BULLETIN
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AN INTRODUCTION TO ISO 14000

ENVIRONMENTAL MANAGEMENT SYSTEMS

CONTENTS

International Trade Centre

EXPORT IMPACT FOR GOOD

This bulleting provides information about the ISO 14000 family of standards on Environmental Management Systems, aiming to help exporters implement such systems.

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1. Environmental Management Systems – ISO 14000

1.1 Introduction

An Environmental Management System (EMS) is part of an organization's overall management system. It is a systematic approach dealing with the environmental aspects of an organization. EMS is a 'tool' that enables an organization of any size or type to control the impact of its activities, products or services on the natural environment. It provides a framework to help the organization identify those aspects of its business that have a significant impact on the environment, to set objectives and targets to minimize these impacts and to develop programmes to achieve targets and implement other operational control measures to ensure compliance with the stated environmental policy[1].

Origins

During the 1992 Earth Summit in Rio de Janeiro, the Business Council for Sustainable Development suggested that the International Organization for Standardization (ISO), which had already established standards for the quality of air, water, and soil, should develop international standards for environmental performance based on the concept of sustainable development[2]. In 1993, ISO formed the technical Committee 207 on Environmental Management to develop international standards for environmental management tools and systems.

1.2 A New Approach to Environmental Protection

The ISO 14000 Series[3]

A set of international standards brings a worldwide focus to the environment, thus encouraging a cleaner, safer, healthier world for us all. The existence of the standards allows organizations to focus on environmental efforts against internationally accepted criteria.

The ISO 14000 series of standards developed by ISO/TC 207 effectively address the needs of organizations worldwide by providing a common framework for managing environmental issues. They promise to effect a broadly based improvement in environmental management, which in turn can facilitate trade and improve environmental performance worldwide.

The ISO 14000 series embodies a new approach to environmental protection for organizations in the global marketplace.

It challenges an organization to[4]:

- Take stock of its impact on the environment;
- Establish its own objectives and targets;
- Commit itself to effective and reliable processes, prevention of pollution and continual improvement;
- Bring all employees and managers into a system of shared and enlightened awareness and personal responsibility for the organization's performance with reference to the environment.

ISO 14001 "Environmental Management systems – Specification with guidance for use", was first published in 1996 and revised in 2004 and then published under the title "Environmental Management Systems – Requirements with guidance for use". The revised standard ISO 14001:2004, inter alia,

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[1] "Export Quality Management – An answer book for small and medium-sized exporters", (2001) International Trade Centre (ITC), p. 188

[2] Sustainable development means "development that meets the needs of today without compromising the ability of future generations to meet their needs". See the 'Glossary of terms' under FAO's website: http://www.fao.org/ag/wfe2005/glossary_en.htm

[3] The complete list of the ISO 14000 family of standards, guides and technical reports is attached as Annex A.

[4] "Export Quality Management – An answer book for small and medium-sized exporters", (2001) International Trade Centre (ITC), p. 185

includes an entirely new section on evaluating an organization's compliance with environmental regulatory requirements.

1.3 ISO/TC 207

ISO/TC 207 is the ISO Technical Committee responsible for developing the ISO 14000 series of environmental management standards and of guidance documents.[5] The committee does not set limit levels or performance criteria for products or operations. Instead, its activities are based on the philosophy that improving management practices is the best way to improve the environmental performance of organizations and their products.

The Subcommittees (SC), Working Groups (WG) and Terminology Coordination Groups (TCG) of ISO/TC 207 are producing standards and guidance documents in the following areas:

- SC 1 - Environmental Management Systems;
- SC 2 - Environmental Auditing & Related Investigations;
- SC 3 - Environmental Labelling;
- SC 4 - Environmental Performance Evaluation;
- SC 5 - Life Cycle Assessment;
- TCG - Terms and Definitions;
- WG 4 - Environmental Communications; and
- WG 5 - Climate Change.

ISO/TC 207 has worked to develop international standards that are practical, useful and usable for business of all sizes, in countries at every stage of development.

Membership in ISO/TC 207, like that of every ISO technical committee, is made up of:

- Participating (P) members
- Countries who wish to vote, participate actively in the discussion and have access to all relevant documentation.
- Observer (O) members
- Countries not wishing to vote, but rather only to participate in discussions and receive all relevant information.
- Liaison (L) organizations
- Representatives of these organizations are invited to take part in discussions and are permitted to receive all information from the TC but are not granted voting status.

Countries are usually represented by their respective national standards organizations.

TC 207 is ISO's largest technical committee. As of 2007, the technical committee structure was as follows: 71 Participating countries of which around 40 are developing countries, 27 Observer countries, and 39 International Organizations in liaison. ISO 14001 is used as a model for implementing an environmental management system by some 111 160 organizations in 138 countries, at the end of 2005. Out of these, more than 56 500 were certified against the latest version of the standard ISO 14001:2004[6].

The ISO 14000 family of standards is amongst ISO's most widely known standards.

ISO 9000 and ISO 14000 standards are implemented by approximately 887 770 organizations in 161 countries[7].

