship is drawn with some caution.

**Table 14 – Duration of EMS Implementation and Cost Savings**

<table>
<thead>
<tr>
<th>Duration of EMS Implementation</th>
<th>0-6 mths</th>
<th>7-12 mths</th>
<th>&gt;12 mths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SMEs</td>
<td>5</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Total Cost Savings (per £m turnover) (2 year Average) a</td>
<td>£479</td>
<td>£2,401</td>
<td>£124</td>
</tr>
</tbody>
</table>

a. The average savings for the sample in each category were calculated by dividing the total sum of savings for the SMEs by the sum of the three year annual average turnover for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.
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The study determined whether there was a relationship between the average cost savings achieved and the different type of standards that SMEs had adopted in addition to their certified EMSs (see Section 4.2.3). The results indicated that SMEs without additional standards such as the quality standard ISO 9001 and health and safety standard OHSAS 18001 had achieved better average cost savings at £2,271 per £m turnover than those that adopted at least one other standard at £1,668 per £m turnover. However those SMEs with ISO 9001 did achieve higher cost savings than those without the quality standard. (see Table 15).

**Table 15 – Average Cost Savings Data Related to the Different Standards held by SMEs**

<table>
<thead>
<tr>
<th>Type of Standard held by SME in Addition to a Certified EMS</th>
<th>ISO 9001</th>
<th>Without ISO 9001</th>
<th>OHSAS 18001</th>
<th>Without OHSAS 18001</th>
<th>IIP</th>
<th>Without IIP</th>
<th>At least 1 Other Standard</th>
<th>No Other Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SMEs</td>
<td>23</td>
<td>8</td>
<td>7</td>
<td>24</td>
<td>6</td>
<td>25</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>Total Cost Savings (per £m turnover) (2 year Average)</td>
<td>£1,761</td>
<td>£1,462</td>
<td>£929</td>
<td>£1,996</td>
<td>£454</td>
<td>£2,041</td>
<td>£1,668</td>
<td>£2,271</td>
</tr>
</tbody>
</table>

a. All SMEs with OHSAS 18001 also held ISO 9001
b. IIP – Investors in People
c. The average savings for the sample in each category were calculated by dividing the total sum of savings for the SMEs by the sum of the three year annual average turnover for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

The study investigated the relationship between staff engagement in an SME’s EMS (see section 4.2.4) and the achieved average cost savings (see Table 16). SMEs with ‘high’ or ‘moderate’ levels of staff engagement achieved higher average cost savings at £1,307 per £m turnover or £2,844 per £m turnover than SMEs with ‘low’ levels of staff engagement at £317 per £m turnover. However, the 10 SMEs reporting ‘moderate’ levels of staff engagement achieved more than double the cost savings than the 17 SMEs with ‘high’ levels of staff engagement.

**Table 16 – Level of Staff Engagement in EMS and Cost Savings**

<table>
<thead>
<tr>
<th>Level of Staff Engagement</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SMEs</td>
<td>17</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Total Cost Savings (per £m turnover) (2 year Average)</td>
<td>£1,307</td>
<td>£2,844</td>
<td>£317</td>
</tr>
</tbody>
</table>

a. The average savings for the sample in each category were calculated by dividing the total sum of savings for the SMEs by the sum of the three year annual average turnover for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

The qualitative questionnaire asked respondents about cost savings as both a driver for (see Section 4.4.1), and benefit of (see Section 4.6.5), EMS implementation. The study was interested to learn if cost savings as a driver and/or benefit translated into quantifiable results in the cost savings data. The 14 SMEs which ranked cost savings as a benefit of EMS implementation achieved greater savings than those that did not
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rank it as a benefit; whereas the 11 SMEs which ranked cost savings as a driver for EMS implementation achieved much lower cost savings than those SMEs that did not rank this issue as a driver (see Table 17).

Table 17 – Cost Savings as a Driver or Benefit against achieved Cost Savings

<table>
<thead>
<tr>
<th>Ranked Cost Saving as Benefit or Driver of EMS Implementation</th>
<th>Cost Savings as a Benefit</th>
<th>Cost Savings as a Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of SMEs</td>
<td>Ranked a</td>
<td>Not Ranked b</td>
</tr>
<tr>
<td>Total Cost Savings (per £m turnover) (2 year average) c</td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>

a Ranked in any of three positions of importance, i.e. 1, 2 or 3 where 1 is the highest.
b Not ranked in any position of importance
c The average savings for the whole sample in each category were calculated by dividing the total sum of savings for the SMEs by the sum of the three year annual average turnover for each SME. Where a saving was not achieved, it has been treated as a zero for the purpose of calculating average savings.

Cost Savings Findings:

- 23 of 29 SMEs achieved a total cost saving in Year 1 compared with 21 of 29 SMEs in Year 2.
- The average cost saving in the study was £4,518 per £m turnover in Year 1 and £5,231 per £m turnover in Year 2.
- The range of cost savings in the study was minus £114 per £m turnover to £34,167 per £m turnover (as a two year average).
- The main contributors to the average cost savings for the 31 SMEs over the 2 years was energy use at 32%, followed by raw materials (31%) and travel at 29%.
- Water and waste to landfill cost savings for the 31 SMEs over the 2 years provide relatively minor contributions at between 4% and 3%.
- There was a 16% improvement in average cost savings in Year 2 relative to Year 1, showing a clear escalation of performance across the 2 year period.
- The highest average cost savings were achieved by the SMEs in the study that took between 7 and 12 months to implement their EMS.
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- Higher average cost savings were achieved by those SMEs in the study that did not hold certification to other standards in addition to their certified EMSs. However the majority of SMEs in the study had ISO 9001 and they achieved higher cost savings than those without this quality standard.

- A relationship existed in the study between average cost savings achieved and the level of staff engagement with moderate and high levels of staff engagement being associated with higher cost savings than low levels of staff engagement.

- The SMEs in the study that ranked cost savings as a benefit of EMS implementation achieved higher average cost savings than those which did not rank it as a benefit.

4.6.3 Total New Business Sales Benefit

Table 18 shows that 21 SMEs returned a value for new business sales that they could attribute to their EMS in Year 2 (i.e. the year immediately following EMS certification). More service sector SMEs (8) returned a positive new business sales value than manufacturing SMEs (3). Many of the remaining 10 SMEs, which did not return a value for new business sales did acknowledge that their sales had increased because of their EMS, but could not attribute a value to it; therefore were treated as nil returns for calculation purposes and are not presented in Table 18. For the 21 SMEs that did return a value, the attributed new business sales expressed as a percentage of turnover ranged from 0.00% (for the 10 SMEs which could not attribute any sales directly linked to having a certified EMS) to 15.38%.

For these 21 SMEs, the average normalised new business sales value was £14,961 per £m turnover, with a range from £0 (10 SMEs could not attribute any new business sales to their certified EMS) to £153,846. Many of the remaining 10 SMEs, which did not return a value for new business sales, did acknowledge that their sales had increased because of their EMS, but could not attribute a value to it; therefore were treated as nil returns for calculation purposes and are not presented in Table 18. For the 21 SMEs that did return a value, the attributed new business sales expressed as a percentage of turnover ranged from 0% (for the 10 SMEs which could not attribute any sales directly linked to having a certified EMS) to 15.38%. More service sector SMEs (8) returned a positive new business sales value than manufacturing SMEs (3). There were three high outliers in rows 1, 2 and 8 of Table 18, which had the effect of increasing the average new business sales values.

All these new business sales values related solely to Year 2 of the study, which was the year immediately following EMS certification for each SME, when new sales could logically be attributed to the EMS.
certification. Some SMEs acknowledged that they had been able to increase their sales in earlier years, due to the fact that they were able to promote the fact that they were implementing an EMS and therefore on route to certification. Many SMEs also confirmed that their new business sales had increased to a greater degree beyond Year 2 and that this trend was strengthening with each additional year.

Table 18 – New Business Sales Attributed to EMS

<table>
<thead>
<tr>
<th>No.</th>
<th>Size</th>
<th>Sector</th>
<th>EMS Type</th>
<th>New Business Sales Attributed to EMS (£)</th>
<th>Turnover in Year of New Business Sales (£m)</th>
<th>Normalised New Business Sales (per £m turnover)</th>
<th>New Business Sales as % of Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£300,000</td>
<td>£2.10</td>
<td>£142,857</td>
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<td>2</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£800,000</td>
<td>£5.20</td>
<td>£153,846</td>
<td>15.38</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£128,924</td>
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<td>£31,895</td>
<td>3.19</td>
</tr>
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<td>4</td>
<td>Small</td>
<td>Service</td>
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<td>£43,863</td>
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</tr>
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<td>5</td>
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<td>£40.49</td>
<td>£0</td>
<td>0.00</td>
</tr>
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<td>6</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
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<td>£1.38</td>
<td>£0</td>
<td>0.00</td>
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<td>£0</td>
<td>0.00</td>
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<td>£5.11</td>
<td>£0</td>
<td>0.00</td>
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<td>18</td>
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<td>£779,000</td>
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<td>£19,136</td>
<td>1.91</td>
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<td>Service</td>
<td>ISO 14001</td>
<td>£0</td>
<td>£11.68</td>
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<td>£20.60</td>
<td>£0</td>
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</tr>
</tbody>
</table>

Number of SMEs: 21
Average New Business Sales for 21 SMEs: £148,896
Total Aggregated New Business Sales: £3,126,819
Average % of Turnover per SME: 1.66
Evidence-based Study into the Benefits of EMSs for SMEs

- 11 of 21 SMEs (8 from the service sector and 3 from the manufacturing sector) attributed new business sales to their EMS in Year 2.

- The average attributed new business sales for 21 SMEs in Year 2 was £14,961 per £m turnover.

- The range of attributed new business sales in the study in Year 2 was between 0% and 15% of turnover (or £153,846 per £m turnover).

- 10 SMEs in the study did not provide a value for attributed new business sales suggesting that they had some difficulty providing an accurate response to this question.

- Many SMEs in the study commented that their attributed new business sales were increasing over time beyond Year 2, and that this trend was strengthening with each passing year.

4.6.4 Total EMS Costs

Table 19 shows the total EMS costs for the 29 SMEs which returned data. These are a product of the cost of internal staff time spent implementing and maintaining the EMS together with any expenditure on consultancy support, third party EMS certification and environmental improvement measures. For the internal staff time, the costs were calculated based on the hours spent on the EMS and the salary costs associated with the individuals in question. This data was not scrutinised or questioned in any detail for reasons of staff confidentiality, so should be looked upon as an approximation of the staff costs. The expenditure on consultancy support and third party certification were precise values of the expenditure on these areas. The capital expenditure relates to the cost of any environmental improvement measures such as upgrading technology or equipment. Where grant funding had been used, this was subtracted from the costs to reflect the true level of expenditure from each SME. These costs are calculated as normalised annual averages for Years 1 and 2.

For these 29 SMEs, the average cost was £1,362 per £m turnover with a range from £0 (1 SME which received funding for both consultancy support and certification) to £25,699 per £m turnover. The 2 SMEs for which a value has not been assigned were unable to provide data about their EMS costs. For the 29 SMEs that did return a value, the costs expressed as a percentage of turnover ranged from 0% to 0.01%, with an average of 0.003%.

