YEE
YOUTH AND
ENVIRONMENT
EUROPE

Environmental
Management
Systems

Jürgen
Paeger

Youth and Environment Europe (YEE) is an umbrella organization uniting environmental youth non-governmental organizations from throughout Europe. Since its foundation in 1983, YEE has been a platform for many organizations that study nature and are active in the field of environmental protection.

The aim of YEE is to provide a platform where these organizations can cooperate and to encourage youth to be involved in environmental protection. YEE creates an opportunity to contact other European organizations, to exchange experiences, ideas and to work together. Find out more about YEE at **www.yeenet.eu**.

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About the author

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Foreword

Dear reader,

three years ago, as it celebrated its 25th anniversary, Youth and Environment Europe (YEE) – a federation of youth environmental NGOs from all across Europe – identified the need to carefully investigate the impact of its own activities on the environment.

While YEE is not involved in harmful production or activities and its members are dedicated to environmental protection, conservation and sustainable development, we observed that our international projects have a serious impact on the environment, because of all the papers printed, food eaten, energy used and plane flights taken. We therefore wanted to get a clear view of how we perform our activities and how we could improve them so as to lessen their negative environmental impact.

This is the reason why we organized the Environmental Audit project. During the training course we discovered that environmental audits are in fact just part of a more comprehensive approach – environmental management. We discovered a new serious side to environmentalism, a system that deals with causes and consequences of our actions regarding the environment.

From the beginning we were dedicated to spreading the knowledge that we ourselves gained. By publishing this brochure on environmental management systems we endeavour to reach all those who would like to improve the performance of their work and activities, and not only by improving the quality of their work and the economy of production, but also by minimising the environmental consequences, too.

It's not a guide that will show you the one correct way forward. Instead, it is an introduction to the complex world of environmental management with its language, legislative framework, PDCA cycles and so on.

We aim in particular to encourage small and medium-sized enterprises from different regions of Europe to implement some kind of environmental management system: to become greener, safer, and indeed to profit from that in terms of economy, publicity, employees' satisfaction or even just the feel good factor which comes from doing something good for the environment.

We hope you enjoy reading our brochure and finish it feeling enriched,

YEE Environmental Audit Team

Anne Kollien   Paulina Piasecka   Michal Švec   Michal Ruman

1. What is an Environmental Management System?

Environmental Management Systems (EMSs) are a planned and organised – aka systematic – **way of handling the environmental issues of an organisation**. As for individuals, the activities of organisations have or can have (in the case of an accident) interactions with the environment, resulting in environmental impacts like resource consumption, environmental pollution or risks for human health. This is a most critical point for certain industrial activities like mining or heavy industries, but to a lesser extent an issue for every organisation. With growing environmental consciousness, it became evident that – just the same as for individuals – the environmental impact of organisations must be reduced.

A short history of environmental management systems

Day to day operations in most organisations are run in a planned and organised way known as sound business management practice that consists of basic steps for planning and implementing improvement. These basic steps of a systematic management approach can be standardized, as was first done on international level with quality management systems – the ISO 9000 series of international standards from 1987 was the first example. It was published by the International Organisation for Standardization, or ISO, which was founded in 1947 as a non-governmental organisation dealing with international standardization issues). In the early 1990s, this successful approach was also used for developing Environmental Management Systems, with the national British Standard BS 7750, established in 1992 as the first example. In the same year, the Earth Summit in Rio de Janeiro, which would become famous for Agenda 21, took place. A group of environmentally conscious businesspeople proposed to develop an international standard for Environmental Management as the contribution of business to sustainable development. The result was published four years later, in late 1996: the international standard ISO 14001 "Environmental Management Systems". In the meantime, the European Commission had been developing its own standard, also based on BS 7750, the "Eco Management and Audit Scheme" (EMAS) published as regulation (EC) no. 1836/93 in 1993. This regulation included some additional requirements in comparison to BS 7750 and later to ISO 14001, e.g. the requirement of publishing an environmental statement for the general public. Following the first revision of EMAS, which took place in 2000, EMAS now includes ISO 14001, but still contains additional requirements like the publication of an environmental statement. After several revisions,

the 2009 edition (ISO 14001:2009) is the worldwide established standard for Environmental Management Systems, and the European regulation EMAS was also published in 2009 as EMAS ed. III (regulation EC no. 1221/2009). What these recent standards and regulations require in detail, we will see in chapters 3 to 6.

Environmental management systems, ecolabels and other approaches

The focus of **environmental management systems**, as described above, is the management of an organisation's environmental issues. Environmental management systems focus on the production of products and services. There are no minimum performance requirements other than compliance with legal requirements – companies have to behave according to the law. This means that continual improvement of environmental performance is required. Where to improve is the decision of the company itself – of course they should invest their time and money where their effort would yield most results. **Ecolabelling** is a labelling system for products. For ecolabelling, the product or service must meet a series of mandatory criteria specific to the labelling system. Some well-known ecolabels are, for example, the Nordic Swan in Nordic countries, the EU-flower and the German Blue Angel. Ecolabels are thus complementary to Environmental Management Systems as they promote products and services which are environmentally friendly.

More information about ecolabels:

EU-Ecolabel: http://ec.europa.eu/environment/ecolabel/about_ecolabel/ what_is_ecolabel_en.htm
Nordic Swan: http://www.nordic-ecolabel.org/
Blue Angel: http://www.blauer-engel.de/en/index.php

As well as Ecolabels, there are other approaches to environmental protection that may be relevant for Environmental Management Systems. Some of the most relevant of these approaches are:

Eco-design: Taking environmental concerns into account during product development and development of production processes is most effective, as the biggest part of the environmental impact of production and products are decided at this stage. Eco-design can be a process or part of processes considered in Environmental Management Systems, and may lead to Ecolabelling when applied to product development. Some of the most interesting subsets of eco-design is cradle-to-cradle (designing products in a way they can be introduced into the biological nutrient cycle, turning "waste" into "food" for the next cycle) and biomimicry (imitating nature's best ideas in technical processes and products). More information: Cradle to cradle - http://epea-hamburg.org/en/home.html; Biomimicry - www.biomimicry.net.

Life cycle assessment (LCA): Considering the environmental impact of the whole life cycle of products is a tool for eco-design as well as choosing the best production equipment and methods. Life cycle assessment considers the environmental impact of all stages of product life, from raw material production to end-of-life impacts (recycling, incineration, etc.). Life cycle assessment or simpler forms of assessing the environmental impact of processes and products may be part of eco-design and procurement processes. More information: Life cycle analysis is dealt with in the ISO 14040 series of standards.

Sustainable procurement: Considering environmental impacts during the procurement process is a requirement of Environmental Management Systems, and may promote the implementation of Environmental Management Systems and ecolabelling by suppliers. More information: http://www.iclei-europe.org/index.php?id=procurement

Green financial planning: Methods for considering the true costs of activities related to the environment. Very often, organisations do not consider the full costs related to environmental activities, e.g. monitoring expenses, record keeping and monitoring, permit requirements etc. For example, when dealing with dangerous substances forward planning for the necessary costs for protective measures, equipment and training may reveal that more expensive harmless substances turn out to be less expensive than the "cheap" dangerous alternatives.

Also intangible cost and benefits, e.g. future liability costs, consumer response and employee relations should be considered.

Other known approaches may be used to report the environmental impact of an organisation. These measures are very often also used to report the environmental impact of whole industries, countries etc. For example:

Carbon footprint: Total set of greenhouse gases caused by an organisation, product or event.
More information: Carbon Trust – Measure my carbon footprint, http://www. carbontrust.co.uk/cut-carbon-reduce-costs/calculate/Pages/Default.aspx
The carbon footprint is a subset of the…

Ecological footprint: Measure of demand of an organisation, industry, country etc. on the ecosystems of the earth. It represents the amount of biologically productive land needed to generate the resources and absorb the waste of a specific organisation, industry, or country. It is important to note here that the ecological footprint of human beings is actually around 1.4, meaning that we use ecological services faster than they can be renewed – our way of production and consumption is thus not sustainable.

More information: Global Footprint Network, www.footprintnetwork.org

2. Benefits of an Environmental Management System

An Environmental Management System is a systematic management approach for dealing with environmental issues. As such, it complements and reinforces a systematic approach to the general management of an organisation; and organisations with sound management generally have a better performance through a proactive and comprehensive approach to addressing aspects of its operations. The opposite of systematic management is reactive decision making – fix things when they break, figure out what to do when there is a threat of fines and lawsuits or being undercut by more efficient competitors. Reactive decision making is seldom good management. In some cases, organisations introduced Environmental Management Systems because they already had a good management system in place; in other cases the Environmental Management System led to better general management showing the way to general improvement of operations, and introducing good management practices where they did not exist before.

In the case of Environmental Management Systems, there are also specific benefits: cost savings, preparing the organisation for tomorrow's markets, improved relations to authorities, risk minimization in terms of environmental liabilities, improved motivation of employees as well as improved occupational health and better environmental performance.

