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

*Systèmes de management environnemental — Lignes directrices
générales concernant les principes, les systèmes et les techniques de
mise en œuvre*



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Contents

Page

1	Scope	1
2	Normative references	1
3	Definitions	1
4	Environmental management system (EMS) principles and elements	3
4.1	Commitment and policy	4
4.1.1	General	4
4.1.2	Top management commitment and leadership	4
4.1.3	Initial environmental review	5
4.1.4	Environmental policy	6
4.2	Planning	7
4.2.1	General	7
4.2.2	Identification of environmental aspects and evaluation of associated environmental impacts	7
4.2.3	Legal and other requirements	9
4.2.4	Internal performance criteria	10
4.2.5	Environmental objectives and targets	11
4.2.6	Environmental management programme(s)	12
4.3	Implementation	13
4.3.1	General	13
4.3.2	Ensuring capability	14
4.3.2.1	Resources — Human, physical and financial	14
4.3.2.2	EMS alignment and integration	14
4.3.2.3	Accountability and responsibility	15
4.3.2.4	Environmental awareness and motivation	16

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4.3.2.5	Knowledge, skills and training	17
4.3.3	Support action	18
4.3.3.1	Communication and reporting	18
4.3.3.2	EMS documentation	19
4.3.3.3	Operational control	20
4.3.3.4	Emergency preparedness and response	20
4.4	Measurement and evaluation	21
4.4.1	General	21
4.4.2	Measuring and monitoring (ongoing performance)	21
4.4.3	Corrective and preventive action	22
4.4.4	EMS records and information management	22
4.4.5	Audits of the environmental management system	22
4.5	Review and improvement	23
4.5.1	General	23
4.5.2	Review of the environmental management system	23
4.5.3	Continual improvement	23
Annexes		
A	Examples of international environmental guiding principles...	25
A.1	The Rio Declaration on Environment and Development	25
A.2	International Chamber of Commerce (ICC) Business Charter for Sustainable Development	28
B	Bibliography	31

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 14004 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 1, *Environmental management systems*.

Annexes A and B of this International Standard are for information only.

Introduction

0.1 Overview

As concern grows for maintaining and improving the quality of the environment and protecting human health, organizations of all sizes are increasingly turning their attention to the potential environmental impacts of their activities, products or services. The environmental performance of an organization is of increasing importance to internal and external interested parties. Achieving sound environmental performance requires organizational commitment to a systematic approach and to continual improvement of the environmental management system (EMS).

The general purpose of this International Standard is to provide assistance to organizations implementing or improving an EMS. It is consistent with the concept of sustainable development and is compatible with diverse cultural, social and organizational frameworks.

It should be noted that only ISO 14001 contains requirements that may be objectively audited for certification/registration purposes or for self-declaration purposes. Alternatively, this International Standard includes examples, descriptions and options that aid both in the implementation of an EMS and in strengthening its relation to the overall management of the organization.

An EMS provides order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibilities, and ongoing evaluation of practices, procedures and processes.

This International Standard considers the elements of an EMS and provides practical advice on implementing or enhancing such a system. It also provides organizations with advice on how to effectively initiate, improve or sustain an environmental management system. Such a system is essential to an organization's ability to anticipate and meet its environmental objectives and to ensure ongoing compliance with national and/or international requirements.

Environmental management is an integral part of an organization's overall management system. The design of an EMS is an ongoing and interactive process. The structure, responsibilities, practices, procedures, processes and resources for implementing environmental policies, objectives and targets can be coordinated with existing efforts in other areas (e.g. operations, finance, quality, occupational health and safety).

Key principles for managers implementing or enhancing an environmental management system include, but are not limited to, the following.

- Recognize that environmental management is among the highest corporate priorities.

- Establish and maintain communication with internal and external interested parties.
- Determine the legislative requirements and environmental aspects associated with the organization's activities, products or services.
- Develop management and employee commitment to the protection of the environment, with clear assignment of accountability and responsibility.
- Encourage environmental planning throughout the product or process life cycle.
- Establish a process for achieving targeted performance levels.
- Provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an ongoing basis.
- Evaluate environmental performance against the organization's environmental policy, objectives and targets and seek improvement where appropriate.
- Establish a management process to audit and review the EMS and to identify opportunities for improvement of the system and resulting environmental performance.
- Encourage contractors and suppliers to establish an EMS.

Organizations can consider the following different uses of the EMS International Standards.

- Using ISO 14001:1996, *Environmental management systems — Specification with guidance for use* to achieve third-party certification/registration, or self-declaration of an organization's EMS.
- Using this International Standard, or parts of it, to initiate and/or improve its EMS. It is not intended for certification/registration purposes.
- Using this International Standard as a guideline or ISO 14001 as a specification for second-party recognition between contracting parties, which may be suitable for some business relationships.
- Using related ISO documents.

The choice will depend on factors such as:

- organization policy;
- level of maturity of the organization: whether systematic management that can facilitate the introduction of systematic environmental management is already in place;
- possible advantages and disadvantages, influenced by such things as market position, existing reputation and external relations;
- size of the organization.

This International Standard can be used by organizations of any size. Nonetheless, the importance of small and medium-sized enterprises (SMEs) is being increasingly recognized by governments and business. This International Standard acknowledges and accommodates the needs of SMEs.

0.2 Benefits of having an environmental management system

An organization should implement an effective environmental management system in order to help protect human health and the environment from the potential impacts of its activities, products or services; and to assist in maintaining and improving the quality of the environment.