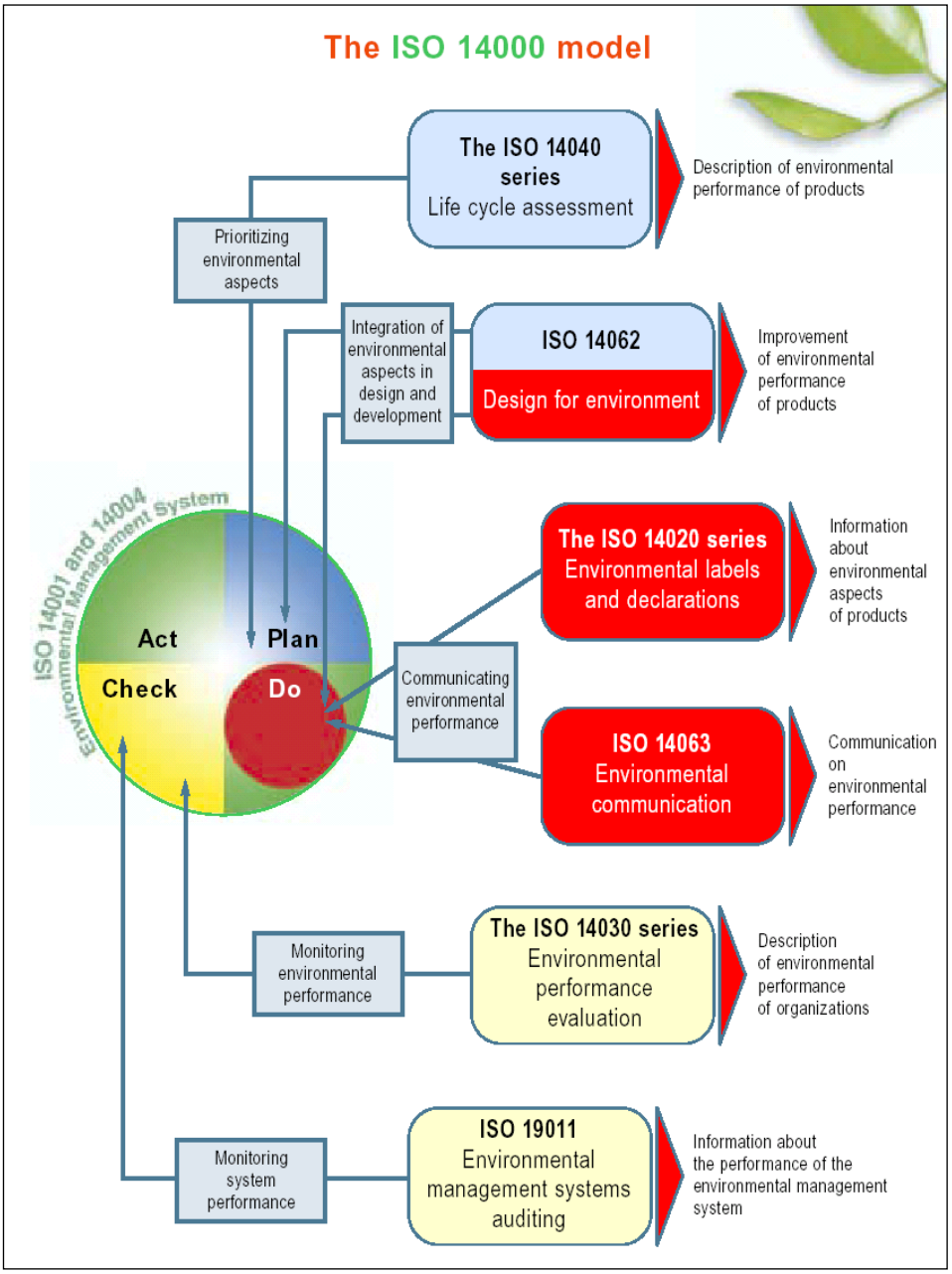
[5] More information on ISO/TC 207 can be obtained at http://www.tc207.org

[6] The ISO survey-2005, http://www.iso.org/iso/en/iso9000-14000/pdf/survey2005.pdf

[7] http://www.iso.org

1.4 The ISO 14000 model

Figure 1: The ISO 14000 model[8]



A voluntary Environmental Management System is a part of an organization's overall synoptic approach to strategic business planning. Environmental management includes several steps in a continual process designed to improve an organization's environmental "footprint" and operating conditions.

As demonstrated in the figure above, the ISO 14000 standards are following the Plan-Do-Check-Act (PDCA) strategy, a self-improving loop including the following steps:

- Plan: Launching of a confirmed policy by the management
  Planning of objectives in relation with this policy
- Do: Implementation of the provisions specified in the plan
- Check: Verification and assessment of results and progress achieved

[8] "Environmental Management - The ISO 14000 Family of International Standards", (2002), ISO.

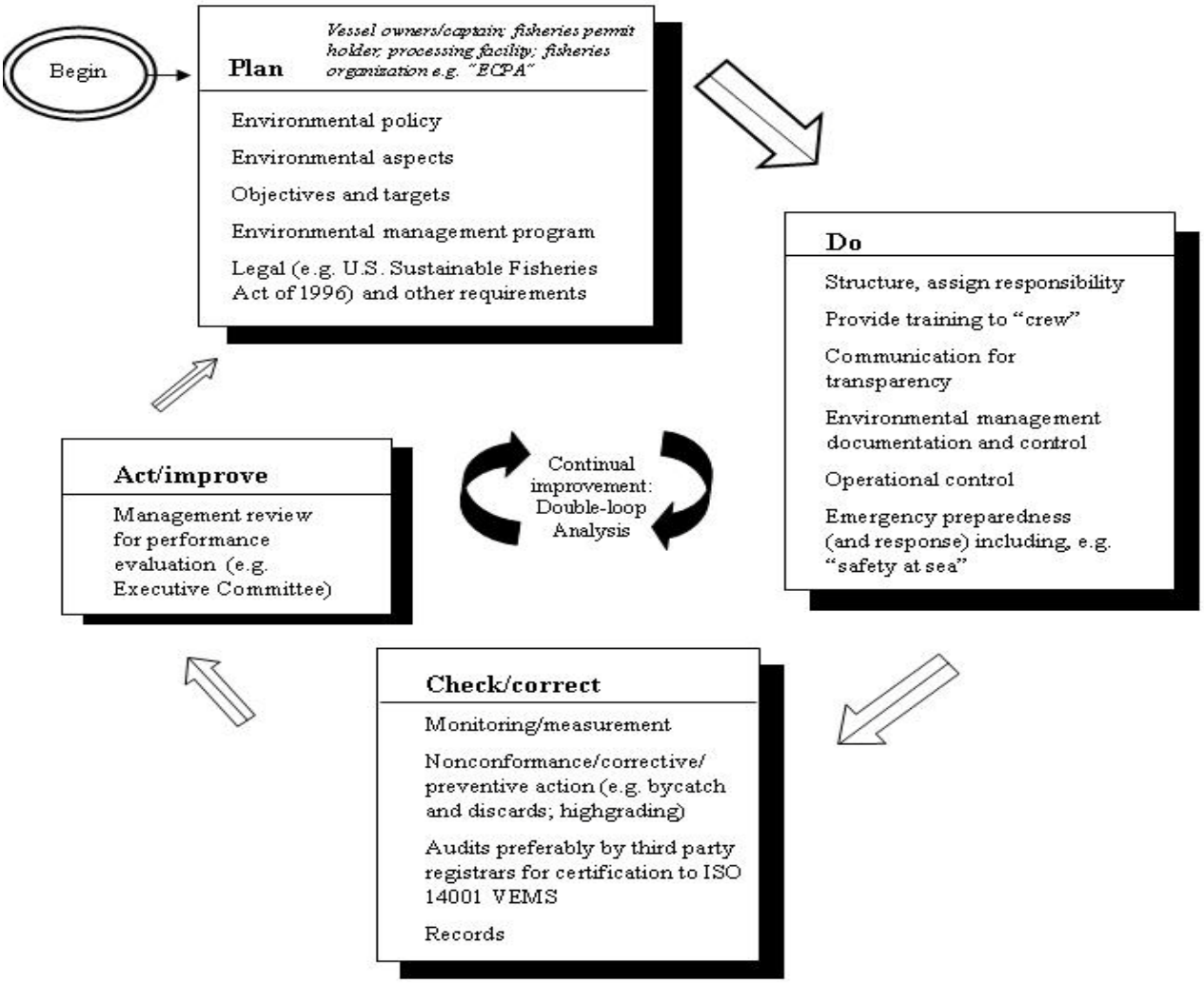
- Act: Review for continual improvement of the system.