Cost savings: Environmental Management Systems require pollution prevention practices that in many organisations generate financial savings. In a production plant without prior environmental activities, often half of the pollution can be prevented with little investment and simple process improvements or "good housekeeping" activities. In European countries, reduced discharge fees and fees for waste disposal often are much higher than the cost of the pollution prevention activities, thus generating financial benefits. Also activities and technologies for improving energy efficiency, like efficient lighting systems and efficient electric drives and pumps are very often cost effective, meaning that they generate cost savings.

Examples: In the UK, a regional waste minimisation initiative conducted detailed investigations into waste costs. The results have consistently surprised the

companies involved - mainly small to medium companies from the engineering, building materials, textiles, food and brewing sectors. These companies had put their total waste costs at about £ 500,000 a year but this covered only collection and disposal. When, as a result of the initiative, raw materials, energy and other previously overlooked factors were included, the true figure which emerged was £ 13 million, or 4.5 % of the companies' combined turnover. Overall, potential savings of £ 3 million - nearly 25 % of waste costs - were identified, many of which could be achieved with no capital outlay (source: UK Department of Trade and Industry and Department of Environment Environmental Technology Best Practice Programme Guide 25: Saving money through waste minimisation).

A USAID study of 43 pollution prevention projects in Polish chemical industry showed that simple housekeeping practices, materials substitutions and technology changes that meant an investment of $ 1,500,000 resulted in a first year return of around $ 7,000,000; payback periods ranged from less than a month to around two years (source: Nicholas P. Cheremisinoff, Green Profits).

Risk minimisation: Systematic risk management is a general task for every organisation, and an Environmental Management System will support the management of risks from and to the environment that may pose a risk for the future of the organisation itself, e.g. through non-compliant releases into the environment or accidents that may lead to environmental liabilities or damaged reputation. The initial environmental review (see chapter 4) is also an assessment of environmental risks, as it evaluates the consequences and the likelihood of environmental impacts. The resulting action plan and other activities to implement the EMS (see chapter 5) provide tools to manage these risks, striving to reduce both their likelihood and their negative effect. Compliance with legislation: Organisations in Europe, especially those involved in production, operate in a highly regulated environment: there is complex environmental legislation with which they must comply. More environmentally dangerous activities need environmental permits. For an organisation, compliance with environmental legislation is an important task as non-compliance may lead to liabilities and legal consequences for the legal representatives of the organisation – its top management. Environmental Management Systems help to ensure legal compliance, as they provide a framework to identify relevant legislation and applicable requirements and to control the compliance within the organisation. This systematic approach to legal compliance will also help to improve the organisation's relations with environmental authorities.

Better relations with the general public: As the activities of non-governmental organisations and public protests against projects that may harm the environment prove, changes

in society are occurring on a global and local level. The Aarhus Convention helps the public to have a say in political decisions that affect the quality of this environment, giving the public access to information, the right to participation and access to justice on environmental matters. "Stakeholders" like residents, interest groups, media, customers and any other group or individual with an interest in an issue are now part of the reality of an organisation, and the best way to deal with them is to gain their confidence through regular and trustworthy information and communication. The Environmental Management System will help you to prepare the data and information you need for this communication process, while certificates and regular reporting will support the process of gaining trust.

Improved motivation of employees: One of the more unexpected results of surveys of organisations that have implemented Environmental Management Systems is the improved motivation of employees. Employees benefit directly from side effect as improved occupational health and safety conditions, but they also care for the environment. Many young students with high potential do not want to work for a future employer with a bad environmental reputation; and BP had problems to retain highly qualified employees after the Oil Spill in the Gulf of Mexico in 2010. An Environmental Management System thus may attract talented individuals to work for your organisation.

Preparing the organisation for tomorrow's markets: There are two main pressures that will change tomorrow's markets: Firstly, the limits of the natural world – issues like global warming, water scarcity and loss of biodiversity – will constrain business operations. Secondly, businesses face a growing spectrum of clients who are concerned about the environment. Those businesses which best meet and find solutions to these challenges will beat their competitors. By raising environmental awareness inside your organisation, an Environmental Management System will help you to implement the necessary steps like eco-design in order to develop processes and products that will be adequate for tomorrow's markets, which will be more concerned about the environment.

➔ The benefits of Environmental Management Systems are convincing: At the end of December 2008 (the most recent figures currently available) at least **188,815 ISO 14001 certificates** had been issued in 155 countries worldwide, 40 per cent of them in China and Japan (source: ISO Survey 2008). In June 2010, **4,507 organisations with 7,709 sites were registered with EMAS**, with Germany (1,405 organisations), Spain (1,227 organisations) and Italy (1,035 organisations) as the leading countries. Czech Republic, for example, had 26 EMAS registered companies (source and quarterly updated numbers: EMAS helpdesk, http://ec.europa.eu/environment/emas/documents/articles_en.htm).

3. Environmental Management Systems: ISO 14001, EMAS and their basic concepts

The full title of the current versions of Environmental Management Systems are **ISO 14001:2009 Environmental management systems – Requirements with guidance for use and Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme**. As mentioned earlier in this document, EMAS includes ISO 14001 and has some additional requirements. Both systems can be used for certification or registration of an environmental management system, but also as a helpful tool for organisations not needing or wishing to register or gain certification. As ISO 14001 is the basis for both standards, we will discuss the ISO 14001 approach and requirements and include additional EMAS requirements where relevant.

ISO 14001 is based on the basic steps of continual improvement known as the Plan-Do-Check-Act (PDCA)-cycle:
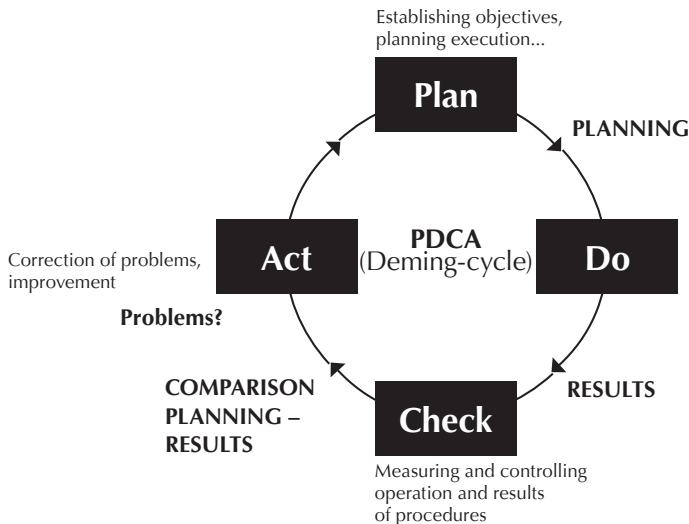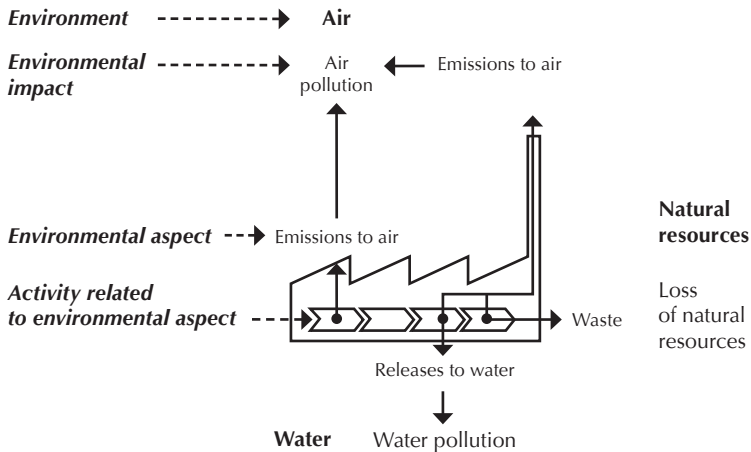

The PDCA cycle was introduced by W. E. Deming, therefore it is often called the Deming-cycle.

For each of these P-D-C-A-steps, ISO 14001 defines minimum requirements that must be fulfilled if an organisation wants certification. As these requirements reflect the basic steps of good management practice, they should be considered by all organisations, even if they do not aim for certification. The ISO 14001 requirements are aimed to manage and control the **significant environmental aspects** of an organisation. Therefore, the first element of ISO 14001 implementation requires an organisation to assess the current situation and to identify the environmental aspects that have, or could have (e.g. in the case of an accident) a significant environmental impact.

Environmental aspects and impacts

Let's see in detail what is meant by environmental aspects and impacts. The **significant environmental aspects** (elements of an organisations activities, products or services that have or could have a significant impact on the environment) are the heart of the Environmental Management System. To that end, they must be managed properly by the organisation by establishing objectives and targets, by controlling and monitoring and measuring activities associated with them and their performance. The **environmental impact** is any change to the environment caused by the activities of the organisation. An impact may have a positive or negative effect on the environment. The relation between aspect and impact is thus that of cause (aspect) and effect (impact).

Environment - - - - - - - - →	**Air**
Environmental impact - - - - - - - - →	Air pollution ← Emissions to air

Environmental aspect - - → Emissions to air

Natural resources

Activity related to environmental aspect - - - → → Waste

Loss of natural resources

Releases to water

Water Water pollution

The relation between environmental aspects and impacts is that of cause and effect.