Having an EMS can help an organization provide confidence to its interested parties that

- a management commitment exists to meet the provisions of its policy, objectives, and targets;
- emphasis is placed on prevention rather than corrective action;
- evidence of reasonable care and regulatory compliance can be provided; and
- the systems design incorporates the process of continual improvement.

An organization whose management system incorporates an EMS has a framework to balance and integrate economic and environmental interests. An organization that has implemented an EMS can achieve significant competitive advantages.

Economic benefits can be gained from implementing an environmental management system. These should be identified in order to demonstrate to interested parties, especially shareholders, the value to the organization of good environmental management. It also provides the organization with the opportunity to link environmental objectives and targets with specific financial outcomes and thus to ensure that resources are made available where they provide the most benefit in both financial and environmental terms.

The potential benefits associated with an effective EMS include

- assuring customers of commitment to demonstrable environmental management;
- maintaining good public/community relations;
- satisfying investor criteria and improving access to capital;
- obtaining insurance at reasonable cost;
- enhancing image and market share;
- meeting vendor certification criteria;
- improving cost control;
- reducing incidents that result in liability;
- demonstrating reasonable care;
- conserving input materials and energy;
- facilitating the attainment of permits and authorizations;
- fostering development and sharing environmental solutions;
- improving industry-government relations.

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

1 Scope

This International Standard provides guidance on the development and implementation of environmental management systems and principles, and their coordination with other management systems.

The guidelines in this International Standard are applicable to any organization, regardless of size, type, or level of maturity, that is interested in developing, implementing and/or improving an environmental management system.

The guidelines are intended for use as a voluntary, internal management tool and are not intended to be used as EMS certification/registration criteria.

2 Normative references

There are no normative references at present.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1

continual improvement

process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy

NOTE — The process need not take place in all areas of activity simultaneously.

3.2

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE — Surroundings in this context extend from within an organization to the global system.

3.3**environmental aspect**

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

NOTE — A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact.

3.4**environmental impact**

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

3.5**environmental management system**

that part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy

3.6**environmental management system audit**

systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management

3.7**environmental objective**

overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable

3.8**environmental performance**

measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets

3.9**environmental policy**

statement by the organization of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets

3.10**environmental target**

detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

3.11**interested party**

individual or group concerned with or affected by the environmental performance of an organization

3.12**organization**

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE — For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.13

prevention of pollution

use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution

NOTE — The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs.

4 Environmental management system (EMS) principles and elements

The EMS model (see figure 1) follows the basic view of an organization which subscribes to the following principles.

Principle 1 — Commitment and policy

An organization should define its environmental policy and ensure commitment to its EMS.

Principle 2 — Planning

An organization should formulate a plan to fulfil its environmental policy.

Principle 3 — Implementation

For effective implementation, an organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

Principle 4 — Measurement and evaluation

An organization should measure, monitor and evaluate its environmental performance.

Principle 5 — Review and improvement

An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

With this in mind, the EMS is best viewed as an organizing framework that should be continually monitored and periodically reviewed to provide effective direction for an organization's environmental activities in response to changing internal and external factors. Every individual in an organization should accept responsibility for environmental improvements.

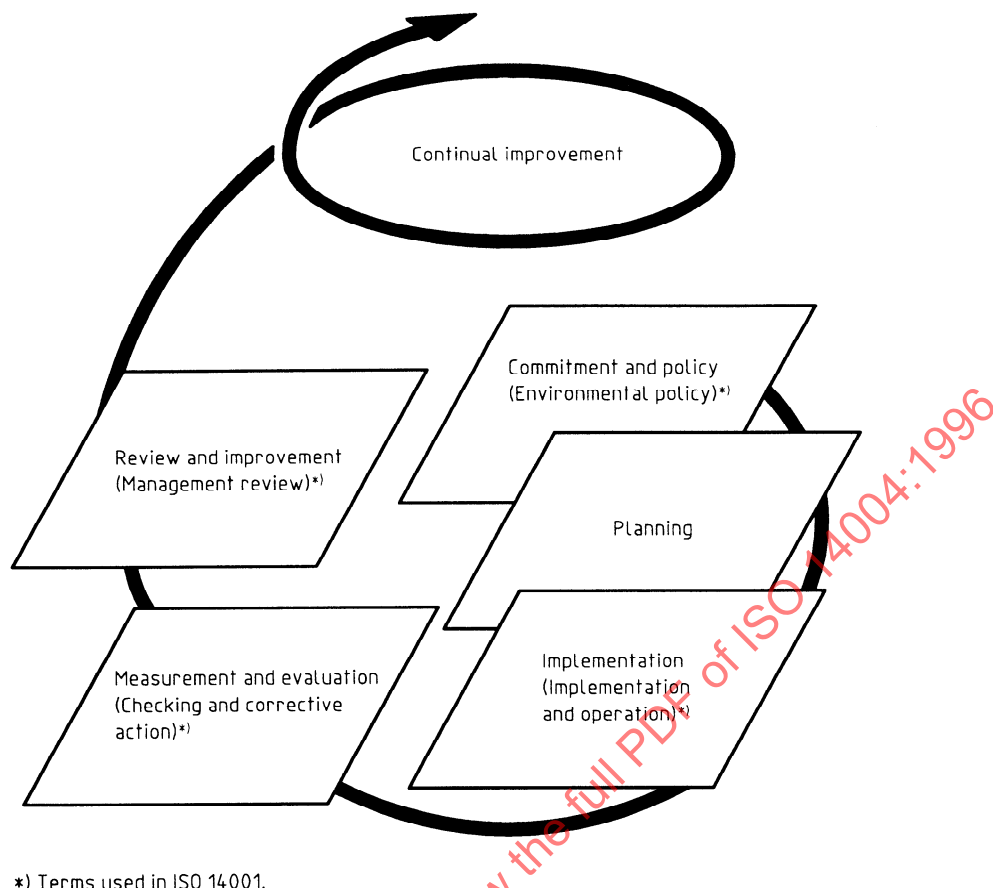


Figure 1 — Environmental management system model for this International Standard

4.1 Commitment and policy

Principle 1 — Commitment and policy

An organization should define its environmental policy and ensure commitment to its EMS.

