

# Do good environmental management systems lead to good environmental performance?

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## Overview

Investors, regulators, companies and their stakeholders are all keen to know whether environmental management systems (EMS) lead to good environmental performance. Companies are beginning to see financial returns from the adoption of EMS in the form of cost savings, risk aversion or reduced

business interruption<sup>1</sup>. Regulators, such as the UK's Environment Agency, strongly encourage the implementation and use of EMS as they believe they should lead to improved environmental performance and better, and more consistent, legal compliance<sup>2</sup>. However, there are widely held concerns about the ability of EMS to secure good environmental performance.

This study explores the correlation between quality of environmental management systems and environmental performance improvements, focusing on companies with high environmental impacts<sup>3</sup>.

Key findings include:

- The majority (72.6%) of high impact companies have implemented an environmental management system of at least a 'moderate' standard
- The implementation of both certified and uncertified environmental

management systems is lower in Hong Kong, Ireland and Singapore (where over 50% have an inadequate EMS) than in Germany, Finland, France, Greece, Italy, Denmark and Portugal (where less than 5% with an inadequate EMS)

- Almost half (48%) of high impact companies demonstrated some improvement in performance over the previous three years. There is a wide range with over 75% of companies in Switzerland, Italy and Portugal demonstrating some improvement but less than 25% in Hong Kong, Singapore and Ireland.
- Less than half (38.8%) of high impact companies produce environmental reports of at least a 'moderate' standard. There are large national differences – USA, Ireland, Hong Kong and Greece have less than 25% of companies producing a report of this quality, whereas over 75% of companies in Germany report.
- There is a broad correlation between the standard of a company's environmental management system and its environmental performance i.e. the more advanced the EMS, the higher the level of performance achieved.

The key message is that almost all companies who can demonstrate environmental performance improvements have a good environmental management system, but a good EMS is no guarantee of environmental performance improvements. For investors this means that while encouraging companies to adopt an EMS is a significant first step (only 2.5% of companies achieve improvement with an 'inadequate' EMS), actual environmental performance also needs to be monitored. For regulators and policy-makers this indicates that there is a correlation between well developed

environmental management systems and improved environmental performance. However, efforts are needed to encourage greater disclosure and reporting of companies EMS and quantitative data on their environmental impacts.

## 1. What are environmental management systems?

One definition of an environmental management system (EMS) is given by the British Standards Institute<sup>4</sup>:  
*"the organisational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy."*

An EMS therefore generally follows the adoption of an environmental policy. The environmental policy formally outlines a company's commitments to environmental management and commonly includes commitments to reduce waste, pollution, energy and resource use, sets objectives and targets and reviews the company's environmental performance. Once the policy and EMS are in place a company will consider the publication of an environmental report to document the company's progress against its policy and performance targets set within the EMS.

Companies may adopt a certified EMS, such as ISO 14001 or Eco-management and audit scheme (EMAS), or they may develop their own 'in-house' systems. Of the certified schemes, ISO 14001 is the most commonly adopted because of its international status and the success of its predecessor, the quality standard ISO 9000. ISO 14001 was written as a consensus standard with nearly 50 countries participating. It can be applied to an entire organisation or

parts therein and/ or its activities, products and services. The aim is to promote continual improvement. Companies achieve certification following inspection by an approved accreditation body.

The Eco-Management and Audit Scheme (EMAS) was developed by the European Union (EU) in 1995 for sites based in the EU. Sites, rather than whole companies, become registered to EMAS following verification by the competent body of that EU country.

The principle elements of an EMS are outlined below:

- Environmental policy – should be made publicly available in order to demonstrate a commitment to address a company's environmental impacts
- Identification of significant environmental impacts – a company should undertake an analysis of its activities in order to define the areas where it has most impact, for example energy consumption, emissions to air, water pollution, waste, water consumption
- Setting of measurable objectives and targets – the policy should include an overall commitment to reduce environmental impact, accompanied by targets in all significant impact areas which should be quantified where possible
- Documenting processes, procedures and responsibilities – a company should put into operation a structure of responsibilities within the organisation, as well as documented procedures and manuals to support the system
- Internal auditing – to include internal audits and site audits, as appropriate
- Internal reporting and management review – there should be a process for internal communication to enable

management review of the success of the system

EMAS and ISO 14001 standards both specify these elements. EMAS additionally requires a public environmental report.