Other **planning** requirements are to establish an environmental policy as a kind of vision that guides all the other activities that follow; to identify relevant environmental legislation and requirements that the organisation must comply with, to determine exactly what the organisation wants to achieve by setting explicit objectives and targets and to work out in detail the best course of action, resulting in an action plan called management program.

➔ You will find more details of the planning elements in chapter 4.

Besides carrying out the action plan, there are more requirements for the DO of the PDCA-cycle, found in the part "implementation and operation" of ISO 14001. They include that management must ensure the availability of necessary resources, that roles, responsibilities and lines of authority for dealing with environmental aspects are defined, that employees and other persons working for the organisation are informed and trained, that proper communication is ensured, that there is a procedure in place for control of necessary documentation and that all operations associated with significant environmental aspects are planned and carried out under specified conditions, e.g. following a documented procedure. Furthermore, the organisation must identify potential emergency situations and accidents and plan for how they will react to them.

➔ You will find more details of the operational requirements in chapter 5.

The "checking" part of ISO 14001 requires that an organisation monitors and measures the key characteristics of operations with significant environmental impact, e.g. their performance and that it evaluates regularly the conformity with legal requirements and ensures the regular execution of internal audits. If these checks (or other sources, like communication from employees) result in discovering problems (non-conformities in the language of the standard), the organisation must "act", which means taking corrective and preventive action. The final point of ISO 14001 requirements is the management review, a regular strategic evaluation of the management system by the top-management.

➔ You will find more details of the check and act elements in chapter 6.

➔ EMAS additionally requires that the identification and evaluation of environmental aspects is done in an environmental review, defines obligatory core environmental performance indicators for measuring the environmental performance, requires active participation of employees and open dialogue with the public, which includes the development of an environmental statement.

Pros and cons of certification

An EMS is not about ISO 14001 certification or EMAS registration; it is about improving the environmental performance and the efficiency of an organisation. As every organisation is unique, its EMS must be tailored to their specific requirements and the EMS requirements translated into the most appropriate approach for every company. The danger of striving for certification is to misunderstand the ISO or EMAS-requirements as a "one-size-fits-it-all" prescription, and let go of the individual adaptation to company requirements. However, the advantage of certification is to have a clear goal for the implementation project and an external verification of compliance with a proven general model of an Environmental Management System, adding credibility to the approach.

An organisation may thus aim for a limited EMS in order to ensure compliance with environmental legislation and minimize the risk of environmental liability, or be interested in a fast ISO 14001-certification or EMAS registration because of client requirements. Or it may start with an individual approach that it gradually expands to full conformity and certification/verification.

➔ You will find more on the certification process in chapter 7.

4. EMS Planning Elements

From the experience of many years of implementing environmental management systems in organisations, it turns out that it is best to start with the identification of legal and other requirements (ISO 14001 4.3.2): You can than use the environmental review to check whether you comply with these requirements or not. As the identification is also part of the environmental review required by EMAS for the identification of environmental aspects, we will follow the EMAS approach and treat both points together as "environmental review".

4.1 The Environmental Review

ISO 14001 requires you to identify environmental aspects of activities, products and services; EMAS specifies that this must be done by an environmental review defined in annex I of the EMAS-regulation. This annex requires:

4.1.1 Identification of the applicable legal requirements relating to the environment.

Applicable legal requirements are those requirements that come from a law or regulation (from all levels, from federal to local level), deal with environmental protection and are applicable to the infrastructure and/or the activities of the organisation. "Other requirements" are those that the organisation has signed on another base, e.g. commitments to reduce their greenhouse gas emissions or contractual requirements regarding the environment.

How to identify applicable legal requirements

It is often difficult to keep yourself informed of all legal requirements that affect your organisation, but there are now many places where you can find this information. There are helpful websites and books, but in a more complex organisation, especially businesses with production activities, you may need the help of a consultant (see chapter 8).

If you are new to the field, a good starting point is the European ECAP (Environmental Compliance Assistance Programme for SMEs) website: http://ec.europa.eu/environment/sme/index_en.htm

On the ECAP website, you find two boxes that may be interesting to you: "Understand key environmental legislation" and "Find out where to get information close to me". The legislation box leads you to detailed information about European legislation about air quality, waste, water, soil etc., and you'll find links to relevant legal texts. However, European directives must be transformed into national legislation which is directly applicable to organisations, and you should look for the relevant information for your country on the internet. A good idea is to start by looking at the website of your environment minister. (No more detailed information can be given here, as this guide covers all of Europe and websites are country specific, but any internet browser will help you to find the relevant sites for your country.) Another good idea may be to contact authorities, business associations and chambers of commerce and industry.

- The **competent authorities**, e.g. national or regional Environmental Protection Agency, local water authorities, etc. often provide information on request and are also informed about changes in environmental legislation.

- **Chambers of commerce and industry**: Some chambers of commerce publish information on legislation relevant for the industry in their bulletins.

- **Publications of industrial associations and federations/trade journals**: Some industrial associations refer to sector-specific amendments to legislation in their publications. Trade journals publish amendments to legislation if these fall within the subject area of the journal.

Once you have identified a source ensuring access to legal texts, you will have to check if they are applicable to your organisation. If it is, you must look for the requirements you must meet. We recommend you to prepare a register of legal and other requirements, containing information about the legal text, the requirement and the infrastructure or activity of your organisation concerned.

Legal text (title)	Requirement	Concerned infrastructure/activity

What exactly is "compliance"?

An organisation complies with environmental legal requirements if:

✓ it respects all laws and regulations of relevance to their organisation
✓ non-compliance with legislation is accepted by the competent authority, for example by way of a special approval, a remediation order with a transitional period, or with some form of documented or written approval.

4.1.2 Identification of environmental aspects of the organisation

As seen above (chapter 3), this means that the organisation understands which are the elements of its activities or products or services that cause a change to the environment (= an environmental impact). **Typical environmental aspects** to consider are:

- Emissions to air
- Releases to water
- Releases to land
- Use of raw materials and natural resources (water, energy, land)
- Energy
- Waste and by-products
- Physical attributes (size, shape, colour, appearance, ...)

In organisations, like banks, insurance companies and for example, nature protection organisations, where these direct impacts are not the most important, indirect environmental impacts should also be considered. In the case of a bank, this can be the **environmental impact** a project financed with a bank loan has; in the case of a nature protection organisation, this could be the environmental impacts of projects run, e.g. a conference. Depending on the nature of the project considered, the influence of the member organisation on this impact can be very different – it may be totally under control of the member organisation, or only partially. But even if the influence is limited – e.g. in a conference, when nobody can control what participants will do with the knowledge acquired – we can suppose that a better quality of the work – in the case the conference – may improve the positive results for the environment.

There is no standard way to identify significant environmental aspects. However, there are two widely used ways to do it. Ecomapping is often used in small and medium organizations, bigger corporations which are too complex for ecomapping often use a process-oriented approach.

Ecomapping

Ecomapping has been developed by Brussels-based eco-consultant Heinz-Werner Engel as a simple, visual tool for scanning environmental good and bad practice, problems and impacts of an organisation. Ecomapping is based on a simple map of the site. This plan is copied several times, acting as the basis for different ecomaps (water, air, energy, ...). Then you walk around and gather information on the shop floor, recording it in the ecomaps. This simple approach is easy to understand and enables you to get more people involved at an early stage of the environmental management systems without needing a huge amount of specialist understanding.

There are 10 steps in Ecomapping:

1st step: Prepare the maps – one satellite map of the site, seen from above, including the entire terrain including car parks, access areas, roads and the surrounding environment (you may use satellite maps from the internet to prepare this map) and a outline of the building(s) to scale, showing the interior spaces (if your organisation doesn't have such a map, an escape route plan is a good base). Copy the outline map 6 times, and designate each map to be one of the following ecomaps: water/wastewater, chemical products, air/odour/noise, energy, waste, risks.

2nd step: Input-output-analysis – check the quantity and quality of raw materials and other products, energy and water entering your organisation in one year and the quantity and quality of products, services and wastes and emissions leaving your organisation during this time. The result will be an overview over inputs and outputs of the organisation.

If possible, identify the nature of the products, noting if they are eco-labelled or recycled, dangerous for the environment or for health and safety.

3rd step: Opinion poll – Ask the employees of your organisation about their perception of environmental problems. Ecomapping contains a model questionnaire which should be adapted for your organisation. Do this and distribute it, asking your colleagues for a quick and intuitive response – one cross per question in two minutes. Collect and summarize the answers. A spreadsheet like Excel may help you to visualize the results. Investigate the activities and aspects rated as worst by the employees, and have a closer look at them when you walk around the shopfloor with your eco-maps.

4th to 10th step: Mapping the site – Start with the **satellite map**: Put in everything that interacts with the environment in the outdoor parts of the organisation and that regards the interaction between the site and the neighbourhood and the rest of the world, e.g.

car parking (potential oil spillage), traffic generated by your employees and activities, public transportation, gardening and landscaping (useful biotopes, pesticide use, etc.), conflicts with neighbours, etc. Be sure to take into account the environmental impact of your activities on this map.

