Eco-Management and Audit Scheme (EMAS)

The **Eco-Management and Audit Scheme** (**EMAS**) is a voluntary environmental management instrument, which was developed in 1993 by the European Commission. It enables organizations to assess, manage and continuously improve their environmental performance. The scheme is globally applicable and open to all types of private and public organizations

3 -core elements

- Performance

Actions implemented by the organisation improve environmental performance and legal compliance, in line with policy targets

- Transparency

These achievements are made public through the annual environmental statement

- Credibility

The environmental statement is verified by independent environmental verifiers who guarantee the value of the information disclosed

EMAS superior quality rests upon:

- stricter requirements on the measurement and evaluation of environmental performance against objectives and targets, and the continuous improvement of that environmental performance;
- compliance with environmental legislation ensured by government supervision;
- strong employee involvement;
- environmental core indicators creating multi-annual comparability within and between organisations
- provision of information to the general public through the validated environmental statement; and • registration by a public authority after verification by an accredited/ licensed environmental verifier.

EMAS is designed to help organisations improve their environmental performance while simultaneously enhancing their competitiveness, e.g. through a more efficient use of resources.

Who can participate in EMAS?

EMAS is applicable in all sectors and open to all types of organisations in the public and private sector that seek to improve their environmental performance. The EMAS easy methodology even enables the introduction of the scheme in small and medium- sized enterprises (SMEs) with few financial and human resources or limited in-house expertise.

The possibility for a single corporate registration lowers administrative and financial burdens for organisations with several sites. For local authorities, EMAS helps streamlining environmental activities and requirements, e.g. in administration, construction, health and education.

To achieve EMAS certification an organisation has to:

1. Contact your local Competent Body to get customised technical support (e. g. a list of qualified EMAS consultants) and information about funding opportunities.
2. Conduct an environmental review

   The organisation needs to conduct a verified initial environmental review, considering all environmental aspects of the organisation's activities, products and services, methods to assess them, the organisation's legal and regulatory framework and existing environmental management practices and procedures.
3. Adopt an environmental policy

   Registration to EMAS requires an organisation to adopt an environmental policy and to commit itself both to compliance with all relevant environmental legislation and to achieving continuous improvement in its environmental performance.
4. Establish an EMS

   Based on the results of the environmental review and the policy (objectives), an EMS needs to be established. The EMS is aimed at achieving the organisation's environmental policy objectives as defined by the top management. The management system needs to set responsibilities, objectives, means, operational procedures, training needs, monitoring and communication systems.
5. Carry out an internal environmental audit

   After the EMS is established an environmental audit should be carried out. The audit assesses in particular if the management system is in place and in conformity with the organisation's policy and programme. The audit also checks if the organisation is in compliance with relevant environmental regulatory requirements. Check the

effectiveness of EMS by follow appropriate indicators, including EMAS core indicators.

6. Prepare an environmental statement

   The organisation needs to provide a public statement of its environmental performance. The environmental statement lays down the results achieved against the environmental objectives and the future steps to be undertaken in order to continuously improve the organisation's environmental performance.

7. Independent verification by an EMAS verifier

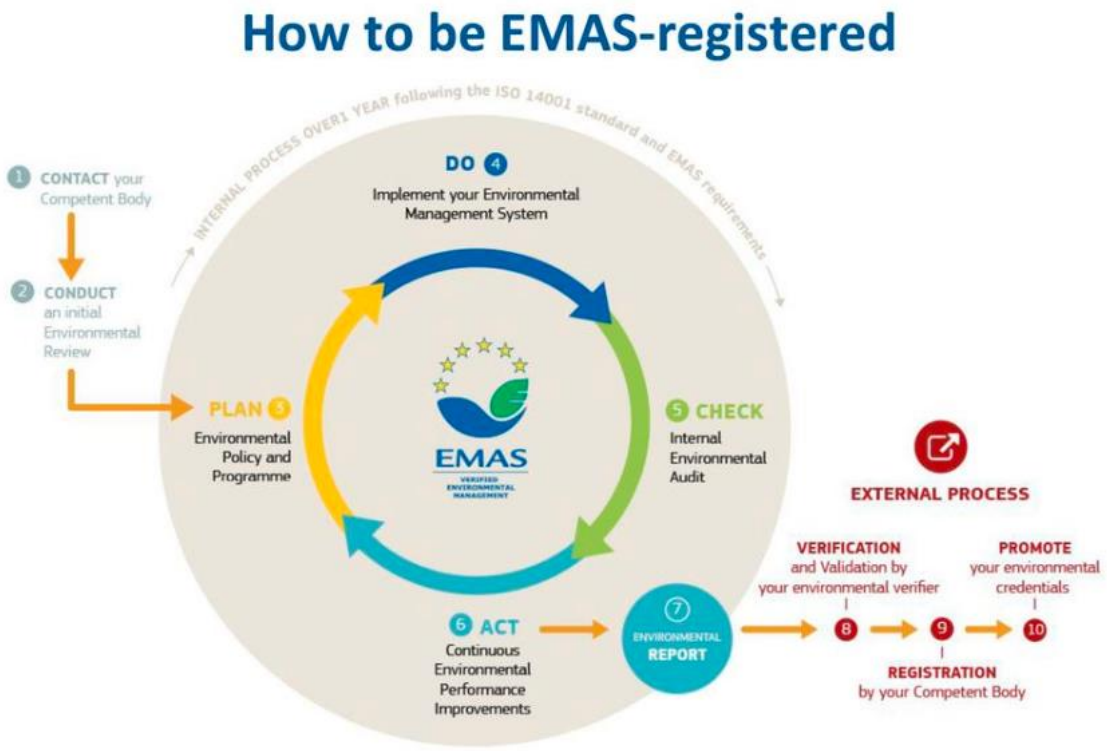
   An EMAS verifier accredited with an EMAS accreditation body of a Member State must examine and verify the environmental review, the EMS, the audit procedure and the environmental statement.

8. Register with the Competent Body of the Member State

   The validated statement is sent to the appropriate EMAS Competent Body for registration and made publicly available.

9. Utilize the verified environmental statement

   The environmental statement can be used to report performance data in marketing, assessment of the supply chain and procurement. The organisation can use information from the validated statement to market its activities with the EMAS logo, assess suppliers against EMAS requirements and give preference to suppliers registered under EMAS.



EMAS is a Governmental Regulation

Another important fact about EMAS is that it is a government regulation, not an international standard. This means that it is the member state's governments that have to organise the registration process of sites within their territory. They designate the Accreditation Body, who is an independent and impartial institution or organisation responsible for the accreditation and supervision of environmental verifiers. Environmental verifiers, on the other hand, are experts on the field of EMAS and need to be both independent of the organisation being verified and that organisation's auditor or consultant. They ensure that organisations seeking registration are in compliance with EMAS requirements.

In particular they check that an organisation:

• Is in legal compliance.

• Has carried out an initial environmental review (if appropriate).

• Has a fully operational EMS which is audited in a systematic, objective and periodic way.

• Has prepared an environmental statement in accordance with the EMAS regulation. Furthermore they verify that that all data and information in the environmental

statement and other information provided by an organisation is reliable, credible and correct.

Benefits EMAS

EMAS brings many benefits to organisations participating in the scheme. These include:

1) Enhanced environmental and financial performance
    - high quality environmental management
    - resource efficiency and lower costs
2) Enhanced risk and opportunity management
    - guarantee of full regulatory compliance with environmental legislation
    - reduced risk of fines related to environmental legislation
    - regulatory relief
    - access to deregulation incentives
3) Enhanced credibility, reputation and transparency
    - independently validated environmental information
    - use of the EMAS Logo as a marketing tool
    - increased business opportunities in markets where green production processes are important
    - better relations with customers, the local and wider community, and regulators
4) Enhanced employee empowerment and motivation
    - improved workplace environment
    - enhanced employee commitment
    - greater team-building capacity

Other benefits

1 Improved environmental performance: 70% of registered organisations show improvement on nearly ALL environmental indicators*

2 Improved legislative compliance and hence less risk of sanctions

3 Better identification of overall corporate responsibilities: Better-defined roles and responsibilities, stronger awareness of teams

4 Fewer environmental accidents

5 Cost savings: Achieved through reuse, recycling, and decrease in resource use

6 Improved relations with stakeholders: Employees are more committed and external stakeholders value the transparency of the organisation

7 Regulatory relief: In some Member States, authorities provide advantages to EMAS registered organisations, such as reductions in inspections or taxes

THE ISO 14000 STANDARDS

The ISO 14000 family of standards is comprised of 23 standards which can be broken down into seven categories:

- EMSs,
- environmental auditing,
- environmental labeling,
- environmental performance evaluation,
- life cycle assessment,
- environmental management vocabulary, and
- environmental aspects in product standards.

ISO 14001: Environmental management systems—Specification with guidance for use

This gives the requirements for an EMS, which allows for an organization to create a policy that incorporates legal requirements and information on environmental impacts.

ISO 14004: Environmental management systems—General guidelines on principles, systems, and supporting techniques

This document provides guidance on developing and implementing EMSs and coordinating them with other managements systems. These are strictly voluntary guidelines and do not impact the certifi cation procedure.

ISO 14061: Information to assist forestry organizations in the use of ISO 14001 and ISO 14004

This serves to help forestry organizations in the application and implementation of the EMS standards

ISO 14010: Guidelines for environmental auditing—General principles

This document provides the general principles of environmental auditing which are universal. Anything classifi able as an environmental audit should meet the given recommendations.

ISO 14011: Guidelines for environmental auditing—Audit procedures— Auditing of environmental management systems

This helps to establish the audit procedures for planning and conducting an audit of an EMS (see Chapter 46 for details on audits). The purpose of such an audit is to ascertain if the EMS is meeting the audit criteria.

ISO 14012: Guidelines for environmental auditing—Qualifi cation criteria for environmental auditors

This document provides guidance on the qualifi cation criteria for environmental and lead auditors. The provisions are applicable to both internal and external auditors.

ISO 14015: Environmental management—Environmental assessment of sites and organizations

This shows how to conduct such an assessment via a systematic process which identifi es the environmental aspects and issues and what consequences they might have for the business. The roles and responsibilities of each party in the assessment are discussed as well as the phases of the process. However, this is not meant to provide guidance on initial environmental reviews, audits, impact assessments, or performance evaluations.

ISO/CD.2 19011: Guidelines on quality and environmental management systems auditing

This document provides the fundamentals of auditing, how to manage auditing programs, how to conduct an environmental and quality management systems audit, and the qualifications of such auditors. This is important for all businesses that have an EMS in any stage of implementation. This standard can be used for other kinds of audits but the capability of the auditors must be determined.

ISO 14020: Environmental labels and declarations—General principles

This provides the guiding principles used in developing and applying environmental labels and declarations. Other ISO standards in this category give more specifi c requirements for certain types of labels and these should take precedence over the general guidelines.

ISO 14021: Environmental labels and declarations—Self-declared environmental claims

These types of labels are classifi ed as Type II environmental labels. This standard gives specifi c requirements for this type of labeling, which includes claims, symbols, and products. It discuses various terms that fi t in this category and the qualifi cations of their use it also provides a basic evaluation and verifi cation methodology for such labeling. However, any legal requirements regarding this labeling take precedence over the standard.

ISO 14024: Environmental labels and declarations—Type I environmental labeling—Guiding principles and procedures

This gives guiding principles and practices to be applied to Type I labeling which covers multiple, criteria-based, third-party environmental labeling programs. It provides criteria procedures and guidance for the certification process and is meant to serve as a reference document intending to reduce the environmental responsibility by promoting market-driven demand for products meeting this labeling program.

ISO 14025: Environmental labels and declarations—Type III environmental declarations

This document discusses the elements and issues regarding this type of labeling. It provides guidance on technical considerations, declaration formatting and communication, and administrative considerations for the development of this labeling program.

ISO 14031: Environmental management—Environmental performance evaluation—Guidelines

This standard provides guidance on the design and execution of environmental performance evaluations within the company. However, actual performance levels are not specifi ed.

ISO/TR 14032: Environmental management—Examples of environmental performance evaluation

This gives some examples from real companies that have conducted environmental performance evaluations to illustrate how to use the guidelines described in ISO 14031.

ISO 14040: Environmental management—Life cycle assessment—Principles and framework

This document provides the basic framework, principles, and requirements for conducting and analyzing life cycle assessments.

ISO 14041: Environmental management—Life cycle assessment—Goal and scope definition and inventory analysis

This standard describes the requirements and procedures for compiling and preparing a goal and scope for the life cycle assessment. Guidelines for performing and reporting the inventory analysis are also given.

ISO 14000 53 ISO 14042: Environmental management—Life cycle assessment—Life cycle impact assessment

This provides the basic framework for the life cycle impact assessment phase and reviews the important features and drawbacks of the phase as well as the requirements for conducting one.

ISO 14043: Environmental management—Life cycle assessment—Life cycle interpretation

This document details the requirements and recommendations for conducting the life cycle interpretation phase of the study.

ISO 14048: Environmental management—Life cycle assessment—Life cycle assessment data documentation format

This standard describes the required formatting for presenting data collected from the life cycle assessment.

ISO 14049: Environmental management—Life cycle assessment—Examples of application of ISO 14041 to goal and scope defi nition and inventory analysis

This gives examples about practices carried out in the life cycle assessment analysis and samples of possible cases that meet the requirements of the standard.

ISO 14050: Environmental management—Vocabulary

This document reviews the defi nitions of the terminology related to the EMS.