The EMS costs varied with size of enterprise, with a 2 year average for medium-sized enterprises of £16,919 and for small enterprises of £12,330. However, once EMS costs are normalised per £m turnover...
Evidence-based Study into the Benefits of EMSs for SMEs

The burden of these costs fell heavier on small enterprises (average cost £2,781 per £m turnover) compared to medium-sized enterprises (average cost £1,000 per £m turnover). There were four high outliers in rows 3, 7, 9 and 17 of Table 19, which had the effect of increasing the average EMS costs.

Table 19 – Total EMS Costs

<table>
<thead>
<tr>
<th>No.</th>
<th>Size:</th>
<th>Sector:</th>
<th>EMS Type:</th>
<th>Cost of internal staff resource (£) Years 1-2 a</th>
<th>Cost of consultancy support (£) Year 2 b</th>
<th>Cost of EMS certification (£) Year 2 b</th>
<th>Costs of Capital expenditure (£) Years 1-2</th>
<th>Total EMS Costs (£) Year 1-2</th>
<th>EMS Costs 2 Year Average (£)</th>
<th>Total EMS Costs Normalised per £m Turnover 2 Year Average (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small</td>
<td>Service</td>
<td>ISO 14001</td>
<td>£0</td>
<td>£3,286</td>
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<td>£70</td>
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<td>Service</td>
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<td>£1,000</td>
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<td>£13,500</td>
<td>£6,750</td>
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<td>Small</td>
<td>Service</td>
<td>Phase 5</td>
<td>£23,922</td>
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<td>£36,650</td>
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<td>£31,016</td>
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<td>£0</td>
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<td>£800</td>
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<td>Service</td>
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<td>£3,580</td>
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<td>Service</td>
<td>ISO 14001</td>
<td>£22,000</td>
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<td>£9,000</td>
<td>£28,500</td>
<td>£13,288</td>
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</tr>
<tr>
<td>12</td>
<td>Medium</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
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<td>£0</td>
<td>£0</td>
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<td>£0</td>
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<td>£0</td>
</tr>
<tr>
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<td>Small</td>
<td>Manufacturing</td>
<td>ISO 14001</td>
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<td><strong>Number of SMEs</strong></td>
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<td></td>
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<tr>
<td></td>
<td><strong>Average Costs for 29 SMEs</strong></td>
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<td>£47,951</td>
<td>£390,618</td>
<td>£830,992</td>
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</tbody>
</table>

a. Phase 3 of BS 8555/Acorn.
b. Phase 5 of BS 8555/Acorn.
c. The numbering system is not uniquely matched to each SME name and is merely to show the count for each set of data.
d. Where grant funding had been received by an SME, the costs have been reduced to reflect the actual cost paid by each SME.
e. The average EMS costs for the sample of 29 SMEs was calculated by dividing the total sum of EMS costs for all SMEs by the sum of the average turnover for the applicable EMS costs years for each SME.

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Evidence-based Study into the Benefits of EMSs for SMEs

Total EMS Costs Findings:

- 29 of 31 SMEs provided data on their EMS costs, with an average annual cost of £1,362 per £m turnover, however medium-sized enterprises had lower average costs at £1,000 per £m turnover than small enterprises at £2,781 per £m turnover. These costs comprised the sum of the expenditures on internal staff resource (value of time spent), consultancy support, third party certification and any capital investment in environmental improvement measures.

- The average total annual EMS costs in the study of £1,362 per £m turnover were significantly lower than the average annual cost saving of £4,875 per £m turnover, and the average new business sales of £14,961 per £m turnover. For the cost savings alone this provides a payback period of 3 months and for the new business sales, a payback period of 1 month. Again for cost savings alone, the payback period for small enterprises was much longer at 23 months than for medium-sized enterprises at 5 months, as it was for service sector SMEs at 15 months compared to 4 months for manufacturing SMEs.

- The range of reported annual average EMS costs was £0 (for 1 SME in receipt of fully funded support) to £25,699 per £m turnover.

- The proportions of each expenditure item to total EMS costs were: 47% investment in environmental performance improvement measures (capital costs), 41% internal staff; 6% for consultancy support and 6% for third party certification fees. This shows that the most significant costs are the direct costs in relation to the staff time and capital employed (88%) to make environmental improvements rather than the third party costs for consultancy support and certification (12%).

4.6.5 Qualitative Benefits

In addition to the quantifiable financial and environmental benefits, the study was interested to learn about the qualitative benefits, i.e. intangible or ‘soft’ benefits accrued to SMEs implementing an EMS. All 31 respondents in the study agreed that their companies had benefited from their EMSs and all either ‘strongly agreed’ or ‘agreed’ with the statement: ‘the benefits of our company EMS outweigh the barriers faced in EMS implementation’.

Each respondent ranked the top three benefits achieved with 1 being the highest rank, with the results shown in Figure 14. Unlike the drivers of EMS uptake, a single benefit was not dominant in the rankings. Eight of 31 respondents in the study ranked ‘energy/resource efficiency savings’ as their highest ranked
Evidence-based Study into the Benefits of EMSs for SMEs

benefit; however this varied only slightly from two other benefits: ‘cost savings’ and ‘better marketing credentials’ which gained 6 and 5 responses respectively at rank 1 position. The benefit ‘improved legal compliance’ achieved the most responses in the second and third ranked position with 6 of 31 and 7 of 31 responses respectively.

Figure 14 – Ranked Benefits from an EMS for all 31 SMEs

The picture altered somewhat when the responses to the three ranked positions (1, 2 and 3) were combined (see Figure 15). ‘Improved legal compliance’ achieved the most responses (17 of 31), and was cited by the majority of the manufacturing SMEs surveyed (10 of 12) and the majority of medium-sized enterprises (10 of 16). ‘Energy/resource efficiency savings’ achieved 16 of 31 responses cited mainly by service sector SMEs in the study (11 of 16) and in particular small service sector enterprises (8 of 11). ‘Cost savings’ as a benefit was still important to respondents (14 of 31) with it being more important to the small enterprises surveyed than the medium-sized enterprises. Interestingly this benefit was not listed by SMEs in the study as an initial trigger to adopt an EMS (see Section 4.4.1). ‘Better marketing credentials’ was a key benefit for the service sector with 10 of the 13 SMEs surveyed which had cited this benefit coming from the service sector.
4.6.6 Public Sector Opportunities

SMEs in the study were asked whether EMS certification had assisted them in qualifying for new opportunities in the public sector (see Figure 16). 17 of 31 responded positively with these being almost equally split between small enterprises and medium-sized enterprises. These opportunities were gained in more than half of the service SMEs surveyed, a slightly higher proportion than amongst the manufacturing SMEs. Twelve respondents considered the public sector opportunities to have been either ‘very significant’ or ‘significant’ to their company’s performance and overall success.
4.6.7 General Management Benefits

All SMEs were asked whether implementing an EMS had benefits for their company’s general management approach. 26 of 31 surveyed agreed that it had, 3 didn’t know and only 2 small service sector enterprises said that it had no benefits to their general management. Examples of the general management benefits included: more proactive monitoring of key cost areas; more structure to areas such as inductions, training and document control across the business; and the creation of a common goal in which everyone got involved and encouragement of communication.
4.6.8 Other Benefits

The study was interested to learn whether EMS implementation had resulted in any other benefits in addition to those highlighted above. 17 of the 31 SMEs surveyed gave examples of other benefits, such as ‘an improved relationship with the local Environment Agency’; ‘greater involvement with the local community e.g. schools, disadvantaged groups and local suppliers (policy commitments to source locally)’ and ‘increased networking and sharing of information with business and trade groups’. One small service sector enterprise summed up the added value of an EMS by stating: ‘there are a lot of intangible benefits to having put the EMS in place, from changing cultures - which has been one of the best outputs - to helping promote self esteem as its an internationally recognised scheme’. However, the remaining 14 SMEs in the study thought there had been minimal or no other benefits beyond those already ranked.

4.6.9 Impact of the Economic Downturn on the SMEs’ EMSs

The study determined the impact of the economic downturn on the importance of the EMS within each SME. Over one third of the respondents surveyed (11 of 31), mainly from the service sector, thought the economic downturn had made the EMS more important in their companies citing for example, that ‘the EMS has been very important for sales in a tougher market place’. However, 18 of 31 respondents, the majority from medium-sized enterprises, thought the EMS had the same importance; one stated: ‘the economic downturn has made EMS maintenance harder as it is an added cost’ and another stated that ‘green awareness has decreased with the recession, so customers are not as interested in EMS or green credentials as before’. Only 2 service sector SMEs thought the economic downturn had made their EMSs less important, with one of these stating that their sales had actually improved with the downturn.

Benefits Findings:

- All SMEs surveyed were of the opinion that the benefits of their EMS outweighed the barriers faced in implementation.
- No single EMS benefit appeared in the study’s ranked responses, however when the three ranked positions were combined the manufacturing SMEs and medium-sized enterprises surveyed both cited ‘improved legal compliance’ as a key benefit whereas service sector SMEs, in particular the small enterprises, cited ‘energy and resource efficiency savings’ as a main benefit.
Evidence-based Study into the Benefits of EMSs for SMEs

- Over half of all SMEs in the study (slightly more small enterprises than medium-sized enterprises) stated that EMS certification had assisted them in qualifying for new opportunities in the public sector with many of these believing the opportunities had been significant to their company’s performance and success.
- The majority of SMEs surveyed derived benefits to their company’s general management from implementing an EMS.
- Other types of benefits from the EMS were highlighted by over half of the SMEs in the study.
- Over a third of the SMEs surveyed considered the economic downturn to have made their EMS more important, in particular for service sector enterprises, however more of the SMEs surveyed especially medium-sized enterprises thought their EMSs had about the same importance.

4.7 Certification

4.7.1 Rationale for Certification

All SMEs in the study were asked why they had chosen to get their EMSs certified. Comments varied and included many that were centred on customer pressure; potential for increased sales and the retention of business; external recognition; and reputation enhancement. One small service sector enterprise summed up many of the respondents’ sentiments in the statement: ‘There is zero marketing potential for a non-certified EMS’. Another thread of comments concentrated on certification being a logical conclusion to the EMS implementation effort and a way of obtaining third party feedback on the quality of the EMS. One medium-sized enterprise stated that: ‘it was the obvious choice, if done it must be done properly, this is making sure that we live the life - what we say we do, we will do’. A few respondents believed external certification was necessary because it added credibility and carried weight with customers with a medium-sized manufacturing enterprise suggesting that they would not be believed by customers unless their EMS was certified.

Certification Bodies

Twelve certification bodies featured in the study: 2 certification bodies undertook 7 certifications each; 3 undertook 3 certifications each; 1 undertook 2 certifications and 6 undertook 1 certification each. The performance data was not analysed by certification body due to the sample size being too small to provide meaningful results.
4.7.2 Third Party Certification Fees

Twenty-nine SMEs in the study reported certification fees ranging from £300 to £4,747. The average fee for certification per SME was £1,653.50 (see Table 20). When normalised by turnover, the average certification fee was £155 per £m turnover.

