



## THE RESULTS OF THE REMAS PROJECT

### Introduction

This document serves to inform decision-makers and non-technical parties on the objectives and the results of the remas project.

### Background

Environmental management systems (EMSs) provide business, in particular those involved in industrial manufacture, with a systematic approach to monitor and improve environmental performance. Although there are laws in parts of Europe whereby the implementation of an EMS is mandatory, more generally they are adopted on a voluntary basis, with the benefits to the business cited as reduction of risk of prosecution and economic savings through the illumination of poor practice.

Since the adoption of an EMS should lead to regulatory compliance and environmental improvement, promoting these may also be considered by Governments as an alternative intervention strategy to enactment of more laws. The effectiveness of EMSs in such a strategy has been questioned by many, resulting in numerous studies throughout the world. Remas is one of these studies, based on mainly on the European experience. It differs from many other studies in that it gathered specific data to test the value of EMSs, with particular reference to the regulator – those responsible for implementing laws. Many other studies have used data gathered for other purposes in their assessment, and whilst it does not make their findings invalid, it does reduce the power of the analysis.

EMSs originated from the quality management approach adopted in the early 1990's. The number of EMSs has increased steadily since introduction, driven in part by their adoption as a supply chain requirement. Many different 'types of EMS exists making one single evaluation if 'value' difficult. There is an international standard – ISO14001 – together with mechanisms to allow independent third party verification that an organisation is conformant with the standard. The Eco Management and Audit Scheme, EMAS, is a European Regulation which incorporates the approach documented in the ISO14001 standard, but requires that adopting organisations go further by making public declarations of commitment and reporting against these. Adoption of EMAS is voluntary by organisations, but in order to achieve the award third party verification is required to demonstrate that the adopting organisation has met the requirements of the regulation. EMAS also encourages that any



duplication resulting from the adoption and verification activities and activities more normally associated with implementation of legislation (e.g. permitting and inspection) should be minimised.

### **Project specification**

Remas set out to achieve the following objectives:

- Demonstrate mechanisms to meet Article 10 of the Eco-Management and Audit Scheme (EMAS)
- Demonstrate where EMAS improves performance and compliance with environmental regulation
- Demonstrate how effective implementation of EMAS improves environmental performance faster or further than command and control regulation
- Encourage uptake of the approach through dissemination with key European Community stakeholders

The project started in November 2002 with a projected completion date of October 2005. In 2005, the project was extended until April 2006.

Remas is supported under the European Commission LIFE fund. The project value is approximately €2 million, with 50% arising from the project partners:

- The Environment Agency (Beneficiary)
- The Institute of Environment Management and Assessment (IEMA)
- The Scottish Environmental Protection Agency
- The Irish Environmental Protection Agency

Project support is also evident from the many European companies taking part in the study and the European Network for the Implementation and Enforcement of Environmental Law (IMPEL). The project attracts interest at an international level.

### **Project findings**

The project used a bespoke mathematical model to interpret the relationships between the adoption of a particular type of EMS and the management activities or 'behaviours' a regulator expected on a good site, and then the subsequent impact of these on regulatory compliance performance and environmental performance. The latter metric was normalised to allow comparisons against raw materials and emissions benchmark levels defined as 'best available techniques' within the European Union's Integrated



Pollution Prevention and Control Directive. Whereas the benchmarks were known, the derivation of the model and comparisons techniques is groundbreaking with a number of 'spin-off' learning points established during the work which adds to the value of the project.

The data gathered was subjected to a number of quality control audits, including site visits by the team and cross reference to local regulatory inspectors. The website used to gather data remains available as an additional project deliverable, and is translated into five languages.

