

# ENVIRONMENTAL MANAGEMENT SYSTEMS: A GUIDE FOR THE HE SECTOR

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## About this Guide

This guide is designed to encourage and help HE institutions to establish and implement an Environmental Management System (EMS). It makes the case for EMS's establishment and goes on to outline their history and development and the growing popularity of both ISO 14001 and the European Union's Eco-Management and Audit Scheme (EMAS) across a wide range of public and private sector industries.

The step-by-step guide explains the principles of environmental management and how they can be applied in practice. It identifies 15 essential steps in the EMS implementation process, including how to draw up an Environmental Policy, evaluate significant environmental effects, organise staff responsibilities and training, document the procedures and undertake an EMS audit.

The guide draws substantially on the implementation process for ISO 14001 and EMAS. Please note that HE institutions are not presently eligible for EMAS Registration, although this is expected to change following a current review of the Regulation. Details of both systems, including the requirements for registration, are presented in the appendices. This will help HE institutions who intend to apply for formal registration at some point in the future. The step-by-step guide is generic and is intended for use by all departments in an HE institution. This approach follows the ISO 14001 and EMAS models which require that the EMS should apply to individual sites or whole organisations. If the institution decides to proceed in stages, the guide may be used by individual departments or faculties. However, it should be recognised that formal registration for individual departments in an organisation is not normally allowed under ISO 14001 or EMAS rules.

## Environmental Management Systems - Introduction and brief history

The concept of environmental management began to evolve with the introduction of environmental auditing in America in the 1970s. Primarily, environmental audits were designed to evaluate environmental risks and ensure compliance with legislation. But as environmental concerns led to more legislation, so environmental auditing became more rigorous. In 1989 the International Chamber of Commerce established a new definition for environmental auditing:

'A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organisation, management and equipment are performing with the aim of helping to safeguard the environment by:

- a. facilitating management control of environmental practices;
- b. assessing compliance with company policies which would include meeting regulatory requirements.'

Environmental auditing in the 1970s paved the way for the development of more systematic methods of measuring environmental performance in the 1980s. In the mid-eighties, the Confederation of British Industry set up an Environmental Forum to advise its members on environmental management issues. The Chemical Industry Association introduced its Responsible Care programme, to advise members on how to improve their performance in all aspects of environment, health and safety. The 1980s saw other initiatives from the Business Council for Sustainable Development, the European Petroleum Industry and others, all designed to encourage and promote greater environmental responsibility in the industrial sector.

In 1992 the British Standards Institution (BSI) introduced BS 7750, the first ever official environmental management systems standard. BSI revised the publication in 1994, following the results of two years of pilot studies, carried out by industries in various industrial sectors.

The basic aim of an environmental management system (EMS) is continual improvement in environmental performance. As with any performance-related system, an EMS requires a policy commitment and the installation of procedures, operational controls, targets, training, performance monitoring, audit and review, to ensure the policy aims and objectives are being met. In this respect, an environmental management system follows the same basic organisational structure as that which applies to financial management, personnel, administration, production and all other systems of effective operational management.

There are now two possible ways for an organisation to gain external validation for its EMS. First there is certification to the international standard, ISO 14001 Environmental Management Systems - Specifications with Guidance for Use, which replaces BS 7750 and is now firmly established in a variety of manufacturing and service industries. Second, the EU Eco-Management and Audit Scheme (EMAS) gives further recognition to a growing number of qualifying organisations (i.e. manufacturing industry, and the waste, power and mining sectors in the European Union plus, in the UK only, local government) which wish to publicise their EMS through an externally-verified environmental statement.

More recently ISO has been developing various supplementary environmental standards, in what is now referred to as the ISO 14000 series. These provide more detailed information on the various elements in an environmental management system.

In the short time that both EMAS and ISO 14001 have been around, the popularity of both schemes has grown rapidly. A survey conducted in 1997 by the European Environmental Press Association (EEP) shows that nearly 800 installations have been certified to ISO 14001, by certification bodies based in seven Member States. According to data released by the UK Accreditation Service about 300 companies are now certified to ISO 14001 in the UK, and the rate of uptake is almost twice that of a year ago. In Germany, over 700 sites are registered under EMAS, according to the EEP survey. In the UK, 47 were registered by the end of January 1998, excluding local authority sites.

In 1997 the European Committee of Standardisation (CEN) established a bridging document which provides guidance on how to interpret the requirements of the ISO standard so that all the environmental management systems requirements of EMAS can be met. The publication of a European Commission Decision in April 1997, means that ISO 14001 can now be used as a route to EMAS Registration.

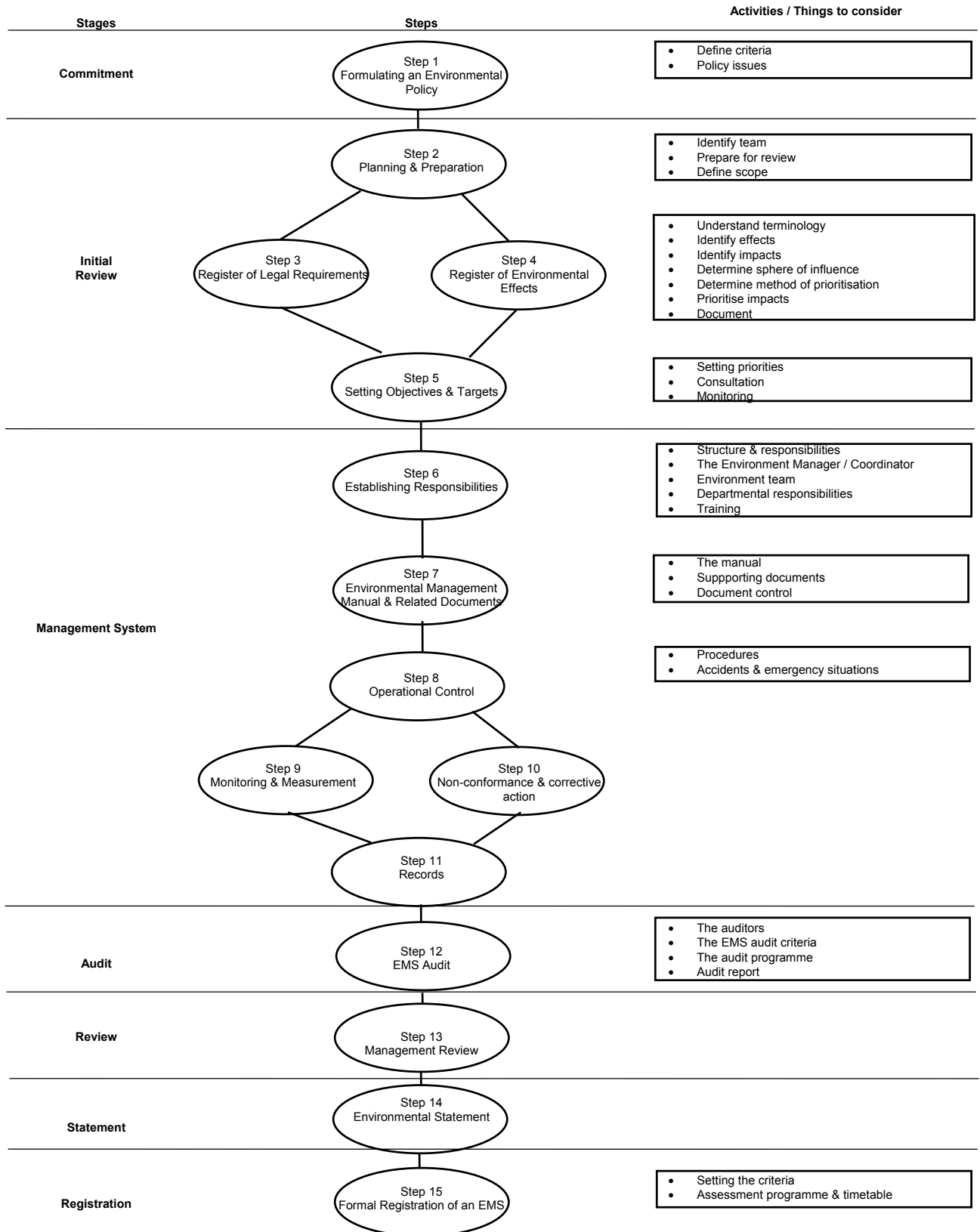
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There is a review of EMAS underway conducted by DGXI. This should be completed by July 1998 and a revised regulation adopted by 2000. It is expected that changes are likely to include a widening of the scope of EMAS so that it is available to other sectors including education, and to make EMAS requirements equate to those of ISO 14001.

Appendix 1 outlines the requirements of ISO 14001, as an international standard, and EMAS, as a European Regulation. For those organisations who have established a quality management system, there is also a section on the linkages between Quality Management System (QMS) BS EN ISO 9001 (formerly BS 5750), and ISO 14001. The links between the two systems, as well as their differences, are discussed in Appendix 2, together with the conversion criteria for registration to both schemes, in Appendix 3. The route to registration is outlined in Appendix 4.

## Setting up an Environmental Management System





## Setting up an Environmental Management System - A step-by-step guide

This section provides a step-by-step guide to establishing an EMS. It is a generic system, and incorporates all the key elements of both the EMAS Regulation and the ISO 14001 Standard.

### **Step 1. Commitment: Formulating an Environmental Policy**

An environmental policy establishes a set of principles against which to measure environmental performance. It is a statement of intent for developing more specific environmental objectives. The introduction and implementation of an environmental policy will mean changes in the way the institution is managed. It is important, therefore, that the Vice-Chancellor and the senior management team acknowledge their commitment to the EMS by officially signing the policy statement.