Table 21 shows that, unsurprisingly, the small enterprises in the study reported lower direct certification fees (average £1,150) than the medium-sized enterprises (average £2,124); as did the service sector SMEs surveyed (average £1,453) compared to the manufacturing SMEs (average £1,982). Medium-sized manufacturing enterprises in the study reported the highest certification fees at an average of £2,720. Of the 29 SMEs in the study, five received full or partial funding for their initial EMS certification, which is reflected in the costs presented. When normalised by turnover, the certification fees were much higher in the small enterprise category (at £251 per £m turnover) than the medium-sized enterprise category (at £130 per £m turnover) and slightly higher for service sector enterprises (at £175 per £m turnover) than manufacturing enterprises (at £136 per £m turnover).

Table 20 – Certification Fees for 29 SMEs

<table>
<thead>
<tr>
<th>Size</th>
<th>Sector</th>
<th>Total</th>
<th>Small</th>
<th>Medium</th>
<th>Service</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number of SMEs</td>
<td>29</td>
<td>14</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Average certification cost per SME</td>
<td>£1,654</td>
<td>£1,150</td>
<td>£2,124</td>
<td>£1,453</td>
<td>£1,982</td>
<td></td>
</tr>
</tbody>
</table>

Table 21 – Certification Fees by Enterprise Size and Sector (29 SMEs)

<table>
<thead>
<tr>
<th>Size</th>
<th>Sector</th>
<th>Total</th>
<th>Small Service</th>
<th>Medium Service</th>
<th>Small Manufacturing</th>
<th>Medium Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number of SMEs</td>
<td>29</td>
<td>11</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Average certification cost per SME</td>
<td>£1,654</td>
<td>£1,213</td>
<td>£1,830</td>
<td>£917</td>
<td>£2,381</td>
<td></td>
</tr>
</tbody>
</table>

4.7.3 Certification Challenges and Barriers

The study determined if SMEs faced challenges achieving certification for their EMS and the nature of these challenges. Generally the SMEs surveyed stated they did not face challenges as clearly shown in Figure 17. The most frequently cited challenge was to do with the difficulties that respondents faced in addressing
Evidence-based Study into the Benefits of EMSs for SMEs

nonconformities raised by third party auditors; 7 of 31 surveyed cited this challenge of which 6 were from the service sector. The cost of certification was a challenge cited by 6 SMEs in the study, distributed equally across sectors and enterprise sizes. However, the challenge: ‘difficulty of reaching the standard’s requirements’, was more keenly felt by the medium-sized enterprises surveyed (5 responses) than the small enterprises (1 response).

**Figure 17 – Challenges Faced in Achieving Certification (31 SMEs)**
Figure 18 – Barriers to Maintaining EMS Certification (31 SMEs)

The study asked about the barriers that SMEs faced in maintaining their EMS certification (see Figure 18). The most frequently cited barrier, by 13 respondents in the study, was ‘difficulty in maintaining requirements, in particular continual improvement’ and this group largely comprised service sector enterprises. ‘Lack of recognition for the standard’ was selected by six SMEs in the study of which two held BS 8555/Acorn certification. These two SMEs specifically commented on the lack of knowledge about BS 8555/Acorn whilst a third SME stated that the lack of recognition for Phase 3 of BS 8555/Acorn had prompted their company to go for and subsequently achieve ISO 14001.

4.7.4 Certification and Stakeholders

The study determined whether or not having a certified EMS improved SMEs’ relationships with their key stakeholders (see Figure 19). The majority of SMEs surveyed (27 of 31) found ‘some improvement’ or a ‘major improvement’ in their relationship with both their employees and their customers/consumers. Just under half of the study’s sample had ‘some’ or ‘major improvement’ with their suppliers/contractors; small enterprises and the service sector SMEs in particular found improved relationships with this group.
4.7.5 Termination of Certification

All SMEs were asked whether they were considering terminating their certification to an EMS standard, with none stating that they were intending to do so.

Certification Findings:

- The decision of the SMEs in the study to have their EMSs certified was driven by commercial imperatives and a logical need to complete the implementation of their EMS by undertaking certification. A few SMEs surveyed believed that it added credibility to their EMS.

- Generally SMEs in the study did not face challenges in achieving EMS certification, however some cited addressing nonconformities and difficulties in reaching the standards’ requirements as two challenges, the later particularly experienced by medium-sized enterprises.
• Under half of all SMEs surveyed faced barriers in maintaining their EMS certification with continual improvement being seen as particularly difficult for the service sector SMEs.

• Lack of recognition for EMS standards was cited as a barrier to maintaining EMS certification by a small number of SMEs in the study.

• The majority of SMEs in the study confirmed that EMS certification had improved their company’s relationship with stakeholders, in particular with their employees and their customers/consumers. The service sector SMEs surveyed also found improved relationships with suppliers.

• No SME in the study was considering terminating its EMS certification.
5.0 Recommendations for Future Research

This study recommends a number of potential areas for future research based on research ideas generated and gaps in information identified during the study.

Investigation into the strategies to overcome EMS implementation barriers:

Although this study identified the type of barriers that SMEs face when implementing an EMS, it did not investigate how SMEs overcame these barriers, so the methods and strategies that have been used to overcome EMS implementation barriers could be usefully investigated. Policy makers and intermediate organisations such as trade associations could use such information to assist enterprises, which have yet to implement EMSs, to effectively do so in future.

Investigation into the reasons for not implementing an EMS:

The number of SMEs that participate in any of the available certifiable EMSs represents a very small proportion of the total number of enterprises, despite the clear benefits of EMSs which this study provides concrete evidence of. However understanding the reasons why enterprises, SMEs in particular, do not consider EMSs, or reject EMSs once informed about them, would be of value to policy makers in their efforts to develop strategies to increase EMS uptake and thereby deliver the associated environmental gains.

Extended longitudinal study of quantitative benefits:

This study gathered quantitative data on the cost savings for two years and new business sales for one year, which was a comparatively limited time period in the context of an EMS, which is a tool that can be expected to have strong persistence value. There would be merit in extending the data collection period for cost savings to evaluate year’s 3, 4 and 5 to establish if the savings continue to increase over time (as per the identified trend for the first two years) or whether they eventually stabilise or even diminish over time. This would help to confirm whether the oft-quoted difficulty that SMEs face in delivering continual improvement is true in practice. If the savings continued to increase in line with the continual improvement requirement of an EMS, then this would provide yet more substantive evidence of the benefits of EMSs as a long-term vehicle for delivering environmental improvements. In addition, extending the data collection for new business sales beyond one year would help to establish the longer-term marketing value of EMSs which could provide further evidence and added incentive for future EMS uptake by SMEs. If supportive, the data set could then be used as by policy makers to encourage EMS uptake and contribute to a great
Evidence-based Study into the Benefits of EMSs for SMEs

understanding of how voluntary, market based tools can be used to address longer-term national sustainability objectives and enterprise viability. It would also help to confirm whether the case that was put forward by some SMEs in this study of increasing sales over time had any merit. This proposed study could also help to design a more scientific approach to measuring the marketing value of an EMS, given that the new business sales in this study were reliant on the SMEs’ own estimations and calculations.

Analysis of micro enterprises and environmental management approaches:

Micro enterprises (less than 10 employees) were excluded from this study as this sector is difficult to engage with and has very limited presence in the EMS market. Despite this, there is an increasingly pressing need to engage with this sector and address its environmental impacts, which when viewed in aggregate are high due to the sheer number of micro-enterprises in existence. Unlocking this latent savings potential could have a significant environmental and economic benefit to the UK, especially due to the positive cost saving and new business sales benefits identified by this study. Given that current approaches have largely been ineffective at engaging this sector, an assessment of the alternative approaches required to engage micro-enterprises in the environmental improvement agenda could be of great value. This research could seek to design and test alternative delivery approaches including simplified EMSs, alternative pricing models, environmental manager loan services and joined up delivery approaches and purchasing models. Such a project would provide policy makers with evidence and effective strategies for a sector that could contribute more effectively to the national sustainability aims and improved economic viability of such enterprises.

Investigation of the quantitative and qualitative benefits of EMSs in the public sector:

EMS implementation in the public sector could have an important role in delivering improved environmental performance and cost savings, which is seen as essential in the current economic and budgetary climate. A study investigating the quantitative financial and environmental performance benefits and the qualitative benefits in public sector organisations would help to provide evidence to justify EMS uptake within the public sector and thereby contribute to national environmental/sustainability targets and budgetary constraints.
Annexes
Annex A -

Improving the uptake of EMS amongst UK SMEs

Literature Review

For Defra

April 2010
Improving the uptake of EMS amongst UK SMEs
Literature review

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Appendix Contents

Appendix 1 - Literature Review List

Appendix 2 - Detailed Review of Literature
1.0 Executive Summary

This literature review forms the first step of a project which aims to generate evidence that can be used to increase the participation of small to medium sized enterprises (SMEs) in environmental management systems (EMS) implementation.

The project aims to collect robust data from SMEs across a range of sectors, on the quantitative and qualitative benefits of formal EMS implementation in terms of environmental and financial savings; as well as qualitative data on the drivers for uptake, and the barriers and behavioural benefits.

An initial literature review was undertaken of published literature and studies (hereafter referred to as studies) within the previous five years to capture existing data and/or findings of relevance to this project. This review will inform the selection of sectors and a statistically relevant sample of SME participants for this project.

37 studies were identified of which 14 (38%) were selected as relevant to this project’s aims. The 14 studies were considered to be relevant as they were published within the past five years (2005 and 2009) and were easily accessible, referenced sources. They also covered EMSs and qualitative and/or quantitative findings related to SMEs.

The quality of information within the 14 reviewed studies was varied, with only 4 (29%) of the 14 studies satisfying all of the relevance requirements. To fully satisfy the relevance requirements, the studies had to be original, contactable sources which referenced the sector and SME status, and discussed the drivers, barriers and benefits associated with EMS implementation. 9 (64%) of the 14 studies satisfied several of the relevance requirements, whilst 1 study (7%) covered only one of the relevance requirements: reference of issues faced by SMEs when implementing a carbon foot printing standard (PAS 2050) rather than an EMS.

The geographical focus of the 14 studies was also varied. Of the 14 studies, 4 (29%) focused on the UK, 6 (43%) on Europe (excluding the UK) and the remaining 4 (29%) on non-European overseas locations including Australia, Lebanon and Brazil.

Of the 12,512 organisations identified in the 14 studies, 9,558 (76%) were identified as
Improving the uptake of EMS amongst UK SMEs

Literature review

SMEs. Only 4 (29%) of the 14 studies reviewed related specifically to SMEs, whilst the other studies covered both SMEs and larger organisations.

The majority of studies reviewed (8 of 14) (57%) focused on enterprises in the secondary and tertiary sectors. The primary sector was only represented by agriculture within 2 studies (14%); with no reference made to extraction activities.