Although the ISO 14000 standards are designed to be mutually supportive, they can also be used independently of each other to achieve environmental goals.[9]

Example of a voluntary environmental management system

The fisheries sector is a good case where an EMS has been implemented (see Figure 2). The 10 National Standards found in the U.S. Sustainable Fisheries Act (Public Law No. 104-297) are particularly applicable. For example, the United Nations voluntary Code of Conduct for Responsible Fishing could be utilized as a "best practice" in an international large marine ecosystem (LME) setting where 90-95% of the world's commercial catch of fisheries is harvested.[10]

Figure 2: Marine voluntary environmental management systems (VEMS): A Continuous cycle[11]



[9] "Benefits of the ISO 14000 family of International Standards", Environmental Management, (2002), ISO. Accessed at: http://www.iso.org/iso/en/prods-services/otherpubs/iso14000/benefits.pdf

[10] Sherman, K., "The Large Marine Ecosystem Approach for Assessment and Management of Ocean Coastal Waters." (2005) found in "Sustaining Large Marine Ecosystems: The Human Dimension", (1996) Hennessey, T. and J. Sutinen (eds.), Large Marine Ecosystems Series Vol. 13, Elsevier, Amsterdam, pp. 3-16.

[11] Adapted and modified from Begley, R., "ISO 14000: A Step Toward Industry Self-Regulation. Environmental Science & Technology," 30 (7), p. 301.

ISO 14001

The key standard for EMS implementation and certification is ISO 14001 *"Environmental management systems – Requirements with guidance for use"*. An EMS provides a framework to help organizations to identify those aspects of their business that have a significant impact on the environment and to then meet environmental objectives and targets to minimize these impacts.

A structured system like EMS allows an organization to move away from reactive, fragmented responses to environmental issues, and engenders a proactive approach allowing for the early identification of impacts, liabilities and opportunities. ISO 14001 provides an organization with the required skills and the management system necessary to achieve increasingly high standards of environmental performance, and move beyond the opportunities stemming from traditional compliance-based environmental programmes.

This will lead to a more aggressive compliance audit procedure prior to achieving certification. The revised standard ISO 14001:2004 is more compatible with ISO 9001:2000 which will facilitate integrating ISO 14001 EMS with ISO 9001 QMS.

ISO 14001 has received a lot of attention and has become widely implemented throughout the world. A "quality management" approach to environmental performance is taken by ISO 14001 and aims to create a culture of continual improvement in environmental performance within the implementing organization. ISO 14001, together with the European Union's Eco Management and Audit Scheme (EMAS), has provided international alternatives to early national EMS standards such as the British Standard BS 7750 (published in 1992).[12]

The other finalized and published standards in the ISO 14000 series cover guidelines, procedures and qualifications for environmental auditing.

The full list of ISO 14000 documents to date is provided as Annex A of this bulletin.

The standards of the ISO 14000 series fall into two major groups, of which the first one is the focus of this paper:

- **Organization-oriented standards**
  Provide comprehensive guidance for establishing, maintaining and evaluating an environmental management system (EMS);
- **Product-oriented standards**
  Determine the environmental impacts of products and services over their life cycles and the environmental labels and declarations.

The key elements of an ISO 14000 EMS are:

- **Environmental policy**
  The environmental policy and the requirements to pursue this policy via objectives, targets, and environmental programs.
- **Planning**
  The analysis of the environmental aspects of the organization (including its processes, products and services as well as the goods and services used by the organization).
- **Implementation and operation**
  Implementation and organization of processes to control and improve operational activities that are critical from an environmental perspective (including both products and services of an organization).
- **Checking and corrective action**
  Checking and corrective action including the monitoring, measurement, and recording of the characteristics and activities that can have a significant impact on the environment.
- **Management review**
  Review of the EMS by the organization's top management to ensure its continuing suitability, adequacy and effectiveness.
- **Continual improvement**

[12] "Introduction to the ISO 14000 series". Accessed at: https://www.denix.osd.mil/denix/Public/Library/EMS/Documents/introduction.html

The concept of continual improvement is a key component of the environmental management system; it completes the cyclical process of plan, implement, check, review and continually improve.

How to obtain copies of the ISO 14000 standards?

The final published copies of ISO 14000 standards and related documents can be obtained from your respective National Standards Association (ISO Member Body). They are normally the primary ISO sales agent. For people in countries whose National Standards Association is not an ISO Member Body, ISO 14000 documents can be obtained directly from the International Organization for Standardization (ISO), 1, chemin de la Voie-Creuse, Case postale 56, 1211 Geneva 20.[13]

1.5 From ISO 14001: 1996 to ISO 14001: 2004

What has changed?

Just like ISO 9001 management system registration has become necessary to do business in many areas of commerce, in Europe for example, similarly, ISO 14001 management system registration may become the primary requirement for doing business in many regions or industries.