ISO Guide 64: Guide for the inclusion of environmental aspects in product standards

This document discusses the environmental impacts in product standards and provides considerations relating product function and environmental impacts. It also gives an outline of how provisions in the product standards can affect the environment, techniques for identifying the impacts, and suggestions for alleviating some of the harmful impacts

ISO 14001	Environmental management systems—Specifications with guidance for use
ISO 14004	Environmental management systems—General guidelines on principles, systems, and supporting techniques
ISO 14010	Guidelines for environmental auditing—General principles on environmental management systems
ISO 14011/1	Guidelines for environmental auditing—Audit procedures—Audit of environmental management systems
ISO 14012	Guidelines for environmental auditing—Qualification criteria for environmental auditors
ISO 14015	Environmental site assessments
ISO 14020	Goals and principles of all environmental labeling
ISO 14021	Environmental labels and declarations—Self declaration environmental claims—Terms and definitions
ISO 14022	Environmental labels and declarations—Self declaration environmental claims—Symbols
ISO 14023	Environmental labels and declarations—Self declaration environmental claims— Testing and verification
ISO 14024	Environmental labels and declarations—Environmental labeling Type I – Guiding principles and procedures
ISO 14025	Environmental labels and declarations—Environmental information profiles—Type III guiding principles and procedures
ISO 14031	Evaluation of environmental performance
ISO 14040	Environmental management—Life cycle analysis—Principles and framework
ISO 14041	Environmental management—Life cycle analysis—Life cycle inventory analysis
ISO 14042	Environmental management—Life cycle analysis—Impact assessment
ISO 14043	Environmental management—Life cycle analysis—Interpretation
ISO 14050	Terms and Definitions—Guide on the Principles for ISO/TC 207/SC6 terminology work
ISO Guide 64	Guide for inclusion of environmental aspects in product standards

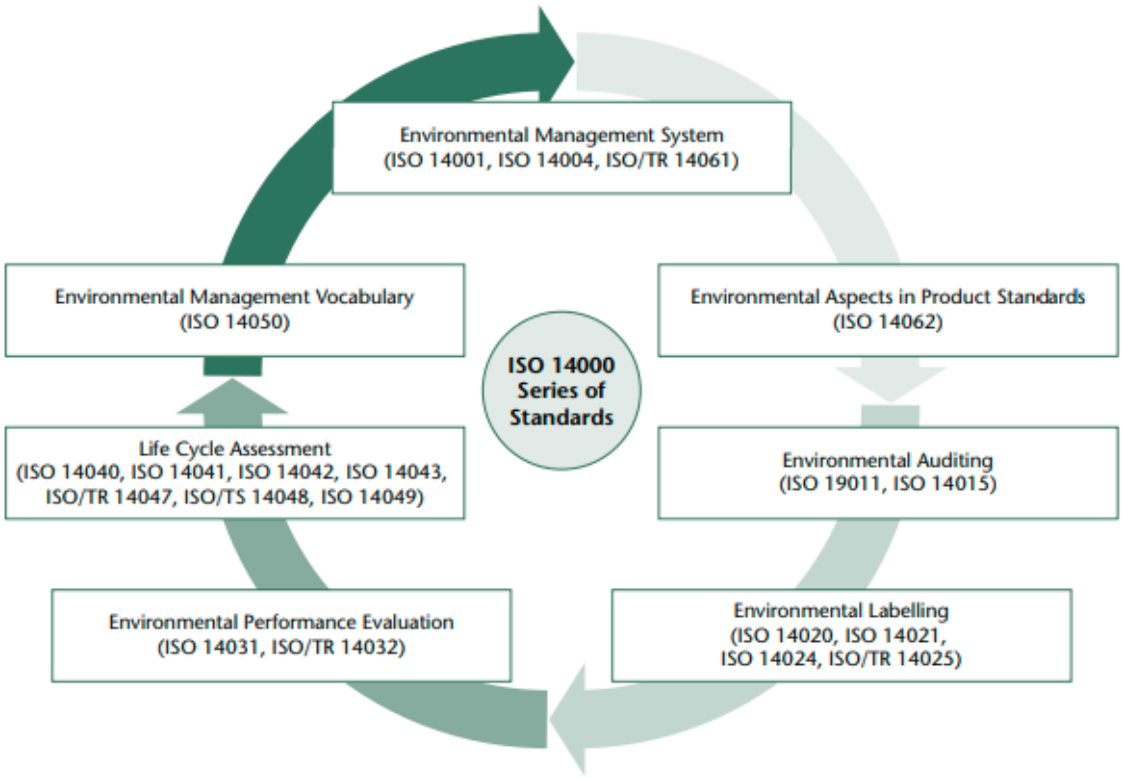


Figure The ISO 14000 Series of Standards [International Network for Environmental Management (INEM)].

ISO 14000 stipulates a set of ten management principles for organizations considering an EMS as follows:

1. Recognize that environmental management is one of the highest priorities of any organization.
2. Establish and maintain communications with both internal and external interested parties.
3. Determine legislative requirements and those environmental aspects associated with the activities, products, and services.
4. Develop commitment by everyone in the organization to environmental protection and clearly assign responsibilities and accountability.
5. Promote environmental planning throughout the life cycle of the product and the process.
6. Establish a management discipline for achieving targeted performances.
7. Provide the right resources and sufficient training to achieve performance targets.
8. Evaluate performance against policy, environmental objectives and targets, and make improvements wherever possible.
9. Establish a process to review, monitor, and audit the EMS to identify opportunities for improvement in performance.
10. Encourage vendors to also establish EMSs.

Structure of ISO 14001

It is important to note that ISO 14001 is an environmental management standard – not an environmental performance standard. The standard is general and no precise requirements concerning environmental objectives are set. This means that improved environmental performance is not guaranteed. The ISO 14001 standard is voluntary and is meant to be applicable anywhere in the world. Though ISO 14001 is not regulated by law, there are strict rules on legal compliance. Improving efficiency of resource consumption and control of environmental impacts are about equally important issues in this standard

The ISO 14000 series of standards is made up of one standard (ISO 14001), which organizations have to comply with, and others that provide guidance to assist organizations' compliance with ISO 14001. ISO 14001 outlines the basis for establishing an EMS. The core sections of the EMS consist primarily of the five subsections highlighted below:

1. **Environmental Policy**
   Develop a statement of your organization's commitment to the environment. Use this policy as a framework for planning and action

2. **Planning**
   2.1 Environmental aspects
   Identify environmental attributes of your products, activities and services. Determine those that could have significant impacts on the environment.

   2.2 Legal and other requirements
   Identify and ensure access to relevant laws and regulations, as well as other requirements to which your organization adhere

   2.3 Objectives and targets
   Establish environmental goals for your organization, in line with your policy, environmental impacts, the views of interested parties and other factors.

   2.4 Environmental management programs
   Plan actions necessary to achieve your objectives and targets.

3. **Implementation and Operation**
   3.1 Structure and responsibility
   Establish roles and responsibilities for environmental management and provide appropriate resources.
   3.2 Training, awareness, and competence
   Ensure that your employees are trained and capable of carrying out their environmental responsibilities.
   3.3 Communication

Establish processes for internal and external communications on environmental management issues.

3.4 EMS documentation

Maintain information on your EMS and related documents.

3.5 Document control

Ensure effective management of procedures and other system documents.

3.6 Operational control

Identify, plan and manage your operations and activities in line with your policy, objectives and targets.

3.7 Emergency preparedness and response

Identify potential emergencies and develop procedures for preventing and responding to them

4. Checking and Corrective Action

4.1 Monitoring and measurement

Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements.

4.2 Non-conformance, and corrective and preventive action

Identify and correct problems and prevent their recurrence.

4.3 Records

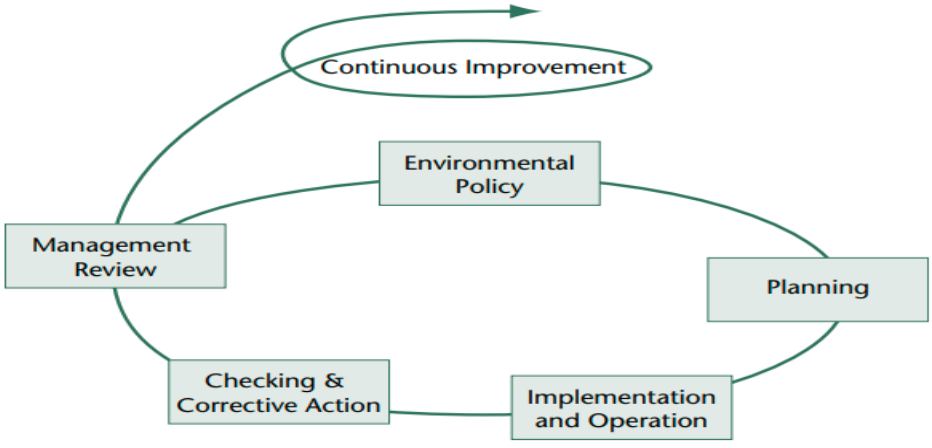
Maintain and manage records of EMS performance.

4.4 EMS audit

Periodically verify that your EMS is operating as intended.

5. Management Review

Periodically review your EMS with an eye to continual improvement.



Model of the ISO 14001 environmental management system [European Committee for Standardization, 1996-08-21, Introduction].

POTENTIAL BENEFITS

- Improved environmental performance
- Enhanced compliance
- Prevention of pollution/resource conservation
- New customers / markets
- Increased efficiency / reduced costs
- Enhanced employee morale
- Enhanced image with public, regulators, lenders, investors
- Employee awareness of environmental issues and responsibilities

Other Benefits

Improved Product and / or service quality
Reduction in incidents, rejections and complaints
Increased productivity and / or efficiency
Reduced internal costs
Improved Profitability
Increased workforce motivation and retention
Employees become more quality aware
Improved processes and procedure
Elimination of redundancy or unnecessary work
Better working environment

POTENTIAL BARRIER

Internal Barriers

- Cost of changing the system to accommodate ISO 14001 are high
- Lack of necessary knowledge and specialists in environmental issues/ certified systems/maintain continuous improvement of standard
- Employees/top management feel there is no benefit in implementing ISO 14001
- No time to implement ISO 14001 due to competing priorities
- The benefits associated to ISO 14001 are not guaranteed
- Implementing ISO 14001 will have no positive effects on the environment
- Company is too small to get ISO 14001
- Lacks the necessary financial resources to implement/maintenance and improvement of ISO 14001
- Lack of government support and the fact that ISO 14001 is not being legally required or enforced by the government

External Barriers

- Little support or guidance on how to implement ISO 14001 from government agencies
- Limited sector specific guidance and materials tailored to different sizes of firms
- Fees paid to consultancy/ registration / accreditation agencies for audition agencies to implement ISO 14001 are high

- Pool legislative frame work to assist firms in implementing ISO 14001
- No financial support to assist firm in the implementation of ISO 14001
- The required documentation for ISO 14001 is very complicated and large
- Partners /customers / suppliers / government agencies demand or pressure companies to implement ISO 14001

Concepts of Continual Improvement

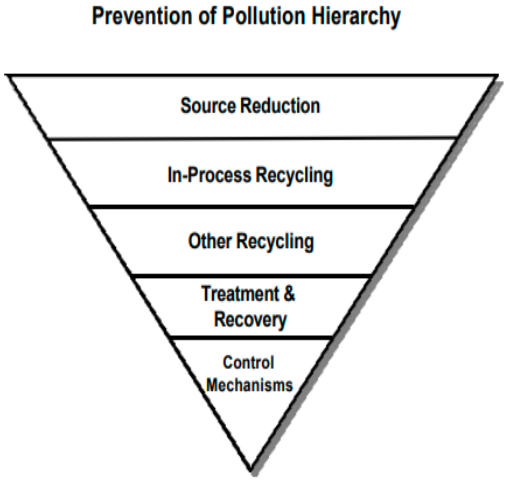
To improve environmental management, an organisation needs to focus not only on what happens but also on why it happens. Over time, the systematic identification and correction of system deficiencies leads to better environmental and overall organisational performance. Most EMS models (including the ISO 14001 standard, which is explained in detail later) are built on the so-called "Plan, Do, Check, Act" quality management model introduced by Deming in the US in the 1950s. This model puts great emphasis on the concept of continuous improvement. In the following we will explain and discuss in detail the requirements of an efficient EMS according to the basic Deming Cycle

Elements of ISO 14001 at Each Step of the Deming Quality Management Model

Pollution prevention

A commitment to preventing pollution is a cornerstone of an effective EMS and should be reflected in an organization's policy, objectives and other EMS elements. Examples throughout this Guide show how organizations have used an EMS to prevent pollution. EMS design and

implementation also should take into account the Pollution Prevention (P2) hierarchy. In evaluating P2 opportunities, organizations should start at the top of the pyramid (i.e., source reduction) and work their way down as needed to define the most appropriate methods for preventing pollution. Examples and best practices of P2 in operation are provided throughout this Guide.



Initial Environmental Review

In most EMS manuals "Environmental Aspects and Impacts" are dealt with after "Planning an Environmental Policy." Due to practical experience from several consulting projects it is advised that "Environmental Aspects and Impacts" be treated first. The reason is simple: there is a greater likelihood of success if the environmental situation is known before planning a policy. An organisation's individual policy can then be formulated in a more substantial and precise manner. But before it can be determined which environmental aspects and impacts will be included in the environmental policy, an initial review needs to be carried out to comprehensively identify environmental aspects and related impacts.

Carrying out an Initial Review

An initial review provides a snapshot of an organisation's environmental performance at a particular moment in time. A thorough and comprehensive review provides a solid basis for developing a register of environmental aspects and impacts, and an environmental management programme. The initial review is sometimes also called a preliminary review. The process involves collecting information on an organisation's environmental aspects and impacts, and the management structures in place to deal with them.

The following definitions used in ISO 14001 provide a clear understanding of the terms.

Environmental Aspect: Element of an organisation's activities, products, or services that can interact with the environment.

Environmental Impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services [ISO 14001:1996, sections 3.3 and 3.4].

Environmental aspects and impact analysis

Requirements of ISO 14001

ISO 14001 requires organisations to use a systematic approach to determine its aspects and impacts, by having documented procedures which:

- determine the environmental aspects of its products, services and activities, taking into account current and planned activities, covering the aspects that it can both control and influence
- determine the environmental impacts of each aspect
- assess the significance of these aspects and impacts.

An organisation must also consider:

- aspects which are under direct management control
- aspects which are indirect and do not fall under management control
- aspects which can be influenced, if not controlled
- past, current and future aspects
- actual and potential aspects
- linkages between environmental aspects and legal compliance or other requirements.