An environmental policy is a requirement for both ISO 14001 (ref. 4.2 in the Standard) and EMAS (Article 3 of the Regulation).

#### **a. Defining the criteria of the policy**

A primary aim of an environmental policy is continuous improvement in environmental performance. Senior management should have ultimate responsibility for the policy but should also consult with staff, students and other stakeholders to ensure that it:

- is appropriate to the nature, scale and environmental impacts of the institution's activities, products and services
- includes a commitment to continual improvement and prevention of pollution
- includes a commitment to comply with relevant environmental legislation, regulations and other institutional policies
- provides the framework for setting and reviewing environmental objectives and targets
- is documented, implemented and maintained and communicated to all staff and students
- is available to the public.

Both the ISO 14001 Standard and the EMAS Regulation require commitment to the environmental policy at the highest level in the organisation and that the policy statement is published. The policy gives authority and permission for environmental responsiveness across the institution. It also encourages 'bottom-up' initiatives.

#### **b. Policy issues for HE**

Themes which the policy should address include:

- efficient use of resources
- waste minimisation
- enhancement of biodiversity
- recycling and re-use
- student access to education to enable responsible global citizenship (which includes responsibilities relating to the environment)
- academic and service staff training relating to environmental responsibilities
- partnerships with local authorities, suppliers and community organisations in relation to shared environmental goals.

The environmental policy should not be viewed in isolation. Many of the issues overlap with other legal and stakeholder interests. The environmental policy should be compatible with other HE policies such as health and safety management and regional/community policies.

### **Step 2. Initial Review: Planning and Preparation**

The terms environmental audit and environmental review are often used interchangeably. As far as the process of establishing an environmental management system is concerned, they are distinct. The environmental review sets the parameters of the environmental management system. It identifies what needs to be managed, measured and recorded, and any information and policy gaps in the existing management system. The environmental audit checks the performance of the environmental management system when it is in place.

An environmental review may precede or follow policy development. More than fifty higher education institutions now have environmental or sustainability policies in place and the development of most of these has preceded any systematic review process. The disadvantage of establishing policy first is that it is not informed by the review. However since the review includes an assessment of the environmental policy, any necessary adjustments could be made at an early stage in the EMS process.

There have been a number of in-house reviews (sometimes erroneously called audits) undertaken by student unions, research students, students as part of their course work with the help of interested lecturers. Most of these have focused narrowly on direct institutional impacts and have neglected to examine indirect impacts and the systems for managing these impacts. They have also been of variable quality.

#### **a. Identifying the review team**

The review may be undertaken by an in-house team or external consultants. At present, UK consultant expertise in the environmental management field mainly relates to the business and local authority sectors. As such, it would be important for institutions to reassure themselves that environmental management consultants, whilst not having much experience in the higher education sector, at least have some understanding of it. Involving "externals" has a number of advantages, including perceived impartiality and enhanced initiative status. The disadvantage is cost. As regards using an in-house team, individuals would need to have some practical experience of establishing environmental management systems and remission from other duties. The Higher Education Funding Council for England paid for partial environmental reviews of six higher education institutions in 1997.

#### **b. Prepare for the review**

The review team should draw up a work schedule including the following elements:

- the identification of key contact, preferably a senior member of staff within the institution, to assist in the identification of other contacts in the institution whose cooperation will be needed during the review process
- the preparation of a core document which explains the review process for circulation to all staff cooperating with the review team and other stakeholders as appropriate
- the development of a timetable which sets out which departments and activities are being reviewed when and by whom to be circulated with the core document
- the identification of a list of data required from specific individuals/departments, for circulation with the core document and timetable
- the development of questionnaires (if appropriate)
- a time allocation for writing the review report

#### **c. Define the scope of the review**

The scope of the review should be defined according to the sites to be considered, the institutional activities and the areas to be investigated, which include the following:

##### **Environmental impacts**

This would include a consideration of direct and indirect environmental impacts both positive and negative. The potential for positive indirect impact through environmental education programmes, influence on the supply chain and the ethical investment process is significant.

There is also plenty of scope for reducing direct negative impacts through resource efficiency, waste minimisation and pollution control.

### **Current policies and procedures for managing environmental responsibilities**

This would involve an assessment of any stand alone environmental/sustainable development policy and other policies which have environmental implications to ensure a consistent institutional approach; and an assessment of the existing institutional arrangements for managing environmental responsibilities e.g. whether the institution has defined and documented the responsibility, authority and interrelations of key personnel who manage, perform and monitor work relating to the environmental policy.

### **Legal and regulatory requirements**

Awareness of legal and regulatory requirements is a fundamental requirement of an EMS. This would involve an assessment of current and future environment related legislation, regulatory consents and permits.

### **Abnormal operations, accidents and incidents**

The review should include an assessment of what has happened in the past e.g. whether there have been incidents of non compliance and the corrective measures which were implemented; whether there have been any accidents and how these could have been avoided; the effectiveness of emergency procedures.

### **d. Report**

The product of the review process is a report which includes base line data on the full range of areas under investigation and an assessment of institutional strengths and weaknesses in maximising positive impacts and minimising negative ones. The report should outline:

- the scope of the review
- methods used
- details of findings
- recommendations

### **Step 3. Initial Review: Register of Legal Requirements**

Breaking the law can lead to heavy fines and even imprisonment in some cases. Legal compliance is a requirement for EMAS registration. The ISO 14001 Standard requires legal requirements to be identified and accessible. A register or some form of documentation is an obvious way to do this.

Sources of information and guidance on legal interpretation include:

- The Environment Agency
- Water companies, Trade Effluent/Business Services Section
- Local authorities, Environmental Health Departments

For HE institutions, the register is relevant to all departments whose activities are governed by environmental legislation and regulations. As a guide, the register should contain:

- a list of regulatory requirements (national and international)
- details of codes of practice
- internal standards (sometimes going beyond legal requirements)
- reference to relevant consents, permits and authorisations from the regulators and local authority
- cross-references with the significant environmental effect or aspect/impact.

<b>Examples of legislation applicable to HE institutions</b>
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**Water Resources Act 1991** - Effluents discharged to controlled water are subject to discharge consents. Schedule 10 states that discharges to controlled waters are subject to new consents if the content of the discharge changes. This may apply where chemicals, not covered under agreed discharge consents, are inadvertently discharged to controlled waters. It is an offence to cause, or knowingly permit, polluting matter to enter controlled waters. Personal and corporate liabilities exist for such offences. Consents to discharge trade effluents to sewer are also required and may be subject to strict conditions.

**Environmental Protection Act (EPA) 1990 (Part I)** - Part I of the EPA requires that processes prescribed for air pollution control (Part B processes) must obtain authorisation from the local authority. The Clean Air Act 1993 further makes it an offence not to use *Best Practical Means* for minimising the emissions of grit and dust from a chimney, particularly where the incinerator falls within a designated smoke control area.

**Environmental Protection Act 1990 (Part II)** - Part II of the Act places a Duty of Care on waste producers and on all who handle waste. They provide for a mandatory system requiring all those subject to the duty of care to keep records of waste received and transferred, including a full description of the waste. Waste arisings occur throughout HE institutions, from harmless packaging materials to general construction waste to hazardous chemicals. The Duty of Care provisions does, therefore, include permanent and contract staff, researchers, students and estate employees across the whole institution.

The register is a working document which should be reviewed regularly to take account of new legislation and regulations and any changes in activities or services. All departments whose activities are subject to legal and regulatory requirements should keep a copy of the register.

### **Step 4. Initial Review: Register of Environmental Effects (Aspects and Impacts)**

This section provides some guidance on how to:

- identify environmental effects
- evaluate their significance
- establish priorities for action.

It should be noted that there are many different approaches to this subject, depending to some extent on the range of an institution's activities and its influence over those operations and procedures which give rise to significant environmental effects.

#### **a. Understanding the terminology**

EMAS and ISO 14001 use different terms to describe the broadly the same thing. The EMAS Regulation requires an organisation to examine and assess; '*..the environmental effects of a company's activities at the site, and compiling a register of those identified as significant*'. The level of significance is dependent on the relative impact on the environment.

ISO 14001 uses a slightly different terminology. For environmental *effect* read *aspect* and *impact*. The standard defines an environmental *aspect* as an; '*element of an organisation's activities, products or services that can interact with the environment*'. The standard defines environmental *impact* as *any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services*'.

To clarify the links between the different definitions it is worth noting that the ISO 14001 Standard defines a *significant environmental aspect* as that which '*has or can have a significant environment impact*', Clause 3.4. Thus a '*significant environmental impact*', as defined in the standard broadly corresponds with a *significant environmental effect*, as explained in the EMAS regulation.

#### **b. Identifying environmental aspects**

Environmental aspects include:

- emissions to air
- discharges to water
- solid and other wastes

- contamination of land
- use of land, water, fuels and energy and other natural resources
- discharges of thermal energy, noise, odour, dust, vibration and visual impact
- effects on different parts of the environment and ecosystem.

A particular activity or operation may have a number of environmental aspects associated with it. For example, spraying herbicides on campus grounds will affect the soil, groundwater and air.

### **c. Identifying environmental impacts/effects**

Having identified the aspect (e.g. emissions to air) and the source of that aspect (e.g. spraying herbicides), the next stage is to identify the environmental impacts/effects associated with that aspect. These fall into a number of categories which influence local and global environmental quality. Examples would include:

- *carbon dioxide and methane* which may influence climate change
- *sulphur dioxide and nitrous oxides* which cause acid rain
- *phosphates and heavy metals* which affect water quality
- *CFCs* which deplete the stratospheric ozone
- *dark smoke and dust* which can affect local air quality
- *methane* from waste disposal which can add to global warming.