11 (79%) of the 14 studies quantified the number of organisations with either EMAS, ISO 14001 or another EMS type. Only 4 (29%) of the studies had 100% of their sample of organisations with EMS implementation. Of the 9,558 SMEs identified across the 14 studies, only approximately 2,370 (19%) had implemented a certified EMS. Due to the heavy bias of a large manufacturing-based EMAS study, just 475 (20%) of the 2,370 SMEs held a non-EMAS certified EMS.

It is worth noting that only 475 (4%) of the 12,512 organisations in the 14 studies reviewed were UK-based SMEs with an implemented EMS, which is similar to the proposed project sample.

Whilst all 14 studies reviewed the identified benefits, barriers and drivers for EMS adoption by enterprises, in general they contained little quantitative data on these issues. The most frequently cited drivers for EMS adoption were improvements to reputation, cost reduction and legal compliance. The most frequently cited barriers were lack of skills, knowledge and expertise within the organisation to implement and maintain an EMS and the implementation and registration costs.

There was a general lack of quantification of the benefits of EMS implementation even though all 14 studies identified financial/business benefits. Only 6 (43%) of the 14 studies referred to social and behavioural benefits, whilst the most frequently cited benefits in the 14 studies were cost savings and legal compliance.

The 14 studies reviewed neither identified those sectors with potential for growth in EMS uptake, nor any potential contacts for the recruitment of SMEs in this project. In addition, none of the studies reviewed articulated an attribution method and consequently provided no information for this project’s own choice of attribution method.
This literature review confirmed the lack of quantitative data on the benefits of EMS adoption by SMEs, with a key tenant of this project being to fill this gap. The review identified some evidence of the sectoral breakdown of EMS implementation by SMEs, with a greater emphasis on the secondary and tertiary sectors, and a limited degree in the primary sector. This finding supports this project’s focus on the former two sectors for its sample selection.
2.0 Introduction

This literature review has a number of aims, including initially, to inform the selection of sectors and a statistically relevant sample of SME participants for the project. This will help to ensure that the results of the project have maximum impact on the uptake of EMSs by UK SMEs. In addition, the literature review aims to gain an understanding of the existing data - both qualitative and quantitative - on the benefits, drivers and barriers to EMS uptake by SMEs, and to identify attribution methods used to measure the contribution that EMSs make to quantitative benefits. Finally, the literature review aims to identify the reasons why some SMEs decide to terminate EMS certification.

By reviewing previously published studies, the literature review captures existing data and/or findings of relevance to this project, and determines whether this project will be duplicating any previously undertaken research. All studies identified are referenced in Appendix 1.

The literature review draws upon studies sourced from journals, websites, reports etc, which are hereafter referred to as studies.

Studies published within the past five years (2005 and 2009) were reviewed to identify quantitative or qualitative findings on the drivers, barriers and benefits of EMS implementation in SMEs across all industry sectors. Studies were drawn from the UK, including the devolved regions, and from overseas.

To ensure the studies included in this literature review were relevant to the scope of this project, a series of conditions were developed to enable the robust selection of studies for inclusion in the review. Of the 37 studies identified, 14 (38%) were deemed to be relevant to the project. To determine the quality of the relevant studies in relation to the project, a further set of criteria were formulated. These methodologies and outcomes are discussed in further detail in Section 3 of this report and the findings of the relevant studies are presented in a series of tables and discussed in more detail in Section 4.
3.0 Literature Selection Criteria

Literature Relevance

To evaluate the relevance of the studies in relation to the project, a series of criteria were developed to justify the inclusion of each study in this literature review. All 37 studies that were initially considered and reviewed are listed in Appendix 1. These were categorised as either relevant or non-relevant with respect to the project. For the studies deemed non-relevant, the reasons are recorded; with these studies then removed from further analysis within this literature review.

Each study was required to meet all of the following criteria to ensure it had relevance to the project:

- There must have been partial or full SME coverage within the scope of the study;
- The study must have been published within the past five years (2005 – 2009);
- To reflect steady state findings, the case studies must have been completed prior to publication;
- The study must have included quantitative and/or qualitative data; and
- The study must have been referenced and be readily accessible.

Of the 37 studies screened through the above criteria, 14 (38%) were deemed to be relevant to this project. Further details of the 14 relevant studies are summarised in Appendix 2.

Literature Quality

Relevant studies were subjected to further analysis to determine their quality of data as related to the project. Each study was rated as either good, acceptable or poor depending on how many of the following descriptors were included. The ratings are described in Table 1 overleaf.
Improving the uptake of EMS amongst UK SMEs

Literature review

Table 1 - Literature Quality Rating System

<table>
<thead>
<tr>
<th>Rating</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>• Specific sector was referenced;</td>
</tr>
<tr>
<td></td>
<td>• Size of organisation was identified, with SME status or otherwise.</td>
</tr>
<tr>
<td></td>
<td>• Geographical location of organisations referenced was stated;</td>
</tr>
<tr>
<td></td>
<td>• Report or case study was the original version;</td>
</tr>
<tr>
<td></td>
<td>• Type of EMS implemented was identified;</td>
</tr>
<tr>
<td></td>
<td>• Drivers, barriers and benefits of EMS implementation were identified; and</td>
</tr>
<tr>
<td></td>
<td>• Sources were contactable to verify findings where required.</td>
</tr>
<tr>
<td></td>
<td>• Evidence of all 7 of the above descriptors.</td>
</tr>
<tr>
<td>Acceptable</td>
<td>• Evidence of between 3 and 6 of the above descriptors.</td>
</tr>
<tr>
<td>Poor</td>
<td>• Evidence of between 0 and 2 of the above descriptors.</td>
</tr>
</tbody>
</table>

Of the 14 studies, 4 (29%) were rated as good quality in relation to their relevance to the project, 9 (64%) were rated as acceptable and 1 (7%) was rated as poor. The study that was categorised as poor was still included in the literature review, as it discussed the issues faced by SMEs when implementing a formal standard, in this case a PAS 2050 carbon footprinting management exercise rather than an EMS.

The low number of relevant, good quality studies identified highlighted the fact that there are no studies with the same objectives and scope as this project, so there is considered to be negligible risk of this project duplicating previously published studies.
4.0 Literature Review Findings

Introduction

As discussed under Section 3, 14 (38%) of the 37 studies received were deemed to be relevant for the purposes of this literature review. The quality of these studies was rated as good, acceptable or poor in relation to the project’s research objectives. A detailed review of the 14 relevant studies is provided in Appendix 2.

To inform the sample selection for the project, the following characteristics of the relevant studies were analysed: location of the study, sectors involved, sample size, size of enterprises and the type of EMS implemented. The drivers, barriers and benefits associated with EMS implementation, and reasons for cessation of EMS certification were also collated from the 14 reviewed studies and analysed.

Size of Organisation

13 (93%) of the 14 studies identified the sample population surveyed, which represented a total of 12,512 organisations. Only 4 (29%) of the 14 studies in the literature review focused specifically on SMEs, whilst the sample populations within the other studies were a combination of SMEs and larger organisations. The detailed percentages are shown in Table 2 and Table 3 below.
## Improving the uptake of EMS amongst UK SMEs

### Literature review

### Table 2 - Sample Analysis: Size of Enterprise, Sector and EMS Coverage (1 of 2)

<table>
<thead>
<tr>
<th>Type of literature</th>
<th>Quality of data</th>
<th>Location</th>
<th>Size of organisation</th>
<th>Sector</th>
<th>Survey population</th>
<th>Type of EMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abelliotis, 2005</td>
<td>Acceptable</td>
<td>Greece</td>
<td>89% SME, 11% large</td>
<td>Secondary: (metal finishing, chemical production, plastics, jewellery production) Tertiary: (communications, furniture retail)</td>
<td>&gt;600</td>
<td>100% EMS (EMAS) (9)</td>
</tr>
<tr>
<td>ENDS, 2006</td>
<td>Acceptable</td>
<td>UK</td>
<td>Not specified</td>
<td>Secondary: (food and drink)</td>
<td>511</td>
<td>ISO 14001 EMAS (no quantification)</td>
</tr>
<tr>
<td>Expert Crede, 2009</td>
<td>Poor</td>
<td>UK</td>
<td>100% SME</td>
<td>Secondary: (private, not specified)</td>
<td>101</td>
<td>100% EMS (69% EMAS) (70) (30% non-EMS EMS) (31)</td>
</tr>
<tr>
<td>Iraldo et al, 2005</td>
<td>Good</td>
<td>Europe</td>
<td>60% SME 40% large</td>
<td>Not specified</td>
<td>1,135</td>
<td>ISO 14001 (no quantification)</td>
</tr>
<tr>
<td>ISO, 2005</td>
<td>Acceptable</td>
<td>Global</td>
<td>100% SME</td>
<td>Not specified</td>
<td>45</td>
<td>4% EMS (ISO 14001) (2) 96% non-EMS (43)</td>
</tr>
<tr>
<td>Massoud et al, 2009</td>
<td>Acceptable</td>
<td>Lebanon</td>
<td>62% SME 38% large</td>
<td>Not specified</td>
<td>455</td>
<td>100% EMS (EMAS) (455)</td>
</tr>
<tr>
<td>Milieu RPA, 2009</td>
<td>Acceptable</td>
<td>Europe</td>
<td>60% SME 40% large</td>
<td>Not specified</td>
<td>455</td>
<td>100% EMS (EMAS) (455)</td>
</tr>
</tbody>
</table>
Only 9,899 (79%) of the 12,512 organisations were categorised by size. 9,558 (97%) of the organisations were classified as SMEs, with the remainder 341 (3%) classified as large organisations. However the definition of SMEs differs across the studies in that an SME was defined as either 200 or 250 full time equivalent employees or less, depending on the study. For
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Literature review

the purposes of this project, which concentrates solely on SMEs, the following European Union (EU) definition\textsuperscript{18} is used:

- **Medium-sized**: <250 employees, and turnover ≤ € 50 million or annual balance sheet ≤ € 43 million;
- **Small**: < 50 employees, and turnover ≤ € 10 million or annual balance sheet ≤ € 10 million; and
- **Micro**: < 10 employees, and turnover ≤ € 2 million or annual balance sheet ≤ € 2 million.

**Location of Organisation**

Whilst the scope of this project is SMEs which are based in the UK, the studies selected for the literature review were not restricted to a specific geographical location. Thus the geographical focus of the 14 studies was varied. Out of the 14 studies, 4 (28.5%) focused on the UK, 6 (43%) on Europe (excluding the UK) and the remaining 4 (28.5%) on non-European overseas locations including Australia, Lebanon and Brazil.

**Sector Findings**

Economic activities are categorised into the following sectors: primary (extraction and agriculture), secondary (manufacturing industries) and tertiary (service industries). Of the 14 studies analysed, 11 (79%) made reference to specific sectors, of which 5 (36%) referred to multiple sectors. 3 (21%) of the 14 studies made no reference to a particular sector and were thus classified as ‘not specified’. The sector coverage of the reviewed studies is illustrated in Figure 20 overleaf.