1. Identifying Environmental Aspects

- An organisation needs to establish and maintain procedures to identify the environmental aspects that it can control and have influence over.
- Direct and indirect aspects need to be distinguished.
- Direct aspects result directly from facility operations, such as raw material use in production. Indirect aspects can only be indirectly connected to a facility operation, such as aspects related to the production of raw materials that are purchased from a supplier.
- The term "aspect" is neutral. Environmental aspects can be either: Positive (such as manufacturing a product out of recycled materials). Negative (such as creating toxic materials). It is almost impossible to work on all aspects identified.
- However, when an improvement process is continuous, some aspects may be taken care of right away and others addressed in the future. Some aspects that may not seem significant in the initial identification process may turn out to be significant in the long run. Therefore, all aspects need to be monitored continuously, and environmental aspects ranked.
- This can be achieved in a number of ways, for instance by ranking according to criteria such as risk involved, material consumption, waste generated, etc. The aspects worked

on are determined by another set of criteria, for example technical and economic feasibility and benefit for the organisation.

- Input-output analysis is very helpful in identifying environmental aspects. This analysis should cover an organisation's inputs and outputs generated by material and energy flows at the site. For most organisations the most important inputs and outputs are:

Inputs	Outputs
raw, operating and packaging materials (including hazardous materials)	products
energy	waste materials (including hazardous waste)
water	wastewater
air	exhaust air
soil	noise and odours

- There are different methods to find the information needed to identify environmental aspects.
    1. One way is to visualize the physical reality of an organisation's activities through Process Mapping and Eco
    2. Another way may be to interview employees
    3. Checklists or questionnaires can also be a means to identify environmental aspects

2. Assess the Significance of aspects

Identifying environmental aspects is very important, because the entire EMS builds on this process of identification. Once the environmental aspects are identified, it needs to be determined which of these aspects have or can have significant impacts on the environment.

Determining which aspects are significant includes making subjective decisions. For this reason, results will improve by having a team of people who represent different job categories. They can provide a cross-section of operational experience.

3. Identifying Environmental Impacts

To plan for and control its environmental impacts, an organisation must know what these impacts are. But knowing what the impacts are is only part of the challenge – it is also necessary to know where these impacts are generated. How the organisation and its products, services and activities interact with the environment needs to be found out. If an organisation has undertaken pollution prevention projects, one must know how and where a special waste is generated in order to minimize or eliminate it and, even better, avoid its generation in the future.

Like pollution prevention, the identification and management of environmental aspects can have a positive financial effect and provide comprehensive environmental improvements. Thus, an

EMS needs to include a procedure to identify and assess environmental impacts that the organisation can control and influence

Impacts Caused by Products

Business activity has a substantial impact on the environment:

- The manufacturing of products starts with extracting raw materials from the environment after which they are processed into items that can be sold. Consequently, in the production process there are various forms of waste produced that enter the environment.
- Environmental impacts are not only generated by industry but also by service organisations, for instance due to use of paper, electricity consumption or transport. All activities that can be associated with the manufacturing process, such as maintenance or packaging, can also cause environmental impacts.
- Additionally, all products have to be disposed of at the end of their life cycle and enter the environment as waste. Service organisations also cause waste to enter the environment due to their activities [Starkey, R. and Andersson, I. 1998, p. 12].

Once the environmental aspects of products, activities and services have been identified, it needs to be determined which aspects have or could have significant impacts on the environment.

Aspects that have one or more single significant impact should be considered significant environmental aspects.

These significant aspects should be considered when establishing environmental objectives, defining operational controls and considering other actions. A multi-step process can be used to make this evaluation. The resulting information should be kept up-to-date so that potential aspects of new products, services and activities are factored into the objectives and controls.

Some of the issues that need to be kept in mind when identifying environmental impacts are:

- When identifying aspects and impacts, one should look beyond activities covered by laws and regulations.
- A compliance programme could in this context provide useful information. Permits, audit reports and monitoring records can be useful inputs.
- Beyond regulated aspects, land, energy and natural resource use for example, should be considered as well.
- Both services and products need to be looked at. The need to examine site operations is obvious but there can be significant environmental impacts involved with activities that do not take place at the organisation's site (such as servicing for customers). At the same time, environmental aspects of products, vendors, and contractors playing a role in the organisation should also be considered, even if their environmental aspects may not be obvious.
- The identification of environmental aspects and impacts can be seen as one of the most critical steps in the EMS implementation process. It is therefore important that this step be taken carefully. The initial effort will be rewarded later [NSF International, 2001, p. 21].
- Processes in the Organisation

In many cases it is difficult to understand why certain environmental impacts occur. In that case it may be helpful to take a look at the processes existing in the organisation that can cause possible environmental impacts. Visualizing the processes using flow charts or process maps can help the identification process.

4. Impact significance analysis

Once the identification process is finished, the impacts identified need to be ranked according to their significance. How this significance is determined varies from organisation to organisation, but it is usually the EMS implementation team that sets the criteria for the ranking process.

- The ranking is important as it may not be possible to work on all environmental impacts. After having ranked the environmental impacts they need to be worked on.
- This process requires careful planning to decrease the amount of work involved.

Below is a list of some questions that could be asked to help identify environmental impacts:

- Which aspects might affect the organisation's ability to comply with regulations and other requirements?
- Are there pollution prevention opportunities?
- Are there potential cost savings or business opportunities (e.g. potential customers who require their suppliers to have an EMS)?
- Are there concerns that might be shared by customers or suppliers?
- Is there a "low-hanging fruit" that might provide early success which can serve both to educate employees and to build confidence in the EMS?
- Are there opportunities to integrate environmental management with occupational health and safety requirements?
- Are there community concerns regarding the organisation's activities?
- Are there unregulated hazardous chemicals that could be better managed or substituted?
- Are some of the "solutions" to environmental concerns or regulations shifting waste from one media (air, water, land) to another?

As soon as a suitable process for the significance assessment has been found for the organisation, one can start describing the process in form of a written procedure. Once there is a reduced list of environmental aspects, they can be ranked using environmental risk information to determine the level of significance.

5. Using Environmental Risk Information to Rank Environmental Impacts

* Although we have gone deeper into the issue of risk management before, we will take another look at it because risk information can be a very good criterion for ranking environmental impacts. Basically this method is very simple: the greater the risks related to an environmental impact, the higher its position in the ranking system. The top ten impacts have highest priority.

These are the impacts that should be addressed first as they represent the greatest danger to the organisation. Removing the risks will ensure a healthy environment and decrease an organisation's liabilities. To make sure that these impacts are dealt with correctly and to minimize the risks involved one will have to analyse how the organisation deals with these aspects.

It needs to be found out whether:

• There is additional information required about the impact or process, such as processes that are not documented correctly or processes that require special precautions.

• The right people are involved.

• The results are dealt with according to their significance.

The next challenge is to organise the information collected in a way that makes the different impacts comparable. If little information is available about a certain impact, perhaps it is possible to collect sufficient data and set rules for dealing with the impact. The next step is to determine which impacts will actually be worked on. This can be done by considering economic and technical feasibility as well as expected improvements for the organisation

Sometimes it may be better to work on impacts that have a lower ranking, as less effort is needed to deal with them

Table 1

Environmental Aspects & Impacts Examples

Environmental aspects	Environmental impacts
Storage of fuel	Spills and leaks
Delivery of cement to ready-mixed concrete production facility	Air emissions, noise
Delivery of concrete	Air emissions, noise
Truck washout	Process water, track out and housekeeping
Electricity use	Air pollution, global warming
Use of recycled paper	Conservation of natural resources
Truck parking	Stormwater, spills and leaks, housekeeping
Use of returned concrete (forms, yard paving, etc.)	Conservation of natural resources

ASPECT IMPACT STUDY

Department: _____ **Location:** _____ **Area:** _____

Sr. No.	Activity	Sub Activities	Aspect	Impact	Control	Condition	Significant	Control Method

Prepared By **Approved By**

Explanation with Example:

Operation/Process	Activity	Aspect	N/A/E	Impact	RSP	LR	RATING					Significant/Non-Significant / Positive Impact	Legal Reference
							SCL	SEV	POC	D	Rating		
Glass Shop	Frame Washing	Disposal of used demineral water	N	Water pollution		yes	4	3	2	2	48	S	

- **Activity:** Frame Washing
- **Aspect:** Disposal of used demineral water
- **N/A/E:** N. The above aspect is carried out on a regular basis in normal operating conditions, hence rated as 'N' implying Normal.
- **Impact:** Water Pollution. (The wastewater generated needs to be treated before disposal)
- **RSP:** There is no scope for RSP as washing of frames needs to be carried out in order to maintain manufacturing standards**.**
- **LR:** Use of demineral water is specific to the company's manufacturing process. The production, handling, use and disposal needs to follow the guidelines.
- **Rating:**
    - **SCL(Scale): 4.**

      As the impact caused by this aspect is Water Pollution and this spreads outside the premises of the company it is rated as 4.
    - **SEV(Severity): 3**

      As the severity of this impact can be treated and reduced it is rated as 3, medium impact on environment.
    - **POC (Probability of Occurrence): 2**

      This activity is carried out only once a week, therefore it is rated as 2.
    - **D(Duration): 2**

      This activity is carried out for only 2.5 to 3.5 hrs once a week, therefore it is rated as 2.

Therefore, rating is calculated by multiplying the SCL x SEV x POC x D. The product obtained determines whether the activity is significant or non-significant.

Rating = SCL x SEV x POC x D

= 4 x 3 x 2 x 2

= **<u>48</u>**

As the rating obtained is 48, it is concluded that the activity is a significant aspect. Also, as the rating given for Scale is 4, the aspect is considered as significant by default.

Note:

Apart from rating being used to determine whether the aspect is significant, non-significant or Positive Impact, the below criteria are also applied in specific situations.

Significant aspect is determined by the following criteria

- Total rating is 48 and above
- If severity rating is 4
- If Aspect is legal requirement
- If Aspect is due to Emergency
- Resource saving potential (RSP)

Reference: {FYI}

Activities:

Functions or duties of an organizational unit that occur within the fence line and that may have a positive or negative environmental impact.

Environmental Aspect:

Element of an organization's activities, products, or services that can interact with the environment.

Environmental Impact:

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services

Conditions:

N – Normal –

Environmental aspects and impacts that occur from conducting the activity on a regular basis in normal operating conditions.

A – Abnormal

Environmental aspects and impacts that occur from unexpected or infrequent activity or irregular schedule, one-time event or during unexpected conditions such as using backup equipment while primary equipment is being maintained (does not lead to an emergency condition).

E – Emergency

Environmental aspects and impacts that occur when the activity and/or an unforeseen combination of circumstances or events results in a need for immediate and or urgent action such as a spill, fire or flooding.

LR – Legal Requirement –

It is the activity controlled by or otherwise subject to regulations or other requirements. Based on the company's legal registry and policies. (eg: handling hazardous waste)

RSP – Resource Saving Potential – If there is a scope for conservation of the used resources.

Rating:

Scale [SCL]: Gives the extent of impact.

1) Within the work area – Rating 2
2) Within the premises – Rating 3

3) Impact Spread outside the premises – Rating 4

Severity [SEV] : Depicts the severity of the impact

1) Low impact on environment – Rating 2
2) Medium impact on environment – Rating 3
3) High impact on environment – Rating 4

Probability of Occurrence [POC] : Depicts the number of times the activity as occurred.

1) Once a week - Rating 2
2) Once a day - Rating 3
3) Once a shift - Rating 4

Duration [D]:

1) Up to 4 hrs /day - Rating 2
2) Up to 8 hrs /day - Rating 3
3) >8 hrs /day - Rating 4

Compliance with Legal and Other Requirements

Environmental legal compliance is an element of an EMS stipulated by ISO 14001 or EMAS. Organisations are required to themselves comprehensively document environmental legal compliance. In addition, it must be ensured that this documentation is systematically reviewed, revised, and kept up-to-date as required.

In order to comply with laws and regulations, an organisation needs to know what rules apply and how they affect the activities of the organisation. Legal compliance can be seen as part of the foundation of an EMS. The reason is that the cost of non-compliance (e.g. fines, possible damage to the environment, revenue loss and impact on public image) can be very high.. Therefore, there are processes required to identify and communicate legal and other requirements that apply to an organisation's activities.

Identifying Legal Requirements

Legal requirements include:

• National, regional and local requirements.

• Standards in locations where an organisation sells products/ services.

• Permit conditions.

• Regulatory obligations.

Other requirements might include (for example):

• Organisation-specific codes.

• International Chamber of Commerce (ICC) Charter for Sustainable Development.

• Other industry codes or programmes to which the organisation voluntarily subscribes (e.g. UNEP declaration for the banking and insurance sector, Responsible Care Programme for the Chemical Industry, and others).

Identifying applicable regulations, interpreting them, and determining their impacts on an organisation's operations can be a time consuming task. Once the legal requirements have been identified, procedures need to be implemented to ensure compliance.

Ways of Ensuring Legal Compliance

Ensuring legal compliance is part of the continuous improvement process. In some business sectors, legal requirements may change rapidly. Compliance with legal requirements is a critical consideration in EMS development and implementation. EMS implementation requires an organisation, among other things, to:

• Develop and communicate an environmental policy that includes a commitment to compliance.

• Develop and implement a procedure to identify, analyse and have access to environmental laws and regulations.

• Set objectives and targets in line with its environmental policy, which includes a commitment to compliance.

• Establish management programmes to achieve its objectives,

• Train employees and communicate relevant EMS requirements to them.

• Establish and implement operational control procedures.

• Establish and implement a procedure for periodically evaluating compliance.

• Establish and implement a procedure to carry out corrective and preventive actions

New or revised legal requirements might require modification of the environmental objectives or other EMS elements. By anticipating new requirements and making changes to the operations, this might avoid some future compliance obligations and their costs.

Any EMS should include procedures for identifying, accessing and analysing applicable legal requirements.

There are many methods for obtaining information about applicable laws or regulations.