4.1.1 General

The organization should begin where there is obvious benefit, for example, by focusing on regulatory compliance, by limiting sources of liability or by making more efficient use of materials.

As the organization grows in experience, and its EMS starts to take shape, procedures, programmes and technologies can be put in place to further improve environmental performance. Then, as the EMS matures, environmental considerations can be integrated into all business decisions.

4.1.2 Top management commitment and leadership

To ensure success, an early step in developing or improving an EMS involves obtaining commitment from the top management of the organization to improve the environmental management of its activities, products or services. The ongoing commitment and leadership of the top management are crucial.

4.1.3 Initial environmental review

The current position of an organization with regard to the environment can be established by means of an initial environmental review. The initial review can cover the following:

- identification of legislative and regulatory requirements;
- identification of environmental aspects of its activities, products or services so as to determine those that have or can have significant environmental impacts and liabilities;
- evaluation of performance compared with relevant internal criteria, external standards, regulations, codes of practice and sets of principles and guidelines;
- existing environmental management practices and procedures;
- identification of the existing policies and procedures dealing with procurement and contracting activities;
- feedback from the investigation of previous incidents of non-compliance;
- opportunities for competitive advantage;
- the views of interested parties;
- functions or activities of other organizational systems that can enable or impede environmental performance.

In all cases, consideration should be given to the full range of operating conditions, including possible incidents and emergency situations.

The process and results of the initial environmental review should be documented and opportunities for EMS development should be identified.

Practical help — Initial environmental review

An important first step is to develop the list of areas to be reviewed. This can include organization activities, specific operations or a specific site.

Some common techniques for conducting a review include

- questionnaires,
- interviews,
- checklists,
- direct inspection and measurement,
- record review,
- benchmarking¹⁾.

Organizations, including SMEs, can consult a number of outside sources such as:

- government agencies in relation to laws and permits;
- local or regional libraries or databases;
- other organizations for exchange of information;
- industry associations;
- larger customer organizations;
- manufacturers of equipment in use;
- business relations (e.g. with those who transport and dispose of waste);
- professional help.

1) Benchmarking is a technique for studying best practice, whether within the organization, in a competitor's organization or in a different industry, to enable the organization to adopt or improve on it.

4.1.4 Environmental policy

An environmental policy establishes an overall sense of direction and sets the principles of action for an organization. It sets the goal as to the level of environmental responsibility and performance required of the organization, against which all subsequent actions will be judged.

A growing number of international organizations including government, industry associations and citizens' groups have developed guiding principles (see annex A for two examples). Such guiding principles have helped organizations define the overall scope of their commitment to the environment. They also help to give different organizations a common set of values. Guiding principles such as these can assist the organization in developing its policy, which can be as individual as the organization for which it is written.

The responsibility for setting environmental policy normally rests with the organization's top management. The organization's management is responsible for implementing the policy and for providing input to the formulation and modification of the policy.

An environmental policy should consider the following:

- the organization's mission, vision, core values and beliefs;
- requirements of and communication with interested parties;
- continual improvement;
- prevention of pollution;
- guiding principles;
- coordination with other organizational policies (e.g. quality, occupational health and safety);
- specific local or regional conditions;
- compliance with relevant environmental regulations, laws and other criteria to which the organization subscribes.

Some issues to be considered in environmental policy

- 1 *Does the organization have an environmental policy that is relevant to its activities, products and services?*
- 2 *Does the policy reflect the organization's values and guiding principles?*
- 3 *Has the environmental policy been approved by top management and has someone been identified and given the authority to oversee and implement the policy?*
- 4 *Does the policy guide the setting of environmental objectives and targets?*
- 5 *Does the policy guide the organization towards monitoring appropriate technology and management practices?*
- 6 *What commitments are embodied in the environmental policy, for example, support for continual improvement, support for the prevention of pollution, monitoring, meeting or exceeding legal requirements, and consideration of the expectations of interested parties?*

Practical help — Environmental policy

All activities, products or services can cause impacts on the environment. The environmental policy should recognize this.

A detailed review of the guiding principles in annex A can help in drafting an appropriate policy. The issues addressed in the policy depend on the nature of the organization. In addition to compliance with environmental regulations, the policy can state commitments to

- *minimize any significant adverse environmental impacts of new developments through the use of the integrated environmental management procedures and planning;*
- *development of environmental performance evaluation procedures and associated indicators;*
- *embody life cycle thinking;*
- *design products in such a way as to minimize their environmental impacts in production, use and disposal;*
- *prevent pollution, reduce waste and the consumption of resources (materials, fuel and energy), and commit to recovery and recycling, as opposed to disposal where feasible;*
- *education and training;*
- *sharing environmental experience;*
- *involvement of and communication with interested parties;*
- *work towards sustainable development;*
- *encourage the use of EMS by suppliers and contractors.*

4.2 Planning**Principle 2 — Planning**

An organization should formulate a plan to fulfil its environmental policy.