\textsuperscript{18} Official Journal of the European Union (2003); SME definition: Commission Recommendation 2003/361/EC.
This literature review could not present the findings by sector, as 14 studies did not specify the size of organisation in relation to the sector, or which organisation had implemented an EMS in relation to the sector. Of the 11 studies which made reference to a specific sector, 8 (73%) identified the sub-sector of the organisations included in the study. This detail is provided in Table 4 below.

**Table 4 - Breakdown of Sectors**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sub-Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Agriculture</td>
</tr>
<tr>
<td>Secondary</td>
<td>Food and drink, Pulp and paper, Construction, Metal and mineral processing, Chemical (inorganic / organic)</td>
</tr>
<tr>
<td></td>
<td>Combustion, Private, Public, Not specified</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Wholesale, Retail, Printing, Warehousing, Accommodation, Health and education</td>
</tr>
<tr>
<td></td>
<td>Hotel and restaurants, Transport, Communications, Professional Services, Private, Public</td>
</tr>
</tbody>
</table>

Only 2 (14%) of the 14 studies specified the inclusion of organisations from the primary sector, with agriculture the only sub-sector represented/identified and no reference to any extraction...
Improving the uptake of EMS amongst UK SMEs

Literature review

...sub-sector organisations. This was an unexpected finding as the studies were sourced globally rather than being limited to the UK, where extraction activity is less prominent.

The most frequently cited sector was the secondary sector, which was represented by 11 (79%) of the 14 studies. Of these studies, 8 (73%) identified the organisations by their individual sub-sectors whilst the other 3 (27%) did not include any further breakdown. These occurrences have been identified as ‘not specified’.

All 5 (36%) of the 14 studies which cited the tertiary sector identified the sub-sector of the organisation. The sub-sector that was most frequently cited within the tertiary sector was accommodation/hotels, which was represented in 4 (80%) of the 5 studies.

None of the reviewed studies identified (a) particular sector(s) with potential growth for EMS uptake by SMEs or large firms.

EMS Findings

The scope of this research project aims to identify the benefits to SMEs where a formal, certified EMS has already been implemented. This literature review intends to inform the project of the types of EMS and benefits that are most relevant to UK SMEs.

Whilst all study samples included a number of organisations with an EMS (either certified or non-certified), only 11 (79%) of the 14 studies quantified the number of organisations with either EMAS, ISO 14001 or another EMS type. Only 4 (29%) of the 14 studies had sample populations comprising entirely of organisations with EMS certification.

Of the 12,512 organisations included in the 14 studies, 9,558 (76%) were identified as SMEs, whilst only approximately 2,370 (19%) had implemented a certified EMS. See Table 5 below for a breakdown of these by EMS type.

Table 5 - Occurrence by EMS type

<table>
<thead>
<tr>
<th>EMS type</th>
<th>Quantification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMAS</td>
<td>1,895</td>
</tr>
<tr>
<td>Non-EMAS (incl. ISO 14001, BS 8555/Acorn)</td>
<td>475</td>
</tr>
<tr>
<td>Total number of SMEs with EMSs</td>
<td>2,370</td>
</tr>
</tbody>
</table>

100%
The most predominant EMS type within the studies was EMAS, which was heavily skewed by the presence of a large, German-based, manufacturing study undertaken by Rennings (see Table 3). If this study is excluded from the analysis, only 475 (3.8%) of the 12,512 organisations have an EMS that is not EMAS registered (i.e. ISO 14001 or BS 8555/Acorn).

It was not possible to compare the type of EMS implemented by the size of organisation, as none of the studies presented the EMS type by organisation size, and just 1 (7%) of the 14 studies (i.e. the REMAS study) identified the specific type of EMS implemented at the sector level.

**Drivers for SMEs to Implement an EMS**

This project aims to identify the drivers (i.e. key motivational factors or triggers) which lead SMEs to implementing a certified EMS. However, as previously noted, only 2,370 (19%) of the 12,512 organisations represented within the 14 studies were identified as SMEs with a certified EMS in place. Subsequently, any findings can only be generalised and not solely attributed to SMEs or a particular sector. Of the 14 studies that are relevant to this project, 10 (71%) identified a series
of applicable drivers which are summarised in Table 6 overleaf.

### Table 6 - Drivers for EMS Implementation

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</thead>
<tbody>
<tr>
<td>Improved reputation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Legal compliance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Cost reduction</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Improved environmental performance</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Stakeholder transparency</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Stakeholder requirement</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
<td></td>
<td>2</td>
<td></td>
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<tr>
<td>Supply chain pressure</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>X</td>
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<td>2</td>
<td></td>
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<tr>
<td>Competitive pressure</td>
<td>X</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td>2</td>
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<tr>
<td>Management commitment</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
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<td>2</td>
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<tr>
<td>Resource efficiency</td>
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<td>X</td>
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<tr>
<td>Improved competitiveness</td>
<td>X</td>
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<tr>
<td>Increased sales and turnover</td>
<td>X</td>
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<td>1</td>
<td></td>
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<tr>
<td>Innovation</td>
<td>X</td>
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<td></td>
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<td>1</td>
<td></td>
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<tr>
<td>Culture change</td>
<td>X</td>
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<td></td>
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<td>1</td>
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</tr>
</tbody>
</table>
The most referenced driver for EMS adoption, which appeared in 6 (60%) of the 10 studies, was the perceived improvement to the organisation’s reputation. The next most popular drivers for SMEs to implement an EMS were legal compliance which was identified in 5 (50%) of the 10 studies and cost reduction which was identified in 4 (40%) of the 10 studies.

The study that was undertaken by the Northern Ireland Environment Agency identified the drivers by sector and was able to make comparisons between private and public sector organisations. The private sector organisations most commonly identified drivers such as the potential cost savings and opportunity to win new work, whilst the public sector organisations stated that the greatest drivers were to reduce environmental impact and set a good example for the rest of the community.

### Barriers to Implementing an EMS

This project also aims to identify the barriers faced by SMEs when implementing a formal EMS. 10 (71%) of the 14 studies discussed the barriers for organisations when implementing an EMS and are these are shown in Table 7.

#### Table 7 - Barriers for EMS Implementation

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</thead>
<tbody>
<tr>
<td>Cost of implementation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>6</td>
</tr>
<tr>
<td>Lack of skills, experience and</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>5</td>
</tr>
<tr>
<td>Cost of registration</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>5</td>
</tr>
<tr>
<td>Unclear and insufficient benefits</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>4</td>
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<tr>
<td>No perceived value</td>
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<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>4</td>
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<tr>
<td>Too resource consuming</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>4</td>
</tr>
<tr>
<td>Lack of stakeholder demand</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Too complex/formal</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Lack of incentive</td>
<td></td>
<td>X</td>
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<td></td>
<td>X</td>
<td>X</td>
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</tr>
</tbody>
</table>
Improving the uptake of EMS amongst UK SMEs

Literature review

The most frequently cited barrier, which was identified in 6 (60%) of the 10 studies, was the cost of implementation. The next most cited barriers were the lack of skills, knowledge and expertise within the organisation to implement and maintain an EMS, which appeared in 5 (50%) of the 10 studies and the cost of registration to a certification scheme, which also appeared in 5 (50%) of the 10 studies. One study identified the barriers by the size of organisation, and identified that the cost of implementation and the cost of third party certification are the greatest barriers for micro and small organisations.

Benefits Realised After Implementing an EMS

Another objective of this literature review was to identify any quantitative and qualitative benefits of formal EMS implementation in SMEs. Whilst all 14 relevant studies made reference to the perceived or realised benefits from implementing an EMS, no quantification of these benefits was presented. The benefits identified have been categorised into either financial/business or social/behavioural as shown in Table 8 below and Table 9 overleaf. The table has been split into two as there was insufficient room to present the full extent of information within one table.

Table 8 - Benefits of EMS Implementation (1 of 2)

<table>
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<tbody>
<tr>
<td><strong>Financial / Business</strong></td>
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<tr>
<td>Energy and resource saving</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Legal compliance</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Cost reduction</td>
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<tr>
<td>Increased market opportunities</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Improved environmental performance</td>
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</table>
### Improving the uptake of EMS amongst UK SMEs

**Literature review**

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<td><strong>Financial / Business</strong></td>
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<tr>
<td>Energy and resource saving</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>7</td>
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<td>Legal compliance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>6</td>
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<tr>
<td>Cost reduction</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>5</td>
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<tr>
<td>Increased market opportunities</td>
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<tr>
<td>Improved environmental performance</td>
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<tr>
<td>Access to additional funding</td>
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<td>Improved reputation</td>
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<td>Reduced environmental incidents</td>
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<td>Increased sales</td>
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<td>Reduced emission levels</td>
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<td><strong>Social / Behavioural</strong></td>
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<tr>
<td>Improved employee participation</td>
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<td>Improved employee motivation</td>
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<tr>
<td>Improved stakeholder relationship</td>
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<tr>
<td>Improved employee retention rates</td>
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<td>Senior management commitment</td>
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**Table 9 - Benefits of EMS Implementation (2 of 2)**

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<tbody>
<tr>
<td>Access to additional funding</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Improved reputation</td>
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<td></td>
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<tr>
<td>Reduced environmental incidents</td>
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<tr>
<td>Increased sales</td>
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<tr>
<td>Reduced emission levels</td>
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</tbody>
</table>
Improving the uptake of EMS amongst UK SMEs

Literature review

Each of the 14 studies identified financial and business benefits. The most commonly cited of these, with 7 (50%) of 14 studies, was energy and resource savings, followed by legal compliance which was identified in 6 (43%) of the 14 studies.

Social and behavioural benefits were only identified in 6 (43%) of the 14 studies. The most commonly cited of these, with 3 (21%) out of 14 studies, was improved employee participation.

Attribution

The project aims to use an attribution method to calculate the proportion of quantifiable benefits (i.e. environmental savings, cost savings, and increased sales) from the implementation of a certified EMS in the SME. As such, the literature review sought to identify if any previous relevant studies had used an attributed method for cost savings or other benefits related to EMS implementation. It was found that no attribution methods were identified in the 14 studies that were reviewed. However, the Rennings study did try to qualify the significance of the influence which the EMS had over the changes made. For example, over 60% of organisations felt that their EMS had significant influence on decision making prior to implementing new environmental products and processes.

Cessation of EMS Certification

This literature review also aims to identify why some organisations do not continue their EMS certification once it has been achieved. Only one study made any reference to why organisations terminate their EMS certification; the REMAS study stated that 2 (8%) of the 25 organisations in the study sample had not sought re-certification due to the certification/registration costs and lack of company resources. It was suggested that the encouragement needed for these organisations to re-enter a formal certified EMS was reduced costs of registration and assistance.
5.0 Conclusions and Recommendations

This literature review aims to inform the wider research project by reviewing the sample selection characteristics together with the findings from relevant studies on EMS implementation by SMEs.

The literature review found that the total sample population represented within the 14 studies mainly drew from the manufacturing and service sectors. These two sectors had greater occurrences of EMS implementation compared to the primary sector, from which only agriculture featured within the reviewed studies. The analysis of the studies within the literature review supported the conclusion that there is fairly limited scope for EMS adoption within the primary sector. It was not possible to formulate conclusions at the sub-sector level, owing to the way the findings were presented within the 14 reviewed studies.

