

“Capacity Building and Strengthening Institutional Arrangement”

Workshop: Sustainable Development

**Environmental management systems
main aspects**

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1. Introduction

As introduced previously, an Environmental Management System (EMS) is a set of processes and practices that can support an organization to reduce its environmental impacts, and to improve the environmental sustainability of its activities

An EMS is usually organized in the following main phases :

- 1) The Initial Environmental Analysis
- 2) The Environmental Policy
- 3) The Planning
- 4) The Implementation
- 5) The Corrective actions
- 6) The Management review

In the next slides will be presented the main aspect of an Environmental Management System

2. The Initial Environmental Analysis

According to the ISO 14001 the environment is the “the context where an organization develops its activities, including water, soil, natural resources, flora and wildlife, human beings and their interrelation”

The Initial Environmental Analysis can allow the understanding of the organization's environmental state and it includes:

- The identification of the regulations and environmental laws applicable to the organization's activities
- Identification of the environmental aspects linked with the activities, services, products, to define which are the main environmental impacts* more significant or critical
- The analysis of the environmental management procedures that are used at the moment
- All the information about previously environmental accidents
- The environmental point of view of all the stakeholders (institutional, local, etc)

*Every modification of the environment (negative or positive, total or partial) caused by the organizations' activities, products or services

2. The Initial Environmental Analysis

Regarding the organization's activities, the preliminary analysis should focus on the following environmental main aspects :

- Air emission
- Water waste release
- Waste management
- Soil contamination
- Use of natural resources
- Other main environmental local issues (noises, vibrations, electromagnetic pollution, smells, etc.)

2. The Initial Environmental Analysis

To collect the information needed for the environmental analysis, can be adopted some techniques and methodologies, such as:

- Questionnaires
- Interview
- Check-list
- Inspections on-site and direct measurement
- Benchmarking

Output of the Environmental Analysis

- a) General analysis of all the activities and productive cycles of the organization that can effect the environment
- b) General frame of the main environmental impacts caused by the organization's activities

2. The Initial Environmental Analysis

Example of Initial Environmental Analysis for the thematic waste

The total hazardous waste produced are:

- < 2 m* o 3600 kg
- tra 2 e 20 m* o tra 3600 kg e 36000 kg
- tra 20 e 100 m* o tra 36000 kg e 180000 kg
- oltre 100 m* o 180000 kg

The hazardous waste on the total waste produced are:

- assenti
- < 10%
- < 25%
- > 25%

m* = m3

3. The environmental policy

The environmental policy define the environmental objectives and general principles of an organization, including the respects of the environmental regulation and the commitment for a continual improvement of the environmental performances

Environmental policy: main features

- a) is implemented by Top Management and involves also other stakeholders or groups that are effected by the environmental performances of the organizations
- b) defines the main environmental aspects and environmental impacts associated
- c) defines the environmental objectives and target to be achieved
- d) is periodical reviewed by Top Management on the bases of Audit process, that eventually can adopt corrective actions
- e) is documented and spread towards the employees in order to promote environmental awareness inside the organization
- f) is spread towards the general public

3. The environmental policy

f) Adopt an environmental Management System (EMS) that is in conformity to the international Standard (ISO14001) or European (EMAS)

g) Promote the technology research (BAT or Economic Valuable) to implement the continual improvement and to check and to prevent the environmental problems, such as:

1. Pollutants emissions in atmosphere
2. Emission sources of particulates
3. Emergency situation that can cause environmental impacts and accidents
4. Reduction for water and energetic consumption
5. Reduction of natural resources use
6. Reduction of noise pollution

3. The Environmental Policy

To identify the environmental impacts, it's important to :

- 1) Choose an activity, product, or service
- 2) Define the environmental activities linked with the activity, product, or service
- 3) Identify the environmental impacts
- 4) Evaluation of the impacts, taking into account the dimension, the probability and the incidence of the impacts

Activity, product or service	Aspect	Impact
Activity : manipulatoion of dangerous materials	Possibility of accidental release of polluted material	Soil or water contamination
Service: maintance of vehicles	Pollutants emissions	Air contamination