These methods include:

• Commercial services (with updates offered online, on
CD-ROM or in paper form).

• Regulatory agencies.

• Trade groups/associations.

• The Internet.

• Public libraries.

• Seminars and courses.

• Newsletters/magazines.

• Consultants and attorneys.

• Customers, vendors and other organisations [US EPA,

July 2001, p. 60].

Once applicable requirements have been identified and analysed for potential impacts, these requirements (and plans for complying with them) need to be communicated to employees, onsite contractors and others, as needed

Legal Compliance Reviews

It is extremely important for an organisation to have a regularly updated register of environmental laws and regulations. It is important to keep in mind that although at particular point in time an organisation may comply with a law, or the law may not be relevant, this situation can change.

The results of the legal compliance review should show **areas of compliance, or areas which do not apply to the organisation's activities**. It should also **show weak points** regarding environmental legal compliance. Some main scenarios should exist when answering the question, "does the organisation comply with a specific piece of legislation?" An overview of all answers to this question should be prepared. This will help the **person responsible for legal compliance to quickly identify the areas where action is needed**. If individual results are "still open" or "not fulfilled," the overview also serves as a list of points requiring attention, e.g. on the basis of the weaknesses identified during the review.

Objective, and accompanying deadlines for realisation – should be formulated to achieve and/or maintain environmental legal compliance. Remember that the priority of achieving legal compliance does not depend solely on organisation objectives; priorities and objectives must take into account relevant deadlines set by authorities. Nowadays, relations between organisations and environmental authorities in some countries are becoming more positive and constructive. It is advisable to discuss any cases of non-compliance and the action plan with the responsible authority.

The ISO 14001 standard also includes a "regular review."Regular internal reviews are recommended (e.g. once a year).It makes sense if environmental legal compliance, as part of the overall system, is reviewed at the same intervals.

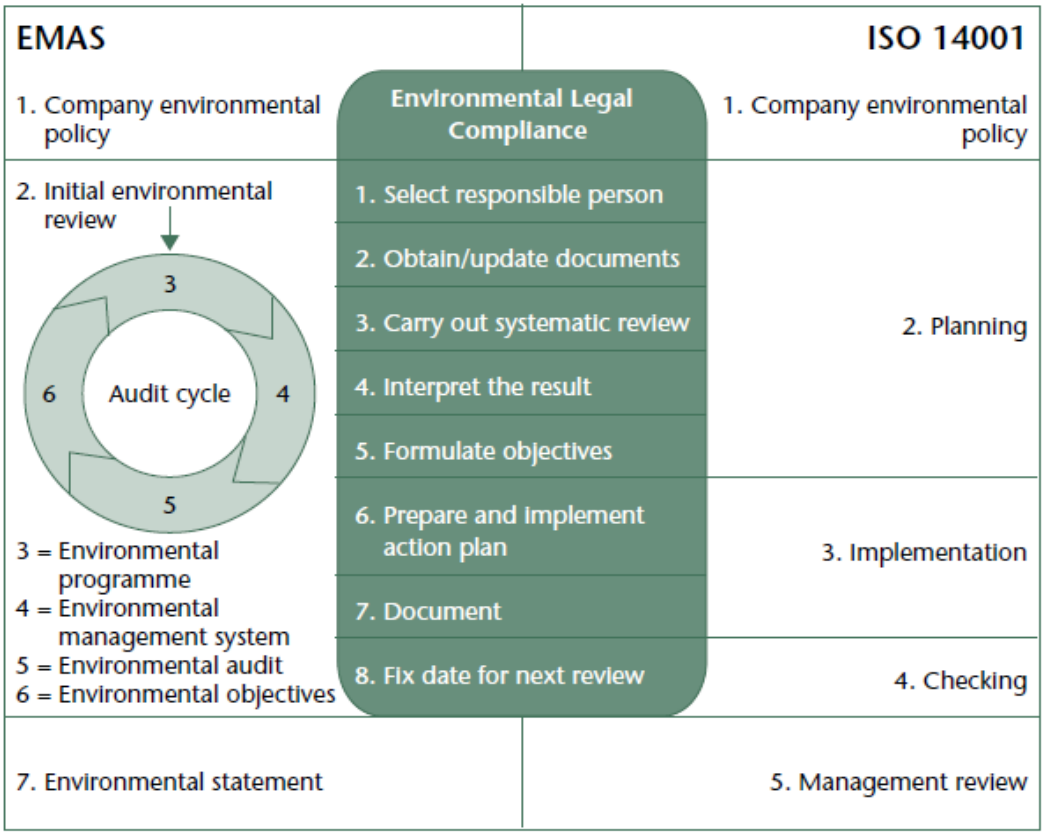
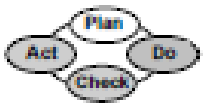


Figure *The Linkage Between ISO 14001 and EMAS*

Commonly Applicable Federal Environmental Laws in the US

Clean Air Act (CAA) [40 CFR Parts 50-99]	Establishes ambient and source emission standards and permit requirements for conventional and hazardous air pollutants.
Clean Water Act (CWA) [40 CFR Parts 100-145, 220-232, 410-471]	Establishes ambient and point source effluent standards and permit requirements for water pollutants, including sources that discharge directly to a waterbody or to a public sewer system.
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) [40 CFR Parts 150-189]	Establishes a program for Federal review of, registration and control of pesticides.
Resource Conservation and Recovery Act (RCRA) [40 CFR Parts 240-299]	Establishes regulations and permit requirements for hazardous waste management. Also, creates standards for underground storage tanks that hold oil or hazardous substances.
Toxic Substances Control Act (TSCA) [40 CFR Parts 700-799]	Regulates the use, development, manufacture, distribution and disposal of chemicals. Certain chemicals (such as PCB's) are subject to specific management standards.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as "Superfund") [40 CFR Parts 300-311]	Establishes a program for cleaning up contaminated waste sites and establishes liability for clean-up costs. Also, provides reporting requirements for releases of hazardous substances
Emergency Planning and Community Right-To-Know Act (EPCRA) [40 CFR Parts 350-374]	Establishes a program (also known as the "Toxic Release Inventory") to inform the public about releases of hazardous and toxic chemicals. Reporting requirements apply to companies that use, process or store specific chemicals over specified quantities.
Hazardous Materials Transportation Act (HMTA) [49 CFR Parts 100-180]	Establishes standards for the safe transportation of hazardous materials.



Capture the Learning: Legal & Other Requirements Worksheet

Do we have an **existing process** for identifying applicable legal and other requirements? If yes, does that process need to be revised? In what way?	
Who needs to be involved in this process within our organization? What should their responsibilities be?	
What **sources of information** do we use to identify applicable legal and other requirements? Are these sources adequate and effective? How **often do we review** these sources for possible changes?	
How do we ensure that we have **access** to legal and other requirements? (List any methods used, such as on-site library, use of web sites, commercial services, etc.)	
How do we **communicate information** on legal and other requirements to people within the organization who need such information?	
Who is **responsible** for analyzing new or modified legal requirements to determine how we might be affected?	
How will we keep information on legal and other requirements **up-to-date**?	
Our next step on legal and other requirements is to ...	

Environmental policy

An environmental policy is a set of fundamental principles and objectives which helps an organisation to put its environmental commitment into practice. It is the foundation upon which improvement of environmental performance and an EMS can be built.

The environmental policy is the basis for any organisation's EMS.

- It is the policy that establishes the objectives against which an EMS will be judged.
- It sets both long term and short term strategies, it defines the direction in which the EMS is supposed to go.
- The policy should create a vision for everybody working in the organisation. Since the policy can greatly influence an organisation's public image, it should be clear, understandable and verifiable
- The policy should relate to products and services, as well as supporting activities.
- The results of a preliminary review and the analysis of the environmental aspects of products, services and activities need to be considered before finalizing the policy.
- This may give insights on how the organisation interacts with the environment and how well environmental challenges are being met. For example, information obtained during the preliminary review might help define specific policy commitments.

ISO 14001 is an international standard for EMS that sets criteria for formulating an environmental policy and environmental objectives while taking into account environmental impacts and compliance with applicable environmental legislation.

The standard only applies to those environmental aspects the organisation can control and over which it can have an influence. Environmental criteria themselves are not specified in the standard. There are no normative references. What is required is that the implementation of ISO 14001 is embedded in a process of continuous improvement. The most important ISO 14001 policy requirement is the support of top management. The policy sets the tone for the establishment of the principles of an EMS. It is the policy that sets environmental targets and objectives, distributes responsibilities and establishes milestones in EMS development against which the management system must be judged. It is top management that is responsible for initiating the environmental policy and for providing resources and directions for others who may have the task to develop the final policy

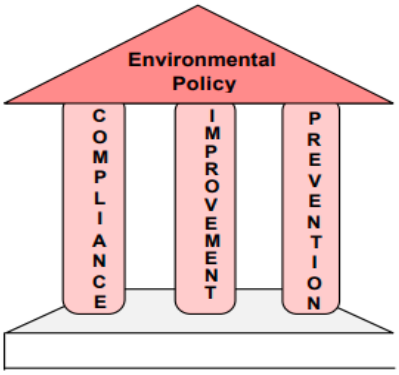
The policy should reflect the following issues:

• Reflect the moral and ethical basis for the organisation's action.
• Account for regulatory/self-imposed requirements.
• Stress commitment to continuous improvement.
• Provide coordination to other organisational policies.
• Provide attachments to requirements, internally and externally alike.
• Be appropriate to the organisation's products and services as they impact the environment.
• Be clear, concise and implemented at all levels of operations.
• Be publicly available.
• Strive toward prevention and continuous reduction of adverse environmental effects, thus supporting sustainable development.

- Set and allow for publication of environmental objectives and targets, improvement plans and management reviews.
- Satisfy the requirements of third parties concerned such as insurance organisations, banks, shareholders etc.
- Be updated and checked routinely

There are several things that need to be considered when an environmental policy is developed. The overall goal is to keep the policy as simple as possible. It is meant as a rough guideline, and how the objectives are met are dealt with in detail in the environmental programmes. The policy should nevertheless not be too general in nature. On the contrary it should reflect specific company characteristics and be related to the products and services the organisation offers. A good approach is always employee participation. If all employees have the chance to participate they will more likely identify with the policy. The policy can also be integrated into other documents that are part of other management systems (see section 7.3. "Integrated Management Systems, IMS"). Once the policy has been prepared it needs to be communicated to the employees and stakeholders of the organisation. Communicating the policy involves making it available to the public, which is compulsory for organisations that seek EMS certification.

The key areas the environmental policy has to cover according to ISO 14001 are:
• Compliance with environmental laws and regulations.
• Pollution prevention.
• Continuous improvement [ISO 14001, section 4.2 and Annex A 2].



Three Pillars of an Environmental Policy

Environmental Targets and Objectives

Both ISO 14001 and EMAS require the environmental policy to state a commitment to continuous improvement. This process can only be controlled by establishing a set of environmental targets and objectives. These targets and objectives can only be effective when they are specific enough to be audited,

"Objectives and targets help an organisation translate purpose into action" An attempt should be made to connect these goals with other existing strategic plans. This can help increase the effectiveness of an EMS and help integrate it into other management processes.
Whether or not the objectives and targets set are appropriate are the decision of the person responsible for implementing the EMS.

- Once the goals have been set it needs to be decided how they will be applied: organisation-wide or to individual units, departments or functions.
- In setting objectives, the environmental policy should be kept in mind. Significant environmental aspects, applicable legal and other requirements, the views of interested parties, technological options, and financial, operational and other organisational considerations should also be considered (see Figure 4.2).
- Environmental objectives are in most cases unique for every organisation. The objectives and targets should reflect what the individual organisation does, how well it is performing and what it wants to achieve [NSF International, 2001, p. 28]..
- Setting a time frame and monitoring the targets and objectives set is another important step in EMS implementation.

Therefore one will have to establish ways of measuring the progress in meeting the targets. This will help evaluate both the progress of implementation as well as document success.
Setting a time frame will help assess resource needs and increase the effectiveness of the EMS.
There are of course quite a few ways of actually setting environmental objectives and targets

There are of course a whole variety of issues to be kept in mind when developing environmental objectives and targets.

- First of all it is important to involve the people of the relevant areas in setting objectives, because they often know best what can be achieved and how.
- On the other hand support from top management is required because they are the ones who can supply the resources needed.

- Top management can also help integrate the environmental objectives set into other organisational goals.
- Once the objectives have been established they need to be communicated to the employees, who have to fully understand the objectives to be able to work towards achieving them.
- From time to time it should be checked whether the objectives are set according to the requirements of the environmental policy and that they are clear enough to be measured.
- At the same time they should be flexible enough to be able to be altered when necessary.

There are two types of environmental targets that can be set: environmental targets that are supposed to maintain the environmental performance and environmental targets that are supposed to improve the environmental performance. The number of targets should not be too large.