### **1.1. Benefits of an environmental management system**

An environmental management system can benefit a company in a number of ways:

- Facilitating greater awareness of legislative requirements and thereby developing plans for compliance
- Identifying the potential for cost savings through efficiency improvements
- Providing a better understanding and greater control of processes thereby reducing emissions and the risk of pollution incidents
- Improving the company's public image by enabling more detailed reporting – environmental performance is increasingly important to, amongst others, customers, insurers and local residents<sup>2</sup>

This is supported by a survey conducted by ISO<sup>7</sup> in 2003 which found that the main motivations for seeking ISO 14001 certification are 'environmental improvements' and 'corporate image', and, to a lesser extent, 'marketing advantage' and improved 'relations with communities.' The key benefits obtained from ISO 14001 certification were improved environmental performance and improved corporate image, followed by improved procedures, relations with authorities, and relations with communities. Companies in the US and Canada reported the highest benefits from improved procedures in this survey, despite relatively low levels of adoption.

## 1.2. EMS standards

Environmental management systems historically focused on achieving compliance with applicable environmental regulations. However, as outlined above, EMS can also provide opportunities and demonstrate to regulators and stakeholders that continuous improvement can be achieved through voluntary programmes. EMS standards have emerged in response to this desire for self-regulation, providing a voluntary mechanism through which companies can demonstrate their commitment to environmental protection.

The specification for EMAS is the same as for ISO 14001 with the exception that EMAS additionally requires an environmental report to be published, which is optional under ISO 14001, and places greater emphasis on pollution prevention and regulatory compliance. Regulatory bodies are consulted before a company is registered under EMAS and can object.

In September 2004, there were 65 companies with EMAS registered sites in the UK and 4,019 in Europe. This compares with approximately 5,500 ISO 14001 certificates in the UK and 23,000 in Europe. There are over 66,000 ISO 14001 certificates globally.

The environmental management standards ISO 14001 and EMAS both require third-party certification. Independent certification of an EMS can provide a mechanism through which good corporate citizenship may be demonstrated to stakeholders and national governments. In addition, businesses may require certification as a contract condition and certification may provide a valuable incentive for operational staff. However, certification adds additional operating costs and may not differentiate companies in

terms of environmental performance, as it is a management, not performance, standard<sup>1</sup>.

## 1.3. How does EIRIS measure the quality of environmental management systems?

EIRIS assesses both internal corporate environmental management systems and those certified to ISO 14001 or registered to EMAS standards.

Internal management systems are assessed on the following indicators (identified as the main EMS elements):

- Environmental policy
- Identification of significant impacts
- Setting of objectives and targets in all key areas
- Documented structure and procedures
- Audit programme
- Internal reporting and management review

The assessment is dependent on the proportion of the company's operations that are covered. Evidence of these systems (e.g. documentation and audit results) is required by EIRIS from the company.

The UK Environment Agency formally recognises EMS in their risk-based approach to regulation through the OPRA (Operator and Pollution Risk Appraisal) scheme. Companies with recognised EMS are awarded extra points in the OPRA scoring system. EMAS receives the highest number of points, followed by ISO 14001 and then companies own in-house system.

A survey of company managers conducted by Arthur D Little found that 86% of respondents in the US and 85% of respondents in the UK thought that consistency between the elements of their own internal uncertified EMS and the ISO 14001 standard was important,

90% of respondents in the UK had conducted an assessment of their existing EMS against the requirements of ISO 14001<sup>6</sup>.

## 2. Measuring environmental performance

One of the many challenges within the field of environmental management is how to measure and assess environmental performance. Theoretically, a well-developed EMS will provide quantitative data on environmental performance to be included in publicly available environmental reports. Indeed the majority of large cap companies now report quantitative information on their environmental performance. However, the task of assessing a company's performance is complex, not least because there is no agreed set of environmental performance indicators.