Other impacts/effects might include the loss of non-renewable resources through materials consumption; noise from student unions which affects the local community and land lost through development which can threaten local wildlife.

The review team should consult with all relevant departments to identify the source of potential impacts/effects of various activities. A number of issues would need to be considered and assessed including whether:

- the effect/impact is positive or negative
- the effect/impact is direct or indirect
- one or more environmental media are affected (e.g. air, land and water)
- the effect/impact is subject to legislation and/or regulation (check against the register)
- the effect/impact is the result of normal, abnormal or emergency operations
- the effect/impact is due to past or current activities.

### **d. Determining the sphere of influence over environmental aspects**

Higher education institutions have considerable scope for helping or hindering the transition to a sustainable world. A typical higher education institution:

- shares the responsibility, with other higher education institutions, of educating most of the people who direct and manage most of society's institutions
- has a multi-million pound turnover
- has ownership and/or use of a substantial amount of land
- is a substantial user of water, energy, paper and many other natural resources and products
- generates large volumes of waste
- is visited every day by large numbers of people using various modes of transport.

Environmental literacy, eco-friendly purchasing and ethical investment initiatives may lead indirectly to environmental benefits. Resource efficiency, biodiversity strategies and waste minimisation initiatives can lead directly to environmental benefits.

In general, the indirect impacts/effects of higher education institutions are more significant than the direct impacts.

#### **e. Prioritising significant environmental impacts/effects**

There are various methods for assessing the priority of significant impacts/effects. A good starting point is to determine whether the environmental impact/effect is subject to legal requirements. For example, there are the legal standards for emissions to air, releases to water and contamination to land. The threshold and limit values assigned to various polluting substances entering the environment are usually prescribed in government regulations, guidance notes and authorisations and various EU Directives. Other sources of information include industry codes of practice and sector application guides.

Clearly, any process or activity which fails to meet legislative or regulatory requirements should be considered a high priority, irrespective of its relative environmental impact/effect. Less clear is how to prioritise environmental impacts/effects which are not subject to legal constraints, but which may still be regarded as significant.

All assessments of priority will depend on initiatives already taken. For example, an HE institution which has already introduced measures to improve energy conservation, may give a lower priority to further reducing the effects associated with energy use than another HE institution that has taken no energy conservation measures.

Defining a method of scoring environmental impacts/effects can help to establish priorities for action. However, it should be recognised that a score-based assessment is likely to involve qualitative as well as quantitative analysis and that the final list of priorities is therefore open to different interpretations.

#### **f. Prioritising significant impacts using the LA-EMAS scoring method**

The Local Government Management Board (LGMB) has devised a useful scoring method for evaluating significant environmental effects for local authorities involved in LA-EMAS. In its guidance notes '*Environmental Effects Evaluation (EEE): at the heart of the Eco-Management Scheme for Local Government (LA-EMAS)*,' it explains that:

*"there are two major components of significance - 'Importance' and 'Influence'. Importance is a combination of the 'frequency' with which the environment is affected by that activity, balanced against the 'severity' of the effect when it does occur."*

Thus, according to the LGMB, the significance of an environmental effect increases proportionally with the frequency and severity of its release. Therefore, the higher the frequency and severity, the bigger the score and the higher the priority. The other component of the evaluation 'influence' is described as *"a balance between the influence which an organisation potentially could exert to control an effect, against the degree to which this influence is being exerted"*. This is also important when deciding priorities, given that the more influence an organisation has over a particular significant effect, the easier it will be to reduce it.

#### **g. Other priorities**

Other factors which influence the relative significance of various environmental impacts are the business concerns of an institution and the external pressures they face from their stakeholders. ISO 14004 identifies business concerns as being important in evaluating significance of environmental impacts. For example:

- potential regulatory exposure
- difficulty of changing the impact
- cost of changing the impact
- effect of changing the impact
- concern of interested parties
- effect on the public image of the organisation.

A broader definition of significance could, therefore, include environmental impacts which have financial implications, such as a reduction in waste disposal costs, energy use and water consumption. Other influences in defining significance include the priorities of regulators, the aspirations of staff and students, sponsors, local communities and other stakeholders.

In general, HE institutions, like most other organisations who have gone through this process, will need to devise their own methods for evaluating environmental effects and prioritising them according to their relative significance.

### **h. Documenting significant impacts/effects**

It is important that the impacts/effects which are regarded as significant are recorded, preferably in a Register, and that the procedures for assessing significance are presented in supporting documentation.

The EMAS Regulation requires a Register of significant environmental effects to be drawn up, whereas the ISO 14001 Standard requires that environmental aspects are identified and that procedures are established and maintained to identify significant environmental impacts.

The Register itself should include the following information:

- a list of the effects which are considered significant (and their scores)
- reference to supporting documents
- reference to the product, process or service which gives rise to the effect
- the department and people responsible for managing the effect
- details of how the effect is managed through the EMS
- details of procedures for updating the effects register.

A register is an essential reference for setting objectives and targets for continual improvements in overall environmental performance.

### **i. Check list for Review Team**

The task of developing a Register of Environmental Impacts involves the Review Team in the following processes:

- Consultation with departments regarding activities, operations and services
- Identification of the aspects associated with these
- Definition of the sphere of influence and control over these aspects
- Production of a list of environmental impacts/effects
- Definition of a method for evaluating and prioritising environmental significance of these impacts/effects
- Recording the method for determining environmental significance
- Documentation and prioritisation of environmental impacts/effects according to their significance.

The information in this section presents a generic approach to evaluating and prioritising the significance of environmental impacts/effects. There are various other scoring methods for evaluating levels of significance, and much will depend on the activities or processes being assessed.

Other sources of information on evaluating the significance of environmental impacts/effects and their associated risks are presented in Appendix 6.

### **Step 5. Initial Review: Setting Objectives and Targets**

The environmental policy should include a commitment to continual improvement in overall environmental performance. Setting objectives and targets is a way of quantifying and qualifying commitment. Objectives and targets are also an assessable component for both EMAS and ISO 14001.

#### **a. Setting priorities**

Objectives and targets should be set within the context of how best to meet the aims of the policy. Reference to the environmental review, the register of legislative requirements and the

evaluation of direct and indirect significant environmental impacts/effects will guide thinking on the order of priorities. Issues to consider would include:

- compliance with legislative and regulatory requirements as presented in the Register
- significant direct and indirect environmental impacts/effects as presented in the Register
- reference to other standards and codes of practice
- the concerns of other stakeholders
- current operational and institutional objectives.

Whilst objectives and targets relating to direct environmental impacts/effects may usefully be based on reducing impacts e.g. emissions to air, objectives and targets relating to indirect impacts are best based on improving the quality of processes e.g. environmental literacy programmes, eco-friendly procurement programmes. Priorities should reflect the nature and scale of on-site activities.

### **b. Consultation**

Consultation is an important part of the process of setting achievable objectives and targets. For HE institutions this includes all stakeholders. Senior academic and service managers, heads of department, estate managers, student representatives and technicians should all be involved in setting objectives for their particular field of operation or activity. This is a good way of ensuring that objectives are owned by stakeholders, appropriate to the area of operation and that the targets are achievable. For example, a call for more secure bicycle racks may be seen as a higher priority by some staff and students, than changing to recycled paper.

Other stakeholders such as suppliers, funders and the local community should also be consulted on environmental issues which affect them. For example, an objective to reduce the amount of waste generated on site could have major implications for catering suppliers. Equally, the noise from student union functions or a reduction of security lighting, may be a particular concern of local residents.

### **c. Monitoring objectives and targets**

Objectives and targets should be monitored to determine whether progress is being made and that the aims for continual environmental improvement, set out in the environmental policy statement, are being realised.

## ***Step 6. Management System: Establishing Responsibilities***

The purpose of a management system is to ensure that objectives and targets within the management programme are implemented within a designated time-frame. As discussed earlier, relevant departments will have been involved in setting their own goals, so there may be several sub-programmes, involving a number of projects in different departments, across the whole institution; there is also likely to be some degree of overlap. The management system will need corporate co-ordination to ensure a coherent implementation and operation.

The following organisational structure provides a general guide on how management responsibilities could be allocated within an HE institution. It explains the role of the environment manager/coordinator, the supporting environment team and the responsibilities of staff members at departmental level.

### **a. Structure and responsibilities**

Roles and responsibilities for all personnel, whose work is incorporated within the management programme, must be clearly defined and documented.

A member of the senior management team should be appointed to oversee the development and implementation of the EMS and to ensure that performance is evaluated against the requirements of the environmental policy. Responsibilities should also include allocating resources to ensure environmental objectives and targets are met.



### **b. The Environment manager/coordinator**

Someone within the institution should be given overall responsibility for co-ordinating the management programme and ensuring that the programme also corresponds with both the aims of the environmental policy and the requirements of the EMS. The environment manager/coordinator would also be involved in some or all of the following:

- working with personnel who have been assigned environmental responsibilities for their department (the environment team - see below)
- environmental training programmes
- communicating environmental issues within the institution and outside it
- consulting with the regulators, suppliers and third-party EMS assessors
- liaison with health and safety managers and quality managers
- maintaining the EMS and reporting progress to senior management
- collating and disseminating good practice
- constantly challenging the institution to improve its environmental performance.

### **c. Environment team**

Headed by the environment manager/coordinator, the team would be made up of personnel from relevant departments whose work forms part of the EMS. The team could include academic and non-academic staff including; heads of department, estate managers, technicians, and catering staff, who have been assigned responsibility for meeting agreed objectives and targets within their department. They would assist the environment manager/coordinator in co-ordinating the management programme to ensure continual environmental improvement across the institution.