The objective should be specific, measurable, achievable, realistic, and time related

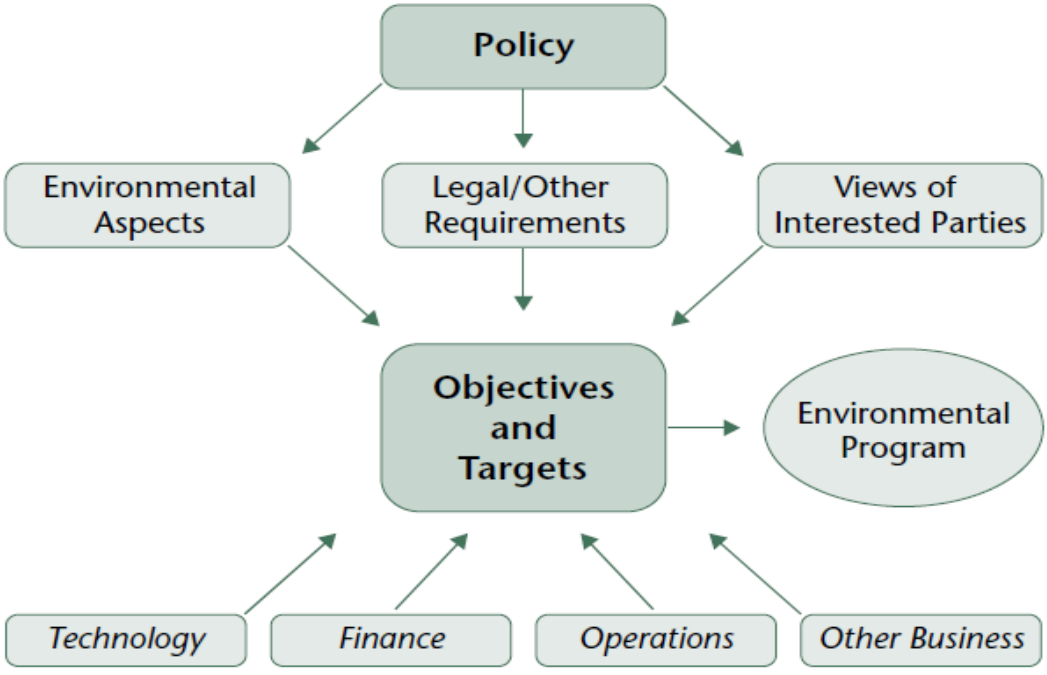


Figure *Environmental Objectives and Targets are Determined by Many Different Factors [NSF International, 2001, p. 28].*

Comparing Objectives and Targets - Some Examples

Objectives	Targets
Reduce energy usage	• Reduce electricity use by 10% in 2001 • Reduce natural gas use by 15% in 2001
Reduce usage of hazardous chemicals	• Eliminate use of CFCs by 2002 • Reduce use of high-VOC paints by 25%
Improve employee awareness of environmental issues	• Hold monthly awareness training courses • Train 100% of employees by end of year
Improve compliance with wastewater discharge permit limits	• Zero permit limit violations by the end of 2001

5 Developing an EMS

5.1. Developing an Environmental Management Programme

5.1.1. Developing an EMS

This chapter is the core of this book as it describes in detail the different steps of EMS implementation required by both EMAS and ISO 14001. Chapter 5 can be seen as step by step instructions on how to develop the key elements of an EMS and what needs to be kept in mind in the process. Figure 5.1 illustrates the EMS implementation process. Take this figure as a reference when working with this chapter, it is a useful map if one should get lost on the way.

All the companies presented in the case studies describe how their EMSs were implemented. They provide valuable information on how EMS implementation is done in practice.

An environmental management programme is a set of specific objectives and actions for improving the environmental performance of an organisation. It is a detailed work plan for putting an organisation's overall environmental goals, i.e. the environmental policy, into practice. According to ISO 14001 [European Committee for Standardization, 1996-08-21, section 4.3.4] the following needs to be included:

a) "Designation of responsibility for achieving objectives and targets at each relevant function and level of the organisation.
b) The means and time-frame by which they are to be achieved."

Again, the environmental management programme should be directly linked to an organisation's objectives and targets. It should be integrated into existing organisational structures such as financial management, purchasing, legal, operational and management information systems [NSF International, 2001. p. 32.]. It is especially important that development of the environmental management programme be given the same status as other programmes in the organisation. This would include input into issues such as:

- Access to capital.
- Choices in technology.
- Production procedures.
- Employee training.
- Emergency protocols [Martin, R. 1998, p. 37].

Main Contents of this Chapter

- How to structure an effective EMS and delegate responsibility.
- How to implement an EMS.
- The importance of appropriate training and how this is conducted.
- The significance and ways of communicating the EMS efforts to stakeholders.
- How an effective document control system is implemented.
- Why operational control is a key EMS element and how it works.
- The significance of emergency preparedness and response in an EMS and the best way of implementing a functional system.
- Importance of EMS evaluations
- How to conduct audits.
- How to do a management review.
- How and why environmental audits are performed.
- The traits a good auditor should possess and how organisations can find the right auditor.
- How an environmental statement (as required by EMAS) is developed.
- Why an environmental statement is also useful for ISO 14001 with regards to stakeholder interests.

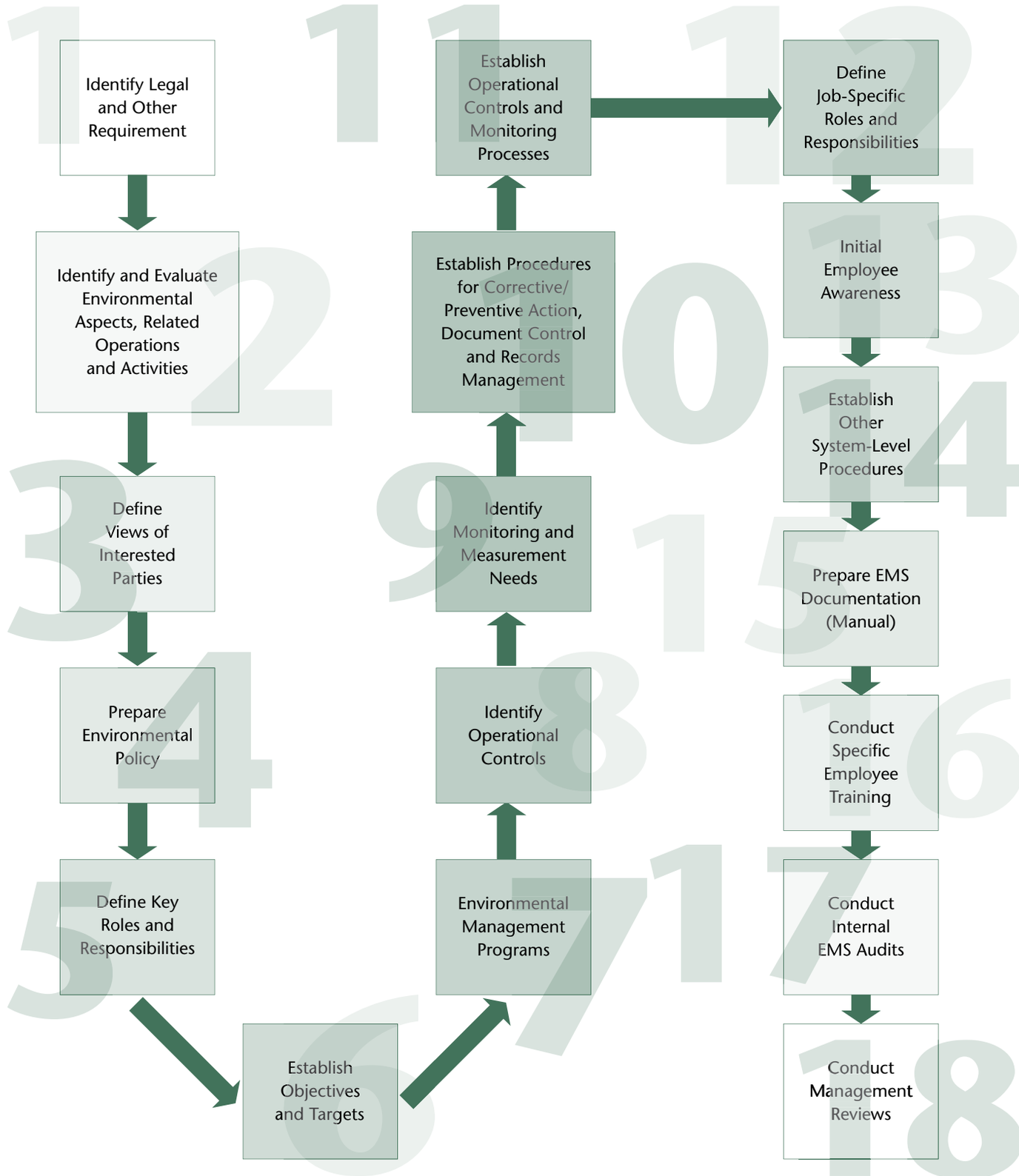


Figure 5.1 *Roadmap for EMS Development [NSF International, 2001, p. 78 (modified)].*

Organisations often find out in the process of EMS implementation that the existing management structures are not adequate to achieve the set targets and objectives. New structures then need to be developed. The best way to do this is to have the employees, in the specific department, participate. Those employees who are involved in establishing and maintaining the EMS may also be involved in this process.

Table 5.1 *How Various Functions Can Support an EMS [NSF International, 2001, p. 37].*

Functions	How They Can Help (Possible Roles)
Purchasing	Develop and implement controls for chemical/other material purchases.
Human Resources	Define competency requirements and job descriptions for various EMS roles. Train temporary workers and contractors; maintain training records. Integrate environmental management into reward, discipline and appraisal systems.
Maintenance	Implement preventive maintenance programme for key equipment. Support identification of environmental aspects.
Finance	Track data on environmental-related costs (such as resource, material and energy costs, waste disposal costs etc.). Prepare budgets for environmental management programmes. Evaluate economic feasibility of environmental projects.
Engineering	Consider environmental impacts of new or modified products and processes. Identify pollution prevention opportunities.
Top Management	Communicate importance of EMS throughout organisation. Provide necessary resources. Track and review EMS performance.
Quality	Support document control, records management and employee training efforts. Support integration of environmental and quality management systems.
Line Workers	Provide first-hand knowledge of environmental aspects of their operations. Support training for new employees

Environmental management programme developmental activities often lead to initiation of projects. These projects may lead to investments in new products, processes and equipment, which will eventually lead to a reduction of environmental effects, increased efficiency, and cost reduction. Potential for such projects might be identified during the initial review and be set as targets [Martin, R. 1998, p. 37].

Despite the complexity, an environmental management programme should be kept simple and understandable. Separate programmes can be developed for new products, processes or services, depending on the nature and scale of the activities of the organisation. All existing programmes must be reviewed on a regular basis to ensure their effectiveness, their main focus should always be on continuous improvement. Environmental programmes can be developed using Tool 27 🛠 *Environmental Programme Worksheet*, though this is just one suggestion.

5.1.2. Structure and Responsibility

For an EMS to be effective it is essential that individual roles and responsibilities be defined, as it is the individual employees of an organisation who will help achieve environmental objectives and targets. As EMS expert Raymond Martin puts it [1998, p. 39]: *"Top management must supply the necessary resources, both financial and staff, to ensure that the EMS is effectively implemented. They are also responsible for appointing a management representative (MR) to oversee the operation of the EMS. Supplying resources is one of the most important tasks of top management."*

The management representative:

- Ensures that the EMS is established and implemented as planned.
- Regularly reports on its performance.
- Works with others to modify and improve the EMS as needed.
- Coordinates actions and projects for the continuous improvement process [NSF International, 2001, p. 35].

Certain responsibilities need to be assigned right from the start. This could include the MR, an EMS coordinator who is in close touch with top management as well as a committee responsible for promoting and developing the EMS. Small companies may not have the resources to employ many people in environmental management. In such cases it may be practical for one person do all the tasks required.

To document all efforts made for EMS implementation, the organisational structure should be defined in writing. An organisational chart could be used as a tool (see Tool 28 🛠

Distributing Responsibilities). To get started the following questions can help determine the most suitable organisational structure for environmental management:

- What is the scope of the environmental management programme?
- What are significant environmental aspects and compliance needs?
- What are the results of previous audits or other assessments?
- What are the current responsibilities for environmental management?
- What are objectives and targets, including those related to compliance and pollution prevention?
- What quality management and/or other management systems exist? [NSF International, 2001, p. 35 et seq.]

Using flow charts to display already existing management activities can be very helpful in the course of EMS implementation. The system should be designed to be flexible, as environmental management needs will change over time. Once the roles and responsibilities are defined, they need to be communicated to the employees. A responsibility matrix can be found in the Toolkit (Tool 29 *Environmental Responsibilities Matrix*).

Table 5.1 shows how different functions within an organisation can take responsibilities within their field of activity in order to support the EMS. Note that virtually every section within an organisation has a certain responsibility towards the environment.

If it is difficult to identify each employee's personal environmental responsibilities and tasks. A good approach is for the employees to draft their tasks and responsibilities. The results of this survey can be compared to what management identified previously and weaknesses can be corrected. The opportunity should be used to review the individual perspectives of the current management structure and individual responsibilities. In many cases this process can lead to improvements in organisation structure and efficiency [Martin, R. 1998, p. 40 et seq.].

Figure 5.2 *An effective EMS requires effective communication, both with regard to content and means of distribution.*

5.1.3. Training, Awareness and Competence

EMS training is basically intended *"to explain the importance of the EMS to staff, and to explain their responsibilities for EMS operations"* [Martin, R. 1998, p. 48]. Adequate training is essential for employees and all levels of management to fully understand their responsibilities. Passive management support is often caused by management's ignorance about the EMS (see section 4.4). Executives need to understand both their own responsibilities and their employees' responsibilities [Martin, R. 1998, p. 48].

Training of all employees is very important because every employee:

- Can have potential impacts on the environment through his or her daily activities.
- Can be a useful resource for generating ideas about establishing operational control for a process, defining environmental aspects or defining structural responsibilities.

All staff members should be trained according to their specific environmental responsibilities. Too much training may confuse employees and is not cost-effective. Training should be carried out in direct relation to significant aspects, targets and objectives in the EMS. It needs to be made sure that all employees understand the potential consequences of not following the EMS, as well as the positive effects of following the EMS. If they do not have significant roles, the employees should at least be trained on EMS content and purpose. Training should be planned around existing meetings to keep the financial expenses for training as low as possible [NSF International, 2001, p. 39].

Training must take place when:

- New employees are hired.
- A change in job descriptions takes place.
- The corrective action process notes failure to follow instructions.
- New procedures are introduced or already existing procedures are altered.
- EMS aspects/objectives/targets have changed.
- New regulations are introduced.
- Job performance is unacceptable
  [Martin, R. 1998, p. 48].

Nevertheless, training is not the only means to achieve competence. Competence is typically based on a combination of education, training and experience. For those jobs that can

have significant environmental impact, criteria for measuring the competence of the employee performing this job should be established. These criteria should be as objective as possible. Competence can be assessed in an informal way by directly questioning employees that are involved in environmentally critical functions. They are the ones who can tell best how they perform in various aspects of their jobs (e.g. "Show me how you..."). Their responses can be used to determine whether or not they have the skills and understanding required to perform their job safely. This procedure can help assess further training needs [NSF International, 2001, p. 39 et seq.].