4.2.1 General

The environmental management system elements relating to planning include

- identification of environmental aspects and evaluation of associated environmental impacts;
- legal requirements;
- environmental policy;
- internal performance criteria;
- environmental objectives and targets;
- environmental plans and management programme.

4.2.2 Identification of environmental aspects and evaluation of associated environmental impacts

An organization's policy, objectives and targets should be based on knowledge about the environmental aspects and significant environmental impacts associated with its activities, products or services. This can ensure that the significant environmental impacts associated with these aspects are taken into account in setting the environmental objectives.

The identification of the environmental aspects is an ongoing process that determines the past, current and potential impact (positive or negative) of an organization's activities on the environment. This process also includes the identification of the potential regulatory, legal and business exposure affecting the organization. It can also include identification of health and safety impacts, and environmental risk assessment.

Some issues to be considered in identification of environmental aspects and evaluation of environmental impacts

- 1 *What are the environmental aspects of the organization's activities, products and services?*
- 2 *Do the organization's activities, products or services create any significant adverse environmental impacts?*
- 3 *Does the organization have a procedure for evaluating the environmental impacts of new projects?*
- 4 *Does the location of the organization require special environmental consideration, for example sensitive environmental areas?*
- 5 *How will any intended changes or additions to activities, products or services affect the environmental aspects and their associated impacts?*
- 6 *How significant or severe are the potential environmental impacts should a process failure occur?*
- 7 *How frequently will the situation arise that could lead to the impact?*
- 8 *What are the significant environmental aspects; considering impacts, likelihood, severity and frequency?*
- 9 *Are the significant environmental impacts local, regional or global in scope?*

Practical help — Identification of environmental aspects and evaluation of associated environmental impacts

The relationship between environmental aspects and environmental impacts is one of cause and effect.

An environmental aspect refers to an element of an organization's activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, consumption or reuse of a material, or noise.

An environmental impact refers to the change which takes place in the environment as a result of the aspect. Examples of impacts might include pollution or contamination of water or depletion of a natural resource.

The identification of environmental aspects and the evaluation of associated environmental impacts is a process that can be dealt with in four steps.

Step 1 — Select an activity, a product or service

The selected activity, product or service should be large enough for meaningful examination and small enough to be sufficiently understood.

Step 2 — Identify environmental aspects of the activity, product or service

Identify as many environmental aspects as possible associated with the selected activity, product or service.

Step 3 — Identify environmental impacts

Identify as many actual and potential, positive and negative, environmental impacts as possible associated with each identified aspect.

Examples from the three steps above are shown as follows.

Activity, product or service	Aspect	Impact
Activity — Handling of hazardous materials	Potential for accidental spillage	Contamination of soil or water
Product — Product refinement	Reformulation of the product to reduce its volume	Conservation of natural resources
Service — Vehicle maintenance	Exhaust emissions	Reduction of air emissions

Step 4 — Evaluate significance of impacts

The significance of each of the identified environmental impacts can be different for each organization. Quantification can aid judgement.

Evaluation can be facilitated by considering the following.

Environmental concerns:

- the scale of the impact;
- the severity of the impact;
- probability of occurrence;
- duration of impact.

Business concerns:

- potential regulatory and legal exposure;
- difficulty of changing the impact;
- cost of changing the impact;
- effect of change on other activities and processes;
- concerns of interested parties;
- effect on the public image of the organization.

4.2.3 Legal and other requirements

The organization should establish and maintain procedures to identify, have access to and understand all legal and other requirements to which it subscribes, directly attributable to the environmental aspects of its activities, products or services.

Some issues to be considered in legal and other requirements

- 1 How does the organization access and identify relevant legal and other requirements?
- 2 How does the organization keep track of legal and other requirements?
- 3 How does the organization keep track of changes to legal and other requirements?
- 4 How does the organization communicate relevant information on legal and other requirements to employees?

Practical help — Legal and other requirements

To maintain regulatory compliance, an organization should identify and understand regulatory requirements applicable to its activities, products or services. Regulations can exist in several forms:

- those specific to the activity (e.g. site operating permits);
- those specific to the organization's products or services;
- those specific to the organization's industry;
- general environmental laws;
- authorizations, licenses and permits.

Several sources can be used to identify environmental regulations and ongoing changes, including

- all levels of government;
- industry associations or groups;
- commercial databases;
- professional services.

To facilitate keeping track of legal requirements, an organization can establish and maintain a list of all laws and regulations pertaining to its activities, products or services.

4.2.4 Internal performance criteria

Internal priorities and criteria should be developed and implemented where external standards do not meet the needs of the organization or are non-existent. Internal performance criteria, together with external standards, assist the organization in developing its own objectives and targets.

Practical help — Internal performance criteria

Examples of areas where an organization can have internal performance criteria might include

- management systems;
- employee responsibilities;
- acquisition, property management and divestiture;
- suppliers;
- contractors;
- product stewardship;
- environmental communications;
- regulatory relationships;
- environmental incident response and preparedness;
- environmental awareness and training;
- environmental measurement and improvement;
- process risk reduction;
- prevention of pollution and resource conservation;
- capital projects;
- process change;
- hazardous material management;
- waste management;
- water management (e.g. waste, storm, ground);
- air quality management;
- energy management;
- transportation.

4.2.5 Environmental objectives and targets

Objectives should be established to meet the organization's environmental policy. These objectives are the overall goals for environmental performance identified in the environmental policy. When establishing its objectives, an organization should also take into account the relevant findings from environmental reviews, and the identified environmental aspects and associated environmental impacts.

Environmental targets can then be set to achieve these objectives within a specified time-frame. The targets should be specific and measurable.