The environment team could also work with the various departments in drawing up procedures and maintaining records for ensuring environmental objectives were being met to agreed targets and timescales; the information would be included in the EMS manual (see the section, *Step 7. Environmental Management Manual and Related Documents* below).

### **d. Departmental responsibilities**

Most departments within an institution will have a management system in place, including line management responsibilities and individual duties. Responsibilities regarding the implementation of the EMS will vary according to who does what. Job descriptions must state clearly any additional responsibility associated with setting and achieving environmental objectives. This may involve defining new responsibilities and performance criteria for particular operations and projects. A checklist for assessing responsibilities might include the following:

- environmental responsibilities are included in job descriptions, where appropriate
- the management manual records information concerning environmental responsibilities
- clear instructions for personnel with specific responsibilities
- any additional operations required to meet environmental objectives must be adequately funded.

These should be agreed with the line manager and the human resources or personnel manager. Additional training should be provided, where appropriate. This is discussed in more detail in the next section.

### **e. Training**

All staff and students should be aware of the environmental policy and all the relevant regulations and environmental effects associated with the work of the institution and their own responsibilities. Additional training may be required to ensure that the management programme and the EMS function properly.

Training should be an integral part of an institution's staff training programme. Environmental training is an investment in continual environmental improvements and the future performance

of the EMS. There are costs, in providing trainers and training material and time lost when attending training courses. Self learning materials can reduce these costs. However, the costs should be measured against the potential benefits which accrue from improvements in environmental performance.

It is not necessary to train all staff in every aspect of the EMS, although they should be aware of the underlying global and local environmental issues which have motivated the institution to develop this initiative. As a guide it is helpful to consider training needs in three broad areas:

**i. Environmental awareness** - aims to encourage a sense of personal responsibility towards environmental protection. Awareness training shows the big picture (e.g. global warming, deforestation and ozone depletion) but it should also explain how these issues correspond with activities at the institution and how they relate to the environmental policy.

**ii. EMS training** - explains what the institution is aiming to achieve and why. Training should include an explanation of the environmental policy, the EMS ( how it works and who is involved), environmental impacts/effects (associated with on-site activities) and details of environmental objectives and targets and how they can be achieved.

**iii. Job-specific training** - mainly for staff whose work is subject to environmental regulations or related to environmental performance criteria (objectives and targets). This would require a more detailed understanding of legislation and the role of the regulators in monitoring environmental standards. For estate managers and technicians, it could also involve learning about environmental impacts associated with particular processes (e.g. effluent discharge from laboratories) and new technology assessment initiatives such as Best Available Techniques Not Entailing Excessive Cost (BATNEEC) and Economically Viable Application of Best Available Techniques (EVABAT). Procurement staff would need to know more about the environmental impacts associated with purchasing goods and materials and their alternatives (e.g. eco-labelled products); be able to draw up environmentally attuned specifications; evaluate tenderers and tenders; and manage and monitor contractors' environmental performance.

For HE institutions, environmental training will tend to focus more on service sector issues such as education, procurement, conservation of energy, water and other resources and perhaps less so on regulations concerning industrial activities such as emissions and discharges, materials processing and product development.

### ***Step 7. Management System: Environmental Management Manual and Related Documents***

Both the EMAS Regulation and the ISO 14001 Standard specify some form of documentation as a way of ensuring that the requirements of the EMS are met. Documents can demonstrate compliance with the requirements of the environmental management system, and record the extent to which planned environmental objectives have been met. For this reason, documentation and associated records are also likely to be the first point of reference for EMS third-party assessment. There is also value in engaging in the process of developing the manual.

#### **a. The manual**

An Environmental Management Manual acts as the principal source of reference and documentation for an EMS. It explains the core of the system, including the policy, objectives and management programme, and should identify those with key roles and responsibilities. The manual should also include information on the following:

- relevant legislation and regulations
- significant environmental effects/aspects
- objectives and targets
- an organogram explaining roles and responsibilities
- details of the environmental management programme
- procedures for keeping environmental management records
- arrangements for auditing and review of the system
- reference to supporting documents and records

### **b. Supporting documents**

Documenting an EMS requires information at different levels. Supporting documents, referenced in the management manual, would include the monitoring programmes and records which relate to performance against agreed environmental objectives and whether these were being achieved. Other documents referenced in the manual, would include work instruction for managing a particular activity or issue, emergency plans (where required), health and safety instructions and quality management information.

### **c. Document control**

The primary purpose of document control is to ensure that the right people have the right information at the right time in the right place. For health and safety managers dealing with COSHH regulations, or quality managers responsible for the implementation of ISO 9001, document control is familiar territory. All relevant documents, including the manual itself, should be:

- assigned to the appropriate department or job title
- designed so as to record relevant data and information
- periodically reviewed and revised according to performance (e.g. progress on achieving environmental objectives)
- authenticated and dated as a true record of the current state of development
- fully referenced

### ***Step 8. Management System: Operational Control***

Operational control provides the mechanisms by which the environmental policy, objectives and targets are converted into action. The functions and activities which require operational control are those associated with significant environmental effects or aspects (see earlier section), and environmental objectives and associated targets, as part of the environmental policy commitment to continual improvements in environmental performance.

Operational control need not be limited to the institution. Both the EMAS Regulation and the ISO 14001 Standard, require that suppliers and contractors comply with the institution's environmental policy as it relates to them. This could be particularly relevant to HE institutions where, for example, procurement of goods and services are identified in the environment policy as part of the programme for continual environmental improvement.

Conversely, as a service sector organisation, a HE institution could be asked to supply information regarding its environmental policy by its stakeholders, such as, students (who are becoming increasingly interested in the environmental performance of higher education institutions), sponsoring organisations, insurance companies.

### **a. Procedures**

Procedures can be formal and informal, written and unwritten (accepted working practice) and should be integrated into existing systems wherever possible. For example, the contract handbook may be amended to reflect the new environmental assessment procedures or standing orders changed to reflect environmental responsibilities within the scheme of delegation.

A procedure should describe:

- Responsibility - Who will take action
- Action - What action will be taken
- Recording - How and where the action will be recorded

In other words, procedures should be:

- Understandable
- Actionable
- Auditable

- Mandatory

### **b. Accidents and emergency situations**

For some hazardous processes or dangerous materials, operational procedures may need to be extended to cover accidents and emergency situations for activities such as incineration or handling and disposing of hazardous materials. This applies where there is the potential for an operational malfunction which, in turn, could give rise to a significant environmental effect/impact. These activities are fairly common in specialist research departments in HE institutions, and procedures relating to other regulations may already be in place. These include the Control of Substances Hazardous to Health (COSHH) and Control of Industrial Major Accidents and Hazards (CIMAH) regulation. All relevant plans and procedures should be referenced in the EMS documentation.

Assuming the procedures fit the purpose for which they are intended, they should then be formally adopted. Those directly involved (on site staff or external contractors), should be informed of the procedures, be familiar with the requirements and competent to carry them out. Additional training may be required where the work involves complicated monitoring, maintenance or inspection or requires the co-ordination of several operators.

#### ***Step 9. Management System: Monitoring and Measurement***

Monitoring and measuring provide documented evidence that an organisation's EMS is performing in accordance with its environmental policy and management programme. More specifically, monitoring and measurement are required to test whether progress is being made in relation to the environmental objectives and targets outlined in the environmental management programme and whether procedures for operational control are effective.

Activities and operations that can have a significant direct or indirect impact/effect on the environment should be monitored on a regular basis.

#### ***Step 10. Management System: Non-conformance and Corrective Action***

An EMS provides transparency across a range of operations and activities in relation to certain environmental criteria. If part of the system fails, or if environmental standards are not being maintained in a particular area, then routine monitoring of the system will identify the problem.

Both the EMAS regulation and the ISO 14001 Standard require procedures for managing non-conformance.

Procedures should be structured and systematic, in order that the cause of the problem is identified and the appropriate corrective action is carried out. Where corrective action is necessary, controls should be modified to ensure the problem does not reoccur.

All changes to the procedures should be recorded. Any significant environmental effects or impacts resulting from a non-conformance should also be recorded and remedied.

With regard to HE institutions, non-conformance is more likely to occur through a failure to meet performance levels, or the malfunctioning of the EMS itself (e.g. poorly defined responsibilities and ambiguous procedures), rather than through a major process failure which may cause environmental damage. However, as most institutions and specialist research establishments use a variety of hazardous substances (many of which are listed) in a variety of situations, e.g. art and design studies, medical research, the need for strict adherence to procedures is paramount.

#### ***Step 11. Management System: Records***

Records are evidence that the EMS is working, according to the requirements of the environmental policy and that environmental objectives and targets are being met. Third party assessors will want to see the records to determine whether the EMS is performing to the requirements of the Regulation or the standard (see Step 12 below).

The environment manual (discussed earlier), provides information on most of the key activities, including legislative requirements, significant effects, departments and individual responsibilities and provides signposts to all the supplementary documentation. Individual departments will

have their own records detailing their contribution to the EMS. It's important to ensure that the records are referenced and up to date and that redundant files are consigned to the recycling bin.

The list of records can be grouped into a number of categories, and include those concerned with:

- environmental policy
- environmental legislation and regulations
- significant environmental effects/impacts
- environmental objectives and targets
- training
- environment management manual
- inspection and maintenance
- measuring, monitoring and calibration
- non-conformance
- emergencies
- communications with suppliers and external agencies
- audit results (see following section)

For HE institutions, the paper based copy of the environmental management manual would be held centrally and accessed through the environment manager/coordinator. It could also be put on the institution's intranet. Supplementary documentation and records will be maintained by the relevant departments, including estate managers, administration departments, procurement and catering. Additional records will also be kept by individual faculties. Cross-references between the centrally-held environmental manual and the departmental records is the key to maintaining an efficient records management system.