A commonly used definition of an indicator is: *"A number, absolute or relative, that facilitates management, communication and follow-up of an organisation's performance."*<sup>5</sup>

Indicators of environmental performance can be:

- Absolute – basic raw data e.g. total carbon dioxide emitted in 2005
- Relative – e.g. energy consumption per unit of output
- Indices – constructed to produce a number by using a baseline year, factoring equivalents on a scientific basis or through the use of factors and weighting to produce a number e.g. 100 as the baseline number with increasing efficiency producing a larger number.

### 2.1. How does EIRIS measure performance improvements?

EIRIS measures a company's performance according to five key operational direct impacts, which are weighted for each sector dependent on the negative environmental impact relative to economic contribution. These are:

- climate change – emissions of greenhouse gases, carbon dioxide, energy consumption
- emissions to air – sulphur dioxide, oxides of nitrogen and volatile organic compounds, or other emissions to air relevant to a company
- discharges to water – chemical oxygen demand, heavy metals
- waste – amount of waste generated, hazardous waste generated, recycling rate
- water consumption – amount of water used

All data is converted to key performance indicators (KPI), which are standardised against an appropriate denominator, such as production or sales data. For example, a KPI based on water consumption data may be expressed as cubic metres of water used per tonne of steel produced. The average annual rate of change in each KPI is calculated, using a three years of data, where available, and averaging the trend for two years. For example, a company may have achieved a 10% year on year reduction in water consumption over the two years.

This type of calculation allows a comparison between companies reporting over different timescales and different indicators. A company reporting on a historical baseline can be compared with one reporting against the previous year only.

A range of indicators can be used for performance in each area. Where a range of data is provided the most appropriate indicator is selected or the performance of each combined. Companies may disclose different data dependent on their operations. For example, a chemicals company may report COD (chemical oxygen demand) or nitrogen and phosphorous and heavy metals while and oil and gas companies may report oil in water, process water and drill cuttings. This flexibility is required due to the variation in data available and allows a range of companies to be compared on an equivalent basis.

A grade is awarded for each key issue, based on the improvement rate achieved:

- **Major improvement** (>7.5% reduction for climate change and water consumption or >15% reduction for waste, air and water emissions)
- **Significant improvement** (>2.5% reduction for climate change and water consumption or >5% reduction for waste, air and water emissions)
- **Minor improvement** (>0% reduction)
- **No improvement** (0% improvement or <2.5% deterioration)
- **Deterioration** (>2.5% increase)
- **No data**

An overall grade is then derived from the five key issue grades. The five areas are weighted for each sector (high, medium or low) depending on the negative environmental impact caused by companies in that sector (e.g. emissions) relative to the economic benefit generated (gross value added (GVA)). For example, air transport generates 3% of UK carbon dioxide emissions, but generates only

0.5% of UK gross value-added – this sector is therefore considered high impact for climate change. Where an issue is not relevant, it is excluded from the assessment calculation. The weighted average score is calculated from the five individual impacts to give the final impact classification.

EIRIS uses publicly available information from company reports or survey responses, which the companies are encouraged to disclose.

### 3. Scope of analysis

#### 3.1. Aim of study

This study explores the correlation between quality of environmental management systems and environmental performance improvements over three years. EIRIS has not on this occasion carried out a 'before' and 'after' analysis of the effects of introducing one.

#### 3.2. Coverage: high environmental impact sectors

This study focuses on business sectors with a 'high environmental impact'. As a basis for the environmental research, EIRIS classifies all companies into 40 sectors, 18 of which are defined as having a relatively high environmental impact 13 are defined as medium and nine as low impact. Similar findings are apparent in medium and low impact companies. However this study focuses on high impact sectors as this represents a more complete data set.