Example of table to define the main environmental aspects

3. The Environmental Policy

Identifying Aspects

- Which operations and activities interface with the environment in a way that could result (or has resulted) in environmental impacts?
- What materials, energy sources and other resources do we use in our work?
- Do we have emissions to the air, water or land?
- Do we generate wastes, scrap or off-spec materials? If so, does the treatment of disposal of these materials have potential environmental impacts?
- Which characteristics or attributes of our products or services could result in impact the environment (through their intended use, end-of-life management, etc.)?
- Does our land or infrastructure (e.g., buildings) interact with the environment?
- Which activities (for example, chemical storage) might lead to accidental releases?

Evaluating Impacts

- Are the impacts actual or potential?
- Are the impacts beneficial or damaging to the environment?
- What is the magnitude or degree of these impacts?
- What is the frequency or likelihood of these impacts?
- What is the duration and geographic area of these impacts?
- Which parts of the environment might be affected (e.g., air, water, land, flora, fauna)?
- Is the impact regulated in some manner?
- Have our interested parties expressed concerns about these impacts?

3. The Environmental Policy

As example, the environmental objectives and targets can include :

- Reduce waste production
- Reduce the release of air pollutants in atmosphere
- Reduce energy and water consumption
- Design products to mitigate the environmental impacts
- Promote the environmental awareness towards the employees

Objectives	Targets
Reduce energy usage	<ul style="list-style-type: none"> • Reduce electricity use by 10% in 2001 • Reduce natural gas use by 15% in 2001
Reduce usage of hazardous chemicals	<ul style="list-style-type: none"> • Eliminate use of CFCs by 2002 • Reduce use of high-VOC paints by 25%
Improve employee awareness of environmental issues	<ul style="list-style-type: none"> • Hold monthly awareness training courses • Train 100% of employees by end of year
Improve compliance with wastewater discharge permit limits	<ul style="list-style-type: none"> • Zero permit limit violations by the end of 2001

4. The Planning

In order to implement the environmental policy, an organization has to develop a planning plan.

As a first prerequisite an organization has to define and implement procedures to know all the environmental regulations and how they effect the activities.

Can be useful implement a data-base whit all the regulations divided for categories (specific regulations for products and services, authorization for sites, emission air limits,etc.)

In an EMS, the main elements related to planning can include:

- a) The environmental management programme (EMP)
- b) Definition of standard for internal environmental performances
- c) Definition of tools and methods to define and measure the environmental objectives

4. The Planning

a) The environmental management programme (EMP)

The EMP allow the organizations to improve its environmental performances indicating the financial resources, the responsibilities, competencies and the actions needed to achieve the environmental objectives

To ensure its effectiveness, the EMP should also define:

- the responsibilities for achieving targets (*who will do it?*)
- the means for achieving targets (*how will they do it?*)
- The budget of financial resources (*which resources will be used?*)
- the time frame for achieving those targets (*when?*)

4. The Planning

Policy	Plannning	Example	Resources(\$)
Environmental Policy Commitment		To protect the natural resources	
	Objective 1	Reduce water consumption	
	Target 1	In the sites chosen reduce the water consumption of the 15% for a year	
	Environmental management programme	Reuse water	
	Action 1	Set up a machine to recycle rinse water used in the process A and to reuse in the process B

Example of a scheme to develop and implement an environmental management programme

4. The Planning

b) Definition of standard for internal performances

The organization, in case there aren't any regulations for specific sector, can decide to set a minimum standard of environmental performance for different aspects , such as for example:

- Management Systems
- Employ's responsibility
- Awareness and environmental training
- Relation with the environmental Authorities
- Measurement of the environmental parameters
- Transports

4. The Planning

c) Definition of tools and methods to define and measure the environmental objectives

Once that the environmental objectives (for example, reduction of waste production in 5 years) are fixed by Top management, it's important to define specific tools such as environmental indicators to evaluate which targets the organization can achieve

Adopting environmental indicators the organization can also evaluate its environmental performances and how well the EMS is working

These indicators should be :

- simple and understandable
- objective
- measurable
- relevant for what the organization is trying to achieve