### **Step 12. Audit: Environmental Management System Audit**

The purpose of an environmental management system audit is to assess whether an EMS conforms to the requirements of the environmental policy and related environmental performance criteria. Additionally, where the EMS has been established for the purposes of EMAS Registration or certification to the ISO 14001 Standard, then the EMS is also audited against those procedural requirements.

The EMS audit should be structured, systematic, documented and undertaken on a regular basis. It doesn't need to be carried out all at once but can be undertaken in phases. The EMAS Regulation (Annex II. H), requires that the audit cycle should be completed; '*at intervals no longer than three years*'. The ISO standard requires only that the audits are carried out '*periodically*', although in practice, annual audits are common.

#### **a. The auditors**

EMS auditing can be carried out by personnel belonging to the institution or by external consultants. The main requirements are that they are impartial and objective, have the requisite skills for the task in hand and be independent of the activities they audit. In practice auditors tend to work in teams with complementary skills, whose combined knowledge and experience will provide the necessary attributes for auditing the EMS. The qualification criteria for environmental auditors and lead auditors should include:

- relevant knowledge and understanding of the environmental issues associated with activities and operations
- practical experience of the operational procedures of particular operations
- training in the structures and implementation of an EMS.

### **b. The EMS audit criteria**

The principal auditing criteria for EMS include:

- implementation and maintenance of the EMS, according to documented evidence (including the environmental policy, environmental regulations, significant aspects/effects, objectives and targets, management programme, procedures, records and emergency plans)
- assessment of the ability of the internal management structure to maintain an effective EMS.

Where the audit is for certification or validation purposes then conformance of the institution's EMS with the audit criteria required under the EMAS Regulation or the ISO 14001 Standard, also applies.

ISO 14010 '*Guidelines for environmental auditing - General principles*' (a non-certifiable standard), provide guidance on auditing criteria, including audit objectives and scope, systematic procedures, the roles and responsibilities of the audit team and reporting the findings of an audit.

### **c. The audit programme**

Both EMAS and ISO 14011 (a non-certifiable standard), provide detailed guidance on how to organise and implement an EMS audit programme, collect audit evidence and report the findings.

Meetings between the auditors and the EMS team (or environment manager/coordinator), would confirm the following:

- the scope of the study
- the timetable for the audit programme
- availability of staff for interviews
- availability of relevant documents and records
- permission to visit certain areas etc.

### **d. Audit report**

The audit report would include all relevant information relating to the agreed audit scope and criteria. In particular, it should include:

- a summary of the audit process
- the identification of the auditee's representatives
- references to the source of information on which the audit findings are based
- a report of the audit findings (including an agreed action plan).

The audit report should then be distributed to all relevant personnel including senior management and heads of departments.

### **Step 13. Review: Management Review**

The management review is an opportunity to assess the overall performance of the EMS: to consider whether or not the EMS is working effectively and whether it continues to fit the purpose for which it was designed. It will assist the management team in determining whether the structure should be amended, or extended, to cover other operational activities.

The EMS audit findings will provide information on whether or not the principal aims of the environmental policy are being met, objectives and targets are being achieved and significant environmental impacts/effects are being addressed.

The management review process should include:

- results from audits
- the extent to which objectives and targets have been met

- the continuing suitability of the environmental management system in relation to changing conditions and information
- concerns expressed by relevant parties.

Above all, the management review is an opportunity to build on the evidence of the audit findings and to decide on the next course of action to ensure continual improvements in environmental performance.

### **Step 14. Statement: Environmental Statement**

The Statement is a validation of the EMS. It is a declaration by an organisation that its EMS is in accordance with the aims set out in the environmental policy and provides evidence that it is committed to continual improvement in overall environmental performance.

The Environmental Statement is a requirement under the EMAS Regulation, but not for certification to the ISO 14001 Standard. However, there is nothing to stop organisations certified to ISO 14001 from publishing a statement or including an Environmental Report as part of their Annual Report.

The Statement should be prepared following completion of the environmental audit with subsequent statements being produced on completion of each audit cycle. The contents of the statement are essentially a matter for the institution to determine but a statement that is prepared in accordance with the EMAS regulation should include:

- a description of the institution's activities
- the environmental policy, programmes and environmental objectives and targets
- significant environmental impacts
- summary data on significant impacts identified in the EMS
- environmental performance of the environmental management system
- dates for submitting the next statement
- the name of the accredited verifier.

The Environmental Statement is a public document and requires that the information is presented in non-technical language which can be understood by people without a technical background. Validation of the Environmental Statement by an external third-party accredited verifier is required for formal Registration under the EMAS Regulation.

### **Step 15. Registration: Formal Registration of an EMS**

Having established and implemented the EMS the next major task is getting the system formally registered. Registration of an EMS provides formal recognition of an organisation's commitment to continuous improvement in overall environmental performance.

A growing number of organisations are now beginning to introduce EMS criteria, into supplier's contracts, as part of their own commitment to continuing environmental improvement. This is particularly important for HE institutions where, for example, industrial research contracts might be dependent on satisfying the sponsor that a credible EMS has been implemented.

This section describes the route to registration, the requirements of the assessment programme and the timetable for implementation.

A comprehensive description of organisations involved in the registration and accreditation process is provided in Appendix 4.

#### **a. Setting the criteria for assessment**

Certification/verification of an EMS is undertaken by an independent accredited certification or verification body. Under ISO 14001 organisations can also make a self-declaration of compliance to the requirements of the standard. Third party assessment does, however, provide an impartial account of an organisation's adherence to its environmental policy and commitment to continual improvement in overall environmental performance. There are now seventeen accredited certification bodies for ISO 14001, 9 of which are also accredited verification bodies for EMAS, licensed in the UK.

## **Environmental Management Systems - A Guide for the HE Sector**

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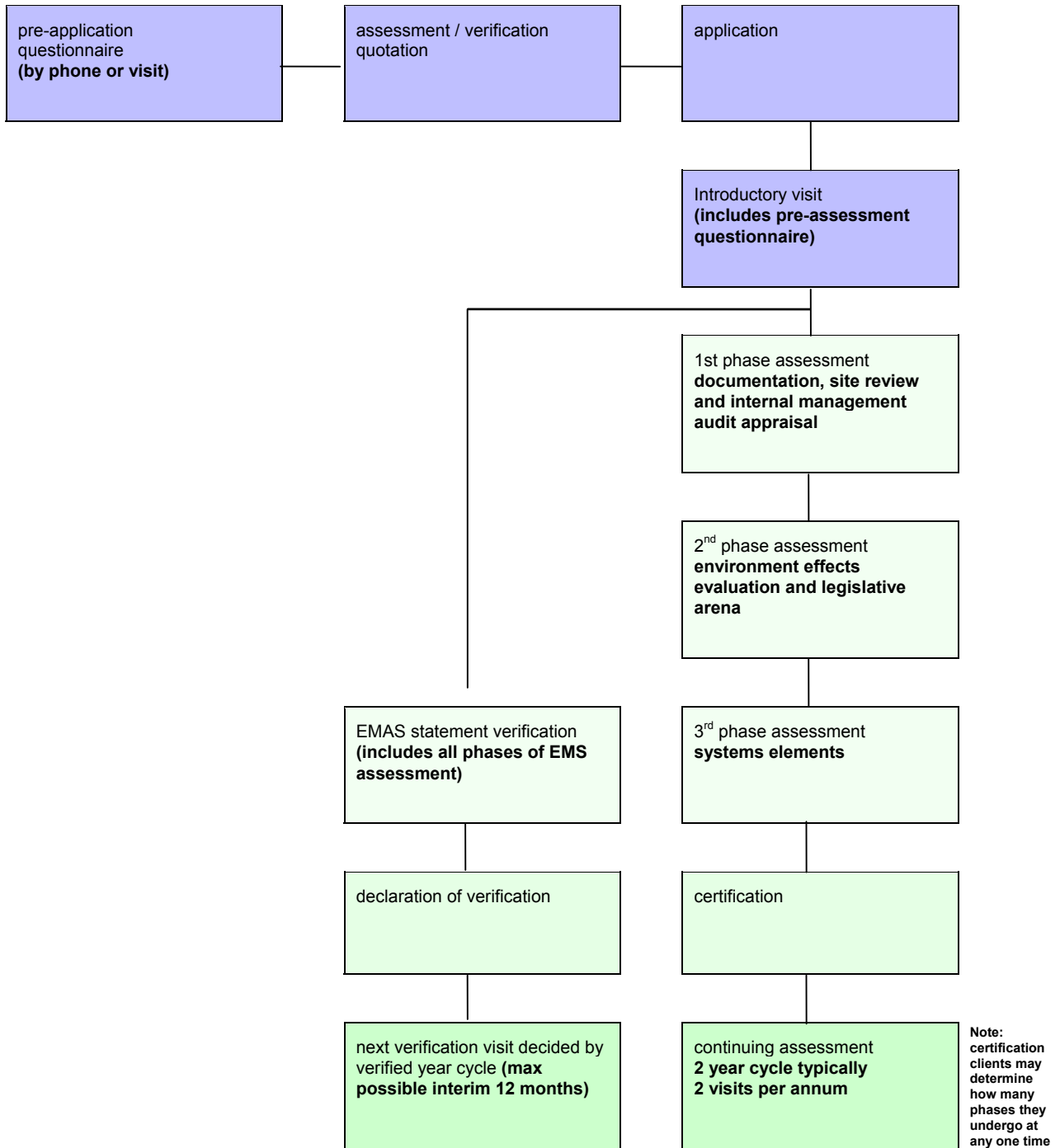
In an attempt to provide consistency in the assessment process, the International Accreditation Forum (IAF), is currently drawing up guidelines for accredited bodies on the criteria for assessing an EMS for external assessment purposes. The following criteria would be considered in the assessment programme:

- senior management commitment and responsibility for the environmental policy
- review of legislation and regulatory requirements
- identification and evaluation of environmental aspects and impacts
- stated environmental objectives and targets
- evidence of environmental performance monitoring
- internal auditing of the EMS and management review
- review of environmental reports and statements (where required)
- validation of data used to compile public environmental statements (EMAS only)

### **b. Assessment programme and timetable**

Third party EMS assessment involves external assessors, employed by Certification Bodies. Assessors normally arrange a pre-site visit to agree a timetable for interviews, examination of documents etc. The BSI assessment programme, illustrated below, provides a useful example of the approach taken by most accredited bodies to EMAS/ISO 14001 assessment:





Source: BSI Systems Assessment (SA) Copyright

It is up to the organisation applying for external assessment to provide all relevant information to the accredited verifier or certifier in order for them to assess whether the EMS meets the requirements of the ISO 14001 Standard, or the EMAS Regulation. Any anomalies in the system, such as a lack of information or breach of legislation, is likely to result in the certificate being withheld until the relevant issue has been dealt with to the satisfaction of the assessor. Where there are particular problems, a period of grace is usually allowed to enable an organisation to put its house in order.