After this, map the indoor activities using the six eco-maps. Do one map in a time, as focus on a single item helps you get valuable information.

Eco-map water: Where does your water come from? Where does waste water go? Where do you have water consumption, where are hazardous products poured into the sewer? Which materials which are dangerous for the water could be substituted? Where do you find wastage and bad habits? Where could you save money?
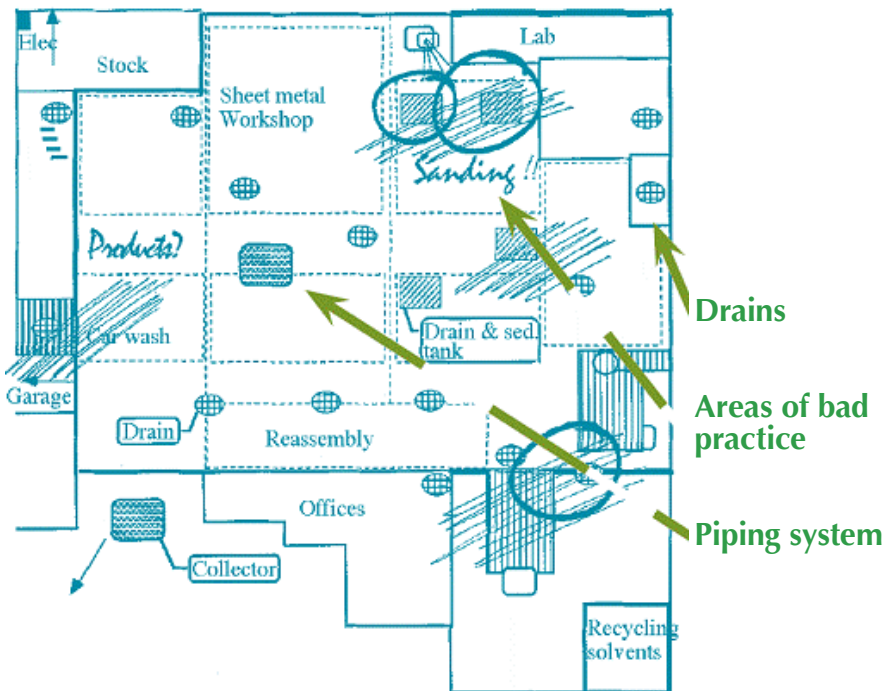
Ecomapping is a visual tool for representing the physical reality of an organisation and identifying environmental hot-spots.

Eco-map chemical products: Observe storage areas (is there an oil tank?): is storage safe? For dangerous substances, are there material safety data sheets available? Are procedures in place for safe handling? Could dangerous substances be substituted? How are leftovers of dangerous substances disposed of? Is there a history of leakages?

Eco-map air, odours, noise, dust: Where are the main emissions poinst (heating system, kitchen extractor fan)? Is maintenance work carried out regularly? Sources of noises and odours?

Eco-map energy: Points of energy consumption (quantify, if possible)? Type of energy and energy efficiency (good/ok/bad)? Wastage of energy? Good practices, bad practices?

Eco-map waste: Where is waste generated? In what quantity? Are there dangerous wastes? Location of bins and container? Waste separation ok? What measures are in place to reduce waste? Good practices, bad practices? Total quantity of waste? Where is the waste going? Is recyclable waste recycled?

Eco-map risks: Where are risks of pollution as a consequence of an incident or accident (e.g. leakage of dangerous substances? Where are risks related to fire, e.g. dispersion of toxic products and explosion? Are emergency procedures in place? Risk areas marked?

These maps are a register of the environmental aspects of your organisation. If an organisation wants a simple and light Environmental Management System, it can now decide which problems are most urgent to solve and develop an action plan. If, however, the organisation wants to go for a certification, this information must be organized. The same people that developed ecomapping also developed a system called EMASeasy, a toolbox of seven different templates that help small organisations to fulfil the ISO 14001/EMAS requirements in a way that external auditors can recognize.

EMASeasy

The templates of EMASeasy include:

✓ **FLIPO** a small procedure to use the different information streams coming from ecomapping to filter and rank activities with significant impacts;
✓ The **one sheet of paper procedures** of ISO 14001;
✓ The **eco-logbook** to record events, documents, communication and training;
✓ The integration of internal audits, controlling, measurements, evaluating good

housekeeping and corrective action in one compact worksheet (**quick-check**);
✓ Environmental control panels to frame management reviews.

An **EMASeasy brochure** in 20 European languages can be downloaded free on the EMASeasy website www.emas-easy.eu (registration required). On that website, you also find a list of certified EMASeasy consultants.

Process-oriented approach

In big companies with lots of space a map may not be the best way to organise gathering of environmental information, they often use a process approach. Start with selecting an **activity, product or service** large enough for meaningful examination and small enough to be sufficiently understood

Identify environmental aspects of the activity, product or service. Here you should consider the aspects mentioned above and normal/abnormal conditions and the case of emergencies. Do also consider the stipulations of ISO 14004 "Environmental Management Systems - General Guidelines on principles, systems and support techniques" to obtain supplementary information for the initial environmental review as well as for the identification and evaluation of environmental aspects.
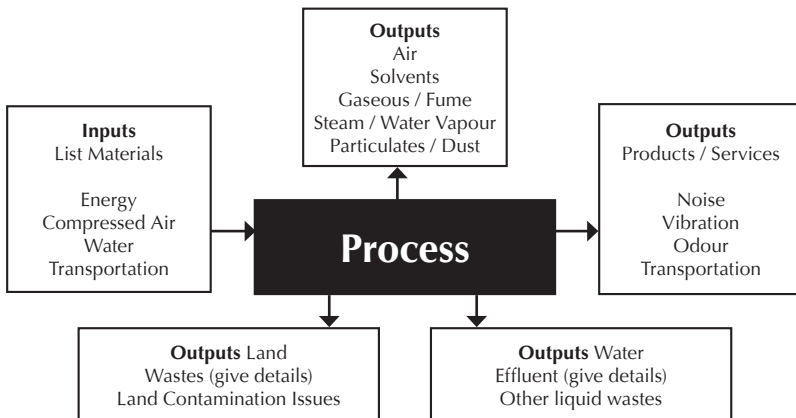
The classical approach to the identification of environmental aspects is connected to business processes and activities.

Identify environmental impacts, considering actual and potential, positive and negative impacts associated to each aspect. Draw on the following example:

Activity, product, service	Aspect	Impact
Activity - Handling hazardous materials	Potential of accidental spillage	Contamination of soil and/or water
Product - Product refinement	Reformulation of the product to reduce its volume	Conservation of natural resources
Service - Vehicle maintenance	Exhaust emissions (CO2 emissions to atmosphere)	Reduction of emissions to air

Evaluate significance of impacts, considering environmental concerns, e.g. extent of the (environmental) impact, severity of the (environmental) impact, probability of occurrence, duration of impact etc… but also the economic concerns, potential legal risks and problems, costs related to the modification of environmental impacts, concerns of interested parties, effect on public image, etc.

People using EMASeasy can seek assistance from the "FLIPO" template, which connects the environmental impacts and evaluation criteria. (The name of the template, "FLIPO" represents the proposed evaluation criteria: flow, legislation, impact, practices and workers opinion). In a workshop, the organisation evaluates the environmental impacts against these criteria with 1 to 3 points per criterion. The resulting total is a measure for the significance of the environmental aspect. Thus, the organisation has **identified their significant environmental aspects**.

4.2 Environmental policy

The environmental policy states the commitment of the top management – the person or group of people with executive responsibility – to the environment. It is a strategic document and a key tool in communicating the environmental priorities to employees at all levels, as well as to external stakeholders. This policy should serve as the **foundation** for the EMS and provide a **unifying vision** of environmental concern by the entire organisation stated and signed by the top management. It should of course be in tune with the organisation's overall corporate policy and be relevant to the organisation's activities and environmental aspects.

The environmental policy must include 3 key commitments:
✓ Continual improvement
✓ Prevention of pollution
✓ Compliance with relevant laws and regulations

Beyond that it must relate to the activities and significant environmental aspects of the organisation. There is no use in copying good-sounding policies of other companies. The organisation probably has some type of environmental policy, **even if not laid down in writing**. For example, the organisation could be committed to complying with the legal requirements in order to avoid major environmental problems. Documenting existing commitments and goals is, therefore, a good starting point. After assessing current practice, have a think about where you would like to go. This step is best done in a workshop, posing two **key questions**:

- Why are we committed to the environment?
- What are we trying to achieve?

Given its importance, the policy should be more than just flowery prose. It should be a clear concise vision of the environmental future, not longer than one page of paper. It should be ambitious, but not unrealistic. Always consider how you would **demonstrate** that you are living by the commitments laid down in the policy. This is a good test of whether or not the policy is a 'living document'. If you choose to use phrases such as "We are committed to excellence and leadership in protecting the environment", how would you demonstrate that such a commitment is being met? Whether or not the organisation meets the commitments of the environmental policy and can demonstrate this will also be one of the key questions in the certification audit. The environmental policy is a key measure for any external auditor. The norm is generic; the environmental policy is unique to an organisation and as such should be laid down in writing to fit a given organisation's need.