The principle underlying the classification system is that a sector's overall environmental impacts should be assessed in relation to its size. The basic indicator used is a ratio of environmental damage to economic

significance. For each sector, direct impacts relating to climate change, air pollution, water pollution, waste and water consumption were reviewed. Impacts arising indirectly through upstream (supply chain) or downstream (product life cycle) were also considered, mainly in qualitative terms. Each sector was profiled in terms of its impacts (high, medium or low) on these issues. Quantitative data is used where available to determine criteria for high, medium or low grades for each issue based on an absolute ratio. For example, sectors which contribute a higher proportion of the national carbon dioxide (CO<sub>2</sub>) emissions than economic value added in the UK are graded at least as medium in this area, and where the CO<sub>2</sub> contribution is more than double the economic significance of the sector they are classified as high. Data is used from a variety of sources to assess these ratios globally.

The overall classification of the sector depends on the number of issues where the sector has a high or medium impact. Sectors with a high impact in at least one key direct impact or a medium impact in more than four key direct impacts are classified as high, and sectors with a medium impact in at least two issues are classified medium overall. The remaining sectors are classified as low impact.

#### High impact sectors

- Air transport
- Airports
- Building materials & quarrying
- Chemicals & pharmaceuticals
- Construction
- Fast food chains
- Food, beverages and tobacco
- Forestry & paper
- Major systems engineering
- Mining & metals
- Oil & gas
- Pest control
- Power generators

- Road distribution & shipping
- Supermarkets
- Vehicle manufacture
- Waste
- Water

#### 3.3. Coverage: developed economies

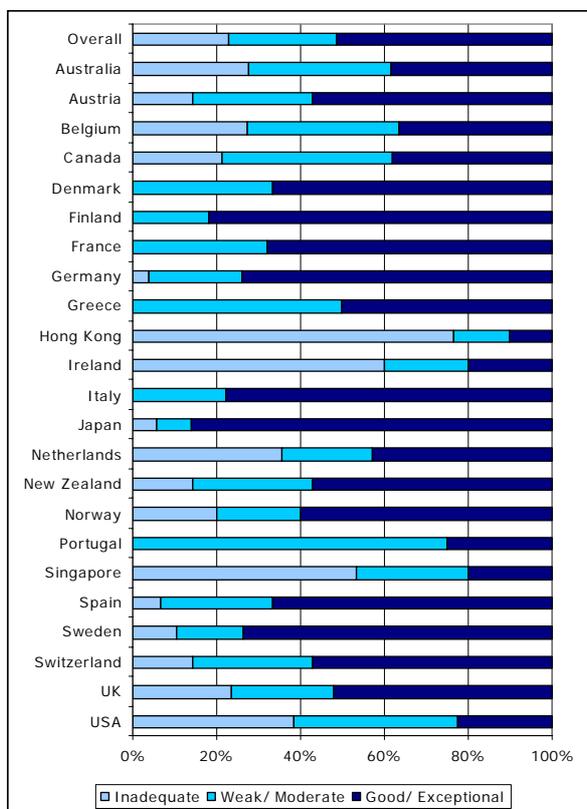
This study is based on over 800 high environmental impact companies in the FTSE All World Developed index representing medium and large cap companies globally.

## 4. Findings

### 4.1. Uptake of environmental management systems

The majority (72.6%) of high impact companies have implemented an environmental management system of at least a 'moderate' standard. High impact companies are generally subject to greater regulation (than low or medium impact companies) and greater scrutiny from stakeholders due to their environmental impact. In many cases these companies have had environmental management systems in place for decades. However, in light of this it is perhaps surprising and worrying that almost a quarter (22.7%) of high impact companies have an 'inadequate' environmental management system.

There are significant national variations in the implementation of both certified and uncertified environmental management systems (as illustrated in the graph below). The lowest levels are found in Hong Kong, Ireland and Singapore (over 50% have an inadequate EMS) and the highest in Germany, Finland, France, Greece, Italy, Denmark and Portugal (less than 5% with an inadequate EMS).



Graph 1

Data: October 2005

Almost 60% of companies (59.8%) have adopted certified environmental management systems (EMAS or ISO 14001). Again wide variations can be seen in national adoption rates. Less than 40% of companies in Hong Kong, Australia, Canada and the US have sites certified to ISO14001. This contrasts with Japan and Finland where over 90% of companies have some ISO 14001 or EMAS certified sites.