The two standards of 1996 and 2004 look similar; however, attention has to be paid to the new requirements which were introduced precisely to improve the standard. Standards are reviewed every five years to ensure that they are current and satisfy the needs of users. The *ISO 9000 + 14000 News* magazine enables you to keep abreast of information about standards on management systems.[14]

The main changes are as follows[15]:

"Plan, Do, Check, Act": This has been included to Figure 1 (the EMS improvement spiral) and is modelled on the one contained in ISO 9001: 2000.

Compatibility & Clarity: Six new definitions have been added and several have been changed.

Definition and Scope of the EMS: Explicit requirement for this, and to then include all activities, products and services that are within the scope of the system.

Legal: The requirements for this kind of requirements, as well as others, have been clarified.

Environmental Aspects: In developing and maintaining the EMS, it is now clear that such aspects need to be taken into consideration.

Revision of Clauses and Requirements: In order to clarify understanding of its intent and purpose of requirements as well as to improve compatibility, clauses and requirements such as *sub-clause on Programmes*, *(old) Structure and responsibility requirements*, *(old) Training, awareness and competence, Communications Clause, Documentation and control of documents*, *Internal Audit clause, Compliance evaluation, Management review clause*, *Annex A and B,* have been reviewed and amended.

1.5.1 Transitional period between the 1996 and 2004 versions

Towards the end of 2004, it was decided that a transition period[16] extending from 15 November 2004 to 15 May 2006 would be given for organizations having the ISO 14001:1996 version to change it to the ISO 14001:2004 version.

Since 15 May 2006, only certificates to ISO 14001:2004 are recognized by members of the International Accreditation Forum (IAF)[17].

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[13] Copies of standards cannot be obtained from the International Trade Centre UNCTAD/WTO (ITC).

[14] A bimonthly publication which provides comprehensive coverage of international developments relating to ISO's management system standards (obtainable from ISO).

[15] "What has changed?", (Jan-Feb 2005), Dodds, O., ISO Management Systems , p.19.

[16] The IAF transition plan (IAF GD 4:2004) can be consulted on the IAF Website (www.iaf.nu - under Publications, then Guidance Documents).

[17] IAF is an international association that represents the accreditation bodies of more than 45 countries and economies which have been set up to verify competence ("accredit") of certification bodies. For more information: www.iaf.nu

2. Benefits and Costs

2.1 Benefits

2.1.1 Benefits of EMS

The company's benefits generated from a sustainable environmental management system can be summarised as follows: improved performance, reduced risk and liabilities, eligibility for a number of environmental agency incentive programmes, better public image[18] and an improvement in operational efficiencies/cost reduction opportunities.

Nowadays organizations are increasingly called upon to demonstrate sound management of economic, social and environmental issues. Evidence suggests that a focus on this "triple bottom line" results in advantages in financing, insurance, marketing, regulatory treatment, and other areas. ISO 14001 is a structured approach to addressing the environmental bottom line.

Implementing an EMS will help a company to establish confidence in interested parties (customers, employees, shareholders, suppliers, regulators, insurance companies, financial institutions, local communities) that[19]:

- The company emphasizes pollution prevention rather than pollution creation and
- It can provide evidence of regulatory compliance.

The potential benefits small and medium-sized enterprises can draw from implementing an EMS include[20]:

- Improving market access;
- Assuring customers of commitment to demonstrate environmental management;
- Adopting a process of continual improvement;
- Improved environmental performance;
- Adopting a preventive approach to ensure compliance with statutory and other requirements applicable to the company;
- Enhancing image and market share;
- Preventing pollution by conserving resources like electricity, water, coal;
- Improved operating efficiency;
- Enhanced employee morale in a safe working environment;
- Credibility with stakeholders;
- Competitive market advantage;
- Improving cost control;
- Meeting vendor certification criteria;
- Legal compliance and facilitating the attainment of permits and authorizations;
- Better image and maintaining good relations with the public, regulators, shareholders, investors;
- Heightened employee awareness of, and responsibility towards, the environmental aspects of their activities;
- Competitive advantage in research;

[18] Firms in Brazil, for example, reported enhanced public image as one of the greatest benefits of ISO 14001 certification. There is also evidence from Formosa Plastics Corp. in Livingstone, New Jersey, which supports this contention. See Corbett, C. J., and Kirsch, D. A.," ISO 14000: An Agnostic's Report from the Front Line", (2000), ISO 9000 + ISO 14000 News, pp. 4-17.

[19] "Export quality management – An answer book for small and medium-sized exporters", (2001) International Trade Centre (ITC), p. 189

[20] "Business Benefits of ISO 14001", (2002), Environmental Management, ISO.

- Incentives for environmental stewardship;
- Improving industry-government relations.

A certification to ISO 14001 improves environmental management and enables equal access to a growing "green" market place. ISO 14001 has proven to be a useful tool to evolve from maintaining regulatory compliance to a position of improved productivity and enhanced competitive advantage. There is evidence that organizations which manage not only the standard economic factors but also the environmental and social

factors affecting their business show financial performance superior to those which fail to manage all three[21].

2.1.2 Benefits of the ISO 14000 family

The whole ISO 14000 family provides management tools for organizations to control their environmental aspects and to improve their environmental performance. Together these tools can provide significant economic benefits, including:

- Reduced raw materials/resource use;
- Reduced energy consumption;
- Improved process efficiency;
- Reduced waste generation and disposal costs;
- Utilization of recoverable resources;
- Potentially lower insurance premiums.

With the different groups of the organization-oriented standards of the ISO 14000 family, organizations can obtain different benefits:

- ISO 14001 – "Environmental management systems – Specification with guidance for use"
- This standard helps organizations both to manage better the impact of their activities on the environment and to demonstrate sound environmental management addressing not only the organization's processes but its products and services. Furthermore, experience has shown that ISO 14001 is a framework that inspires and channels the creativity of the members of an organization, making them active agents to promote environmental protection, resource conservation and improved efficiencies.
- ISO 14004 – " Guidelines on principles, systems and support techniques"
- This standard provides guidance on the establishment, implementation, maintenance and improvement of an environmental management system and its coordination with other management systems.
- ISO 14031 – "Environmental performance evaluation"
- This standard provides guidance on how an organization can evaluate its environmental performance. It also addresses the selection of suitable performance indicators, so that performance can be assessed against criteria set by management. This sort of information can be used as a basis for internal and external reporting on environmental performance.
- ISO 19011 – "Guidelines for quality and/or environmental systems auditing"
- Environmental audits are important tools for assessing whether an EMS is properly implemented and maintained. ISO 19011 is equally useful for environmental management systems and quality management system audits.