**Figure 1 Theoretical Model**

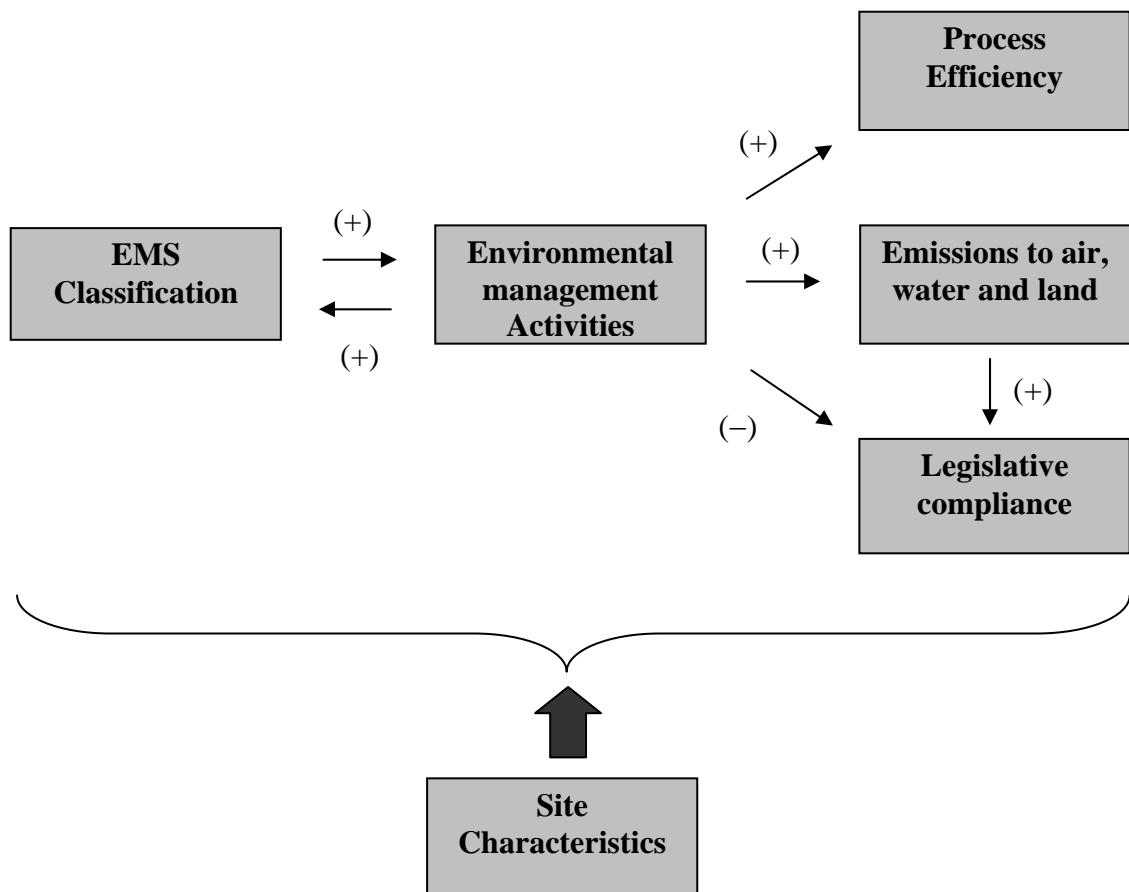


Figure 1 represents a conceptual view of the analysis model and intuitive relationships between the various components.



Data on various types of EMS were collected, but these were classified into five:

1. Sites with no defined EMS approach
2. Sites with an informal EMS but no third party auditing
3. Sites that had achieved certification to ISO14001 using an accredited certification body
4. Sites within group (3) that had also taken the steps to reach EMAS but have not registered under the scheme
5. Sites registered under EMAS.

The main purpose for classification (4) - named ISO14001+ - is to determine if the registration and verification activities within EMAS provides extra value over an enhanced ISO14001 approach.

Environmental management activities are defined as the behaviours – or checks and balances – a regulator would like to see occurring on a site. IMPEL defined these as part of the project; elsewhere they are known as the remas criteria.

The two way relationship between these two boxes maps a real life possibility. Either the adoption of the EMS drives better behaviours at a site (the forward relationship), or the better behaviours exist anyway and it is merely the better sites that are registering for the ISO14001 certificates or EMAS (the reverse relationship).

The second stage of analysis relates the better behaviours on sites to indicators of environmental performance represented by the three boxes on the right of figure 1. 'Process efficiency' and 'emissions to air, water and land' measure the performance of a site against the relevant performance benchmark within IPPC. There are more than 3500 of these within the technical guidance surrounding IPPC allowing for the different production sectors and industrial process techniques. These are derived in Commission working groups involving regulators, industrial and trade body representatives and represent international norms. There are two unexpected findings here:

- a) There are very few benchmarks on solid waste production within the IPPC reference documents, and hence comparisons are very difficult even though data has been proved by industry in the project. There appears to be no technical reason for this. Publication of these benchmarks may aid the reduction of waste by industry in Europe, thus complementing other interventions underway in the European Commission such as the Waste Framework Directive.



- b) Companies taking part in the project had difficulties providing data on raw material utilisation in a format which allowed comparison to the relevant benchmarks. This suggests that it is not done on a regular basis and there is still much scope for emphasising the benefits of resource efficiency measures, even within the sites currently regulated under IPPC.

It is expected that better behaviours on sites would influence better performance in both these indicators, hence the denoted positive relationship in the model.

Legislative compliance can be potentially influenced by two routes. This metric reflects the number of non-compliance events declared by the company - that is the number of times a permitted level has been exceeded. Given that some of these permit levels refer to emission levels, a reduction of emission may be expected to have a positive impact on legislative compliance- that is a reduced number of non-compliance events. Conversely, one of the better behaviours expected on a site is looking for non-compliance events and registering these where they occur. This is indicated by the direct 'negative' relationship. Clearly where the better behaviour identifies non-compliance events that were previously unknown, this may lead to an increase in the number. This may be better explained in the four box model approach in figure 2.