→ Examples for environmental policies you find on the websites of ISO-certified or EMAS-registered organisations.

Everyone in the organisation should **understand** the policy and what is expected of him/her in order to achieve the organisation's objectives and targets. **Make sure that your employees understand the policy.** Incorporate the policy into training sessions and materials, and refer to the policy at staff or all-hands meetings. Test awareness and understanding from time to time by asking employees what the policy means to them and how it affects their work.

4.3 Environmental objectives and action plan

As an Environmental Management System promotes systematic management, strategic priorities for improvement have to be set. Without objectives and targets, the environmental policy will probably not have any value! Objectives and targets turn the theory of the policy into shop-floor practice. They mark the goals to be achieved and

the 'milestones' on the way, by providing the general outlines for the management of environmental aspects.

Objectives and targets

Most organisations treat 'objectives' and 'targets' as largely interchangeable. However, looking at the definitions of ISO 14001 you will find that objectives are overall goals, and targets mean a series of stepping-stones towards these goals. In either case, both elements should be measurable wherever possible.

The environmental management programme(s) is/are an adequately resourced action plan(s) to bring the objectives and targets to life. The management programme is an antidote to dealing with environmental issues as they arise.

You will start to define objectives based on your environmental policy, the list of significant environmental aspects of your organisation and the result of the evaluation of compliance with environmental legislation and regulation, giving priority to significant environmental aspects and legal non-conformities.

However, this prioritisation may not translate directly into the issues addressed in objectives, because environmental objectives can become the art of the possible, rather than the desirable. They must, therefore, be furnished with business goals and financial means. For example, you may have evaluated an environmental aspect as highly significant, but an improvement would require the purchase of new technology that is not economically feasible at the moment. In addition, when deciding about objectives and targets, you should also consider psychological aspects - it may be worth taking action in these areas where feedback from employees and/or stakeholders indicates particular problems.

The objectives that you define should be SMART, standing for:
- Specific: Focus on important performance factors; avoid broad expressions like 'being more environmentally friendly'.
- Measurable: Remember: What cannot be measured cannot be managed. As a consequence, objectives must be quantitative in order to be measured. Plan measurement carefully so as to gain feedback on progress.
- Achievable: If your objectives are set too high it is unlikely that they will be realised and this will de-motivate those involved.
- Realistic: If, on the other side, objectives are set too low, the organisation will under-

utilise its potential and perhaps be lulled into a false sense of security. You should also avoid setting too many objectives.

• Time-bound: In addition to being measurable, your objective must also have a fixed deadline by which it must be met.

➔ EMAS requires additionally that an organisation with an EMS demonstrates better environmental performance evaluating its performance against objectives and targets. If your objectives and targets are based on significant environmental aspects, it will not be a problem to demonstrate this performance improvement.

Action plan

• When deciding on the best way to realise your objectives you should draw on knowledge and experience existing at different levels of your organisation. Remember that technical measures are not the only way of achieving your goals! You should also consider organisational and communication measures, e.g. awareness building and training.

• One secret of project management is to start at the end. Walking backwards from your goal to the start, you can see all the steps along the way. Prepare a list of all the different measures suggested. Eliminate clearly impractical options. You should define different criteria that can be used to evaluate proposed measures and to identify the most appropriate measures. Consider measures in terms of:

• effectiveness in reducing or eliminating the impact in question,

• resources required in terms of time, money, personnel, knowledge, technology etc.

• You can also consider potential for cost-savings and return-on-investment or payback periods.

• A timeframe must be set for each measure. These schedules should be realistic. It is important to get feedback from the employees responsible for implementing the different measures on how realistic they think the deadlines are.

• Your environmental programme should specify the person(s) responsible for implementing the different measures. When allocating responsibility you should ensure that the person in question has the knowledge and skills necessary to carry out their tasks.

5. EMS Implementation and Operation Elements

This is where the Environmental Management System ceases to be a paper entity and makes direct contact with day-to-day operations of the organisation. So don't be surprised to find a large number of sub-clauses in this part of the specification. Reviewing existing methods and procedures carefully, by adding to what is already there, will enable you to minimise the number of additional procedures and methods – and thus, your workload and the risk of your staff forgetting new procedures. You will find the requirements in ISO 14001 section 4.4:

DO - Relevant ISO 14001 sections:

4.4 Implementation and operation
4.4.1 Resources, roles, responsibility and authority
4.4.2 Competence, training and awareness
4.4.3 Communication
4.4.4 Documentation
4.4.5 Control of documents
4.4.6 Operational control
4.4.7 Emergency preparedness and response

Resources, roles, responsibility and authority

The first essential element is a framework of people with **EMS assignments** at different levels and in different departments of the organisation. At the centre (or top) of this framework is the person assigned to coordinate the EMS operations and to report to the top management (the ISO 14001 term for this person is "management representative"). In small organisations, the management representative may have other tasks in some area of routine operations, in mid-size organisations s/he is often also the coordinator for other management systems, as quality or occupational health and safety management systems. Large organisations often install an EMS committee headed by the coordinator to share the ongoing work. Responsibilities can be documented as job descriptions, in list form or in other forms. EMASeasy offers a "responsibility matrix" to document responsibilities. Responsibilities must be communicated: everybody should know her/his own role and that of other employees in order to make the EMS operate smoothly.

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How to choose a management representative for the EMS

In ISO 14001 and EMAS, there is no formal training requirement for the management representative. Of course, as for anybody working in the EMS, the management representative must be competent (see next chapter). There are two basic possibilities:

✓ The management representative comes from the existing staff. Advantage: Good knowledge of infrastructure, operations and formal and informal structures of the organisation. Disadvantage: May need some training about environmental management.
✓ Hire a person with adequate training to be the management representative. There are university courses for environmental engineers etc. that include environmental management. Advantage: Theoretical knowledge available. Disadvantage: Must learn about infrastructure, operation, formal and informal structures of the organisation.

Most organisations will not assign a newbie to a responsible task like coordination of a management system. However, another important criterion besides technical knowledge should be taken into consideration: social skills. As the environmental coordinator depends on the cooperation of other employees in the organisation, her/his communication and social skills will probably be the most important factor of success. Technical assistance can be ensured through an external consultant (see chapter 8).

Competence, training and awareness

The activity of every employee has an impact on the environment. Reducing environmental impact means changing behaviour. Changing behaviour requires awareness of what should be done, motivation to do it and the capability to do it – which may mean the acquisition of new skills. Therefore, training, awareness and competence are vital for the implementation of an EMS. It is about providing the knowledge to enable employees to recognise their role and to understand why their action matters, to increase employee commitment and to help them acquire the skills they need to achieve better performance.

Two specific points are addressed in this section of the norm:
✓ Baseline trainings that cover all employees, including the following issues
 - the importance of the environmental management system and of the new procedures

improving environmental as well as health and safety performance
- the roles within the organisation of those achieving and maintaining the EMS
- the potential environmental impact of deviations from procedures (non-conformance)
✓ A specific technical and skills training for individuals and units that are responsible for activities or processes that may create significant environmental impacts (e.g. for those employees that maintain pollution control equipment).

The baseline training, or general awareness training, deals with basic knowledge about the environmental impact of industrial activities as well as focusing on good practices to be applied. It explains why organisations are motivated to become involved with environmental management, the internal framework for EMS, changes needed and what they expect from their employees and how they can participate. This training is normally done by the environmental manager her/himself.

Steps to a training programme

Step 1: Identify training needs: What are the competencies employees need (competence profile)? What is the current level of education, training and/or experience? Are there gaps between profile and competencies? Gaps = Training needs. Are you introducing new or revised procedures/work instructions for activities? New procedures = Training needs.

Step 2: Define training objectives: It is the aim of the training to develop new competencies. To this end, didactic support is required but it also requires finding means to develop and support changes in attitudes. This means you need to think carefully about our training objectives.

Step 3: Identify in-house training and external training programmes: A big part of training will be realised by your own personnel. A new production process will be demonstrated by the supplier. Other training programmes will be available outside your organisation. Check offers at professional trade associations, chambers of commerce and industry, government departments, suppliers etc.

Step 4: Implement your training programme:
Training programmes will only be effective if suitable training methods are selected. Depending on the desired training outcome, you can use different methods:

Lectures: Suitable to provide a general overview and to introduce new ideas. With a retention of 20 % one of the least effective training methods.

Group work/discussion: Participants are much more involved than during lectures, normally they retain 50 % of the information elaborated. It is important to structure group work and to visualize results.

Videos: A well-produced video can be an eye-catcher. But it is more frequently used as a light break in a training session than as an integral part.

Case study/role play: Excellent techniques to engage participants in activities during training, especially when addressing organisational changes and to develop interpersonal skills. With this method, you can reach up to 90 % of information retained by participants.

On-the-job training: Can be effective for activities combining knowledge, skills and techniques.