The ISO 14000 series of standards gives small and medium-sized enterprises (SMEs) an opportunity to compete on a level playing field with larger and even global companies, as the same standard is applicable to all types and sizes of organizations.

[21] "Environmental Management – The ISO 14000 Family of International Standards", (2002), ISO.

2.2 Costs

2.2.1 Implementing an EMS

Implementing a comprehensive Environmental Management System can be expensive, especially for SMEs. Organizations have to pay for the implementation and certification of an EMS. Most companies will incur similar initial costs to implement ISO 14000 and, thus, all firms in a given industry should experience the same or similar cost structure effects from implementation. Two possible exceptions would be for organizations that have previously developed a strong positive environmental position or that have gone through ISO 9001 registration[22]. Companies wanting ISO 14001 certification have to carry the brunt of the direct and indirect costs.

Direct or implementation costs may include:

- Awareness building courses and training for the employees;
- Acquiring additional equipment and instruments;
- Acquiring relevant international standards of the ISO 14000 family and other publications; or
- Hiring consultants or external trainers, if required.

The cost of establishing and implementing an EMS will vary from company to company depending upon the scope, work and in-house competency available. If the company decides to hire the services of a consultant for complete EMS development including awareness training etc., then the duration of the consultancy in a company will vary from 40 to 60 days over a period of 6 to 9 months.

Indirect costs also occur:

- Time spent by the management and other staff in developing the EMS;
- Costs relevant to the implementing and maintaining of the EMS; the internal auditing; documentation and taking corrective actions.

Certification costs:

The certification costs are influenced by the decision to take an internationally accredited certifying firm or doing self-certification. A national certifying firm which has not been accredited or self-certification may be less expensive than an internationally accredited certification firm, but the ISO 14001 certificate may not be recognized by the international bidder. As the prices for these measures are mainly based on consultant or certification fee, they vary widely depending on the market price for consultant fees in each country[23]. If you wish to obtain third-party certification, it is advisable to obtain quotations of the fee involved from two or three accredited certification bodies before deciding on a particular certification body.

The certification fee depends upon various factors such as complexity of scope, size of your company, number of locations, number of employees, etc.

Typical certification fees in India are detailed below.

<u>For a company having up to 100 employees</u>

- - Initial Certification audit USD 2000
- - Surveillance (five in all) audits USD 1500
- (over a period of 3 years)

<u>For a company having up to 400 employees</u>

- - Initial Certification audit USD 3500
- - Surveillance (five in all) audits USD 2500
- (over a period of 3 years)

[22] "ISO 14000 and the Bottom Line", (1999), Raiborn, Cecily A.; Joyner, Brenda E.; Logan, James W.

[23] "ISO 14001: International Environmental management systems standards", (1995) Tibor, T., Feldman, I.

In addition to the above, the actual cost of travel, boarding and lodging for the auditor(s) will also be payable to the certification body.

2.2.2 Possible non-tariff barriers to trade

A major goal of ISO/TC 207 is to facilitate trade and minimize trade barriers by levelling the playing field. But the standard could have the opposite effect and lead to imposing the requirements and management systems of advanced industrial nations on developing countries, requirements they lack the knowledge and the resources to meet.

ISO 14000 is a voluntary standard, and ISO 14001 registration is a voluntary scheme. Therefore, ISO 14001 does not create any official trade barrier as recognized by the WTO Agreement on Technical Barriers to Trade. If a country makes ISO 14001 registration a regulatory requirement for all companies doing business within its borders, however, this raises a potential barrier to foreign companies that find it difficult, for various reasons, to meet the requirements of the standard. This might apply especially if the foreign company facing the barrier is a subcontractor or vendor to a company located in the country with the requirements[24].

Another barrier faced by many countries is the lack of a certification infrastructure. This may require companies in these countries to seek certification from foreign certifiers, again potentially driving up costs and creating trade barriers.

Example: The case of the Philippines [25]

In the past, the Philippines has had experiences related either to conformance with voluntary environmental management systems or to primarily local environmental problems affecting their trade and needing increased domestic policy support and both leading to higher costs. The most visible of all is the ISO 14001 certification, adopted in the export area of semiconductors. Although it is voluntary, ISO has become a precondition for them because of a greening of the supply chain and a strong cross border force for allied industries in this business. However, establishing an ISO 14000 Environmental Management System (EMS) is expensive for the Philippines in this case. The great majority of ISO 14001 certified companies in the Philippines are large multinationals. Small companies are generally faced with this difficulty of cost, lack of awareness of the benefits of EMS and cleaner production, and lack of awareness of environmental laws.

3. Implementing an Environmental Management System

Implementing an EMS is no different than the implementation process for a quality programme. It affects the entire organization and requires commitment across-the-board. Of central importance in the ISO 14000 series are the environmental management system standards, ISO 14001 and ISO 14004. These standards allow an organization to take a systematic approach to the evaluation of how its activities, products and services interact with the environment gap. The specification requirements for an EMS under ISO 14001 "*Environmental management systems – Requirements with guidance for use*" include[26]:

- Gaining the top management commitment to the EMS;
- Development of an environmental policy;
- Planning of an EMS, including the:
  - identification of significant aspects and their associated environmental impacts;
  - establishment of legal and regulatory requirements relevant to the organization's activities, products and services;
  - development of quantifiable objectives and targets to reduce the organization's significant impacts on the environment;

[24] "ISO 14000 – A Guide to the New Environmental Management Standards, ISO, (1996), p. 15.

[25] WTO Document WT/CTE/W/177, Committee on Trade and Environment – "The Study of the Effects of Environmental Measures on Market Access", (2000), WTO.