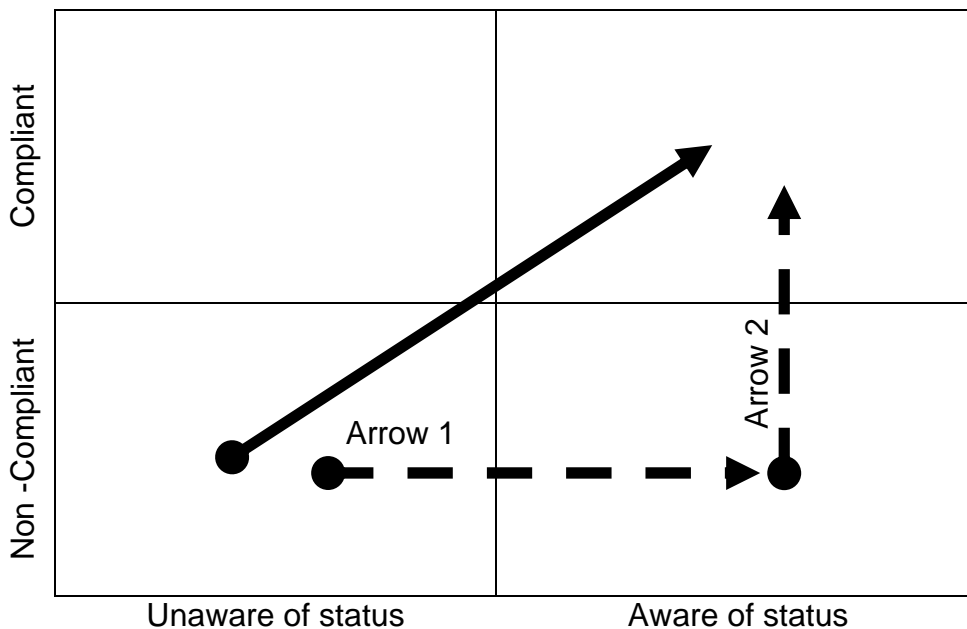


Figure 2: Means to improve compliance



Clearly the primary aim is to move a site from the status of 'non-compliant' and 'unaware' to 'aware' and 'compliant' – thick arrow, However this make to place as a two stage process, indicated by the dotted arrows. The transition depicted by arrow 1 results in increasing numbers of non-compliance (high numbers can be good!); arrow 2 results in decreasing numbers (high numbers poor). Thus a comparison of whether a site has an EMS and whether these results lower numbers of compliance is too simplistic. This may answer some of the sometimes contradictory findings of previous studies.

Using statistical tests it is possible to confirm the relationships in the model and express these in levels of confidence. Such tests show that implement a structured EMS on site such as ISO14001 and EMAS does improve the environmental management activities with a high degree of confidence. In this respect EMAS is better than ISO14001, which in turn is better than an informal EMS. In turn, and again to a high degree of confidence, the environmental management activities do influence compliance and this can manifest itself through both routes in figure 2. Thus it can occur as a higher number of non-compliance events, representing better awareness, and lower non-compliance events representing better compliance management. The distinction between the two appears to be dependant on the difference regulatory regimes in place in different regions of Europe. Similarly improved environmental management activities appear to drive reduced emissions levels, although this is at a lower confidence level than the above. This too differs in different regions of Europe.

### **Compliance protocol**

To develop the model the study made in depth assessment of compliance. In addition to the analysis methodology, t his established that there were different expectations of the requirements in the different stakeholder groups of regulator, industry and third party verifier. This led to the development of a common compliance protocol.

The protocol is based on the checks an inspector (in the United Kingdom or Ireland), might undertake in either determining a permit or making an inspection. The conceptual design allows for a self checking tool that allows an industrial; site manager to answer a series of questions, and from this establish if the site is potentially non-compliant (and just not found out yet!), compliant by chance or compliant by the design of the management systems. Questions in various 'dimensions of compliance', such as resource provision, systems, compliance history etc, allow a profile of the site to be established.



Many site managers taking part in the development conclude that this is a useful tool to determine where improvements could be made and to compare multiple sites within a company.

Currently the protocol is developed at conceptual level only and applicable to IPPC sites. Many have called for this to be developed further as a useful tool to aid self reporting and audit of compliance in a commonly understood manner. This further work is yet to be commissioned. The current version of the protocol is available for use and is an additional deliverable not specified in the original contract bid.

## **Summary**

The remas project concludes that there is a relationship between EMS's and performance driven through better site management activities. Whereas an incrementally more stringent EMS drives incrementally better site environmental management, the resultant increase in performance occurs at a lower (but positive) ratio. This is thought to be due to poor specification of performance requirements by key stakeholders. Revision to EMAS and IPPC are already proposed to remedy this.