For the above reasons, it is recommended that the manufacturing and service industries are included within the sample selection for the wider research project and that the primary sector be excluded.

Within the literature review, there was no indication of the growth potential for EMS uptake in any specific sub-sector, hence the sample selection could not be informed by the findings of any previous study.

This literature review also found that only 4 (29%) of the 14 studies focused on SMEs and that there was a low occurrence of micro-sized enterprises with certified EMSs identified within the studies. From previous experience of working with micro-sized enterprises, it is known that record keeping and the informal nature of the systems in use make it difficult to interrogate the records to find quantitative data. It is therefore recommended that the project sample should exclude micro-sized enterprises and only seek to sample SMEs with between 10 and 249 employees (i.e. small and medium categories).

The literature review did not provide sufficient evidence to draw any conclusions relating to the drivers, benefits and barriers associated with EMS implementation in terms of organisation size or sector.

The three most frequently cited drivers identified by this literature review were
Improving the uptake of EMS amongst UK SMEs

Literature review

Improvements to reputation, cost reduction and legal compliance. The most frequently cited barriers were the lack of skills, knowledge and expertise within the organisation to implement and maintain an EMS, the costs associated with EMS implementation and the EMS certification costs.

There was a general lack of quantification of the benefits in the 14 reviewed studies, even though the most frequently cited benefits were financial and business benefits, such as cost savings and legal compliance. Social and behavioural benefits were identified in only 6 (43%) of the 14 studies.

It can be concluded that this research project will not be duplicating any previous research by collecting and analysing both quantitative and qualitative data on the environmental and business benefits associated with EMS, and analysing the drivers, barriers, and benefits of EMS implementation for SMEs.

Of the 14 studies reviewed, only 1 (7%) study discussed the reasons why some organisations choose to lapse their EMS certification. The main reasons cited for this were due to the ongoing registration costs and lack of resources to maintain the EMS.

This literature review aimed to identify previously used attribution methods, however none were identified in the 14 relevant studies analysed. To ensure the project objectives are achieved, an attribution method will be used within the presentation of the research project findings.
Appendix 1 - Literature Review List

Relevant Literature:

Of the 37 studies considered during the literature review, the 14 listed below were considered to be relevant to the project.

Articles:


Seiffert, B (2008); Environmental impact evaluation using a cooperative model for implementing EMS (ISO 14001) in small and medium-sized enterprises; (pdf) Journal of Cleaner Production, 16:14 pp.1447-1461.

Zorpas A, (2009); Environmental management systems as sustainable tools in the way of life for the SMEs and VSMEs; (pdf) Bioresource Technology, 101:6 pp.1544-1557.

Reports:


Milieu and PRA Ltd (2009); Study on the Costs and Benefits of EMAS to Registered Organisations (pdf) accessed via eu.europa.eu on 20/01/10.

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NIEA (2009); Measuring the effectiveness of environmental management system, phase 1 desktop report (pdf) accessed via www.ni-environment.gov.uk on 20/01/10.


REMAS (2007); Analysis of final REMAS project dataset (pdf) accessed via remas.iema.net on 20/01/10.

Web Source:

VECCI and EPA Victoria (2010); Grow me the money (website) accessed via www.growmethemoney.com.au on 20/01/10.

Non-Relevant Literature:

The following studies were discounted from the literature review using the relevance criteria. The reasons why are indicated in brackets.

Articles:


Arimura T, Hibiki A, Katayama H (2008); Is a voluntary approach an effective environmental policy instrument? A case for environmental management systems; (pdf) Journal of Environmental Economics and Management, 55 pp.281-295 (case study data older than 5 years).


Hertin J, Berkhout F, Wagner M, and Tyteca D, (2008); Are EMS environmentally effective? The link between environmental management systems and environmental performance in European companies; (pdf) Journal of Environmental Planning and Management, 51:2 pp.259-283 (case study data older than 5 years).

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Peters, M and Turner K R, (2004); SME environmental attitudes and participation in local-scale voluntary initiatives: some practical applications; (pdf) Journal of Environmental Planning and Management, 47:3 pp.449-473 (case study older than 5 years).

Schylander E, and Martinuzzi A, (2007); ISO 14001 – Experiences, Effects and Future Challenges: a national study in Austria; (pdf) Business Strategy and the Environment 16 pp.113-147 (case study data older than 5 years).

Reports:

Milieu and PRA Ltd (2009); Study on the Costs and Benefits of EMAS to Registered Organisations (pp) (replaced by final published report found on web).

Norfolk EMS~ME thoughts; (doc) received from Defra Nov 2009 (Template of EMS, no information on success of implemented EMS).

REMAS (2006); The REMAS findings (pdf) (summary of previous two documents, no new information).

WYG (2009); Measuring the effectiveness of environmental management system, phase 2 Final Draft Report MBx comments; (pdf) (The final published report was sourced instead).

Baxter, M (2007); Taking the first steps in environmental management; (pdf) accessed via www.iema.net on 20/01/10 (no case study data).

Web Sources:


Global Action Plan (2010); Case study: Visit London; (website) accessed via www.globalactionplan.org.uk on 20/01/10 (single case study).

Global Action Plan (2010); Case study: Kitley House Hotel & Restaurant; (website) accessed via www.globalactionplan.org.uk on 20/01/10 (single case study).

Global Action Plan (2010); Case study: Bite Communications; (website) accessed via www.globalactionplan.org.uk on 20/01/10 (single case study).

Groundwork ebs (2005); ISO 14001 environmental management system - Chester Zoo; (pdf) accessed via www.iema.net on 20/01/10 (single case study).

Groundwork ebs (2005); ISO 14001 environmental management system – Merseyside Fire and Rescue Service; (pdf) accessed via www.iema.net on 20/01/10 (single case study).
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Kirklees Metropolitan Council (2004); A Case study of achieving EMAS; (pdf) accessed via www.iema.net on 20/01/10 (case study is older than 5 years).

UWIC (2009); Green Enterprise 2009; (pdf) accessed via www.groundworkinwales.org.uk on 20/01/10 (not original source).
Appendix 2 - Detailed Review of Literature

Is an environmental management system able to influence environmental and competitive performance? The case of the eco-management and audit scheme (EMAS) in the European Union (Iraldo et. Al, 2009)

This article aims to determine whether the implementation of EMAS has an impact on the organisation’s environmental performance and competitive advantage, using the dataset provided by the EU-funded EVER (Evaluation of EMAS and Eco-label for their revision) study in 2005.

The subset of data used included 70 EMAS adopters and 31 non-adopters, all organisations chosen were from the private sector (including manufacturing, other industrial and service sectors) in the EU. The organisations were split into 3 categories depending on their size - small (25), medium (35) and large (41).

The most significant findings included:

- Two very distinct drivers were identified for organisations to implement and maintain their EMAS registration, either to enhance their reputation, a “certificate-oriented” approach or to ensure legal compliance and demonstrate a continual improvement process, a “strategic” approach
- Larger sized organisations had a better environmental performance than smaller companies, barriers such as lack of skills and knowledge, cultural gap and organisational lag were identified as preventing SMEs achieving better environmental performance once the EMS is implemented and awarded certification or registration.
- EMAS registered organisations with higher environmental performance also have better competitive performance and capability to develop new technologies.

UK Business Carbon Top3Map (Experto Crede, 2009)

The report aims to provide an initial view of SME capability in the UK to measure and monitor carbon footprinting since the development of the PAS (Publicly Available Specification) 2050 on carbon footprint measurement in 2008. This standard will help organisations to implement carbon
Improving the uptake of EMS amongst UK SMEs

Literature review

reporting under the Carbon Reduction Commitment in 2010. This requirement will steadily impact the whole supply chain, right down to small organisations.

Responses from 511 UK SMEs were gathered to identify the barriers to SMEs using the carbon footprint measurement tool and possible actions to remove these barriers. Even though this study does not investigate EMSs it does mention some of the barriers which SMEs face when implementing new management systems, this is the main reason for its inclusion in the review.

**The influence of different characteristics of the EU environmental management and auditing scheme on technical environmental innovations and economic performance. (Rennings, 2005)**

A telephone survey of EMAS-validated facilities in the German manufacturing sector, 1,277 organisations responded. The study was not restricted to a particular size of organisation and so the findings are not specific to SMEs.

The benefits of implementing an EMS were identified as improving environmental quality, reducing costs, with an indirect benefit of stimulating the implementation of environmental product and process innovations across all operations including production, distribution and procurement.

Where environmental products and process innovations have been implemented over half of the organisations stated that the EMS had a substantial influence.

Over half of participants stated that senior management had strong involvement in the development of EMAS, whilst a fifth stated all employees strongly participated in environmental initiatives.

**Ends survey brings mixed news for certifiers (ENDS, 2006)**

Over 600 environmental professionals participated in the survey; over half worked for organisations with ISO14001 certification but also included were EMAS registered organisations and certification bodies. The survey was not designed to include a specific sector or size of organisation. However this literature discusses driver and benefits.
Improving the uptake of EMS amongst UK SMEs

Literature review

The main driver for implementing an EMS was a change in culture; others included competitive pressure, supplier demands, regulatory requirements and the desire to cut costs.

A number of benefits were identified (reduction in resource use and waste production, compliance liabilities, competitiveness and corporate reputation) however business drivers such as legal compliance and customer demand were more important.

70% of participants agreed that the implementation of an EMS leads to significant environmental performance improvement that otherwise would not have been achieved.

The global use of environmental management systems by small and medium enterprises (ISO, 2005)

An international survey covering 71 countries was conducted to determine the benefits and barriers to SMEs implementing ISO 14001. The participants included 917 SMEs defined as an organisation with up to 100 employees. No specific sector was focussed upon.

SMEs generally perceive environmental issues as a compliance issue rather than a core business concern, this statement supports the most popular drivers identified as customer requirement, improvement in environmental compliance and continuous improvement in environmental performance.

Once the SMEs had implemented the EMS, the initial drivers above were realised as benefits plus an increase in employee commitment and cost savings.

The main barriers to implementation of an effective EMS identified by the SMEs are the costs of implementation and maintenance, including cost of certification, resource and time. There was also a significant lack of knowledge, skills and expertise to implement ISO 14001 without external assistance. Small businesses are prone to assume their own environmental impact is insignificant and so consider a formalised EMS irrelevant to them. Organisations with less than 50 employees rarely have formal operating systems in place and so are deterred by implementing such management systems.

SME-nvironment Survey UK (Netregs, 2009)
Improving the uptake of EMS amongst UK SMEs

Literature review

This survey was designed to capture information on legal compliance and environmental good practice within SMEs, this included the implementation of EMSs. There were over 7,000 responses from 10 UK sectors (including healthcare, education, construction, transport by land, hotels & restaurants, and agriculture).

Only 4% of the businesses surveyed had an EMS in place. The organisations from the construction industry were the most likely, and transport the least likely to have implemented a formal EMS.