[26] http://www.iso.org

- establishment and maintenance of environmental management programmes, which include the proper allocation of resources and specified timeframes within which to achieve stated objectives and targets;

- Maintenance and continual improving of the EMS, including the:
  - monitoring and measurement of operations and activities;
  - record-keeping;
  - creation of procedures to deal with non-conformances with the requirements of the standards, company policy and legislation;
  - development of procedures, programmes and processes to prevent any repeat of non-conformances; and
  - EMS audit procedures and programmes;
- Management review of an EMS to determine its suitability, adequacy and effectiveness and to make recommendations for the achievement of continual improvements in environmental performance.

Step 1 - Evaluate the organization's needs/goals for implementing EMS

The first and foremost important task for an SME undertaking the implementation of an EMS, is to establish "the reasons to do it". A system implementation should be driven by:

- The improvement of the performance and therefore an increase in bottom line profits
- The effective management of risk
- The assurance of quality of product or service to the customer
- The basis for implementing is a culture of opportunity
- If required, the acquisition of a symbol of international recognition
- Improve the overall efficiency
- Continual improvement
- Reduced waste of resources
- Consistent control of key processes
- Greater marketing appeal and improved public relations
- Meeting the requirements for inclusion on some tender lists.

Step 2 - Obtain information about the ISO 14000 family

The persons identified for initiating the development of an ISO 14001 EMS need to understand the requirements of ISO 14001:2004.

Supporting information such as environmental management principles, frequently asked questions (FAQ), guidance on clauses and documentation requirements and other brochures are available free of charge on the ISO website at http://www.iso.org

Step 3 - Appoint a management representative

You should appoint a management representative within the organization. If, within the organization, you still do not have adequate competence to develop an EMS, you may appoint a consultant. Before doing so, it is good to check his/her background; knowledge about the standard realization processes of *your* organization; and experience in helping other organizations to achieve their stated goals, including certification.

Carry out a cost benefit analysis of hiring a consultant and agree the scope of his/her work in writing. It is also possible to appoint a consultant only for the training of key staff; the latter can then carry out further training and development of the system.

Step 4 - Awareness and training

Raise awareness about EMS requirements amongst all personnel performing activities that affect standards. Plan for and provide specific training on how to develop environmental management manuals, on procedures, on EMS planning; on how to identify improvement processes; and on how to audit

compliance with the EMS, etc. Special attention should also be given to the allocation of roles and responsibilities within a pre-defined management or organization structure; procedures and processes for handling internal and external communications; creation of supporting documentation and documentation control mechanisms; operational control procedures; and emergency preparedness and response planning and testing.

Step 5 - Gap Analysis

Evaluate gaps between your existing environmental management system and the EMS requirements of ISO 14001. Prepare how to bridge these gaps, including by planning for resources. A gap analysis identifies the "gaps" in existing environmental policies and procedures compared to the various elements of the ISO 14001 standard. It is an excellent starting point for creating an EMS and usually indicates that most of the elements of an EMS already exists at most facilities.

Step 6 - Performing internal audits

An internal audit is performed by the company's own personnel who has received proper auditing training as it relates to the standards. The training should be conducted according to ISO 19011:2002. The standard provides guidance on the principles of auditing; the management of audit programmes; the conduct of management system audits as well as on the competence of auditors.[27]

The goal of the internal audit is to look at the organization's environmental management. To meet the requirements of ISO 14001 for continual improvement, companies should be able to demonstrate that their EMS is reviewed regularly by top management.

Step 7 - Taking corrective action

If the EMS does not meet the specifications of ISO 14001 it is the responsibility of the upper management to review the plan and correct it when necessary. The goal is to detect and then correct the root causes of deficiencies.

ISO 14004 "*Environmental management systems – General guidelines on principles, systems and supporting techniques*" has been developed to provide additional guidance for organizations on the design, development and maintenance of an EMS. It includes details on:

- Internationally accepted principles of environmental management and how they can be applied to the design and development of all the components of an EMS;
- Practical examples of the issues an organization will need to ensure they have addressed in the design of their EMS, including guidance on how to identify the environmental aspects and impacts associated with their activities, products and services; and
- Practical help sections to provide an organization with assistance in navigating through the various stages of EMS design, development, implementation and maintenance.

4. Certification

After an organization has implemented an EMS tailored to ISO 14001 and operates it for an adequate period of time (generally three to six months, and on satisfactory completion of internal audit) a third-party certification body[28] can be contracted to verify that the organization's EMS meets the standard's requirements, and that the environmental objectives and goals are being carried out at all levels of the operation. This is the external audit process. Third-party certification includes the following basic steps:

- Filling an application
- Manual or policy review
- Pre-assessment (optional)
- Certification
- Surveillance

[27] ISO 19011:2002 replaces ISO 14010:1996, 14011:1996, and 14012:1996.

[28] If the company decides to obtain third-party certification.

A thorough review of an organization's environmental management system documentation is required under ISO 14001. In most organizations, documentation is structured in the following three-tier hierarchy:

- The EMS manual and/or environmental policy;
- Operating procedures; and
- Environmental records.

During an EMS audit documents are reviewed to see if they meet the applicable requirements of the ISO 14001 standard and any other requirements. The criteria to which the EMS is being measured against needs to be clearly defined in the company's documentation. If this review shows that the organization's documented system is not capable of meeting the requirements, no more time should be spent on the audit until the situation is corrected.

During audits, we come across non-conformances. If the non-conformance (NC) was identified as a "minor", it is a problem that can be easily corrected. Usually, a minor non-conformance is not something that will block the auditing process. When a "major" non-conformance is identified, it usually means that a significant change to the EMS has to be done, like adding a procedure or changing a practice. Corrective action must be taken to eliminate the cause of the non-conformance. Organizations should seek to find the root cause of the non-conformance and prevent it from recurring. Once a major non-conformance is corrected, a follow-up assessment limited to the area of concern is usually required. As long as there are non-conformances, both minor and major, certification is not possible.

Once a company is certified, it receives a certificate and is listed in a register or directory published by the certification body. Most certifiers conduct surveillance visits once a year. The standards validity of a registration certificate is three years, after which a full re-audit is done for renewal. After certification, companies must continue to show that they are meeting the requirements of the standard. Should a company fall short of this goal, its registration may be revoked.