EMAS certification is less widespread than ISO 14001 even within Europe. In Belgium, Switzerland, Norway and Finland over a quarter of companies have some EMAS certified sites and in Austria and Germany over half the companies have some EMAS certification. There is a clear preference for ISO 14001 certification, either because of its global nature, thereby being more useful and more easily recognisable outside Europe or because

the requirements of EMAS are more demanding than those of ISO 14001.

| Country      | Percentage companies with EMAS certified sites | Percentage companies with ISO14001 certified sites |
|--------------|--|--|
| Australia    | 0.0  | 38.3   |
| Austria      | 57.1   | 71.4   |
| Belgium      | 27.3   | 45.5   |
| Canada       | 0.0  | 38.1   |
| Denmark      | 22.2   | 88.9   |
| Finland      | 45.5   | 100.0  |
| France       | 8.0  | 72.0   |
| Germany      | 59.3   | 88.9   |
| Greece       | 0.0  | 87.5   |
| Hong Kong    | 0.0  | 20.0   |
| Ireland      | 0.0  | 40.0   |
| Italy        | 22.2   | 66.7   |
| Japan        | 0.0  | 91.3   |
| Netherlands  | 7.1  | 57.1   |
| New Zealand  | 0.0  | 57.1   |
| Norway       | 40.0   | 80.0   |
| Portugal     | 0.0  | 75.0   |
| Singapore    | 0.0  | 40.0   |
| Spain        | 0.0  | 80.0   |
| Sweden       | 5.3  | 84.2   |
| Switzerland  | 28.6   | 85.7   |
| UK           | 6.3  | 54.2   |
| USA          | 2.2  | 35.7   |
| <b>Total</b> | <b>6.7</b>                                     | <b>59.8</b>  |

Table 1

Data: October 2005

Companies in the US, in particular, have historically been more tightly regulated. Achieving regulatory compliance, or even preventing increased future regulation, is a commonly sited driver for establishing environmental management systems. Therefore, US companies may believe they have already achieved the main purpose of introducing an EMS just by complying with the regulations, which may go some way toward explaining the relatively low adoption rates. These regulations however do not require public reporting of data. Instead, data

is predominantly reported to the regulators only.

The high level of certification to ISO 14001 and EMAS standards in Germany is partly explained by the strong public awareness of environmental issues historically and the desire by companies to demonstrate a commitment to managing their environmental impacts<sup>8</sup>. Some German companies also demand certified management systems from their suppliers, which supports the high adoption rate.

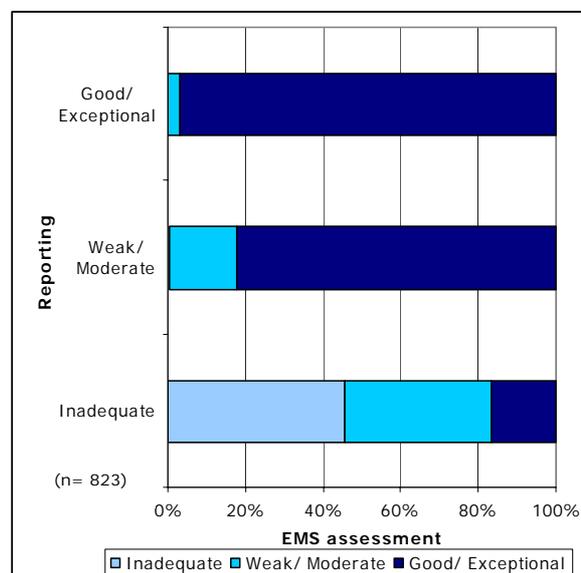
The high adoption of ISO 14001 in Japan is primarily due to the country's experience with the quality standard ISO 9000. Initially, adoption of ISO 9000 was slow as Japanese companies considered their quality management to be very good and adoption of a quality standard to be unnecessary. However, customers in Europe and the US started requiring ISO 9000 registration of Japanese suppliers so the Japanese Ministry of International Trade and Industry (MITI) organised a major registration effort among Japanese firms to avoid losing export business to registered firms elsewhere. When ISO 14000 followed, Japanese companies did not want to risk a similar situation and adopted the standard to a high degree<sup>9</sup>.