4. The Planning

Example of environmental indicators that can be adopted:

Examples of EMS Performance Indicators

- Pounds of VOC emitted per unit of production
- Pounds of hazardous waste generated per year
- Percentage of employees completing environmental training
- Average time for resolving nonconformities
- Energy use per unit of production
- Percentage of solid waste recycled / reused

5. The Implementation

The implementation of the environmental policy and planning involves the following aspects:

a) Structure and responsibility

The organizations has to develop procedures for any structures and sectors to define responsibility and role for each employee involved in the EMS implementation

b) Training and Awareness competences

The training it's important to ensure that employees are able to manage their responsibility to understand the environmental policy of their organization. The training programmes can include:

- An environmental training need assessment for the employees
- The definition of an environmental training plan(courses, seminars, stages,etc.)
- The evaluation of the environmental training plan

5. The Implementation

Example of how various professional figures can support EMS

Functions	How They Can Help (Possible Roles)
Purchasing	<ul style="list-style-type: none"> • Develop and implement controls for chemical / other material purchases
Human Resources	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Implement preventive maintenance program for key equipment • Support identification of environmental aspects
Finance	<ul style="list-style-type: none"> • Track data on environmental-related costs (such as resource, material and energy costs, waste disposal costs, etc.) • Prepare budgets for environmental management program • Evaluate economic feasibility of environmental projects
Engineering	<ul style="list-style-type: none"> • Consider environmental impacts of new or modified products and processes • Identify pollution prevention opportunities
Top Management	<ul style="list-style-type: none"> • Communicate importance of EMS throughout organization • Provide necessary resources • Track and review EMS performance
Quality	<ul style="list-style-type: none"> • Support document control, records management and employee training efforts • Support integration of environmental and quality management systems
Line Workers	<ul style="list-style-type: none"> • Provide first-hand knowledge of environmental aspects of their operations • Support training for new employees

5. The Implementation

c) Communication

This includes the preparation of procedures to spread information inside and outside the organization, with the aim to :

- Show the top management' s commitment for the environmental protection
- Increase the environmental awareness
- Communicate information to the stakeholders about the EMS of the organizations

Internal Methods	External Methods
<ul style="list-style-type: none"> • newsletters • intranet • staff meetings • employee meetings • bulletin boards • brown bag lunches • training 	<ul style="list-style-type: none"> • open houses • focus or advisory groups • web site or e-mail list • press releases • annual reports • advertising • informal discussions

5. The Implementation

d) EMS documentation

The EMS processes and procedures need to be defined, registered and updated and the organization has to develop a list that describes all the documentation about:

- The procedures of the environmental policy, objectives and targets (included the tools to achieve them)
- The procedures for the different roles and responsibilities
- The procedures for every structures and sectors
- All the environmental procedures adopted by every sectors
- Other EMS-related documents

5. The Implementation

e) Operational control

For the implementation it's also important to develop operative procedures to control all the activities that can effect the environmental impacts; these activities can be related with the following aspects:

- Research, design and industrialization
- Purchasing
- Production processes and maintenance
- Laboratories
- Transport
- Storage
- Customer service
- Building of new plants or modifications of old plants

5. The Implementation

f) Emergency response

The plans for the emergency has to face the accidents unexpected or random, taking into account the accident already happened and the probability that can happen again

The emergency plans can include:

- A list of the responsables for the different kind of emergency
- A list of the emergency services (for examples fireworks)
- A communication plan internal and external
- Procedures actions to be taken in case of emergency
- All the Information available on the hazardous materials present in the organization
- Training plan

6. The Corrective Actions

Once that have been defined all the activities that produce the main environmental impacts, it's needed to develop preventive and corrective actions, with the aim to prevent or mitigate the environmental impacts from organization's activities

Often the main impacts on the environment come from the activities of 'ordinary maintenance', such as for example the activities linked with plants functioning and processes, purification plants and plants to cut air emissions