Step 5: Evaluate the results:

Learning from experience is a vital part of EMS. The key question for evaluating training results is:

Did the training achieve the objectives, which means: did the training improve the performance of the EMS thanks to the correct application of new procedures and work instructions?

➔ **EMAS** also requires active employee involvement in the EMS and proposes employee participation schemes at all levels of the organisation. They shall be involved in the initial environmental review, the establishment of the EMS, in the internal audit process, environmental committees etc.

Communication

To ensure an effective EMS, communication is the key. Information and decisions must be communicated at all different levels of your organisation and to people with different functions. Furthermore, communication from external sources must also be clearly communicated, and your own organisation must ensure that it is clear in its own external communications.

Three specific points are addressed in this section of ISO 14001. An organisation needs
✓ A procedure for internal communication with respect to the EMS
✓ A scheme for receiving and responding to communication from external parties
  (e.g. complaints from neighbours)

✓ A decision whether or not the organisation will communicate to external parties on its significant environmental aspects

For a systematic approach to communication, you have to define objectives, the contents and the type of communication (to inform, to instruct, to motivate or search for information). "To inform" means to provide employees with the facts required for their work. "Instructing" is more directed, usually with a specific purpose in mind. "Motivating" is about staff commitment, making them recognise the merits of the EMS for the business, the environment and themselves. "Search for information" describes all those events when you are not telling staff something, but when you are encouraging them to tell you, for example asking the right questions, or simply keeping quiet at the right time in a meeting so others have space to bring forward their ideas. This is about complementing top-down communication from management by bottom-up input from employees. Employees on the shop floor have the best knowledge in an organisation about what actually happens during day-to-day operations, what environmental impacts are caused and the reasons why this happens. They are thus a source of for improvements.

Normally, your EMS **external communication strategy** will be embedded into your general external communication strategy. A communication strategy means to define objectives, target groups, methods for communication (notice boards, sensitisation campaigns, journal of the organisation, site visits for neighbours, etc.) and resources.

➔ **EMAS requires an open dialogue with the public and other interested parties with regard to its environmental impacts.** This is the main difference between EMAS and ISO 14001. One of the key consequences of this requirement is that EMAS organisations are required to prepare an **environmental statement** that includes the environmental policy, a description of the significant environmental aspects of the organisation and their related impacts and a summary of data about the environmental performance. The requirements for the statement are given in annexe IV of the EMAS regulation.

Documentation and Control of Documents

Management systems sometimes have a bad reputation when it comes to paperwork (often ridiculed as "bureaucracy" or "paper tiger"), but documents have a crucial role, both, in terms of moving information and in providing information on what has happened in the past. Used like maps, documents can help to keep you and your organisation on course. Used as records, they can help to show where you have been and how you reached where you are. The danger in documentation is that it can be misused as wallpaper, used to cover the cracks of the management system.

Documentation should be kept at an efficient minimum. The litmus test for seeing if a document is a bureaucratic nicety or a necessary document is if you know why you need a document.

Three specific tasks are addressed under the EMS Documentation section of the ISO 14001:
✓ Description of the core elements of the Environmental Management System
✓ The description must demonstrate the interaction of these core elements
✓ The description must refer to related documents

How to organise the EMS documentation?

The standard does not impose any particular format. The development of an environmental management manual is one possible approach. The environmental management manual may refer to related documents, such as operating procedures and work instructions. That will depend on the extent of your documentation, and on your intention for external presentation (e.g., to interested stakeholders).

Operating procedures and work instructions

One very common form of documenting procedures are written **Operational Procedures**. Other instructions are documented in form of **Work Instructions**, which state how a particular job is to be carried out in detail. The latter prevent Operational Procedures from becoming overloaded with details. They can even aid to keep the documentation up-to-date, as it is easier to change a one-page Work Instruction than a multi-page Operational Procedure. Work Instructions may back up Operational Procedures. For example, an Operational Procedure on 'Waste segregation and handling' may be backed up by notices on the wall at each place where waste is created.

Control of documents

The primary purpose of document control is to ensure that only current documents are used and that old and obsolete versions are removed. Document Control ensures that actual documents are approved by the competent persons and distributed to the persons concerned where they are employed.

Four specific tasks are addressed under the Document Control section of ISO 14001:
✓ Define the scope of the document control system (which documents must be controlled?)
✓ Develop a document authorisation or approval system
✓ Ensure that only current versions of documents are used
✓ Outdated documents that need to be archived must be identified in a suitable manner

Your first task is to think thoroughly which documents needs to be controlled. Evidently, it is important that only current procedures and work instructions are used. But other documents are perhaps less vital, and the utility of document control will not pay for the effort. You may even decide that you implement different levels of document control for different types of documents, e.g. formal approval and controlled distribution.

The approval/authorisation system is to ensure that the distributed documents are adequate. A responsible person must approve these documents. Think how this approval will be demonstrated. On paper documents it may be a signature, while electronic documents may only be posted online after they have been approved.

Distribution: ensure that every person who needs the document gets a copy. For example: you need to control the distribution of information about new or changed legal requirements – that means you must plan who in your organisation must be informed about the changes. Distribution may be done physically (paper documents) or through posting the document in the intranet (electronic documents). But ensure that everybody who needs to be familiar with the new document knows where to find it. Remove old and obsolete documents; this is easy if you are using electronic documents. It might be a good idea to oblige the receiver of new documents to send back obsolete ones and confirm receipt of new ones.

If, for some reason or the other, you need to keep obsolete document versions, mark them 'obsolete' to avoid unintended use. Many organisations use stamps OBSOLETE DOCUMENT.

Operational control

Operational control is about carrying intention through to reality. To gain sufficient operational control over the operations and activities linked with the significant environmental aspects, you have to look at why you do what you do and think of new ways of doing it. This may be hard, because many of the current operational controls will either be based on 'common sense' or have evolved over a long period of time. It is now that you will hear the cry 'But we've always done it this way and it has always worked very well'. To ensure legislative compliance and conformity with your own stated policy, objectives and targets, the relevant operational controls must be in place. 'We've always done it this way' does not provide sufficient reason not to change it.

Three specific points are addressed under the Communication section of the norm:
- ✓ Identify the operations and activities that are directly associated with the significant environmental aspects.
- ✓ Develop procedures and operational criteria for these operations and activities.
- ✓ Communicate the procedures and operational criteria to suppliers of products and services that might interact with these operations and activities in such a way as to cause significant impacts.

Where do you need written procedures?

The aim of establishing operational control is not to end up with thousands of pages of procedures which detail how every activity should be carried out. The aim is to ensure that environmentally relevant activities are carried out in compliance with the established policy and objectives. By implementing standard procedures and practices (in form of work instructions) you will be able to respect the PDCA cycle of your EMS. This means planning, implementing and controlling all environmentally relevant activities. But remember that there are other possibilities to ensure operational control: during training, be sure to share with people examples of how operating criteria will help to manage significant environmental aspects. Whether you prefer to adopt procedures or operating criteria will depend on the culture of your enterprise, the qualification of employees, etc. You may also consider that written procedures or work instructions tell people how to do a job. Training teaches people how to do a job. Adequate training (with training records) is another way to achieve operational control.

Identify activities and processes related to significant environmental aspects and relevant to your environmental policy and objectives. Identify procedures that have already been established in these areas. Decide which procedures still need to be developed.

A procedure may be a simple pictogram, or an exhaustive statement of specifications for your supplier. **Documented procedures** are only required where their absence could lead to deviations from the environmental policy, objectives and targets. Use the format that is working best in your organisation.

Structure for documented procedures

You should try to develop a consistent structure that provides
- ✓ the aim of the procedure
- ✓ the activity to which it applies
- ✓ an explanation of the terminology (if necessary)

✓ the name and position of the person(s) responsible
✓ a description of the procedure
✓ related documents
✓ to whom the procedure is to be distributed

Emergency preparedness and response

The final element of ISO 14001 DO-requirements are procedures dealing with environmental emergencies. Incidents can definitely harm the environment – and an organisation's reputation.

Four specific points are addressed under the Emergency Preparedness and Response section of ISO 14001:
✓ Identify the possibilities for accidents and emergency situations
✓ Prepare emergency response procedures, including preventing and mitigating environmental impacts
✓ Test these procedures periodically
✓ Evaluate and revise response procedures regularly.

Possible accidents and emergencies may include fire, explosions, chemical spills or release of toxic or harmful gases as well as natural disasters like storms, floods, earthquakes. In a properly managed organisation, they should already be known due to occupational health and safety reasons, but it is a good idea to ensure your organisation has conducted the necessary analysis and is prepared for such events.

The prevention of emergencies should also be covered widely by health and safety procedures. However, you may want to verify if all environmental accidents and emergencies are covered, even if they do not represent immediate danger to people. An example of such accidents is spilling of liquids dangerous to water, which will not result in a direct threat to people by intoxication, but can pose a long-term threat to the ground water in the surrounding area. An adequate emergency prevention would be to install and regularly control a retention system.

Emergency procedures

Emergency procedures should be written as a list of short, sharp statements that can be clearly understood. You can even use a larger and bolder typeface than usual. If they are ever required, the reader will not have time to 'digest' complicated sentences.