When the objectives and targets are set, the organization should consider establishing measurable environmental-performance indicators. These indicators can be used as the basis for an environmental-performance evaluation system and can provide information on both the environmental management and the operational systems.

Objectives and targets can apply broadly across an organization or more narrowly to site-specific or individual activities. Appropriate levels of management should define the objectives and targets. Objectives and targets should be periodically reviewed and revised, and should take into consideration the views of interested parties.

Some issues to be considered in environmental objectives and targets

- 1 *How do environmental objectives and targets reflect both the environmental policy and significant environmental impacts associated with the organization's activities, products or services?*
- 2 *How have the employees responsible for achieving the objectives and targets had input into their development?*
- 3 *How have the views of interested parties been considered?*
- 4 *What specific measurable indicators have been established for objectives and targets?*
- 5 *How are objectives and targets regularly reviewed and revised to reflect desired improvements in environmental performance?*

Practical help — Objectives and targets

Objectives can include commitments to

- *reduce waste and the depletion of resources;*
- *reduce or eliminate the release of pollutants into the environment;*
- *design products to minimize their environmental impact in production, use and disposal;*
- *control the environmental impact of sources of raw material;*
- *minimize any significant adverse environmental impact of new developments;*
- *promote environmental awareness among employees and the community.*

Progress towards an objective can generally be measured using environmental performance indicators such as:

- *quantity of raw material or energy used;*
- *quantity of emissions such as CO₂;*
- *waste produced per quantity of finished product;*
- *efficiency of material and energy use;*
- *number of environmental incidents (e.g. excursions above limits);*
- *number of environmental accidents (e.g. unplanned releases);*
- *percentage waste recycled;*
- *percentage recycled material used in packaging;*

- *number of vehicle kilometres per unit of production;*
- *specific pollutant quantities, e.g. NO_x, SO₂, CO, HC, Pb, CFCs;*
- *investment in environmental protection;*
- *number of prosecutions;*
- *land area set aside for wildlife habitat.*

An integrated example

Objective: reduce energy required in manufacturing operations.

Target: achieve ten percent reduction of energy consumption compared to the previous year.

Indicator: quantity of fuels and electricity per unit of production.

4.2.6 Environmental management programme(s)

Within the general planning of activities, an organization should establish an environmental management programme that addresses all of its environmental objectives. To be most effective, environmental management planning should be integrated into the organization's strategic plan. Environmental management programmes should address schedules, resources and responsibilities for achieving the organization's environmental objectives and targets.

Within the framework provided by the environmental management planning, an environmental management programme identifies specific actions in order of their priority to the organization. These actions may deal with individual processes, projects, products, services, sites or facilities within a site.

Environmental management programmes help the organization to improve its environmental performance. They should be dynamic and revised regularly to reflect changes in organizational objectives and targets.

Some issues to be considered in environmental management programme(s)

- 1 *What is the organization's process for developing environmental management programmes?*
- 2 *Does the environmental management planning process involve all responsible parties?*
- 3 *Is there a process for periodic reviews of the programme?*
- 4 *How do these programmes address the issues of resources, responsibility, timing and priority?*
- 5 *How are the environmental management programmes responsive to the environmental policy and general planning activities?*
- 6 *How are the environmental management programmes monitored and revised?*

Practical help — Environmental management programme

The following is an example of a process for developing an environmental management programme.

Commitment and policy	Planning	Example
Environmental policy commitment 1 ¹⁾		Conserve natural resources
	Objective 1	Minimize water use wherever technically and commercially practical
	Target 1	Reduce water consumption at selected sites by fifteen percent of present levels within one year
	Environmental programme 1	Water reuse
	Action 1	Install equipment to recycle water used for rinsing in Process A for reuse in Process B

1) This iterative process should be repeated for all policy commitments, objectives and targets.

4.3 Implementation**Principle 3 — Implementation**

For effective implementation, an organization should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

4.3.1 General

The capabilities and support required by the organization constantly evolve in response to the changing requirements of interested parties, a dynamic business environment, and the process of continual improvement. To achieve its environmental objectives an organization should focus and align its people, systems, strategy, resources and structure.

For many organizations, implementing environmental management can be approached in stages and should be based on the level of awareness of environmental requirements, aspects, expectations and benefits, and the availability of resources.

4.3.2 Ensuring capability

4.3.2.1 Resources — Human, physical and financial

The appropriate human, physical (e.g. facilities, equipment), and financial resources essential to the implementation of an organization's environmental policies and the achievement of its objectives should be defined and made available. In allocating resources, organizations can develop procedures to track the benefits as well as the costs of their environmentally or related activities. Issues such as the cost of pollution control, wastes and disposal can be included.

Some issues to be considered in human, physical, and financial resources

- 1 *How does the organization identify and allocate the human, technical and financial resources necessary to meet its environmental objectives and targets, including those for new projects?*
- 2 *How does the organization track the costs and benefits of environmental activities?*

Practical help — Human, physical and financial resources

The resource base and the organization structure of the small or medium enterprise (SME) can impose certain limitations on implementation. In order to manage these constraints the SME should, wherever possible, consider cooperative strategies with

- *larger client organizations to share technology and know-how;*
- *other SMEs on a supply chain or local basis to define and address common issues, to share know-how, to facilitate technical development, to use facilities jointly, to establish a way to study the EMS, to collectively engage consultants;*
- *standardization organizations, SME associations, Chambers of Commerce, for training and awareness programmes;*
- *universities and other research centres to support production and innovation.*

4.3.2.2 EMS alignment and integration

To effectively manage environmental concerns, the EMS elements should be designed or revised so that they are effectively aligned and integrated with existing management system elements.