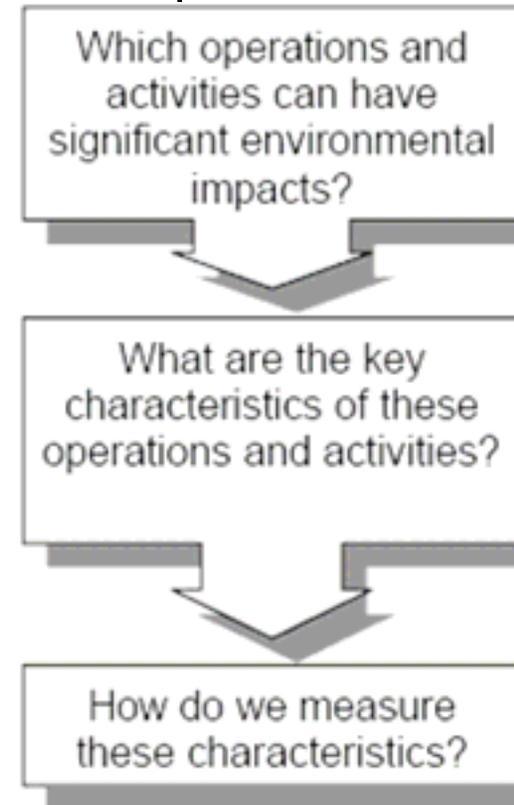
Other important activities that can have impacts on the environment and that need to be taken under control are the purchasing and supplying of raw materials, products and services (because sometimes raw materials and products couldn't respect the environmental parameters fixed by the organization and generate some problems on the whole productive processes)

6. The Corrective Actions

Consequently, in order to develop corrective and preventive actions the organization needs to measure and monitoring its environmental performances

Monitoring and measurement enables an organization to:

- evaluate environmental performance
- analysis of causes of problems
- assess compliance with legal requirements
- identify areas requiring corrective action
- improve performance and increase efficiency



To measure its environmental performances an organization can use the indicators defined during the planning and the result's from inspection's activities

6. The Corrective Actions

Regarding the equipments and tools for the measurements, it's important to carry out periodical test to ensure their calibration and maintenance



That means to develop procedures and guidelines about:

- how to use these equipments
- how evaluate to compare environmental dates with different equipments
- the compliance with regulations

In addition, all the activities regarding measurement and monitoring has to be documented, registered and storage



6 . The Corrective Actions

Another aspects that corrective actions has to take into account is the non conformity management. A correct process to manage the non conformity should:

- To report immediately the non conformity happened (real or potential) to the sectors involved
- To remove if possible the non conformity to avoid that it happens again, or try to mitigate the possible impacts on the environment
- To understand the reasons that caused the non conformity
- To elaborate a data-base of all the non conformity

Example of possible causes for non-conformity

- poor communication
- faulty or missing procedures
- equipment malfunction (or lack of maintenance)
- lack or training
- lack of understanding (of requirements)
- failure to enforce rules
- corrective actions fail to address root causes of problems

6 . The Corrective Actions

Finally, the organization has to implement an active program of Audit to verify periodically its Environmental Management System, with the aim to verify if:

- the EMS is in conformity with the environmental policy of the organization
- the EMS compliance with the environmental regulation at national and international level
- the EMS is working in an appropriate and efficiency way

The Audit , that is performed by external auditor, will provide useful information to the organization to maintain or modify its EMS and to implement the needed corrective actions

7. The Management Review

The top management has to review the whole environmental management system, at regular interval, to verify that the EMS is still effective and efficacious

On the base of Audit's results, the top management review has to face the eventually necessity to modify, integrate or change the environmental policy, the objectives and targets, finalized to the continual improvement of environmental performances

The responsible' s review is the person in charge for all the documentation of the EMS and set up meeting with all the top management usually every 6 or 12 months

During the meeting review the following aspect can be included:

- analysis of audit's results
- review of the environmental objectives and targets
- evaluation of the efficiency of the EMS
- eventually changes in the environmental policy caused by new environmental regulations

8. Conclusions

Following all these phases (analysis, policy, planning, implementation, corrective actions, management review) will be set up a kind of continual cycle, finalized to the continual improvement of the environmental performances