If possible, procedures should be periodically tested, e.g. fire frills or a mock situation. If you have a real emergency, hold an after-action check to see how well the procedures worked, and revise them if necessary in the light of experience.

6. EMS Checking and Problem Solving Elements

Once your management system is implemented and operating, you will need to monitor your performance, both in terms of procedures and practices and environmental aspects. If there are any deviations from planned procedures or expected results, you will have to act upon these, in order to ensure that you meet your objectives.

The checking elements may be divided into 'day-to-day' operations and the 'big events', the periodically – at least once a year – conducted environmental management system audits and management reviews.

Monitoring and measurement means that you should think about how to monitor your significant environmental aspects and the operations related to them. This clause includes requirements to maintain and calibrate your monitoring equipment at appropriate intervals, as well as to regularly evaluate compliance with relevant legislation and regulations (e.g. the regular communication of the results of your waste water monitoring to the authorities, if this is required in your environmental permit).

Three specific tasks are addressed under the Monitoring and Measurement section of the norm:

✓ Track the performance of the EMS with respect to the significant environmental aspects (with records that document the environmental performance)
✓ Ensure accurate and reproducible measurements through maintenance and calibration of monitoring equipment (records)
✓ Evaluate regularly compliance with relevant environmental laws and regulations.

In order to monitor the significant environmental aspects, you must think about which reference data to use for this task. Relative indicators (like energy consumption per unit of output), rather than absolute figures (like total energy consumption per year), are most widely used, because indicators can be compared from one year to another, thus highlighting better performance even if your production rises. Environmental indicators provide information on the environmental management in your enterprise by referring to a limited number of significant key information – your "control panel".

Types of environmental indicators

Environmental indicators can be divided into:

Environmental performance indicators: Monitor the enterprise's environmental performance. Typical examples are energy consumption, amount of waste generated per unit of output, total volume of transportation. They are frequently divided into materials, energy, infrastructure and transportation indicators.

Environmental management indicators: Present the actions taken. Examples could be the hours of employees trained, number of audits conducted, number of suppliers assessed, etc.

Environmental conditions indicators: Describe the quality of the environment surrounding the enterprise, as for example, the bio-diversity or the quality of surface waters. This only makes sense, if the enterprise causes a considerable environmental problem in its neighbourhood.

➜ **EMAS** requires that organisations report in their environmental statement about **core indicators** – these are indicators that must be stated if relevant. EMAS core indicators are:

A – Total input/output:
- Energy efficiency: annual energy consumption and percentage of renewable energy sources
- Material efficiency: annual mass flow of different materials
- Water: total annual water consumption
- Waste: total annual generation of waste and of hazardous waste
- Biodiversity: use of land (build-up area)
- Emissions: total annual emission of greenhouse gases, SO_2, NO_x and PM
- B - Overall annual output

R - Ratio A/B

plus other environmental performance indicators relevant for the organisation (depending on activities).

Non-conformities and corrective and preventive action

Nobody is perfect, and a management system does not function like clockwork from the first day. Reality in the field does not always match the planning. If you identify,

for example by monitoring and measurement as described above, a non-conformity (something that does not work properly, for example: any deviation from a documented procedure), you will have to act. Such responses to problems that have already occurred are called corrective action. Corrective action is complemented by preventive action; actions taken in order to prevent potential **non-conformances** from happening at all.

The most important tasks are:
✓ Define responsibilities and authority to investigate and handle non-conformities
✓ Mitigate impacts related to non-conformities
✓ Investigate and eliminate the causes of non-conformities

Corrective action is about eliminating the causes of non-conformance, with the help of the objective to prevent the problem from happening again. Therefore, you have to investigate the causes of every non-conformance in order to eliminate them. To assess whether you attained the desired objective by introducing corrective action, you will have to keep track of your action. In this way, you can learn from each mistake and benefit by experience.

Preventive action is about preventing potential non-conformities from happening. This can mean, for example, paying closer attention to incidents and deviations from procedures even if they did not ultimately result in an environmental impact or a pollution release ("What would have happened if… ?").

Control of records

Records are a subgroup of documents: in management systems, records are all those documents that show what you have done; that document your performance (while other documents may tell you what to do, like working instructions or written procedures, see above). The records that support the management system are important with respect to audits and management reviews, but still more so to handle and analyze data on energy consumption, waste generation, resources used and all those activities carried out on a day-to-day basis.

Three specific tasks are addressed under this section of the norm:
✓ Establish and maintain a record retention system for necessary environmental records
✓ Establish retention timeframes for the records
✓ Create and archive records in such a manner that they are traceable and identifiable.

All the records you decide to retain should be maintained in an organized fashion, in order to be protected against deterioration, loss and other damages and to be easily retrievable. That does not mean that you have to change existing procedures if they are

already organized. For example, if training certificates in your enterprise are stored in the personal file of each employee within the human resources department, this can remain as it is. In order to ensure that you will find these records, you should indicate this in your procedure about environmental training.

Internal audit

An internal environmental audit is a systematic examination of the environmental management system that checks:
• Whether the system is being used as planned
• Whether the system actually works in compliance with the ISO 14001 standard

Audits can be particularly valuable in smaller organisations, where the top managers are often so closely linked to the work performed that they may not see problems or bad habits that have developed.

An internal environmental audit should be carried out at regular intervals, by selected persons (called internal environmental auditors), at least once a year. If the environmental auditors find something that does not comply with the requirements of the environmental management system (EMS), or something that seems inappropriate, they report on these findings to the top management (audit report).

➔ For internal audits, internal auditors will have to be trained in order to have the required competences.

Internal audits

An **opening meeting** can be handy even in small enterprises. The purpose of such meetings is to provide reference points in the process, and to give the auditees the chance to understand exactly what is going on and why. It is another good opportunity to check if everyone shares the same understanding of auditing. Problems with logistics, availability of personnel, changed circumstances and other factors that may affect the audit can be discussed and action agreed upon.

The on-site audit process is best described by the following three principle methods for collecting evidence:

✓ **Interviewing:** conduct structured interviews (very often using checklists) with individual staff members at all level within the scope of the audit, selected

either randomly or on the basis of their responsibility. Communication and interpersonal skills are particularly important to get the most out of the interviews. Typical evidence: Personnel does not appear to be certain of their responsibilities, employee giving other description of a process than the responsible person, being told that last week things were really going wrong. If you get such answers, you know that the implementation of the EMS is facing serious problems, including in terms of employees understanding it.

✓ **Observation of activities:** analyze shop floor practice and on-site operations. Stay alert and notice details of operations currently taking place which seem to not be in line with documented procedures. Sometimes the evidence may be visual, but it could also be aural or olfactory. Typical evidences found through observation: practice does not reflect requirements documented in procedures. For example: there are suspicious stains on the floor, high noise levels, smell of solvents, etc.

✓ **Reviewing documents:** check a sample of the EMS documentation for consistency. Frequently, inconsistencies in the paperwork or presence of outdated documents indicate, for example, an inefficient EMS or a lack of control. On the other hand, a large number of documents which do not reflect the reality of the enterprise also furnish evidence of the fact that the EMS is not in good working condition.

The **closing meeting** helps to 'sign off' the individual findings of the audit, and gets the auditee to accept responsibility for the subsequent corrective (or preventive) action.

An **audit report** has to be prepared, in order to communicate the findings and conclusions of the audit to the top management. If you have reached an agreement on corrective action, they should show in the report.

The minimum distribution for the report is to the managers of the departments audited and those directly responsible for the actions required by the audit findings, and to the person(s) responsible for the maintenance of the EMS itself.

An overall environmental audit report including conclusions, covering the entire enterprise, should be prepared for the top management, who will need it to conduct the management review.

Management review

Most successful enterprises have a top management who are always setting themselves new goals, as well as enjoying achievements. This also needs to be applied on environmental management. Every now and then, top management needs to take a step back and take the long view on where you are and where you would like to go. It is a time to acknowledge success, to think through the obstacles and to renew the vision. This way, the commitment to continual improvement is translated into new objectives, closing the PDCA cycle.

Two specific tasks are addressed under the Management Review section of the norm:
✓ Collect the necessary information
✓ Evaluate the management system, focalizing possible need for changes to policy, objectives and other elements of the EMS (records)

In order to prepare the management review, remember the purpose of the review: to assess the suitability of the management system in delivering the organization's goals as well as the continued relevance of the goals themselves. It is a good starting point to go back to your initial environmental review and the significant environmental aspects, to see if the basis has shifted and if in consequence the environmental policy needs adjusting, and to see if the procedures developed are still robust and applicable. Finally, new and more ambitious objectives can be set to ensure continual improvement.

Management review and continual improvement

The ISO 14001 standard is committed to continual improvement, and this alone would bring out the need to re-assess the environmental management system on a regular, periodic basis. Indeed, alongside corrective and preventive actions, the review is the fundamental tool to ensure continual improvement, e.g. addressing the question of new objectives.