ISO 14001 certification requires compliance in four organizational areas:

- Implementation of an environmental management system;
- Assurance that procedures are in place to maintain compliance with laws and regulations;
- Commitment to continual improvement; and
- Commitment to waste minimization and prevention of pollution.

5. Integration of ISO 14000 with ISO 9000

Both ISO 14001 and ISO 9001 deal with management systems that form an integral part of the overall management of an organization. Both systems are designed to contribute to improving the business performance of an organization. The standards share many common system elements which can be easily used to integrate the environmental management system with the quality management system of an organization in the following areas[29]:

- **Documentation**
  Both standards require the development of documentation to address their requirements. One possible method of integrating documents is to develop separate policy manuals, but to prepare common documented procedures for various QMS and EMS requirements.
- **Management responsibility**
  Both standards require the commitment of top management to establishing and implementing management systems.
- **Resource management**
  Both systems contain requirements for resources, including human resources, for applying the policies and achieving the objectives of the organization. Requirements for competence, awareness and training are common to both standards.

[29] "Export quality management – An answer book for small and medium-sized exporters", (2001) International Trade Centre (ITC), p. 192.

- **Product realization**
  The ISO 9001 quality management system addresses various product realization processes separately, i.e. planning of product realization, customer-related processes, design and development, purchasing and production and service provision. In these processes, the identification and/or operational control of significant environmental aspects may be integrated.

- **Measurement, analysis and improvement**
  Most of the requirements in this section (internal audits, monitoring and measurement, control of non-conformities, corrective action, preventive action, continual improvement) are common to both the EMS and the QMS. These common requirements can be addressed simultaneously in the management system procedures.

Certification bodies are also agreeing to undertake joint certification audits in companies that have integrated an EMS and a QMS, thus reducing the third-party certification. ISO 19011 "*Guidelines on quality and/or environmental auditing systems*" provides guidelines on quality and/or environmental management system auditing. The benefits of ISO 19011 can be summarized as follows[30]:

- Better applicability to the conduct of internal audits, and also more focused on use by small and medium-sized enterprises;
- More flexible approach to auditor qualifications and audit team selection; and
- Applicability to combined audits, and herewith bridging the gap between quality and environmental management tools.

6. ISO 14000 and developing countries

The standards are designed to encompass diverse geographical, cultural and social conditions. They apply to all types and sizes of organizations. However, ISO is aware of the difficulties facing developing countries in the area of standardization, e.g. due to the lack of expertise and funds the participation of developing countries in the process of standard development is limited. To overcome those difficulties ISO has established a Committee on Developing Country Matters (DEVCO).

DEVCO and TC 207 have been working together closely to develop tools to assist developing countries in understanding the ISO 14000 series, and participating in the development process. These tools include the Manual on "Environmental management and ISO 14000", the TC 207 Web site and various seminars and workshops. It is recognized that countries need to have a standardization infrastructure in place, and clear, accurate information should be available for potential users.

ISO member bodies in many developing countries recognized early the potential significance of the ISO 14000 series, and some of them have been active participants in the standards development process. TC 207 has encouraged developing country participation. The Committee has taken several initiatives to help ensure that the standards do what they were designed to do, and that they meet the needs of all of their intended users, including SMEs and businesses in developing countries.

By encouraging participation in TC 207 and its subcommittees by representatives of developing countries, and through consultation with other experts, TC 207 considers the particular requirements of these countries and attempts to address their needs in the core EMS documents.

6.1 Cases of Best Practice

The following examples[31] show how direct environmental and economic benefits[32] have been achieved by companies (public, private or both) that have initiated system changes – namely through ISO 14000.

Pulp and Paper Mills (India)

[30] "Combining audits on quality and environmental management systems", ISO Bulletin, December (2002).

[31] ISO Management Systems, "Special Report: What will an EMS do for my organization? Some concrete answers", (2005), ISO, pp-11-13.

[32] Other examples include:

- One of Rockwell's automation plant reduced its hazardous waste by 18% after implementing ISO 14001. Ford's Lima engine plant reduced its piston tin plating process resulting in a reduction in

There was a generation of excessive paper waste at the Ashoka Pulp and Paper Mills (India). By modifying processes and equipment and introducing new technology, this problem was resolved. An estimated annual savings of USD 118 000 has been achieved following the USD 25 000 investment and waste and river pollution have been significantly reduced.

Suzhou Industrial Park (China)

ISO 14000 has been successfully promoted by the Chinese State Environmental Protection Administration (SEPA). It included initiatives such as Suzhou Industrial Park (SIP) in the city of Suzhou. A rapid yet sustainable urban development has been promoted in Suzhou, thanks to growing foreign investment. Between the years 1992 to 1999, the district economy increased by 50% per year, with spectacular increases in gross domestic product and business revenue. The value of the import-export business expanded from zero to USD 2.88 billion. In this particular programme, more than 360 foreign enterprises are involved, including thirty nine Fortune 500 companies, representing a total investment of USD 3.5 billion. Several enterprises have implemented ISO 14001 and cleaner production (CP) with remarkable economic benefits. For example, the Panasonic Electric Company's SIP plant was able to compete on the European market when it received ISO 14001 certification. The implementation of Ming Chi Computer Company's CP resulted in over USD 1.8 million per year savings from energy and water saving and resource cycling.

7. Publicizing your certification[33]

- Don't use ISO's logo.
- Don't adapt or modify ISO's logo for your use.
- If you want to use a logo, ask your certification body for permission to use its logo.
- If your organization is certified to ISO 14001:2004, use the full designation (not just "ISO 14001").
- In the 14001:2004 contexts, "certified" (and "certification") and "registered" (and "registration") are equivalent in meaning and you can use either term.
- Don't say your organization has been "accredited".
- Don't use "ISO certified", or "ISO certification". Use instead "ISO 14001:2004 certified", or "ISO 14001:2004 certification".
- Don't display ISO 14001:2004 certification marks of conformity on products, product labels, or product packaging, or in any way that may be interpreted as denoting product conformity.
- Don't give the impression in any context that ISO 14001:2004 certifications are product certifications or product guarantees.
- When including a reference to ISO 14001:2004 certifications in product-related information, including advertisements, do not do so in such a way that ISO 14001:2004 certifications may be interpreted as being product certifications or product guarantees.
- Be accurate and precise about the scope (the extent) of your organization's or ISO 14001:2004 certifications, as far as both the activities and geographical locations covered by the certifications are concerned.