Management system elements that can benefit from integration include

- organization policies;
- resource allocation;
- operational controls and documentation;
- information and support systems;
- training and development;
- organization and accountability structure;
- reward and appraisal systems;
- measuring and monitoring systems;
- communication and reporting.

Some issues to be considered in organizational alignment and integration

- 1 *How has the environmental management system been integrated into the overall business management process?*
- 2 *What is the process for balancing and resolving conflicts between environmental and other business objectives and priorities?*

4.3.2.3 Accountability and responsibility

Responsibility for the overall effectiveness of the EMS should be assigned to (a) senior person(s) or function(s) with sufficient authority, competence and resources.

Operational managers should clearly define the responsibilities of relevant personnel and be responsible and accountable for effective implementation of the EMS and environmental performance. Employees at all levels should be accountable, within the scope of their responsibilities, for environmental performance in support of the overall environmental management system.

Some issues to be considered in accountability and responsibility

- 1 *What are the responsibilities and accountability of personnel who manage, perform and verify work affecting the environment, and are these defined and documented?*
- 2 *What is the relationship between environmental responsibility and individual performance and is this periodically reviewed?*
- 3 *How do the responsible and accountable personnel*
 - *obtain sufficient training, resources and personnel for implementation?*
 - *initiate action to ensure compliance with environmental policy?*
 - *anticipate, identify and record any environmental problems?*
 - *initiate, recommend, or provide solutions to those problems?*
 - *verify the implementation of such solutions?*
 - *control further activities until any environmental deficiency or unsatisfactory condition has been corrected?*
 - *obtain appropriate training to act in emergency situations?*
 - *gain an understanding of the consequences of non-compliance?*
 - *gain an understanding of the accountability that applies to them?*
 - *encourage voluntary action and initiatives?*

Practical help — Accountability and responsibility

To ensure effective development and implementation of an EMS, it is necessary to assign appropriate responsibilities. One possible approach for developing environmental responsibilities is indicated below. It should be recognized that companies and institutions have different organizational structures, and need to understand and define environmental responsibilities based upon their own work processes.

The following is a sample model of environmental responsibilities.

Sample environmental responsibilities	Typical person(s) responsible
Establish overall direction	President, chief executive officer (CEO), board of directors
Develop environmental policy	President, CEO, chief environmental manager
Develop environmental objectives, targets and programmes	Relevant managers
Monitor overall EMS performance	Chief environmental manager
Assure regulatory compliance	Senior operating manager
Ensure continual improvement	All managers
Identify customers' expectations	Sales and marketing staff
Identify suppliers' expectations	Purchasers, buyers
Develop and maintain accounting procedures	Finance/accounting managers
Comply with defined procedures	All staff
NOTE — In the case of SMEs the person responsible can be the owner.	

4.3.2.4 Environmental awareness and motivation

Top management has a key role to play in building awareness and motivating employees by explaining the organization's environmental values and communicating its commitment to the environmental policy. It is the commitment of the individual people, in the context of shared environmental values, that transforms an environmental management system from paperwork into an effective process.

All members of the organization should understand and be encouraged to accept the importance of achieving the environmental objectives and targets for which they are responsible and/or accountable. They in turn should encourage, where necessary, the other members of their organization to respond in a similar manner.

Motivation to continually improve can be enhanced when employees are recognized for achieving environmental objectives and targets and encouraged to make suggestions that can lead to improved environmental performance.

Some issues to be considered in environmental awareness and motivation

- 1 How has top management established, reinforced and communicated organizational commitment to the environmental policy?
- 2 To what extent do employees understand, accept and share the environmental values of the organization?
- 3 To what extent do shared environmental values serve to motivate environmentally responsible action?
- 4 How does the organization recognize employees' environmental achievements?

4.3.2.5 Knowledge, skills and training

The knowledge and skills necessary to achieve environmental objectives should be identified. These should be considered in personnel selection, recruitment, training, development of skills and ongoing education.

Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within an organization. Employees should have an appropriate knowledge base, which includes training in the methods and skills required to perform their tasks in an efficient and competent fashion and knowledge of the impact their activities can have on the environment if performed incorrectly.

The organization should also ensure that contractors working at the site provide evidence that they have the requisite knowledge and skills to perform the work in an “environmentally responsible manner”.

Education and training is needed to ensure that employees have appropriate and current knowledge of regulatory requirements, internal standards and the organization's policies and objectives. The level and detail of training may vary according to the task.

Training programmes typically have the following elements:

- identification of employee training needs;
- development of a training plan to address defined needs;
- verification of conformance of training programme to regulatory or organizational requirements;
- training of target employee groups;
- documentation of training received;
- evaluation of training received.

Some issues to be considered in knowledge, skills, and training

- 1 How does the organization identify environmental training needs?
- 2 How are the training needs of specific job functions analysed?
- 3 Is training developed and reviewed and modified as needed?
- 4 How is the training documented and tracked?

Practical help — Knowledge, skills and training

Examples of the types of environmental training which can be provided by the organization are as follows.

Type of training	Audience	Purpose
Raising awareness of the strategic importance of environmental management	Senior management	To gain commitment and alignment to the organization's environmental policy
Raising general environmental awareness	All employees	To gain commitment to the environmental policy, objectives and targets of the organization; and instil a sense of individual responsibility
Skills enhancement	Employees with environmental responsibilities	To improve performance in specific areas of the organization, e.g. operations, research and development, and engineering
Compliance	Employees whose actions can affect compliance	To ensure regulatory and internal requirements for training are met

4.3.3 Support action

4.3.3.1 Communication and reporting

Communication includes establishing processes to report internally and, where desired, externally on the environmental activities of the organization in order to

- demonstrate management commitment to the environment;
- deal with concerns and questions about the environmental aspects of the organization's activities, products or services;
- raise awareness of the organization's environmental policies, objectives, targets and programmes;
- inform internal or external interested parties about the organization's environmental management system and performance as appropriate.