5.1.4. Training Programmes

Key Steps in Developing a Training Programme:

Step 1: Assessment of training needs & requirements.
Step 2: Defining training objectives.
Step 3: Selecting suitable methods and materials.
Step 4: Preparing training plan.
Step 5: Conducting training.
Step 6: Tracking of training (and maintaining records).
Step 7: Evaluating training effectiveness.
Step 8: Improving training programme (as needed)
[NSF International, 2001, p. 40].

The Toolkit includes examples of training plans and training planners (Tool 30 🛠, Tool 31 🛠, Tool 32 🛠 *Planner, Plan Operational Contarol and Awareness*).

In many cases, the planning of training does not need to be started from scratch. Many organisations may already have qualified staff on the basis of experience or previous training. Some training procedures may already exist. Developing a training programme for new employees may be very important to ensure safety and a working EMS. If temporary or contract workers are used in the organisation, their training needs may also have to be assessed. In some organisations, environmental awareness training can be included with existing safety training programmes [NSF International, 2001, p. 40]. The Toolkit includes samples of different types of training and training purposes (Tools 33 🏭 *Training Purposes*, Tool 34 ⓘ *Training and Workshop Methods*).

As the development of training programmes is a costly process it is advised to integrate EMS training into already existing training programmes or to present EMS information at other meetings, where in-depth training is not required. New employees, especially those with only little work experience require much more training than other employees. This represents a serious challenge for many organisations. A good way to solve this problem is to develop a "training package" for new employees. Video tapes of EMS training courses could be included in the package. The training needs of the environmental managers and trainers also needs to be considered. They also require regular training to be kept up-to-date with, for example, legislative development. Temporary or contract workers also need to be trained [NSF International, 2001, p. 40].

5.2. Communication

5.2.1. Internal and External Communication

Stakeholders usually show great interest in the environmental performance and management efforts of an organisation. An effective EMS requires this information to be communicated both internally and externally [NSF International, 2001, p. 43].

Internal communication is the communication within a facility or organisation that is directly related to the EMS. It is required to establish communications on and between all relevant levels of functions within the organisation. External communication is the communication between the organisation and interested parties outside the organisation. There are numerous benefits resulting from effective communications.

Internal communication will:

- Motivate the workforce.
- Gain acceptance for management's plans and efforts.
- Explain the environmental policy and the EMS and how they relate to the overall organisational vision.
- Ensure understanding of roles and expectations.
- Demonstrate management commitment.
- Monitor and evaluate performance.
- Identify potential system improvements
[NSF International, 2001, p. 43].

Effective **external communication** will:

- Demonstrate management's commitment to the environment.
- Make others aware of the organisation's environmental policy and commitment to environmental responsibility.
- Address concerns about the organisation's environmental activities by external parties.
- Announce the organisation's strategic environmental management approach.
- Establish a line of communication that clearly defines emergency responsibilities [Martin, R. 1998, p. 53].

Often, good external communications can avoid problems with regulatory agencies and non-governmental organisations (NGOs). Communication with these sources may even help in the process of setting aspects, objectives and targets.

5.2.2. Communication Systems

A good communications system includes flow of information top-down as well as bottom-up. This means that management needs to inform the employees as well as the employees need to inform management about environmental issues. A frictionless and quick flow of information is especially needed in emergency situations or when stakeholders urgently need information related to environmental risk. The release of contradictory or confusing information creates an atmosphere of mistrust and fear and is counter-productive towards EMS efforts [Martin, R. 1998, p. 52].

"Communication should be clear enough to leave no room for misinterpretation." [Martin, R. 1998, p. 53]. The communication work plan provided in the Toolkit (Tool 35 🛠 *Communication Work Plan*) is an example of how communication can be conducted systematically.

The following questions are of importance for communication efforts:

- Are processes established that apply for receiving and responding to concerns from internal and external interested parties that relate to environmental issues?
- How is the organisation's environmental policy and performance communicated (internally and externally), and are the results of environmental audits and other self-assessments included in this communication?
- Are environmental communications adequate to support the continuous improvement cycle? [Martin, R. 1998, p. 54]

There are certain issues that should be communicated by any organisation:

- Environmental policy and corporate profile.
- Established targets and objectives.
- Measurable environmental performance evaluation such as waste reduction figures, recycling efforts, energy savings etc.
- Identified environmental opportunities.
  and/or
- Independent verification of communicated results.
  [Martin, R. 1998, p. 54]

5.2.3. Stakeholders or Who is the Audience?

To successfully implement a communications system, the relevant audiences need to be determined. Once they have been identified, it has to be found out what these audiences need to know and how the information can be transmitted. Tool 36 🛠 *Identification of Stakeholders* gives an example on how these relevant audiences, the stakeholders, can be identified. Existing methods for communication can help to solve the problem. Table 5.2 gives examples of these methods [NSF International, 2001, p. 44].

Table 5.2 *Communication methods.*

Internal Methods	External Methods
newsletters	open houses
intranet	focus or advisory groups
staff meetings	website or e-mail list
bulletin boards	press releases
brown bag lunches	annual reports
training	advertising
	informal discussions

Communication should always be kept as simple, clear, concise and accurate as possible.

In the EMS development process it is more desirable to just fulfil the requirements by EMAS and ISO 14001. However, once an EMS has been successfully established, it can be very useful to extend the communications programme to other "softer" forms of communication such as open houses for interested parties, routine press releases concerning environmental activities, and sending environmental performance reports to the press and others [Martin, R. 1998, p. 53].

5.3. EMS Documentation

5.3.1. What Constitutes EMS Documentation?

EMS documentation consists of:

- The environmental policy.
- The organisational structure and key responsibilities.
- A description or summary of how an organisation satisfies EMS requirements (e.g. "How do we identify environmental aspects?" and "How do we control documents?" and "How do we comply with legal requirements?").
- System-level procedures (e.g. procedures for corrective actions).
- Activity or process-specific procedures/work instructions.
- Other EMS-related documents (such as emergency response plans, training plans, etc.)
  [NSF International, 2001, p. 48].

When undertaking a new activity like EMS development, documenting discussions, plans, targets, and programmes is crucial. Documentation ensures that no information is lost, and enables performance to be tracked. It ensures that the EMS is well understood and operating as designed. However, adequate information must be provided to the people doing the work. There also may be external parties that want to un-

derstand how the EMS is designed and implemented, such as customers, regulators, lending institutions, registrars and the public. For these reasons, the various processes that make up an EMS should be documented.

How an organisation interprets "documentation" will depend on the particular experience of the organisation. But generally it can be said that the documentation should include the environmental policy, an overview of the organisational structure and certain responsibilities and a description or summary of how EMS requirements are being satisfied within the organisation. Furthermore documentation should constitute system-level procedures such as procedures for corrective actions and activity or process-specific procedures as well as work instructions. Other EMS related documents may also be included, such as emergency response plans or training plans.

5.3.2. The EMS Manual

The EMS manual is a kind of a "road map" or description that shows how the different pieces of the EMS fit together. It is a very useful tool to keep an overview of the structure of the EMS. It can be seen as a series of explanations on the processes an organisation has to implement to be in conformity with the requirements of the specific EMS standard. It is not practical to have a single manual that contains the entire EMS documentation. Rather, a summary manual can be made that:

- Describes the core elements of the system (and how the elements relate to each other).
- Provides direction to related documentation.
  [NSF International, 2001, p. 47]

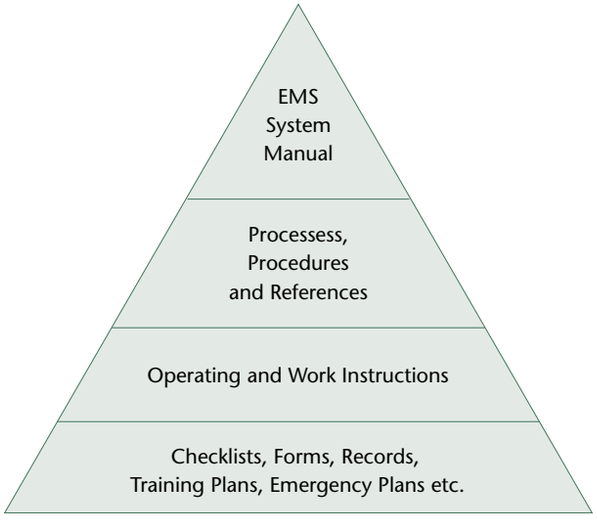


Figure 5.3 *Levels of Documentation [Adapted from US EPA, October 2000, p. 152].*

5.3.3. How to Develop Documentation – Four Steps

The preparation of EMS documentation consists of four basic steps:

1. Determining how EMS documentation can be integrated into existing documents.
2. Fitting the documentation to the organisation's needs.
3. Determining a standard format for all documents.
4. Prototyping each document [US EPA 2000, p. 148 et seq.].

The **first step** involves identifying existing documentation, what the purpose of this documentation is and whether it works the way it is supposed to. The aim of this first step is to locate the documentation that can be used as a starting point for EMS documentation. Already existing documents could be documents such as a quality plan or work safety instructions. Tool 37 🛠 *Documentation Sheet* is a sample documentation sheet.

Step two is meant to adapt the documentation on the one hand to what the EMS team desires and on the other hand to what the organisation is able to afford. These questions may help to determine what fits the needs of an organisation:

- How can those documents existing be extended rather than having to create new ones?
- Does the business operate in a single location or many? This will affect who creates some of the documents and where they are located. It may also affect how many versions of a document might be necessary to cover different circumstances.
- What is the organisation's current computer capability? Many organisations use an electronic system to maintain documents (i.e. a digital network/intranet documentation).
- What security precautions are needed? As a computer system becomes larger and can be accessed by more people, electronic information can more likely be edited and destroyed. Security, or at least restrictions on data access and data change rules, can be a critical issue for many organisations [US EPA 2000, p. 150].

The **third step** in the documentation development process is to ensure that all documents have the same format. This means that the document structure and page appearance should be standardized. If the organisation already has a standard style, that style should be used if possible. Once a consistent format has been developed it needs to be used by everyone. If the organisation uses electronic documentation (which saves paper) it is best to provide a sample format file. An advantage of having a standard is that all documents can more easily be identified as coming from the organisation. However, the main advantage is that documents are easier to read and understand when they are consistent.

Prototyping as required in **step four** means that before the relevant information is filled in, one has to visualize what will be needed in the document and create an outline for it. This practice can be applied as well to the entire EMS development process. The prototyping should be done by the people who will later use the documents. This way the documents will be closer to reality and more effective. The US EPA [October 2000, p.151] suggests the following questions to help the prototyping process:

- What is the document's purpose?
- Who will use it, and how will they use it?
- How long should the document be?
- What must be included in the document? Which information is most critical?
- Is it process-focused? Process-focus rather than regulation or programme-focus helps people who use the documents to better understand how their jobs fit into the rest of the actions of the organisation.
- How is the information best arranged? Will the user read sequentially or randomly?

Figure 5.3 illustrates how documentation as a whole is organised. The EMS system manual at the top of the pyramid is quite general and not very detailed, but degree of specificity, amount of detail and number of pages increase from the top to the bottom of the pyramid.

5.3.4. Document Control

An organisation's staff are not able to consistently perform their jobs in the right way unless they are provided with the proper tools. These tools include all EMS related documents, such as the environmental policy, objectives and targets, information about roles responsibilities and authorities, a description of the EMS, procedures on the system-level and process or activity-level, and emergency response plans. Without a mechanism to manage these EMS documents, an organisation cannot be sure that people are working with the right documents.

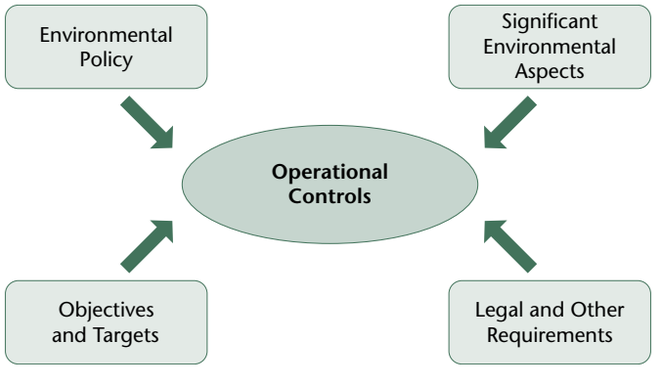


Figure 5.4 *Influences on Operational Controls [NSF International, 2001, p. 53].*

To ensure that everyone is working with the proper EMS documents, every organisation should have a procedure that describes how such documents are controlled. Implementation of this procedure should ensure that:

- EMS documents can be located.
- They are periodically reviewed.
- Current versions are available where needed.
- Obsolete documents are removed
  [NSF International, 2001, p. 50].

It has also to be made clear who has the responsibility for preparing documents, making changes to documents and keeping them up-to-date. Document control should address certain issues such as preparation, distribution, revision, periodic review and removal of documents that have become obsolete. These responsibilities have to be distributed clearly if the documentation system is supposed to function effectively.

The procedure should generally be kept as simple as possible. For larger organisations these document control processes are usually more complex while small organisations use simpler processes.

Limiting the distribution of documents can help. It should be determined how many copies are needed and where they should be kept for ease of access. Using a paperless system can be considered if the people who need access to documents are connected to a local area network (LAN) or have access to the organisation's internal website. Such systems can greatly help controlling and reviewing documents. There are also various commercial software packages that can simplify the document control effort. Another good idea is to prepare a document control index that shows all of the organisation's EMS documents and the history of their revision. This index should be included in the manual. If multiple paper copies exist, a distribution list can be prepared that shows where each copy is located. Changes in documents should be highlighted after revision to make the changes visible to readers [NSF International, 2001, p. 51].