Once the site has been awarded an ISO 14001 certificate or Registration to EMAS, the certifier/verifier maintains a cycle of continuing assessments to ensure that the site is maintaining its compliance with the Standard/Scheme and that it can demonstrate continual improvement in its environmental performance.

## Appendix 1 - The Requirements for ISO 14001 and EMAS

This section outlines the requirements of ISO 14001, as an international standard, and EMAS, as a European Regulation, and considers the links with the former BS 7750. It demonstrates where the systems complement each other and where they differ and outlines the requirements for conversion. It also explains the route to registration. For those organisations who have established a quality management system, there is also a section on the linkages between Quality Management System (QMS) BS EN ISO 9001 (formerly BS 5750), and ISO 14001.

There are two internationally recognised EMS systems: ISO 14001 *Environmental Management Systems - Specifications with Guidance for Use* and EMAS, The EU's *Eco-Management and Audit Scheme (EMAS)*. The first ever national standard, BS 7750, published by the British Standards Institution in 1992 (revised 1994), was formally withdrawn in September 1996, following the adoption of ISO 14001 by the European Committee of Standardisation (CEN). BS 7750's replacement in the UK is the new BS EN ISO 14001.

The UK's national standards body, the British Standards Institution (BSI), which devised BS 7750, holds the secretariat to the Subcommittee (ISO/TC207/SC1), which is responsible for the development of BS EN 14001. BSI is also a consultee in the development of EMAS. Consequently, BS 7750 was a key reference document for the development of both ISO 14001 and EMAS, and, since harmonisation has been a common theme throughout the development of EMS, the various schemes have much in common.

### ***ISO 14001 Environmental management systems - Specification with guidance for use***

The formal title in the UK is BS EN ISO 14001, where BS denotes its adoption as a British Standard and EN denotes adoption as a European Standard. ISO 14001 is an international voluntary standard. It is not a law, and there are no legal requirements for organisations to register or to seek certification.

ISO 14001 is the only certifiable Standard in what is generally known as the ISO 14000 standards series. There are more than twenty other environmental standards in the 14000 series, some still in draft. They provide organisations with more detailed information on the various elements in an environmental management system and can be used as tools to achieve other management requirements. They serve as useful guides on a whole range of related environmental management issues, including environmental auditing, labelling, performance evaluation and life cycle assessment.

The ISO 14001 Standard has much in common with the Quality Management System (QMS) standard, ISO 9001 (formally BS 5750 in the UK). Indeed, the International Organisation for Standardisation designed ISO 14001 to ensure correspondence with ISO 9001. The two systems share a common core of management principles and techniques, and, according to some estimates, an organisation operating ISO 9001 may have over 50% of the procedures and documentation needed to develop ISO 14001, already in place. Thus an organisation may elect to use ISO 9001 as a basis for its EMS, whilst recognising that there are differences in terms of environmental performance criteria and meeting the requirements of an environmental policy.

The ISO 14001 Standard specifies the requirements for an environmental management system in terms of an organisation's environmental commitment to a policy, compliance with applicable legislation and regulations and to continual improvement in its overall environmental performance. It does not set environmental performance targets: these are left to individual organisations to determine for themselves.

The standard applies to any organisation, large or small, in either the public or private sector that wishes to implement and maintain an EMS and assure itself, and others, that the system conforms with its environmental policy.

Organisations seeking certification to ISO 14001 can elect for third party certification by an accredited certification body, or can make a self-declaration of compliance to the requirements of the standard. For most organisations, there is added credibility in having third party certification.

### **ISO 14001 - requirements for certification**

- an environmental policy - including a commitment to continual improvement, prevention of pollution and compliance with relevant environmental legislation and regulations. The policy must be available to the public
- identification and evaluation of environmental aspects associated with an organisation's activities, products and services which may have a significant impact on the environment
- compliance with relevant legal and other regulatory requirements
- documented and, where possible, quantifiable environmental objectives and targets
- the establishment and maintenance of an environmental management programme in order to achieve agreed objectives and targets
- evidence of the practical implementation of an EMS including the allocation of roles and responsibilities, training programmes, documentation, operational control procedures and emergency preparedness and response mechanisms
- monitoring and measuring of relevant operational and management activities, including record keeping
- procedures for periodic auditing of the EMS, to inform management of the findings and to ensure the system conforms with the standard (i.e. that the EMS is properly implemented and maintained)
- management review of the EMS to ensure its suitability, adequacy and effectiveness in meeting the requirements of an organisation's environmental policy and commitment to continual improvement.

### **The EU's Eco-Management and Audit Scheme (EMAS) Regulation**

Council Regulation (EEC) No 1836/93, known as the EU's Eco-Management and Audit Scheme (EMAS), was formally adopted in June 1993 and came into force in April 1995. As an EU Regulation, EMAS is directly applicable law, and all Member States have a mandatory responsibility to adopt it. However, in terms of its application by industry, EMAS is an entirely voluntary scheme and there is no legal requirement for any organisation or any sector to participate in the scheme.

The EMAS Regulation is designed mainly for use by manufacturing organisations. Article 1 of the Regulation refers specifically to '*voluntary participation by companies performing industrial activities*' and that 'the scheme' is established '*for the evaluation and improvement of the environmental performance of industrial activities...*'.

Grants are available in the UK to encourage small companies to join the scheme. SCEEMAS, the Small Company Environmental and Energy Management Assistance Scheme, provides up to 50% towards the costs of external consultants to advise on the principal stages of environmental management.

Whilst Article 1 of the Regulation prescribes EMAS as an industrial scheme, Article 14 allows Member States to adapt the scheme, *on an experimental basis*, for other sectors e.g. distributive trade and public services. In response, the UK government broadened the scope of EMAS to allow local authorities in the UK to participate in the scheme.

The Voluntary Eco-Management and Audit Scheme for Local Government (LA-EMAS), came into being in April 1995. LA-EMAS is designed to help local authorities evaluate and improve their environmental performance in terms of their activities, services and provision of relevant information to the public. The scheme has received an enthusiastic response, with 46% of local authorities actively implementing the scheme, although currently there are only around 3 authorities which have been verified and two with departments certified to ISO 14001.

Outside the industrial sector, local authorities are the only other sector in the UK, so far, which is participating in the EMAS. HE institutions can be broadly classed as a 'public service', therefore, participation on an experimental basis is a possibility. However, the current review of the EMAS Regulation will probably render that unnecessary by broadening the scope of the scheme so that the education sector can participate fully. The LA-EMAS scheme has required only minor amendments to the Regulation and take up amongst local authorities has been high,

given the short time it has been available. Choosing an appropriate EMS for the education sector is discussed in more detail in Appendix 5.

### ***EMAS - requirements for registration***

Registration under the EMAS applies to individual sites; organisations with more than one site must register those sites individually. In the case of local authorities individual departments can register, provided there is a corporate commitment for the whole authority to join the scheme in the future. It is worth noting that the EMS is only part of the requirements of EMAS registration, as the regulation also requires EMS audit programmes and the publication of an Environmental Statement.

Requirements for joining the scheme include the following:

- environmental policy - a company environmental policy with a commitment to comply with relevant legislation and continuous improvement in environmental performance.
- environmental review - to provide baseline data and information to decide on its environmental programme.
- environmental programme - sets out quantified objectives and targets to ensure greater environmental protection at the site with measures to show how this will be achieved.
- environmental management system - including organisational structure, responsibilities, practices, procedures and resources, to ensure implementation of the policy and programme.
- environmental audit - a systematic, documented, periodic and objective evaluation of the performance of the organisation, management system and processes to ensure compliance with company environmental policy and the effectiveness of the system itself.
- environmental statement - for each site following the initial review and subsequent audits. The statement should be written in non-technical language and made publicly available. It should include a description of activities, an assessment of significant environmental impacts/effects and information on environmental performance. A presentation of environmental policy, programmes and management system and a date for the next report should also be published.
- verification - the Environmental Statement must be verified by an independent, accredited environmental verifier. For registration purposes, the Environmental Statement is submitted to the 'Competent Body' for EMAS in the Member state in which the site is located. The Institute of Environmental Assessment is the Competent Body in the UK.