But even an organisation focusing only on legal compliance will still need to conduct a review, because laws change and 'legal catch-up' needs adjustment, too. And obviously, not only do laws change, but your organisation does too. New materials, new designs, new processes, new management initiatives, new managers with new ideas... This flux makes the management review an imperative, to ensure that the EMS remains relevant to what the organisation is doing. And it must be performed by the senior management, because they have the necessary detachment for the strategic view needed during this part of the PDCA cycle.

Remember to document the conclusions of the review (e.g. in the form of minutes of meetings) and to communicate changes to the concerned employees.

Once your objectives have been up-dated the environmental programme will have to be changed accordingly. Your enterprise has now embarked on a new PDCA cycle!

7. The Certification Process

Once you have implemented all the elements of ISO 14001 or EMAS, you may want an independent third party to certify that your EMS conforms to the standard. The process is called certification (ISO 14001) or registration (EMAS); certification and registration are different names for basically the same thing, the external verification of your EMS. If you are successful, you will get a certification in ISO 14001 and/or will be registered in EMAS. Certification audits are done by auditors working for accredited certification bodies in the case of ISO 14001, external audits for EMAS by an environmental verifier. An ISO-14001-auditor may also be an environmental verifier for EMAS (and one external audit can count for both standards, ISO 14001 and EMAS).

→ You can find the certification bodies and environmental verifiers working in your country via the internet. You should choose your certification body or verifier carefully, as a competent external auditor adds important value to your EMS. The most important point to look after is that your external auditor matches with the culture of your organisation; meaning that he should be familiar with your kind of business and your way of working – it would not be a good idea to have a bureaucratic auditor if you are proud of your informal way of working, or the other way round. Last but not least, you should also feel you will be able to have a friendly working relationship with your prospective auditor.

Once you have decided which certification body or verifier will conduct your audit, your external auditor will start with a **document review**. This is done either at your site or, more typically, at the auditor's office. The auditor will request the documents s/he will want to check. This step allows her/him to know your organisation and its activities, and they will check your EMS documentation for completeness and adequacy. Some certification bodies offer a pre-assessment audit, but this is usually unnecessary if you are working with an experienced consultant. Next step is the **certification audit**. The certification audit is similar to the internal audit (see chapter 6). The external auditor will check your EMS for conformity with standard requirements and effectiveness. The length of the audit is a function of the size and complexity of the audited organisation; the auditor will look for proof that people follow procedures and policies and properly complete paperwork (records), s/he may ask people how they do things and how they are trained. If s/he does not discover any major non-compliances, s/he will recommend your organisation for certification. If s/he discovers non-compliances that are not too serious, s/he will normally give you some time to rectify them – you

will get your recommendation for certification after you prove you have success-
fully taken the corrective action to the auditor.

Certification bodies usually follow the recommendation of auditors, meaning that some
time after recommendation for certification you will receive your certificate. EMAS
companies have to apply to the national competent body to be included into the EMAS
register. After successful certification or registration, we recommend one last activity
for your EMS implementation project: have a party!

8. The Best Way to Get Started

You should consider the introduction of an EMS as a project, applying the principles of project management to the implementation project. The first step to get such a project started is to gain the commitment of top management. This is important for two reasons: first, top management allocates the necessary internal resources (budget, human resources, time, etc.) you need for the implementation. Second, the clearly stated will of the top management is the unquestioned law of the land for implementing an EMS. Employees will look at what the top managers say – and do. If the commitment of the top management is easily recognisable, employees will follow. If top management is not 'walking the talk', if there are no clear demonstrations of top management's determination to successfully implement the management system, employees will engage in other areas were they feel that their efforts are better appreciated. Last, but not least, their attitude will be of crucial importance if things do not run smoothly or if there are conflicts with other business decisions within your organisation.

Second, you will need a project leader and a project team. Somebody must drive the EMS; and the project leader is often the later environmental manager. The project leader or environmental manager will be responsible for the implementation of the management system within the enterprise and will co-ordinate the work of the project team and other involved staff. Therefore, the environmental manager:

✓ needs to know the organization well
✓ must be well respected in the organization
✓ must maintain good relations with senior management as well as with employees
✓ needs an orderly mind
✓ must be open-minded and innovative
✓ must be committed to, and convinced by, the principles of environmental protection.

The environmental manager should be accompanied internally by a project team. Ideally, all departments of the organization should be represented in this team. In very small enterprises the team may consist of 2-3 persons, only. One of them may later become the internal auditor.

Depending on the internal resources and skills, the project leader and the project team may need help from the outside in form of a consultant. A consultant can help with complex tasks like identification of legal requirements and significant environmental aspects and ensure the quality of the results of these steps.

How to choose a consultant?

First of all, as a management system is unique, don't trust any consultant who tries to sell you her/his "one-size-fits-all"-manual! Generic procedures lead to frustration and extra costs for maintenance, and this means that they do not lead to savings. That said, intelligent templates, like the EMASeasy ones, may help you reduce costs and paperwork. However, it is important that you remain in control of your EMS and it remains your system. To find a good consultant, reputation is an important point – word of mouth recommendations from people you trust are a good way to identify consultants, as may be hints from chambers of commerce and industry, certification bodies, etc. An important point is to invite potential consultants and to get a personal impression – if the "chemistry" between project leader, project team and the consultant does not work, you will regret it later. Interview your prospective consultant, asking about her or his experience in organisations similar to your own and if remote support by telephone and e-mail is included. If the prospective consultant is working for a big consultancy, make sure the consultant you see is the consultant that will actually do the work.

Do not measure the consultant's input by the size of documentation, but rather by the involvement and commitment of the organisation developed during the project.

The project team (with the possible help of the consultant) should than set up a project plan for the project, following the steps described in chapters 3 to 6.

9. Resources

There are lots of resources about environmental management available on the internet. A big part of them are focused on EMAS, as this public system receives more public support. However, all this information is useful for organisations interested in ISO 14001 also, as this standard is included in EMAS.

You will find this information using your internet browser. However, some starting points are given below:

- **EMAS regulation:** The full text of the EMAS regulation can be found in all European languages on the EMAS helpdesk website (http://ec.europa.eu/environment/emas/index_en.htm): go to "EMAS documents".
- **ISO 14001:** The text of ISO 14001 must be purchased at you national standard organisation or at the ISO website (www.iso.ch). However, as the ISO requirements are part of EMAS regulation, they figure as annexe II in the EMAS regulation (see above).
- **EMAS helpdesk:** The EMAS helpdesk is generally a source of helpful information about EMS. Under "tools" you find, for example, a toolkit explaining EMS for small and medium organisations (http://ec.europa.eu/environment/emas/toolkit/index.htm), a library of environmental statements (http://ec.europa.eu/environment/emas/es_library/index_en.htm) and a link to national competent bodies ("useful links, http://ec.europa.eu/environment/emas/tools/links_en.htm).
- **Ecomapping/EMASeasy:** A brochure explaining this approach to EMS can be downloaded in 20 languages at http://www.emas-easy.eu/ (registration required).
- **Environmental legislation:** The British Institute of Environmental Management and Assessment has published a book about "Managing compliance with environmental law", that can be downloaded for free (http://www.iema.net/practitioner/6). It is based on British law, but the approach can be used in other countries, too.
- **Environmental good practice:** Two more websites with helpful information come from Britain: NetRegs (http://www.netregs.gov.uk/) and Envirowise (http://envirowise.wrap.org.uk/), both useful websites with guidance for businesses and other organisations.

The Europe for Citizens Programme supports a wide range of activities and organisations promoting "active European citizenship", especially the involvement of citizens and civil society organisations in the process of European integration.

The aim of this programme is to bring Europe closer to its citizens and to enable them to participate fully in the European construction. Through this programme, citizens have the opportunity to be involved in transnational exchanges and cooperation activities, contributing to developing a sense of belonging to common European ideals and encouraging the process of European integration.

Source: http://eacea.ec.europa.eu/citizenship/

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The booklet "Environmental Management Systems" was published within the framework of the project "Environmental Audit" organised by Youth and Environment Europe. The project involved five organisations and consisted of three stages: a training course, a period for local action and an evaluation meeting. The training course took place in Bělá u Jevíčka, Czech Republic, from September 16th to 22nd 2010 and involved 11 participants. The local actions differed from country to country and were assessed during the evaluation meeting from March 1st to 5th 2011 in Prague, Czech Republic.

The following member organisations of Youth and Environment were partner promoters of the project "Environmental audit":

We would like to thank all our partners and participants for their involvement and commitment, and also acknowledge the generous financial support of DJN!

Environmental Management Systems are a planned and organised way of handling the environmental issues of an organisation. This means that continual improvement of environmental performance is required. Where to improve is the decision of the company itself – of course they should invest their time and money where their effort would yield most results.

As such, Environmental Management Systems complement and reinforce a systematic approach to the general management of an organisation; and organisations with sound management generally have a better performance through a proactive and comprehensive approach to addressing aspects of its operations.

 In the case of Environmental Management Systems, there are also specific benefits: cost savings, preparing the organisation for tomorrow's markets, improved relations to authorities, risk minimization in terms of environmental liabilities, improved motivation of employees as well as improved occupational health and better environmental performance.

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