[33] http://www.iso.org/iso/en/iso9000-14000/certification/publicizing/publicizing_2.html#inbrief

Annex A

The ISO 14000 family of standards, guides and technical reports

ISO 14001:1996	Environmental management systems -- Specification with guidance for use
ISO 14001:2004	Environmental management systems -- Requirements with guidance for use
ISO 14004:2004	Environmental management systems -- General guidelines on principles, systems and support techniques
ISO/CD 14005	Environmental management systems -- Guidelines for a staged implementation of an environmental management system, including the use of environmental performance evaluation
ISO 14015:2001	Environmental management -- Environmental assessment of sites and organizations (EASO)
ISO 14031:1999	Environmental management -- Environmental performance evaluation -- Guidelines
ISO/TR 14032:1999	Environmental management -- Examples of environmental performance evaluation (EPE)
ISO 14040:2006	Environmental management -- Life cycle assessment -- Principles and framework
ISO 14044:2006	Environmental management -- Life cycle assessment -- Requirements and guidelines
ISO/TR 14047:2003	Environmental management -- Life cycle impact assessment -- Examples of application of ISO 14042
ISO/TR 14049:2000	Environmental management -- Life cycle assessment -- Examples of application of ISO 14041 to goal and scope definition and inventory analysis
ISO 14050:2002	Environmental management -- Vocabulary
ISO/DIS 14050	Environmental management -- Vocabulary
ISO/TR 14062:2002	Environmental management -- Integrating environmental aspects into product design and development
ISO 14063:2006	Environmental management -- Environmental communication -- Guidelines and examples
ISO 19011:2002	Guidelines for quality and/or environmental management systems auditing
ISO/WD 26000	Guidance on social responsibility

Annex B

List of selected documents on environmental management systems

An Introduction to ISO 9000:2000, (2001), International Trade Centre (ITC).

Assessing the Presence and Impact of Non-Tariff Barriers on Exporters, (2002) Standards New Zealand.

ISO 14001 Environmental management systems – Specification with guidance for use. (2004) International Organisation for Standardisation, Geneva Switzerland.

Economic benefits of standardization, (2000), DIN Deutsches Institut für Normung.

Effective Corporate Governance Using Quality and Environmental Management Systems, (ASQ, 2004), Liebesman.

Environment and Trade – A Handbook, (2005), United Nations Environment Programme (UNEP) www.unep.org and International Institute for Sustainable Development (IISD) http://iisd.ca. The handbook is available in a Web version at both www.unep.ch/etu and http://iisd.ca/trade/handbook; ISBN 1-895536-85-5. The handbook highlights the relationship between environment and trade. For a better understanding of how trade can effect environment.

Export Quality Management – An answer book for small and medium-sized exporters, (2001), International Trade Centre (ITC), Palais des Nations, 1211 Geneva 10, Switzerland, Email: itcreg@intracen.org, Internet: www.intracen.org, ISBN 92-9137-214-5. The publication gives questions and answers on all aspects of quality control and management directed to exporters.

Handbook for Implementing an ISO14001 Environmental Management System, (2006), John Kinsella; Annette Dennis McCully, Elsevier Limited.

ISO 14001 Environmental Certification Step by Step: Revised Edition, (2004), Edwards, E.J, Butterworth-Heinemann.

ISO Management Systems, published six times a year by the Central Secretariat of ISO, 1, chemin de la Voie-Creuse, Case postale 56, 1211 Geneva 20, Switzerland, Email: central@iso.org, Internet: http://www.iso.org, ISSN 1680-8096. The magazine includes updates on the ISO 9000 family of quality management and quality assurance standards, and on the ISO 14000 environmental management standards, and news on their implementation around the world, as well as related developments, including ISO 9001 and ISO 14001 certification.

ISO Standards Compendium: ISO 14000 – Environmental management, (2001), ISO, 1, chemin de la Voie-Creuse, Case postale 56, 1211 Geneva 20, Switzerland, Email: central@iso.org, Internet: http://www.iso.org, ISBN 92-67-10328-8. The compendium brings together in one volume all the published International Standards developed by ISO/TC 207 on Environmental management. It also includes Draft International Standards.

The ISO Survey of ISO 9000 and ISO 14001 certificates – Twelfth cycle, (2005), ISO, 1, chemin de la Voie-Creuse, Case postale 56, 1211 Geneva 20, Switzerland, Email: central@iso.org, Internet: http://www.iso.org, ISBN 92-67-10377-6. The ISO Survey provides an overview of ISO 9000 and ISO 14001 certification worldwide with international, regional and national totals of certificates awarded, comparisons with previous years and industry sector breakdowns country-by-country.

ISO Directory of ISO 9000 and ISO 14000 accreditation and certification bodies, (2007), ISO, 1, chemin de la Voie-Creuse, Case postale 56, 1211 Geneva 20, Switzerland, Internet: http://www.iso.org/iso/en/info/ISODirectory/countries.html. The directory lists accreditation (where one exists), then certification bodies by country. Address, telephone and fax details are provided, along with the name of contact person.

Manual 10 - Environmental Management and ISO 14000, (2001), ISO, 1, chemin de la Voie-Creuse, Case postale 56, CH-1211 Genève 20, Email: dev@iso.org, Internet: www.iso.org, ISBN 92-67-10341-5. The manual introduces the ISO 14000 series of standards to readers who wish to obtain an overall idea. It is of interest to any reader who wants to gain insight into those aspects of environmental management dealt with by TC 207 and its Subcommittees.

Quality and Environmental Management Systems in the Global Marketplace: A North American Perspective on Sustainability, Corporate Social Responsibility and Other 21st Century Issues, (ASQ, 2004)**,** Gagnier, Dan; Smith, Trevor.

The Petroleum Company of Trinidad and Tobago Limited, (2005), Maharaj, P. S.; Ramnath, K.

The economics of standardization, (2000), G. M. Peter Swann, Manchester Business School.

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