**4.2. Reporting and disclosure levels**

The following graphs explore the relationship between the quality of environmental management systems and standards of reporting, disclosure and environmental performance.

Less than half (38.8%) of high impact companies produce environmental reports of at least a 'moderate' standard. There are large national differences – USA, Ireland, Hong Kong and Greece have less than 25% of companies producing a report of this

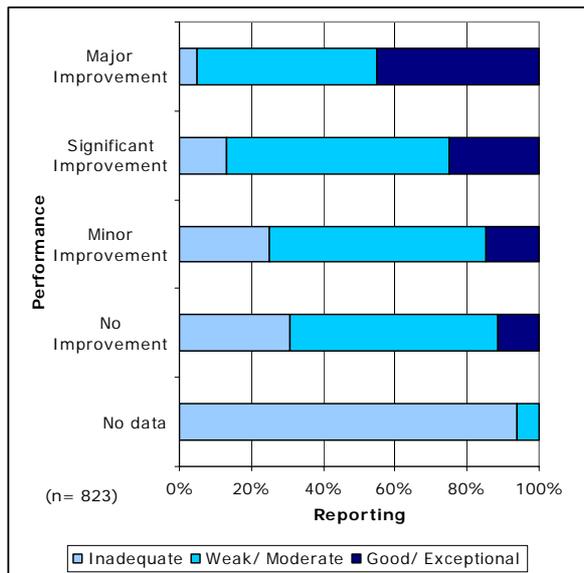
quality, whereas over 75% of companies in Germany report. Of those companies that do report there is a clear correlation between the quality of the company's EMS and the quality of the reporting. The graph below illustrates that 97% of companies producing environmental reports of a 'good' or 'exception' standard also had EMS of a 'good' or 'exception' standard. Furthermore, almost half (45.5%) the companies producing 'inadequate' reports also had 'inadequate' environmental management systems.



Graph 2 Data: October 2005

The correlation between the quality of reporting and disclosure of quantitative data is clear. All companies that do not disclose quantitative data either publicly or in response to a survey request are assessed as 'inadequate' or 'weak' public reporting. Although, it is generally the case that whilst companies with an EMS report performance data, some companies with a 'good' or 'exceptional' EMS do not report any performance data ('no data'), and many who do report only score 'no improvement'. However, as stated earlier there may be a variety of reasons for the 'no improvement' assessment. This includes companies that have reported one year of data

only or have recently experienced disposals, acquisition or changed their measuring methodology without recalculating previous years' data to enable comparison.



Graph 3 Data: October 2005

The graph above illustrates the link between the quality of reporting and environmental performance. Over 45% of companies with reports assessed as 'good/ exceptional' also demonstrate a major improvement in performance. It may be that companies are more likely to disclose fully when there is good performance to report. However, this also illustrates the importance of reporting as an indicator of performance.

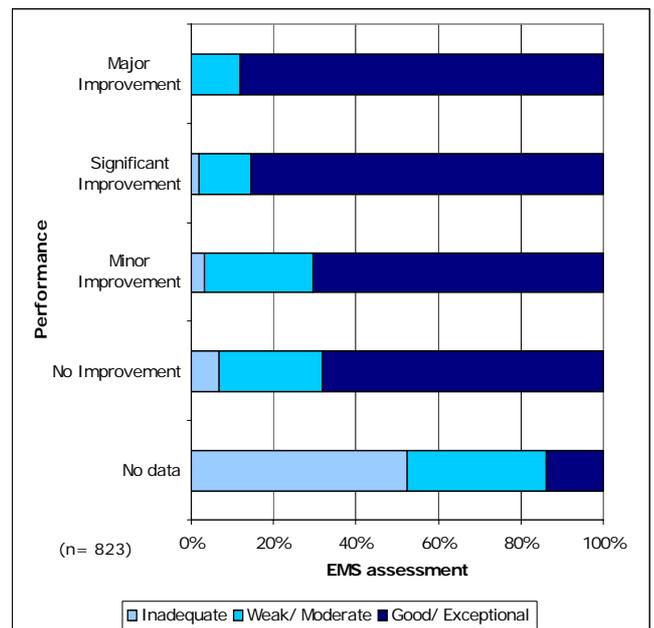
**4.3. Good systems leading to good performance?**