Results from EMS monitoring, audit and management review should be communicated to those within the organization who are responsible for performance.

The provision of appropriate information to the organization's employees and other interested parties serves to motivate employees and encourage public understanding and acceptance of the organization's efforts to improve its environmental performance.

Some issues to be considered in communication and reporting

- 1 *What is the process for receiving and responding to employee concerns?*
- 2 *What is the process for receiving and considering the concerns of other interested parties?*
- 3 *What is the process for communicating the organization's environmental policy and performance?*
- 4 *How are the results from EMS audits and reviews communicated to all appropriate people in the organization?*
- 5 *What is the process for making the environmental policy available to the public?*
- 6 *Is internal communication adequate to support continual improvement around environmental issues?*

Practical help — Communication and reporting

a) Items that can be included in reports:

- organization's profile;
- environmental policy, objectives and targets;
- environmental management processes (including interested party involvement and employee recognition);
- environmental performance evaluation (including releases, resource conservation, compliance, product stewardship and risk);
- opportunities for improvement;
- supplementary information, such as glossaries;
- independent verification of the contents.

b) It is important to remember for both internal and external environmental communication and reporting:

- two-way communication should be encouraged;
- information should be understandable and adequately explained;
- information should be verifiable;
- the organization should present an accurate picture of its performance;
- information should be presented in a consistent form (e.g. similar units of measurement to allow for comparison between one period and another).

- c) *An organization can communicate environmental information in a variety of ways:*
- *externally, through an annual report, regulatory submissions, public government records, industry association publications, the media, and paid advertising;*
 - *organization of open days, the publication of telephone numbers where complaints and questions can be directed;*
 - *internally, through bulletin board postings, internal newspapers, meetings and electronic mail messages.*

4.3.3.2 EMS documentation

Operational processes and procedures should be defined and appropriately documented and updated as necessary. The organization should clearly define the various types of documents which establish and specify effective operational procedures and control.

The existence of EMS documentation supports employee awareness of what is required to achieve the organization's environmental objectives and enables the evaluation of the system and environmental performance.

The nature of the documentation can vary depending on the size and complexity of the organization. Where elements of the EMS are integrated with an organization's overall management system, the environmental documentation should be integrated into existing documentation. For ease of use, the organization can consider organizing and maintaining a summary of the documentation to

- collate the environmental policy, objectives and targets;
- describe the means of achieving environmental objectives and targets;
- document the key roles, responsibilities and procedures;
- provide direction to related documentation and describe other elements of the organization's management system, where appropriate;
- demonstrate that the environmental management system elements which are appropriate for the organization are implemented.

Such a summary document can serve as a reference to the implementation and maintenance of the organization's environmental management system.

Some issues to be considered in EMS documentation

- 1 *How are environmental management procedures identified, documented, communicated and revised?*
- 2 *Does the organization have a process for developing and maintaining EMS documentation?*
- 3 *How is EMS documentation integrated with existing documentation where appropriate?*
- 4 *How do employees access EMS documentation needed to conduct their job activities?*

Practical help — EMS documentation

Documents can be in any medium and should be useful and easily understood.

All documentation should be dated (with dates of revision), readily identifiable, organized, and retained for a specified period. The organization should ensure that

- *documents can be identified with the appropriate organization, division, function, activity, and/or contact person;*
- *documents are periodically reviewed, revised as necessary and approved by authorized personnel prior to issue;*
- *the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the system are performed;*
- *obsolete documents are promptly removed from all points of issue and points of use.*

4.3.3.3 Operational control

Implementation is accomplished through the establishment and maintenance of operational procedures and controls to ensure that the organization's environmental policy, objectives and targets can be met.

Practical help — Operational control

The organization should consider the different operations and activities contributing to its significant environmental impacts when developing or modifying operational controls and procedures. Such operations and activities may include

- *research and development design and engineering;*
- *purchasing;*
- *contracting;*
- *handling and storage of raw materials;*
- *production and maintenance processes;*
- *laboratories;*
- *storage of products;*
- *transportation;*
- *marketing, advertising;*
- *customer service;*
- *acquisition, construction or modification of property and facilities.*

Activities can be divided into three categories:

- *activities to prevent pollution and conserve resources in new capital projects, process changes and resources management, property (acquisitions, divestitures and property management), and new products and packaging;*
- *daily management activities to assure conformance to internal and external organizational requirements, and to ensure their efficiency and effectiveness;*
- *strategic management activities to anticipate and respond to changing environmental requirements.*

4.3.3.4 Emergency preparedness and response

Emergency plans and procedures should be established to ensure that there will be an appropriate response to unexpected or accidental incidents.

The organization should define and maintain procedures for dealing with environmental incidents and potential emergency situations. The operating procedures and controls should include, where appropriate, consideration of

- accidental emissions to the atmosphere;
- accidental discharges to water and land;
- specific environment and ecosystem effects from accidental releases.

The procedures should take into account incidents arising, or likely to arise, as consequences of

- abnormal operating conditions;
- accidents and potential emergency situations.