The differences between EMAS and LA-EMAS are as follows:

1. The industrial scheme applies to a company's sites - its factories, depots etc. For local authorities, a more convenient and appropriate unit of management is the department, division or service function. The circular uses the term operational unit to describe these.
2. The industrial scheme allows a single site within a company to seek registration. The local authority scheme similarly allows individual operational unit registration but in doing so requires more obligations at the level of the authority as a whole. This is a set of management responsibilities, structures and procedures for the environment at the corporate level. In addition, the scheme requires that the registration of individual departments and divisions is only temporary. The whole authority must commit itself eventually to seek corporate registration.
3. The industrial scheme is principally concerned with the control and effects on the environment of the production activities associated with a site - its polluting emissions, production of solid waste and so on. Like all productive organisations, local authorities have direct effects on the environment. But unlike industrial companies, they also have major environmental impacts through the way they deliver their services. The adapted scheme pays detailed attention to how these indirect 'service' effects arise from policies and programmes and can be managed.

## Appendix 2 - Comparing EMAS and ISO 14001

### *Differences between EMAS and ISO 14001*

There is close correspondence between the EMS components in both EMAS and ISO 14001. However, there are minor differences between the requirements for verification (under the EMAS Regulation), and certification (under the ISO 14001 Standard). The main differences are as follows:

- **Preliminary review** - this is mandatory and assessable in EMAS but not required for ISO 14001
- **Environmental Statement** - EMAS requires the policy, programmes and EMS to be made publicly available as part of the Environmental Statement. ISO 14001 requires only the environmental policy to be available to the public
- **Verification** - Under EMAS the Environmental Statement must be verified by an independent third party verifier. This is then submitted to the competent body (the Institute of Environmental Assessment) for final approval and registration
- **Audits** - EMAS requires a maximum 3 year EMS audit cycle whereas ISO 14001 requires only 'periodic' audits
- **Suppliers and contractors** - EMAS requires procedures to ensure procurement and contracted services comply with the company's environmental policy, whereas ISO 14001 requires only that suppliers and contractors are informed of the policy.

### *The links between the former BS 7750, ISO 14001 and EMAS*

Whilst BS 7750 was the forerunner of both EMAS and ISO 14001, the systems were designed to be compatible, so that the transition from the national standard to the international standard and/or European regulation would be relatively straightforward. The close correspondence between BS 7750 and ISO 14001 means that organisations previously registered under BS 7750 would have had little difficulty transferring across. The UK Accreditation Service (UKAS) has drawn up a list of 18 *aspects* of an EMS which organisations needed to consider when transferring from a BS 7750 certificate to a BS EN ISO 14001 certificate. Aspects such as compliance with relevant environmental legislation, environmental performance and conformance with stated objectives and targets are just a few of the considerations. Organisations had until 30 September 1997 to make the transition from a BS 7750 certificate to an ISO 14001 certificate.

### **Appendix 3 - Transferring from ISO 14001 to EMAS**

Under Article 12 of the Regulation, organisations in the industrial sector who were previously certified to BS 7750 or are certified to ISO 14001, are now able to use these standards to meet most of the EMS requirements for registration to EMAS, providing their business falls within the scope of the Regulation and that their environmental statement has been independently verified and is publicly available.

In an effort to clarify the correspondence between ISO 14001 and EMAS, DG XI (the Environment Directorate of the European Commission) issued a mandate to the European Committee of Standardisation (CEN), to ensure that the environmental standards (ISO 14001, 14010, 14011 and 14012) reflected the contents of the EMAS. The response from CEN is a bridging document which, among other things, provides guidance on how to interpret the requirements of the ISO standard so that all the environmental management system and auditing requirements of EMAS can be met. The publication of a European Commission Decision in April 1997, means that ISO 14001 can now be used as a route to EMAS Registration. Organisations can use the CEN Bridging Document when designing and implementing their ISO 14001 EMS, to simultaneously meet the requirements of EMAS.

Thus, there is now a bridge between the ISO 14001 Standard and the EMAS Regulation, although the CEN Bridging Document also acknowledges that some requirements of EMAS are outside the scope of the ISO standard. The most important difference is the publication of an Environmental Statement, which must meet the detailed requirements of the EMAS Regulation and be independently validated

## Appendix 4 - Formal Registration of an EMS

Formal registration to either EMAS or ISO 14001 involves a number of organisations. This section explains who these organisations are and what they do.

**International Organisation for Standardisation (ISO)** - the international standards-making body, made up of representatives of national standards-making bodies, responsible for the development of the ISO 14000 series of standards. The British Standards Institution is the UK representative.

**European Committee of Standardisation (CEN)** - the European standards-making body, made up of national standards bodies (not just EU members), responsible for adopting the ISO 14000 series as a European standard, hence EN ISO 14000 series. The British Standards Institution is the UK representative.

CEN can be contacted at:

European Council for Standardisation  
Central Secretariat  
Rue de Stassart 36  
B-1050 Brussels  
Belgium

Tel: 00 32 3 55 0811

Fax: 00 32 3 55 0819

**The British Standards Institution (BSI)** - the UK National standards-making body, responsible for the development of the environmental standard BS 7750, which formed the basis of the ISO 14001 Standard. In the UK, the BS 7750 was replaced by BS EN ISO 14001. BSI was also responsible for the development of the quality standard BS 5750, which formed the basis of the ISO 9001 quality standard.

BSI can be contacted at:

BSI Information Centre  
389 Chiswick High Road  
London  
W4 4AL

Tel: 0181 996 7111

Fax: 0181 996 7048

**The European Accreditation of Certification body (EAC)** is at the top of the accreditation hierarchy and brings together the national accreditation bodies of seventeen European countries. The EAC has developed guidelines for the accreditation of certification and verification bodies, which have been adopted by most of the European accreditation bodies.

**The United Kingdom Accreditation Service (UKAS)** - previously the National Accreditation Council for Certification Bodies (NACCB). UKAS is the UK representative on EAC, and is responsible for accrediting certification and verification bodies in the UK.

UKAS can be contacted at:

United Kingdom Accreditation Service (UKAS)  
Queens Road  
Teddington  
Middlesex  
TW11 0NA

Tel: 0181 943 6494

Fax: 0181 943 6664

**International Accreditation Forum (IAF)** - comprises members from 37 national accreditation bodies (including EAC members). IAF is developing guidelines for accredited bodies on the procedures for assessing an EMS for certification/registration purposes.

**Accredited certification body** - external accredited assessors. A body accredited by a national accreditation body (UKAS in the UK), to assess an organisation's compliance with the requirements of ISO 14001.

**Accredited verification body** - external accredited assessors. A body accredited by a national accreditation body (UKAS in the UK), to assess an organisation's compliance with EMAS.

**Institute of Environmental Assessment (IEA)** - UK Competent Body for EMAS and is responsible for registering sites under EMAS.

IEA can be contacted at:

Welton House  
Limekiln Way  
Lincoln  
LN2 4US

Tel: 01522 540069

Fax: 01522 540090

**Registration** - formal endorsement of an organisation's EMS whether EMAS or ISO 14001.

**Certification** - issued by an accredited certification body certifying that an organisation's EMS complies with the requirements of ISO 14001.

**Verification** - issued by an accredited verification body verifying that an organisation's EMS Statement and audit programme(s) complies with the requirements of EMAS.

**Internal auditors** - carry out internal environmental audits for either scheme. Their role is to assess whether the intentions in the environmental policy are being met in practice. Basically, auditors ensure everything is in place, prior to the external assessors being called in. Auditors can be employees or external consultants. They are not required to be accredited, but must be competent and independent of both the activities they audit and the verifiers.

#### ***The accreditation of certification and verification bodies***

The EAC has developed guidelines for the accreditation of certification bodies based on European Standard EN 45012 - General Criteria for Certification Bodies Operating Quality System Certification. The EAC has adapted EN 45012, replacing 'quality system' with 'environmental management system', and inserting additional clauses to cover environmental issues. UKAS, and other accreditation bodies, have their own procedures for assessing the competency of potential certification and verification bodies, but must be able to demonstrate that they meet the EN 45012 criteria, if they wish to be accredited to certify/verify EMS.



## Appendix 5 - Choosing an EMS for the HE Sector

A number of HE institutions are now considering establishing an EMS. As a general guide to developing an EMS, it is worth considering the following options:

**own system** - This has some merit for high risk companies dealing with complicated process management systems, such as the chemicals industry. HE institutions may also decide to devise a system which best fits their existing organisational framework. However, both ISO 14001 and EMAS provide a structured approach to developing an EMS, which is suitable for most organisations, including HE institutions. There is no point in re-inventing the wheel.

**adapt ISO 9001** - Organisations who have already established a quality management system should be able to integrate EMS requirements relatively easily. Some estimates suggest that over 50% of the procedures and documentation requirements for EMS will already be in place.

**adopt ISO 14001** - This is the most popular EMS in the UK at the moment. It is applicable to both industrial and service sector industries. It can be applied to a whole institute or individual departments within it. It is an international Standard and therefore recognised by HE institutions both within and outside the EU.

**adapt EMAS** - EMAS is an industry-based scheme, although it has been successfully adapted for local authorities. Unlike ISO 14001, EMAS requires the publication of an independently-verified Environmental Statement, thus allowing full public scrutiny of an organisation's environmental performance. EMAS is currently being reviewed and the indications are that the scheme will be broadened to enable other sectors to participate. The UK government currently has no plans to adapt the EMAS schemes for other sectors, until the review is concluded.

For those HE institutions who choose to adopt the ISO 14001 Standard, the European standards body (CEN) have produced a bridging document which establishes a route to EMAS Registration, providing certain additional criteria are met. Details of the bridging document are presented in Appendix 3.

## Appendix 6 - Evaluating the Significance of Environmental Aspects and Impacts

This is one of the most difficult aspects of implementing an EMS. The step-by-step guide explains what is required and gives examples of various scoring methods. This section suggests other methods for evaluating the significance of environmental impacts.