Almost half (48%) of high impact companies demonstrated some improvement in performance over the previous three years. There is a wide range with over 75% of companies in Switzerland, Italy and Portugal demonstrating some improvement but less than 25% in Hong Kong, Singapore and Ireland.

A correlation between the standard of a company's EMS and its environmental performance is evident i.e. the more advanced the EMS, the higher the level of performance achieved (measured over three years). Interestingly, there is no instance of a company achieving 'major improvement' in performance without having implemented an EMS.

However, a good EMS is no guarantee of environmental performance improvements. An EMS requires companies to identify their environmental impacts and to set targets to try to reduce those impacts, but this does not necessarily mean a company will achieve those targets or indeed require that the targets be 'stretching'. Continual improvement is a requirement of both ISO 14001 and EMAS standards. However, where the improvement takes place may be open to interpretation. This may include improvement in performance e.g. a reduction in air emissions or an improvement in the environmental management system e.g. improved monitoring and auditing.

The following graph illustrates this correlation:



Graph 4 Data: October 2005

Investigating this link is also the subject of remas<sup>10</sup>, a three year project designed to examine environmental management systems currently in place in business and industry across EU Member States. The project aims to demonstrate that companies and organisations that implement an EMS show better environmental performance overall. A report based on analysis of an initial sample of data from the UK found that the sample provides strong evidence to support the hypothesis that the adoption of an accredited EMS leads to an overall improvement in operator performance (as measured by management indicators such as commitment to training and awareness and operational and risk management), with EMAS having a greater beneficial impact than ISO 14001. However, the evidence that EMS leads to improved process efficiency (as measured by environmental impact indicators such as compliance, process efficiency and releases) is not very strong.

This study concludes that the correlation between well developed environmental management systems and improved environmental performance suggests that supporting adoption of EMS could reduce the overall environmental impact of companies in those cases where no EMS is yet in place. However, efforts are required to encourage greater disclosure and reporting of companies' EMS and quantitative performance data to promote greater transparency regarding their environmental impact and to monitor the effectiveness of reporting as a spur towards improved environmental performance.

## Notes

- <sup>1</sup> Environmental management standards and certification – Do they add value? T J Sunderland (1997)
- <sup>2</sup> Environment Agency – Environmental Management Systems: Position Statement (Jan 2005)
- <sup>3</sup> Similar findings are apparent in medium and low impact companies, however this study focuses on high impact sectors as this represents a more complete data set.
- <sup>4</sup> British Standards Institute (1994) British Standard for Environmental Management Systems: BS7750
- <sup>5</sup> Ross H, 1996 Det Norske Veritas, lecture, Developing Environmental Performance Indicators for Business
- <sup>6</sup> Arthur D Little survey
- <sup>7</sup> Charles J Corbett, Anastasia M Luca and Jeh-Nan Pan, Global perspectives on global standards: a 15-economy survey of ISO 9000 and ISO 14000, ISO Management Systems, January-February 2003
- <sup>8</sup> Paul Scott, Management systems and sustainable development: the moving goal posts from environment to corporate responsibility, ISO Management Systems, September-October 2003
- <sup>9</sup> Charles J Corbett and Michael V Russo, The impact of ISO 14001: ISO 14001-irrelevant or invaluable? ISO Management Systems, December 2001
- <sup>10</sup> Further details available at <http://remas.ewindows.eu.org/>

## Glossary

EMS – Environmental management system  
EMAS – Eco-management & Audit Scheme  
ISO 14001 – International Standard Organisation standard concerned with environmental management.

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