Practical help — Emergency preparedness and response

Emergency plans can include

- emergency organization and responsibilities;
- a list of key personnel;
- details of emergency services (e.g. fire department, spill clean-up services);
- internal and external communication plans;
- actions taken in the event of different types of emergencies;
- information on hazardous materials, including each material's potential impact on the environment, and measures to be taken in the event of accidental release;
- training plans and testing for effectiveness.

4.4 Measurement and evaluation

Principle 4 — Measurement and evaluation

An organization should measure, monitor and evaluate its environmental performance.

4.4.1 General

Measuring, monitoring and evaluating are key activities of an environmental management system which ensure that the organization is performing in accordance with the stated environmental management programme.

4.4.2 Measuring and monitoring (ongoing performance)

There should be a system in place for measuring and monitoring actual performance against the organization's environmental objectives and targets in the areas of management systems and operational processes. This includes evaluation of compliance with relevant environmental legislation and regulations. The results should be analysed and used to determine areas of success and to identify activities requiring corrective action and improvement.

Appropriate processes should be in place to ensure the reliability of data, such as calibration of instruments, test equipment, and software and hardware sampling.

Identifying appropriate environmental performance indicators for the organization should be an ongoing process. Such indicators should be objective, verifiable and reproducible. They should be relevant to the organization's activities, consistent with its environmental policy, practical, cost-effective, and technologically feasible.

NOTE — Examples of environmental performance indicators are shown in “Practical help — Objectives and targets” (4.2.5).

Some issues to be considered in measuring and monitoring

- 1 *How is environmental performance regularly monitored?*
- 2 *How have specific environmental performance indicators been established which relate to the organization's objectives and targets and what are they?*
- 3 *What control processes are in place to regularly calibrate and sample measuring and monitoring equipment and systems?*
- 4 *What is the process to periodically evaluate compliance with relevant legal and other compliance?*

4.4.3 Corrective and preventive action

The findings, conclusions, and recommendations reached as a result of measuring, monitoring, audits and other reviews of the environmental management system should be documented, and the necessary corrective and preventive actions identified. Management should ensure that these corrective and preventive actions have been implemented and that there is systematic follow-up to ensure their effectiveness.

4.4.4 EMS records and information management

Records are evidence of the ongoing operation of the EMS and should cover

- legislative and regulatory requirements;
- permits;
- environmental aspects and their associated impacts;
- environmental training activity;
- inspection, calibration and maintenance activity;
- monitoring data;
- details of non-conformance: incidents, complaints and follow-up action;
- product identification: composition and property data;
- supplier and contractor information;
- environmental audits and management reviews

A complex range of information can result. The effective management of these records is essential to the successful implementation of the EMS. The key features of good environmental information management include means of identification, collection, indexing, filing, storage, maintenance, retrieval, retention and disposition of pertinent EMS documentation and records.

Some issues to be considered in EMS records and information management

- 1 *What environmental information does the organization need to manage effectively?*
- 2 *What capability does the organization have to identify and track key indicators of performance and other data necessary to achieve its objectives?*
- 3 *How does the organization's record/information management system make information available to the employees who need it when they need it?*

4.4.5 Audits of the environmental management system

Audits of the EMS should be conducted on a periodic basis to determine whether the system conforms to planned arrangements and has been properly implemented and maintained.

Audits of the EMS can be carried out by organization personnel, and/or by external parties selected by the organization. In any case, the person(s) conducting the audit should be in a position to do so objectively and impartially and should be properly trained.

The frequency of audits should be guided by the nature of the operation in terms of its environmental aspects and potential impacts. Also, the results of previous audits should be considered in determining frequency.

The EMS audit report should be submitted in accordance with the audit plan.

4.5 Review and improvement

Principle 5 — Review and improvement

An organization should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.

4.5.1 General

A continual improvement process should be applied to an environmental management system to achieve overall improvement in environmental performance.

4.5.2 Review of the environmental management system

The organization's management should, at appropriate intervals, conduct a review of the EMS to ensure its continuing suitability and effectiveness.

The review of the EMS should be broad enough in scope to address the environmental dimensions of all activities, products or services of the organization, including their impact on financial performance and possibly competitive position.

The review of the EMS should include

- a review of environmental objectives, targets and environmental performance;
- findings of the EMS audits;
- an evaluation of its effectiveness;
- an evaluation of the suitability of the environmental policy and the need for changes in the light of
 - changing legislation,
 - changing expectations and requirements of interested parties,
 - changes in the products or activities of the organization,
 - advances in science and technology,
 - lessons learned from environmental incidents,
 - market preferences,
 - reporting and communication.

Some issues to be considered in the review of the EMS

- 1 *How is the EMS periodically reviewed?*
- 2 *How are the appropriate employees involved in the review of the EMS and follow-up?*
- 3 *How are the views of interested parties taken into account in the EMS review?*

4.5.3 Continual improvement

The concept of continual improvement is embodied in the EMS. It is achieved by continually evaluating the environmental performance of the EMS against its environmental policies, objectives and targets for the purpose of identifying opportunities for improvement (see figure 1).

The continual improvement process should

- identify areas of opportunity for improvement of the environmental management system which lead to improved environmental performance;
- determine the root cause or causes of nonconformances or deficiencies;
- develop and implement (a) plan(s) of corrective and preventive action to address root cause(s);
- verify the effectiveness of the corrective and preventive actions;
- document any changes in procedures resulting from process improvement;
- make comparisons with objectives and targets.

Some issues to be considered in corrective and preventive action and continual improvement

- 1 *What process does the organization have to identify corrective and preventive action and improvement?*
- 2 *How does the organization verify that corrective and preventive actions and improvements are effective and timely?*

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