**1. Life cycle assessment (LCA)** - this is a product-based assessment which allows comparison between different products throughout their life cycle. It considers all the stages in the life cycle in terms of inputs and outputs and their effect on the environment. The ISO 14040 standard (a non-certifiable standard), establishes the principles for LCA. Publication is expected in 1998. The EC Eco-labelling Scheme also uses an LCA methodology to evaluate environmental effects in different product groups. Each member state has been asked to evaluate a range of products, of which some have been given an eco-label.

Eco-labelled products are a particularly useful guide to HE institutions' Procurement Policy. Eco-labels cover a wide range of products from soil enhancers to stationery and white goods, such as fridges and freezers used in laboratories.

**2. Environmental assessment** - this is a statutory obligation for certain new development projects under the Town and Country Planning (Assessment of Environment Effects) Regulations 1988 - Statutory Instrument 1199/88. The Regulation relates specifically to major new developments on particular sites for planning purposes, and is unlikely to be invoked for most developments on campus.

However, it does provide a useful framework for assessing environmental effects associated with new developments on campus. For example, the Regulation outlines a number of procedures for assessing environmental effects and how they might impact on existing infrastructures, air and water quality and on current land uses. It also provides guidance on mitigating measures, where significant adverse environmental effects are identified.

**3. Risk-based assessment** - The Control of Substances Hazardous to Health Regulations 1994, the Management of Health and Safety at Work Regulations 1992 and the Control of Industrial Major Accident Hazards Regulations 1984, all provide information on risk assessment which is equally relevant to the assessment of significant environmental effects/impacts. Health and Safety managers are often responsible for risk management and they are increasingly becoming involved in environmental management. An initial assessment of environmental risk would aim to identify potential hazards associated with the use of resources, emissions to atmosphere, discharges to water and waste arising (particularly hazardous waste). Such information is useful in the evaluation of significant environmental effects/impacts.

## Appendix 7 - Policy Context

### *Global policy context*

A number of significant international agreements came out of the 1992 Earth Summit in Rio, namely:

- Agenda 21: a comprehensive action plan to guide global sustainable development
- Rio Declaration: a set of 27 Principles endorsed by governments supporting 'the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among states, key actors of societies and people'
- Forestry Principles
- Convention on Climate Change
- Convention on Biological Diversity.

In 1994 the UK government produced four strategy documents in response to the commitments it made at the 1992 Earth Summit namely:

- Sustainable Development: the UK Strategy
- Sustainable Forestry: the UK Programme
- Climate Change: the UK Programme
- Biodiversity: the UK Action Plan.

A Commission on Sustainable Development was set up after the Earth Summit as the focus within the UN system for monitoring the implementation of the Rio agreements. In June 1997 the outcomes of the Rio 'Earth Summit' were reviewed at the UN General Assembly Special Session, the 'Earth Summit II', held in New York. Whilst some real progress has been made over the past five years in the areas of forestry, fresh water, transport and at the local level under the banner of Local Agenda 21, the overriding message coming out of the event was that there is still much to be done to halt the continuing degradation of our planetary control systems.

### *The Toyne reports*

At a European and UK level a variety of laws, policies and instruments have been developed relating to sustainable development. The UK government is unique amongst member states in having developed a position on environmental responsibility in the further and higher education sector, the 1993 Environmental Responsibility (Toyne) report. This report set out in broad, non prescriptive terms, the main areas of further and higher education institution responsibility relating to the environment, namely:

- good house-keeping (environmental management systems development)
- student entitlement to a basic level of environmental education
- course updating to take account of environmental connections
- specialist provision in keeping with market demand

In 1996, the progress made against the background of the report's twenty-seven recommendations was formally reviewed and the need for further action assessed. The review report made two key recommendations which stated that within three years, all further and higher education institutions should:

- be either accredited to, or committed to becoming accredited to, a nationally or internationally recognised environmental management systems standard
- have developed the capacity to provide all students with the opportunity to develop defined levels of competence relating to responsible global citizenship.

These recommendations were further endorsed in the government's 1997 Environmental Education Strategy: Action Plan. This Plan and the Toyne reports will be important points of

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reference for the work of the newly established Government Panel on Sustainable Development Education, chaired by Sir Geoffrey Holland, the Vice-Chancellor of Exeter University.

## Appendix 8 - Benefits of Good Environmental Management

### *Cost savings through improved resource productivity*

Resource productivity is about doing things differently in a way which improves quality of life, pollutes and depletes less and makes money. A holistic approach to design, new technologies and new ways of linking them make big cost savings possible. For example, the Queens Building which houses the School of Engineering at De Montfort University is the largest naturally ventilated building in the UK. It uses 25-50% of the fuel of a typical engineering building and cost less to build. At an equipment level the same principles apply. A modern laptop computer can reduce electricity demand by more than 90% when compared with an old-fashioned desktop computer with similar capabilities. However the fitting of power management onto the latter can save at least two thirds of the energy.

Doing more with less also reduces waste disposal costs which have risen substantially following the Duty of Care Provisions established under section 34 of the 1990 Environmental Protection Act. Since October 1 1996, all higher education institutions are paying an additional seven pounds in landfill tax for every tonne of general waste going to landfill. Incineration costs tend to be even higher than landfill.

### *Positive image*

People expect their higher education institutions to be managed in a way that is exemplary and institutions, in turn, want to be viewed as responsible neighbours, employers and service providers. Active involvement in the pursuit of sustainability solutions - whether these relate to local transport and planning issues, education and training initiatives, or the efficient use and maintenance of higher education buildings and estates - communicates the kind of institutional values, including a care for others and a sense of "fair play", which people want their public institutions to have. As such, higher education institution involvement in sustainability issues provides an excellent vehicle for building purposeful and respectful relationships with local and regional communities - the spin off from this being a good local image.

To be seen as responsive in an area of public and political concern is obviously beneficial in terms of increasing general visibility. To ensure full recognition for initiatives taken, some mechanism for communicating responsiveness is needed. A number of institutions are producing environmental reports.

### *Quality gains*

Managing the environmental impacts of higher education institutions includes efforts to both minimise negative environmental impacts and maximise positive ones. The most significant, positive contribution a higher education institution can make towards shaping a more sustainable future is through its students, who are tomorrow's influential decision makers. The challenge is to develop in all students the ability to make choices and decisions which take account of sustainability principles. This is in keeping with recommendations in the Toyne report and review (see Appendix 7) and the repeated call of employers for environmentally literate specialists - engineers, architects, managers, designers etc. The reorientation of course curricula called for above may be viewed as part of the routine updating process - a process designed to ensure that curricula are in tune with current thinking and relevant to the needs of society. Updating in relation to sustainability is necessary to maintain quality of provision.

Another important determinant in the quality of provision is the quality of the learning environment. Any attempt to communicate sustainability principles through course curricula will be negated if, for example the way an institution chooses and uses resources and manages waste contravenes these principles. Institutions must simply practice what they teach if they wish to claim that they are taking their environmental responsibilities seriously. In short, good environmental management contributes to the quality of the learning environment and, in turn, to the quality of learning.

There are also quality gains relating to the teaching and learning process associated with motivated lecturer efforts to deliver education for sustainability. It is no coincidence that those involved in education for sustainability are also working at the "sharp-end" of the teaching and learning quality debate. Where education relates to a purpose, as does education for

sustainability, there tends to be a keen interest in the extent to which the educational process is serving the purpose (in other words whether the pedagogy works), a desire to be effective and a willingness to be innovative.

### ***Enhanced student recruitment potential***

Students are increasingly asking questions about the environmental performance of higher education institutions. At the moment they have little hard information to help them assess how seriously an institution is taking its environmental responsibilities. A small number of institutions include environmental policy statements in their prospectuses, but even these give no real indication of whether a systematic approach to implementation is being taken or whether there is any commitment to continuous improvement. The recurring message from the NUS for the past five years has been that students are likely to favour institutions with a good environmental performance. All they need is the information to enable them to make a judgement. The Forum for the Future, through its HE 21 Project, is developing a set of sustainability indicators for the higher education sector, which will be tested by its twenty-five higher education partners. The intention is to use these as a basis for developing an index of corporate engagement to guide student choice.

Certification/verification of an environmental management systems standard would serve as a significant indicator of responsibility which would both impress and reassure students.

### ***Enhanced research and consultancy opportunities***

Addressing higher education environmental responsibilities relating, for instance, to purchasing, transport and waste, calls for dialogue with external organisations e.g. government, local authorities, businesses, non government organisations. Dialogue around common problems can provide a door way to research and consultancy projects which apply the specific knowledge and skills which institutions have to offer.

More generally, the environmental products and services market offers major opportunities to environmentally responsible higher education institutions. It is estimated that by the year 2000, this market in Europe alone will be larger than the combined markets for the chemical and aerospace industries. The global market for environmental technology is expected to reach £325 billion by 2010, of which the UK will command £15 billion (OECD, 1996).

Higher education institutions are also important locational assets in the global economy, capable of attracting 'foot-loose' corporate investment. There would seem to be potential for environmentally proactive universities to attract investment from environmentally proactive multi-national companies - the attraction being an environmentally 'friendly' and informed place in which to experiment. Another kind of opportunity relates to HE twinning initiatives between the North and South relating to sustainability.

### ***Compliance with Government and EU legislation and policies***

Breaking the law can result in prosecution and liabilities. Such actions can leave a question mark over an institution's credibility. The benefit of having an environmental management system in place is that compliance with all legal and policy requirements is routinely and systematically addressed.

Recent developments in environmental legislation reflect a move to viewing the environmental impact of a product or service in a holistic way and to making product and service providers responsible for their wastes.

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