The majority of organisations considered an EMS to be of ‘no use’ or of ‘little use’ to them; this was felt most strongly within very small organisations of only 0-9 employees. The main concerns of SMEs were the perceived formality and complexity of the systems and associated costs.

The main benefits gained by businesses from improving environmental performance were reduced operating costs and a more motivated workforce; a direct relationship was identified between the reported benefits and the number of employees in the organisation.

Measuring the effectiveness of Environmental Management Systems (NIEA, 2009)

This study was undertaken on behalf of Northern Ireland Environment Agency (NIEA) in line with their Sustainable Development Strategy for NI and the NIEA ‘Better Regulation’ programme, mainly focussing on the relationships between EMS and environmental improvements, and EMS and legal compliance.

1,000 organisations based in Northern Ireland with 5+ employees were surveyed within a range of public and private sectors (manufacturing, wholesale & retail, business services, transport & communications, construction and hotels & catering, agriculture / primary). Nearly 99% of the organisations were classified as SMEs, with the majority of businesses having 5-9 employees.

2.7% of the sample had a formal accredited EMS implemented, including ISO 14001 (most popular), BS8555, EMAS and Green Dragon. EMS uptake was greater in agriculture / primary, manufacturing and construction sectors compared to the other sectors considered in the survey.

Barriers identified were no perceived value of formal EMS to organisation, insufficient knowledge of EMS within the organisation and lack of resource available for implementation.
Improving the uptake of EMS amongst UK SMEs

Literature review

For the small number of organisations who had allowed their certification to lapse; cost implications of maintaining the certification was stated as the main reason.

Benefits identified included improved legal compliance and costs savings mainly realised in waste and energy reduction. There was a weak relationship between improved environmental performance and increased sales. The public sector reported more success in managing compliance issues and achieving improved environmental performance compared to the private organisations.

The two main motivators for organisations to go beyond legal compliance were cost savings and a green commitment within the organisation; the presence of an EMS ranked low.

**REMAS (Life, IEMA, EA, SEPA, EPA in Ireland, 2007)**

The study was co-funded by the LIFE Environment Fund, the Institute of Environmental Management and Assessment (IEMA), the Environment Agency (EA), Scottish Environmental Protection Agency (SEPA) and the Environmental Protection Agency in Ireland. It aimed to look into the relationship between implementing different types of EMS and the change in behaviours at a site, the impact of behaviours on emissions levels and compliance with legislation.

The study captured data from 315 companies from 14 European countries and 8 industrial, Integrated Pollution and Prevention Control sectors (including combustion, food and drink, pulp and paper, inorganic and organic chemicals, and metal and minerals processing). The organisations either had an accredited certified EMS, an informal system or no system in place. The study was not SME specific; however two thirds of the organisations involved were classified as SME, in line with European Union (EU) definition.

Strong evidence was found that adoption of an accredited certified EMS improves site environmental management activities. Overall environmental management performance was found to be better with ISO 14001 than under an informal system, which in turn was better than under no system.

The main findings were:

- Improved environmental management leads to lower average emission levels.
Improving the uptake of EMS amongst UK SMEs

Literature review

- Overall, the number of self-reported permit/licences breaches increased with improved environment management, mainly due to improved reporting and documenting processes.

- A reduction in formal enforcement notices issued was linked to improved environmental management.

- Overall environmental management performance was higher in organisations with EMAS compared to organisations with ISO14001. This may be associated with the more demanding requirements for (self) reporting and monitoring of environmental performance with EMAS compared to ISO 14001 system.

**Study on the Costs and Benefits of EMAS to registered Organisations (Milieu and RPA, 2009)**

This study used the responses from 455 organisations from most EU Member States across a variety of sectors; the greatest number of responses came from the Chemicals sector. 60% of the sample was micro, small and medium sized organisations, and 40% large organisations.

Most popular drivers for organisation seeking EMAS registration were to improve resource and production efficiency, an internal management approach / culture and improve their reputation. Other significant reasons were the desire to improve transparency with stakeholders and legal compliance. Manufacturing organisations tended to identify improve resource and production efficiency as the main reasons, whist the service industries, closer to the customer, indicated that stakeholder transparency and supply-chain pressure were key motivations.

The most popular benefits identified were energy and resource saving, improved stakeholder relationships, and reduction in negative incidents. The private sector ranked increased market opportunities much higher than the public sector. However the cost savings from efficiency improvements are unlikely to be achieved year on year and may tail off in the long term once all possible measures have been implemented.

Among the barriers to EMAS uptake noted, unclear or insufficient benefits, and cost of implementation were ranked the highest, followed by regulatory pressures, cost of registration,
Improving the uptake of EMS amongst UK SMEs

Literature review

lack of financial incentives, and lack of awareness amongst public and clients and internal management preference.

Reasons for withdrawal from EMAS mainly from large organisations from the private sector were that the benefits were unclear or insufficient to justify registration. Factors that would encourage them to re-register were reduced regulatory requirements, competitor registration, customer requirement, assistance with implementation, and reduced fees for registration.

**Grow Me the Money (VECCI and EPA Victoria, 2010)**

Grow Me the Money has been developed in partnership with the Victorian Employers’ Chamber of Commerce and Industry (VECCI) and Environment Protection Authority Victoria (EPA Victoria) under a Sustainability Covenant. It is a non-accredited step by step 12 month programme to help SMEs to develop sustainable practices.

At present, 33 organisations have completed the programme; the sectors included range from accommodation, printers, manufacturing/warehousing, health/education, professional services and food retail.

The main benefits stated in the case studies relate to cost saving from improved resource efficiency and reduction in waste generation. By communicating their environmental achievements other benefits were promoted as improved reputation, staff retention and engagement.

**Environmental impact evaluation using a cooperative model for implementing EMS (ISO 14001) in small and medium-sized enterprises (Sieffert, 2007)**

Four organisations from a variety of secondary and tertiary sectors were used in this case study to test the environmental impact evaluation method for implementing EMS. Three out of four organisations were classified as SMEs, all had ISO14001 implemented.

The main drivers for implementing were stakeholder pressure or requirement, such as from foreign clients and surrounding community due to previous environmental incidents. Benefits gained included reduced costs (lower insurance, improved process efficiency), enhanced
reputation, better access to markets, environmental impact are reduced and improved employee involvement.

Costs of implementation, lack of skills and resources and an entrepreneurial culture are stated as the most common barriers faced by SMEs. One organisation had previously attempted to implement an EMS, but failed due to complexity of the methodology received from consultants. Another firm has recently lost its certification due to organisational downsize and other strategic priorities.

Drivers, barriers and incentives to implementing environmental management systems in the food industry: A study of Lebanon (Massoud et al, 2009)

The majority of the 45 organisations in the case study who responded did not have an EMS implemented; only 4% of the organisations had ISO 14001 in place.

Where organisations had implemented an EMS, the main reasons stated were to improve environmental performance, enhance company image and reduced operational costs. The benefits realised were centred on the provision of tax exemptions and loans for organisations with EMS and legal compliance.

Nearly 60% of respondents did not perceive ISO 14001 certification as having any added value in enhancing their competitiveness and nearly all (98%) claimed that none of their suppliers, customers or the stakeholders demanded ISO 14001 certification. The majority (87%) also stated there was a lack of governmental support or motivation to adopt a voluntary EMS.

Although most organisations did not have an EMS implemented, almost 68% of respondents reported to have taken initiatives to improve their environmental performance anyway.


The study aimed to gather information from the EMAS registered companies in Greece. 9 out of the 10 companies registered with EMAS in December 2003 were involved. 8 of the 9 companies were classified as SMEs in a variety of secondary and tertiary sectors.
Improving the uptake of EMS amongst UK SMEs

Literature review

The main drivers stated for implementing EMAS were improved company image, legal compliance, reduced production costs and improved reputation within the local community.

Nearly half (4) companies identified closer monitoring of production process as a benefit, whilst only 2 organisations made immediate cost savings from reduced energy and resource consumption.

8 out of 9 companies stated that there were no major requirements from stakeholders to implement an EMS. Other barriers identified were surrounding costs of implementation and upgrading of equipment and infrastructure.

Due to lack of funding, the organisations financed their own EMAS implementation and subsequently did not have a single person dedicated to the EMS, due to lack of resource.

Environmental management systems as sustainable tools in the way of life for the SMEs and VSMEs (Zorpas, 2009)

This article used data from Eurostat 2008 to quantify the number of organisations with either EMAS or ISO 14001 registration/certification. Whilst there was no original case study, the benefits, barriers and drivers for SMEs were discussed.

The main drivers identified were cost reduction, reduced environmental impact and improved public image. The most common benefits included reduced waste production, gains in efficiency, market opportunities, achieving legal compliance and improved community and employee relations.

Dis-benefits for SMEs implementing EMS were found to fall into three categories: resources, lack of rewards and EMS surprises (such as cost of certification, poor implementation advice, problems meeting stakeholder requirements). Further observations made included:

- Most small (usually micro) enterprises had hardly any interest in their environmental performance
- Without stakeholder pressure, few enterprises were interested in taking an active role in environmental protection.
Annex B -

Qualitative Questionnaire
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Unique reference no:</td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>Company name:</td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>Name of contact person:</td>
<td></td>
</tr>
<tr>
<td>A4</td>
<td>Position:</td>
<td></td>
</tr>
<tr>
<td>A5</td>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td>Telephone number:</td>
<td></td>
</tr>
<tr>
<td>A7</td>
<td>Mobile number:</td>
<td></td>
</tr>
<tr>
<td>A8</td>
<td>E-mail address:</td>
<td></td>
</tr>
<tr>
<td>A9</td>
<td>Number of employees:</td>
<td></td>
</tr>
<tr>
<td>A10</td>
<td>Number of employees band:</td>
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<tr>
<td>A11</td>
<td>Annual turnover:</td>
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<tr>
<td>A12</td>
<td>Annual turnover band:</td>
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<td>A13</td>
<td>Balance sheet assets band:</td>
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<td>A14</td>
<td>SME size classification:</td>
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<td>A15</td>
<td>SME ownership:</td>
<td></td>
</tr>
<tr>
<td>A16</td>
<td>Parent Sector:</td>
<td></td>
</tr>
<tr>
<td>A17</td>
<td>Sector Group for Study Purposes:</td>
<td></td>
</tr>
<tr>
<td>A18</td>
<td>Sector NACE Code:</td>
<td></td>
</tr>
<tr>
<td>A19</td>
<td>Sub-sector NACE Code:</td>
<td></td>
</tr>
<tr>
<td>A20</td>
<td>Year of company formation:</td>
<td></td>
</tr>
<tr>
<td>A21</td>
<td>What is your company’s principal area(s) of activity?</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td>Additional Notes</td>
</tr>
<tr>
<td>------------------------</td>
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<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>B1 EMS Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 Year EMS implementation work started</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3 Initial certification year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4 Certification body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5 Does your company hold any other initiatives / standards? Show list to interviewee. Note whether the scheme is accredited (e.g. by UKAS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiative/ standard</td>
<td>Yes/No/Don’t know</td>
<td>Additional Notes</td>
</tr>
<tr>
<td>ISO 9001</td>
<td></td>
<td></td>
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<tr>
<td>OHSAS 18001</td>
<td></td>
<td></td>
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<tr>
<td>Investors in People</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 1 (please provide details)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 2 (please provide details)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 3 (please provide details)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6 Within your company who is responsible for EMS implementation?</td>
<td>EMS team / A specific person</td>
<td></td>
</tr>
<tr>
<td>B7 In your opinion, approximately what percentage of people in your company is aware of the environmental issues the company faces?</td>
<td>0-25% / 26-50% / 51-75% / &gt;75%</td>
<td></td>
</tr>
<tr>
<td>B8 In your opinion, approximately what level of staff engagement is there in your company’s EMS?</td>
<td>High / Moderate / Low</td>
<td></td>
</tr>
</tbody>
</table>
Does your company encourage suppliers and or contractors to have certified EMSs?  