5.4. Operational Control

5.4.1. Identify Existing Controls

Operational controls are required to control significant environmental aspects and impacts, but also to keep track of legal and other requirements, objectives and targets as well as environmental policy, as illustrated in Figure 5.4. Some of these aspects may already be controlled before the EMS is implemented. The first step is to identify those aspects that already

Figure 5.5 Emergency preparedness. *This sign announces the location of a fire extinguisher.*

have operational controls as well as those that still require them. Operational controls that may already exist could, for example, be procedures for compliance with environmental and health and safety regulations [US EPA 2000, p. 119]. A chart should be made to keep track of the activities where control procedures are needed. Tool 38 🛠 *Operational Control* is an example of such a chart.

Documented procedures can help an organisation to manage its significant environmental aspects, ensure regulatory compliance and achieve environmental objectives. There are certain activities that require specific documented instructions because of their high potential of resulting in non-conformance or their high risk of environmental impact. Determining which operations should be covered by documented procedures and how those operations should be controlled is a critical step in designing an effective EMS. It has to be kept in mind that operational controls might even be necessary for managing significant aspects or legal requirements that have no established legal targets or objectives. In determining which operations and activities need to be controlled, it is necessary to look beyond routine production or service. Activities such as equipment maintenance, management of on-site contractors, and services provided by suppliers or vendors can significantly affect an organisation's environmental performance.

5.4.2. How to Identify Procedures to be Controlled

The process of identifying the procedures that need to be documented is best started by looking at the environmental aspects and legal requirements that have already been identified. Then, the operations related to these aspects and legal requirements must be identified and the controls necessary to manage these need to be considered. Flow charts that are available or can easily be developed may simplify the identification of the process steps where some type of control might be appropriate. The preparation of draft procedures may ensure that they are appropriate, realistic and practical.

Following are a few hints for writing procedures. The existing process needs to be understood. Starting with a flow chart, if one is available, can be very useful. Where possible, it should be built on informal procedures.

- It should be focused on steps needed for consistent implementation.
- A consistent format and approach should be used.
- Draft procedures need to be reviewed with employees that will have to implement them. (Better yet: enlisting employees to help write them.)
- Keeping procedures simple and concise is very important. Excessive detail does not necessarily provide better control and may confuse the user.
  [NSF International, 2001, p. 54]

Note that the draft procedures need to prepared and reviewed with the people who will be implementing them. It is often the case that the reviewers come up with a simpler way to achieve the same results.

5.5. Emergency Preparedness and Response

To prevent or to at least minimize the impacts of uncontrolled events, an emergency preparedness and response programme should be established. Such a system can "reduce injuries, prevent or minimize environmental impacts, protect employees and neighbours, reduce asset losses and minimize downtime" [NSF International, 2001, p. 57]. There are of course also financial implications as accidents can be much more costly than the implementation of an emergency preparedness and response programme. Tool 39 🏭 *Checklist: Emergency and Response* is an emergency preparedness and response checklist.

To be effective the programme needs to include provisions for:

- Assessing the potential for accidents and emergencies.
- Preventing incidents and their associated environmental impacts.
- Plans/procedures for responding to incidents.
- Periodic testing of emergency plans/procedures.
- Mitigating impacts associated with these incidents [NSF International, 2001, p. 57].

To ensure continuous improvement it is important to review an organisation's emergency response performance after an incident has occurred. This is helpful for assessing where incidents are most likely to occur and how they may be prevented in the future. If performance is poor, emergency plans and procedures will have to be reviewed.

Many organisations overlook two important steps in EMS development: identification of potential accidents and emergencies, and how the impacts of such incidents can be mitigated. This problem can be solved by creating a team made up of staff from all the relevant departments. The staff can identify

potential emergencies by asking "what if" questions related to their activities. This team should consider both normal and abnormal situations.

Every staff member has to know what to do in case of an emergency. Useful procedures for insuring this are mock drills and the posting of emergency plans around the site. Feedback from staff may help to improve the procedures [NSF International, 2001, p. 57 et seq.].

5.6. Checking and Corrective Action

5.6.1. Performing Environmental Audits

Both EMAS and ISO 14001 require organisations to carry out an environmental management system audit. This means that an organisation must check to see whether its environmental management system fulfils the specified requirements.

It is important to distinguish EMS audits from other forms of auditing. EMS audits are often more complex than other audits, such as legal compliance audits or quality management audits. EMS audits often combine elements of the other types of audits. This of course requires highly qualified auditors (see below).

They can often be well combined with other audits such as regulatory compliance audits, health and safety audits, quality management system audits, etc. A combined environmental compliance audit and EMS audit makes the most sense. The requirements of ISO 14001 do not require compliance with regulations, but they do require the commitment to compliance and routine monitoring of the compliance status. As a result, compliance is more closely related to EMS auditing than quality auditing [Martin, R. 1998, p. 81].

Two important aspects of auditing are the subject matter of the audit and the audit criteria. The subject matter of an audit is whatever is being audited, e.g. conformance with environmental objectives or compliance with environmental legislation. The audit criteria are policies, guidelines, standards or other requirements against which the subject matter of the audit is being checked. As Starkey and Andersson [1998, p. 69] put it, *"An environmental audit seeks to determine whether or not the audit subject matter conforms with the audit criteria."*

For example, the audit criteria of a legislative compliance audit would be the applicable environmental legislation while the subject matter of the audit would be the environmental activities and conditions covered by legislation. For an EMS audit the audit criteria would be the EMAS or ISO 14001 requirements while the subject matter of the audit would be the EMS of the organisation.

The basic intent of auditing is to provide management with information that can be used to make better decisions. Auditing is usually carried out by external contractors as it may be difficult for in-house staff to be critical and objective. However, employees could perhaps audit each other's department. To increase audit effectiveness internal and external auditors can cooperate. In this context it is "essential to develop procedures that clarify audit scope, audit frequency, auditor qualifications, reporting requirements, and follow-up". Two major objectives should be expected from an audit:

- The determination of compliance with the environmental management system as outlined by the objectives and targets, aspects, environmental management programme, the environmental manual, procedures, and work instructions, and to check for effective implementation of them all.
- Determine if the system is effective in achieving the expectations of the policy [Martin, R. 1998, p. 83].

Auditing should take place regularly (see section 7.1). This is particularly important in small organisations because there we often find that staff are not aware of bad habits and problems because they are so tightly involved in the work. Audit results should be incorporated as quickly as possible in the corrective and preventive action process. It is often recommended to perform audits annually. The actual audit frequency can be determined by:

Table 5.3 *Different Audit Situations [Starkey and Andersson, 1998, p. 71].*

Situation	Auditee	Audit Team	Client	Audit Description
An organisation (C) undertaking routine internal audits	C	C	C	Internal, first party
A retailer (R) undertaking audits of a supplier (S) using its own auditing staff	S	R	R	External, second party
An organisation (C) commissioning audits of a waste contractor (W) by an auditing organisation (A)	W	A	C	External, third party
A certification body (B) auditing the EMS of an organisation (C) seeking certification to ISO 14001	C	B	C	External, third party

- The nature of the organisation's operations and activities.
- The significant environmental aspects/impacts (which were identified earlier).
- The results of monitoring processes.
- The results of previous audits.

Tools 40 🛠 *Internal Environmental Audit Plan* and 41 🛠 *Checklist: Internal Environmental Audit* are checklists and audit procedure templates for an internal auditor.

The last step in auditing involves determining whether or not the audit subject matter conforms with the audit criteria. This is done by collecting the audit evidence, which means verifiable information and records or statements of fact. It is important to be aware that auditors can only use existing information, they never generate information themselves. Audits can only take place if enough audit evidence is available

5.6.2. The Auditing Teams

The people involved in an audit are:

- **Auditee** (the organisation to be audited).
- **Audit team** (the group of auditors, or a single auditor designated to perform a given audit. The leader of the team is known as the lead auditor).

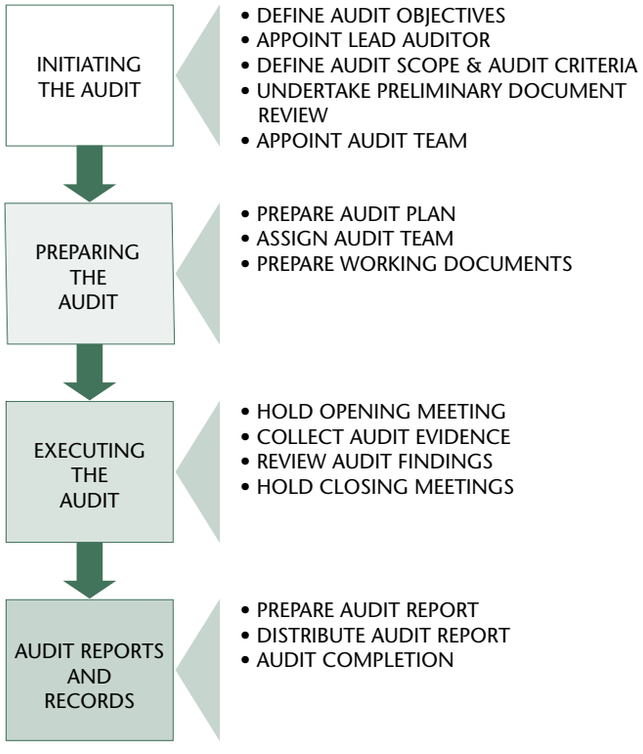


Figure 5.6 *The Four Stages of EMS Auditing [Starkey and Andersson, 1998, p. 73].*

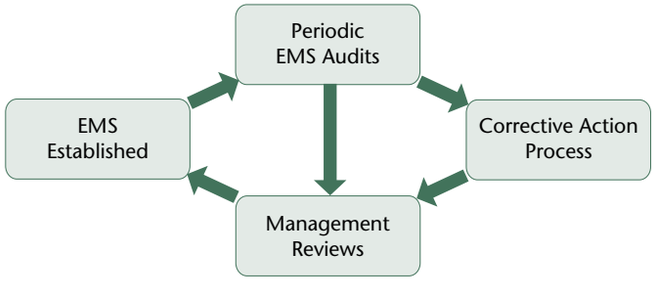


Figure 5.7 *Linkage Among EMS Audits, Corrective Action and Management Reviews [NSF International, 2001, p. 73].*

- **Client** (the organisation in which the audit is performed), [Starkey, R. and Andersson, I. 1998, p. 71].

The audit team should be selected by the organisation itself. If there are no resources available for this inside the organisation, external training may be required. If an organisation is already certified according to ISO 9001, it may be feasible to use the quality auditors for the EMS audits, as they already possess many of the skills required.

Table 5.3 shows how the above terms apply in different situations.

Auditing an EMS is a very complex process and therefore it is useful to divide the process into different audit stages, as illustrated in Figure 5.6.

Tool 42 ⓘ *Internal Environmental Audit Procedure Template* provides more information about how to carry out an audit and Tool 43 🛠 *Internal Environmental Audit Report* is a blank sheet for audit reporting.

There are several aspects of EMS audits that need to be considered. The auditing team needs to resist the temptation to evaluate why certain non-conformances have occurred. Auditing involves only collecting facts. Evaluation comes later. Nevertheless, in the audit process an auditor should discuss with employees any deficiencies detected. This verifies the audit findings and raises the awareness of employees about EMS requirements. If an organisation is using internal auditors (which is usually not recommended, see above), at least two people should be trained. An auditing team usually performs better than a single auditor, and some flexibility is provided if one of the auditors has a schedule conflict. If prior notice of an audit is not given, employees may feel intimidated and confusion may be created. Therefore, it is important to communicate the audit scope, criteria, schedule and other relevant information to the employees concerned. Audits are meant as a check on how well an EMS meets EMAS, ISO 14001, or local requirements. It is not an assessment of how well employees perform their job. Audits should be judged according to the quality of the findings and not the quantity.

Figure 5.7 illustrates how EMS audits are linked to other key elements of the continuous improvement process. Note that without periodic EMS audits there is no corrective action nor management review.

5.6.3. Traits of a Good Auditor

A good auditor needs to be independent of the activity audited. As NSF International [2001, p. 72] notes, an auditor should be *"objective, impartial, tactful and attentive to detail."* As well, to conduct an audit effectively, an auditor must be well informed and prepared.

Whether or not internal or third party auditors are used, they should also possess the qualifications outlined in ISO 14012, which was replaced by ISO 19011 in the year 2002:

- Expertise in environmental science and technology.
- Expertise in the technical and environmental aspects of facilities operations.
- Expertise in environmental law, regulations.
- Expertise in environmental management systems.
- Expertise in EMS auditing techniques [ISO 14012:1996].

These qualifications are essential. An auditor should be registered with a recognized environmental auditor certification scheme. However, ISO does not require that individuals working as auditors for ISO 14001 registrars have to be certified.

Without the above areas of expertise, an EMS audit will not provide the information needed to make improvements. Auditors who have a great amount of experience with quality management system audits or legal compliance audits may not be able to perform an EMS audit if they lack the necessary technical background.

5.6.4. Monitoring, Measurement and Evaluation

NSF International [2001, p. 60] summarized the importance of monitoring and measurement as follows:

"An EMS without effective monitoring and measurement processes is like driving at night without the headlights on – you know that you are moving but you can't tell where you are going! Monitoring and measurement enables an organisation to:

- Evaluate environmental performance.
- Analyse root causes of problems.
- Assess compliance with legal requirements.
- Identify areas requiring corrective action.
- Improve performance and increase efficiency.

In short, monitoring helps you manage your organisation better. Pollution prevention and other strategic opportunities are identified more readily when current and reliable data is available."

The next step required in EMS development after the implementation of the environmental policy is measuring the environmental impacts of an organisation. This can be achieved by establishing an environmental inventory. Accurate measuring can only be done when all equipment for monitoring and measuring works accurately and is regularly calibrated. The inventory also includes information about the status of legal compliance. Another issue worth including in this initial collection of data is information about the financial consequences of environmental protection [Sturm with Upasena, 1998, p. 42].