Yes / No / Sometimes 

Please also answer question H1 & H2 at the bottom of this page.

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Section C - Drivers for EMS Implementation

To be asked to the Managing Director or Senior Manager

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>What was the initial trigger to implement your company’s EMS? In your opinion, approximately what percentage of people in your company is aware of the environmental issues the company faces?</td>
<td>0-25% / 26-50% / 51-75% / &gt;75%</td>
</tr>
<tr>
<td>C2</td>
<td>Rank the top three drivers/reasons your company implemented its EMS; where 1 has the highest rank? Show list to interviewee.</td>
<td></td>
</tr>
</tbody>
</table>

Drivers for EMS Implementation

<table>
<thead>
<tr>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attract investment/funding/loans</td>
</tr>
<tr>
<td></td>
<td>Compliance with legal and other requirements</td>
</tr>
<tr>
<td></td>
<td>Cost savings</td>
</tr>
<tr>
<td></td>
<td>Increased sales/market</td>
</tr>
<tr>
<td></td>
<td>Participation in grant funded and/or other environmental projects/initiatives</td>
</tr>
<tr>
<td></td>
<td>Reduction of business risks e.g. financial risk</td>
</tr>
<tr>
<td></td>
<td>Pressure/influence from stakeholders</td>
</tr>
<tr>
<td></td>
<td>Publicity/reputational gain/ brand enhancement</td>
</tr>
<tr>
<td></td>
<td>Reduced environmental impact e.g. pollution reduction</td>
</tr>
</tbody>
</table>
In light of your company's decision to adopt an EMS, rate the importance of the various stakeholders listed below on the following scale: Show list to interviewee.

<table>
<thead>
<tr>
<th>Stakeholder influence</th>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers/consumers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family/children of owners and/or the people employed by the company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurers/lenders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shareholders/investors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppliers/contractors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Out of all of your customers, what proportion asks for details of your company’s certified EMS?  
All / Most / About half / Some / None

Do you agree or disagree with the following statement (view statement card):  
Additional Notes
The reasons our company implemented an EMS are still as relevant as they were initially.

Strongly agree / Agree / Neither agree or disagree / Disagree / Strongly disagree

C7 Finally, have you got any other comments on the reasons for your company’s EMS implementation?

Section D - Barriers for EMS Implementation

To be asked to the Environmental Management Representative

D1 Has your company had to overcome any specific barriers implementing its EMS? Yes / No

D2 Rank the top three barriers to implement your company’s EMS; where 1 has the highest rank. Show list to interviewee.

<table>
<thead>
<tr>
<th>Barriers to EMS Implementation</th>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits and value of EMS unclear or insufficient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complexity and bureaucracy of systems approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of external support for implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees not engaged in the process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of management committed to the process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level of existing regulator pressures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of skills/knowledge/experience within the company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of funded support and/or government incentives for EMS implementation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### Section D - Barriers to EMS Implementation

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited financial resources/budget for EMS implementation</td>
<td></td>
</tr>
<tr>
<td>Limited human resources/time for implementation</td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

Do you agree or disagree with the following statements (view statement card):

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree / Agree / Neither agree or disagree / Disagree / Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3</td>
<td>The barriers we faced implementing our EMS implementation were easy to overcome.</td>
</tr>
<tr>
<td>D4</td>
<td>We still face barriers in maintaining our company’s EMS.</td>
</tr>
</tbody>
</table>

Finally, have you got any other comments on the barriers faced during your company’s EMS implementation?

### Section E - Benefits of EMS Implementation

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better marketing credentials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To be asked to the Environmental Management Representative

E1 Has your company benefited from its EMS? Yes / No

E2 Rank the top three benefits achieved from having your company’s EMS; where 1 has the highest rank. Show list to interviewee.

Benefits of EMS Implementation Rank Additional Notes

Better marketing credentials | | |
| Better stakeholder relations |
| Changes in workforce including employee motivation/satisfaction/retention |
| Cost savings |
| Energy/resource efficiency savings |
| Enhanced competitiveness/sales |
| Higher company standards |
| New and/or improved products or services |
| Improved supply chain interaction and security |
| Improved working methods (from EMS management tools/techniques) |
| Increased competence of employees |
| Increased publicity |
| Improved legal compliance |
| Reduced risk and number of negative incidents |
| Other, please specify |

**Additional Notes**

<p>| E3 | Has EMS certification assisted your company in qualifying for new opportunities in the public sector? | Yes / No / Don't know / Not applicable |
| E4 | How significant have these opportunities been for your company’s performance/success overall? view statement cards | Very significant / Significant / Neither significant or insignificant / Insignificant |
| E5 | Has implementing an EMS had benefits for your general management approach? | Yes / No / Don't know |
| E6 | If yes, what are the benefits? | 7 |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>E7 What impact has the economic downturn had on the importance of the EMS within the company?</td>
<td>Made EMS more important / EMS has about the same importance / Made EMS less important</td>
</tr>
<tr>
<td>E8 Do you agree or disagree with the following statements; view statement cards</td>
<td>Strongly agree / Agree / Neither agree or disagree / Disagree / Strongly disagree</td>
</tr>
<tr>
<td>E9 The benefits of our company EMS outweigh the barriers faced in EMS implementation</td>
<td></td>
</tr>
<tr>
<td>E9 There has been a transfer of positive environmental behaviour from work to home</td>
<td></td>
</tr>
<tr>
<td>E10 Do you think there has been a transfer of positive environmental behaviours from your company to other places?</td>
<td>Yes / No / Don't know</td>
</tr>
<tr>
<td>E11 If yes, can you give examples of the positive environmental behaviour? Note to interviewer to get details on the impact of the change and how long it has been going on, how widely it has been adopted.</td>
<td></td>
</tr>
<tr>
<td>E12 Has the implementation of an EMS at your company led to any other benefits e.g. in the local community or further afield? Please give examples.</td>
<td></td>
</tr>
<tr>
<td>E13 Finally, have you got any other comments on the benefits achieved from your company’s EMS?</td>
<td></td>
</tr>
</tbody>
</table>
Section F - EMS Certification/Registration
To be asked to the Environmental Management Representative - Now I want to ask you a few questions about the certification/registration of your company’s EMS.

F1 Why did your company choose to get its EMS certified/registered?

F2 Have you faced any of the following challenges in achieving certification/registration?
<table>
<thead>
<tr>
<th>Challenge</th>
<th>Yes/No</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of certification/registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance to third party auditing/scrutiny</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulties in addressing of non-conformities raised by third party auditors.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerns over confidentiality e.g. exposure of legal compliance or sensitive information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time required for the certification audits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty of reaching the standards requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F3 Are any of these barriers applicable to maintaining EMS certification/registration?
<table>
<thead>
<tr>
<th>Barrier</th>
<th>Yes/No</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty of maintaining requirements, in particular continual improvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in finding a satisfactory auditor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of recognition for standard (e.g. for BS 8555)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in company values/business priorities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### F4
How has your company’s relationship changed with customers, suppliers and other stakeholders since having a certified EMS? View statement cards.

<table>
<thead>
<tr>
<th>Competitors</th>
<th>Customers/consumers</th>
<th>Employees</th>
<th>Insurers/lenders</th>
<th>Regulators</th>
<th>Management</th>
<th>Local community</th>
<th>Shareholders/investors</th>
<th>Suppliers/contractors</th>
<th>Other, please specify</th>
</tr>
</thead>
</table>

### F5
Is the company considering terminating its EMS certification?

<table>
<thead>
<tr>
<th>Reason for Terminating Certification</th>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of benefits from certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in business priorities/management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost savings/budget constraints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time needed to achieve certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient demand from customers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty of maintaining EMS to required standard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### F6
If yes, rank the three reasons for not continuing with EMS certification where 1 has the highest rank? Show list to interviewee.

<table>
<thead>
<tr>
<th>Reason for Terminating Certification</th>
<th>Rank</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of benefits from certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in business priorities/management</td>
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<tr>
<td>Cost savings/budget constraints</td>
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<tr>
<td>Time needed to achieve certification</td>
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</tr>
<tr>
<td>Insufficient demand from customers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty of maintaining EMS to required standard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Other, please specify

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F7</strong></td>
<td>If yes (F5), would the company maintain its EMS without certification?</td>
</tr>
<tr>
<td><strong>F8</strong></td>
<td>Finally, have you got any other comments on the certification of your company’s EMS implementation?</td>
</tr>
</tbody>
</table>

### Section G - Staff Views of Company EMS

**To be asked to a general member of staff - I want to ask you a few questions about the company’s approach to the environment**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G1</strong></td>
<td>Are you aware whether or not your company has a certified EMS?</td>
</tr>
<tr>
<td><strong>G2</strong></td>
<td>Have your own working practices changed since the EMS was put in place?</td>
</tr>
<tr>
<td></td>
<td>If yes, could you give examples of the changes? Note to interviewer to get details on the impact of the change and how long it has been going on and who is involved.</td>
</tr>
<tr>
<td><strong>G3</strong></td>
<td>In your opinion, what proportion of your colleagues have changed their working practices since the EMS was implemented?</td>
</tr>
<tr>
<td>Do you agree or disagree with the following statements; view statement cards</td>
<td>Strongly agree / Agree / Neither agree or disagree / Disagree / Strongly disagree</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>G5</td>
<td>I have a more positive attitude toward the company since the EMS has been implemented.</td>
</tr>
<tr>
<td>G6</td>
<td>I do green things at home.</td>
</tr>
<tr>
<td>G7</td>
<td>I have taken some of the green ideas at work and tried them at home.</td>
</tr>
<tr>
<td>G8</td>
<td>I have taken some of my green ideas from home and tried them at work.</td>
</tr>
<tr>
<td>G9</td>
<td>Focusing on the environment has had an overall benefit to the company.</td>
</tr>
</tbody>
</table>

**Additional Notes**

| G10 | Finally, have you any other comments about the company and its management of environmental issues? |  |

**Additional Notes**

| H1 | How many months did it take to implement the EMS? |  |
| H2 | Did you use the BS 8555/Acorn approach to develop your EMS (regardless of which level of certification is currently held)? | Yes / No |