Another key step in the monitoring process is to evaluate the environmental performance of an organisation. This is done by assessing the environmental performance against the objectives and targets that were set in the environmental policy as well as against environmental legislative requirements the organisation is subject to. In this context it is important to develop well structured procedures for monitoring and measuring. NSF International [2001, p. 60] suggests organisations develop procedures to:

- Monitor key characteristics of operations and activities that can have significant environmental impacts and/or compliance consequences.
- Track performance (including progress in achieving objectives and targets).
- Calibrate and maintain monitoring equipment.
- Periodically evaluate compliance with applicable laws and regulations through internal audits.

Monitoring and measuring is a costly activity, and applying these procedures may help to decrease the costs. Further, only relevant data should be collected, and not data already collected in other contexts, e.g. regulatory compliance. It may be possible to start with simple monitoring and measuring processes that can be expanded as experience is gained and the EMS grows more complex.

5.6.5. Management Review

The management review process in ISO 14001 is basically the same as the internal environmental audit for EMAS. It is a key to continuous improvement and determines whether the system is alive, effective and in daily use. By performing a review, management shows its interest in the system and makes employees aware that it is serious about using the system to improve the environmental performance of the organisation. Management itself determines the intervals in which it performs reviews. Generally, the scope of the review should be comprehensive, though not all elements of an EMS need to be reviewed at once.

Management reviews are an opportunity to make decisions on keeping an EMS cost-effective and efficient. It may turn out that some processes initially put in place are not needed to achieve the objectives and target or to control key processes. Such processes can be eliminated. One of the main objectives of a management review is to assess whether or not employees have been following the guidelines and procedures intended to be implemented for the EMS. In this context it should be considered whether or not the environmental aspects the employees are dealing with are still appropriate. The second main objective of the management review is assessment of the appropriateness of environmental targets and objectives, as well as indicators of environmental performance, which often become obsolete due to, e.g., changing legislative requirements, new stakeholder demands or market pressures. Furthermore the management review needs to determine whether the environmental targets and objectives are being met and whether the financial resources are adequate for supporting the EMS. Other objectives of the management review are to:

- Review regulatory compliance and to determine the causes of non-compliance.
- Determine whether or not operational controls, procedures, corrective actions, preventive measures and continuous improvement efforts were able to improve the environmental performance of the organisation.
- Determine process improvements due to EMS measures.
- Determine if there is operational areas existing that could possibly be improved with EMS measures.
- State corrective action and preventive measures to deal with the non-conformances identified in the review, and to verify that the corrective actions taken were appropriate [Martin, R. 1998, pp. 86-87].

5.6.6. Management Review: Questions to Ask

When conducting a management review the following questions are worth asking in order to achieve satisfying results:

- Were the objectives and targets achieved? If not, why not? Should the objectives be modified?
- Is the environmental policy still relevant to what is being done?
- Are roles and responsibilities clear, do they make sense and are they communicated effectively?
- Are resources being applied appropriately?
- Are the procedures clear and adequate? Are other controls needed? Should some of them be eliminated?
- Are problems being fixed when they are found?

Table 5.4 *Stakeholders Who May Require Environmental Information.*

Stakeholders	Reasons for wanting environmental information
Employees	• To satisfy themselves that their employer is responsible, and that any environmental or health risks are being managed effectively. • To assess how their work has contributed to overall environmental performance. • To understand the business reasons for any environmental actions and how such actions may affect their jobs.
Local communities	• To understand how the organisation's operations affect the local area's air, land and water quality. • To know that there are processes and programmes in place to manage environmental risks and impacts.
Regulators	• To establish what the organisation is doing to manage and improve environmental performance.
Customers	• To assess the suitability of the organisation as a potential supplier. • To compare the organisation's performance to that of alternative suppliers. • To be informed of possible risks/liabilities • To be informed of the environmental impacts associated with products or services.
Suppliers	• To understand its customer's approach to environmental management.
The financial community	• To assess environmental risk in order to make informed decisions on insurance, lending and investment.
Environmental campaigners	• To identify examples of best practice. • To benchmark environmental performance.

- Is the EMS being monitored (e.g., via system audits)? What do the results of those audits tell?
- What effects have changes in materials, products, or services had on the EMS and its effectiveness?
- Do changes in laws or regulations require changes to some of the approaches?
- What other changes are coming in the near term? What impacts (if any) will these have on the EMS?
- What stakeholder concerns have been raised since the last review? How are concerns being addressed?
- Is there a better way? What can be done to improve?" [NSF International, 2001, p. 76].

Tool 44 🛠 *Non-Compliance and Correction Report* can be used to learn how a management review can be conducted to ensure continuous improvement.

5.7. Development of an Environmental Statement

5.7.1. What is an Environmental Statement?

There is considerable evidence that an informed public has a strong influence on the environmental performance of industrial enterprises, through a variety of mechanisms including market forces, social pressures and support for improved regulatory controls. ISO 14001 does not include specific requirements for the disclosure or publication of environmental performance measures or audit results, although other EMS models (e.g. EMAS) do have some such requirements.

An environmental statement is a document which an organisation produces to inform stakeholders about its environmental activities. It is generally accepted that environmental statements are: stand-alone printed documents, annual publications, normally voluntary undertakings, the principal vehicle for company communication on the environment, and should be a fair and credible reflection of the organisation's environmental activities.

Figure 5.8 *Collage of different environmental statements.*

This step is only required when implementing an EMS according to EMAS. It is a way for an organisation to make information on its environmental performance publicly available. EMAS puts great emphasis on delivering information about an organisation's environmental activities to the public. The environmental statement can be used to communicate success, problems and objectives in the field of environmental management. Furthermore it can also be used to:

- Motivate employees to get actively involved in environmental protection measures.
- Document environmental activities and performance.
- Reinforce commitment to the on-going implementation of environmental management.
- Monitor success.
- Aid planning.

EMAS requires this statement to be:

- Examined and validated by an accredited environmental verifier.
- Published only once it has been validated.
- Published in accordance with the audit cycle, that is once every year [EMAS, Annex III point 3.2].

5.7.2. The Drivers for Environmental Reporting – Stakeholder Demands

Calls for environmental reporting of organisations have been around for some time. As early as 1991, the International Chamber of Commerce (ICC) called on organisations to report on their environmental management activities in its ICC Business Charter for Sustainable Development.

Today, employees, customers and neighbours, in addition to environmental pressure groups demand more transparency regarding pollution caused by organisations and their products and about measures taken to reduce or avoid pollution. This means that active communication about environmental issues has become increasingly important in recent years.

Reporting mainly aims at measuring environmental performance, conducting regular environmental audits and assessments of compliance with organisation requirements, and periodically providing appropriate information to, where relevant, the board of directors, shareholders, employees, the authorities and the public.

Table 5.4 lists some of the various stakeholders that may require environmental information regarding an organisation and the reasons they require such information. This demand for information can often be met by the publication of an environmental statement.

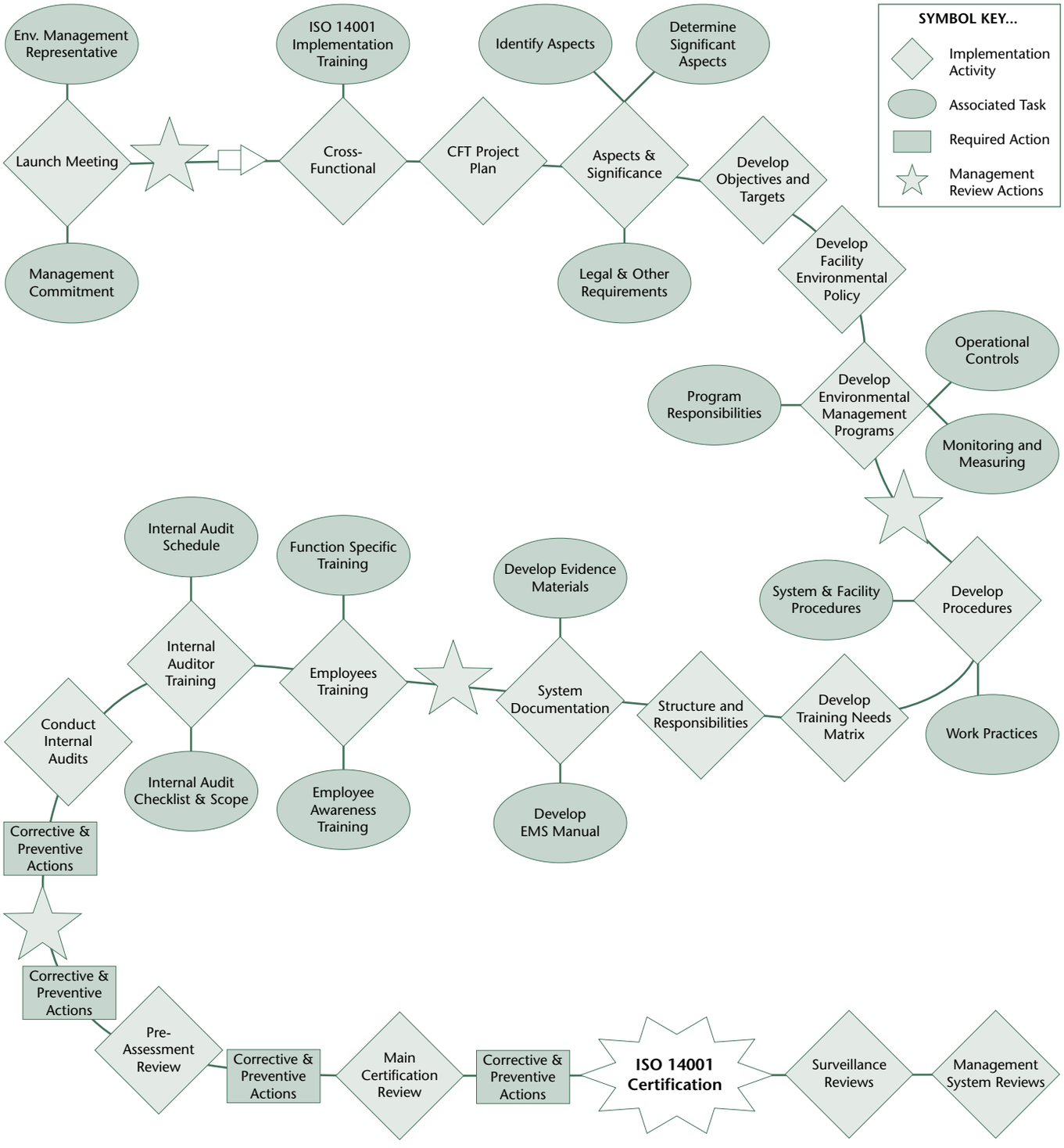


Figure 5.9 *EMS Development and Implementation*
[North Carolina Division of Polution Prevention and Environmental Assistance. (PPP) June 2000. (modified)].

Producing an environmental statement involves the following six steps. Refer also to Tool 45 ⓘ *Environmental Statement*, which describes the information that should be included in an environmental statement.

- Description of the organisation's activities at the site considered.
- Assessment of all the significant environmental issues of relevance to the activities concerned.
- Summary of figures on emissions, waste generation, consumption of raw material, energy and water, noise and other significant environmental aspects.
- Other factors regarding environmental performance.
- Presentation of the environmental policy, programme and management system of the organisation.
- Deadline set for the next statement.
- The name of the accredited environmental verifier [Iandoli, C. and Cozzolino, M. 1999].

This section discussed the different stages that EMS development involves. Figure 5.1, Roadmap for EMS Development, illustrates these stages. Figure 5.9 provides another example (see also Tool 46 *EMS Development and Implementation).* These are two of several ways of visualizing the EMS implementation process. Implementing an EMS is not the end of the EMS development process. It is just the beginning. Chapter 6 explains how official recognition can be achieved for both EMAS and ISO 14001, and chapter 7 turns to what comes after implementation.

Study Questions

1. What is an environmental management programme and how should it be related to the environmental policy and other management programmes?
2. Which is the most important task of top management? Why is it important to designate responsibilities clearly?
3. When does training have to be carried out?
4. Do you believe training helps raise awareness? Or do you agree with people who say that most employees not directly involved with the EMS don't really care about the EMS and become annoyed with training? What would you do to try motivate employees to participate in the EMS?
5. What is meant by internal and external communication?
6. What measures could be taken in your opinion to make information flow quickly between top management and the employees? What could be done to prevent misinterpretation? Do you agree with the statement made in the text that internal communication can help motivate the workforce?
7. How can effective documentation be developed?
8. What could be some negative results of bad EMS documentation? Do you think the risk of employees manipulating EMS documents to make their department look better does exist? Explain. How could manipulation be prevented?
9. What could the results be of a badly controlled EMS documentation? Can you see a paperless system come into existence in the near future
10. In which way can operational controls help control environmental aspects and impacts? Are there limitations to their effectiveness?
11. Are there other negative impacts than financial impacts connected to bad emergency preparedness and response? What can external results be?
12. What is an environmental audit and what can be achieved from it?
13. Do you believe that internal auditors ever can be objective? Under which circumstances would this be so?
14. Is monitoring the same as auditing?
15. How does the effectiveness of a management review depend in the employees' will to cooperate?
16. Are there reasons for developing an environmental statement for companies certified according to ISO 14001? Do you agree that the environmental statement is a very important element of the EMS development process? Or would you rather say that there must have been reasons for ISO not including this requirement into the ISO 14001 standard?

Internet Resources

Implementing an Environmental Management System

http://www.inem.org/new_toolkit/comm/environment/emas/toolkit/toolkit_8.htm

Ford Motor Company
– Environmental Management System Workbook

http://www.p2pays.org/ref/08/07378.htm

What is an environmental management programme?

http://www.inem.org/new_toolkit/comm/environment/emas/toolkit/toolkit_7.htm

How to control and monitor environmental performance

http://www.inem.org/new_toolkit/comm/environment/emas/toolkit/toolkit_15.htm

What is a management review?

http://www.inem.org/new_toolkit/comm/environment/emas/toolkit/toolkit_20.htm

Auditnet

http://www.auditnet.org

What is an environmental statement?

http://www.inem.org/new_toolkit/comm/environment/emas/toolkit/toolkit_21.htm

The Environmental Statement Library

http://europa.eu.int/comm/environment/emas/es_library/library_en.htm