BS EN ISO 14031:2013

BSI Standards Publication

Environmental management — Environmental performance evaluation — Guidelines (ISO 14031:2013)

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN ISO 14031:2013. It supersedes BS EN ISO 14031:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SES/1/4, Environmental Management - Environmental performance evaluation.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 74304 7

ICS 13.020.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 14031

August 2013

ICS 13.020.10

Supersedes EN ISO 14031:1999

English Version

Environmental management - Environmental performance evaluation - Guidelines (ISO 14031:2013)

Management environnemental - Évaluation de la performance environnementale - Lignes directrices (ISO 14031:2013)

Umweltmanagement - Umweltleistungsbewertung - Leitlinien (ISO 14031:2013)

This European Standard was approved by CEN on 19 July 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN ISO 14031:2013: E

Foreword

This document (EN ISO 14031:2013) has been prepared by Technical Committee ISO/TC 207 "Environmental management".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2014, and conflicting national standards shall be withdrawn at the latest by February 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 14031:1999.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 14031:2013 has been approved by CEN as EN ISO 14031:2013 without any modification.

Annex ZA
(informative)

Relationship between this International Standard and the Essential Requirements of EU Directive 765/2008/EC and 339/93/EEC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 765/2008/EC and 339/93/EEC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

Contents

Page

Foreword

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

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 207, *Environmental management*, Subcommittee SC4, *Environmental performance evaluation*.

This second edition cancels and replaces the first edition (ISO 14031:1999), which has been technically revised.

Introduction

Many organizations seek ways to understand, demonstrate and improve their environmental performance. This can be achieved by effectively managing those elements of their activities, products and services that can significantly impact the environment.

This International Standard sets out a process called environmental performance evaluation (EPE) (see 3.10) which enables organizations to measure, evaluate and communicate their environmental performance using key performance indicators (KPIs), based on reliable and verifiable information.

EPE is equally applicable to small and large enterprises and can be used to support an environmental management system (EMS) (see 3.7), or used independently. An organization with an EMS in place can assess its environmental performance against its environmental policy, objectives, targets and other environmental performance objectives.

Data and information generated by EPE can be used by an organization to implement other environmental management tools and techniques in a coherent, transparent and cost effective way, e.g. other standards developed by ISO/TC 207 such as those relating to environmental management systems (ISO 14001, ISO 14004, ISO 14005, ISO 14006), to environmental declarations (ISO 14025), to environmental labelling (ISO 14024) and to life cycle assessment (ISO 14040, ISO 14044). A full list is given in the Bibliography. This International Standard can also be used independently.

Environmental performance evaluation and environmental audits are complementary tools that can be used to assess environmental performance and identify areas for improvement. The key aspects (and differences) of these tools are the following:

— EPE is an ongoing process of collection and assessment of data and information to provide a current evaluation of performance, as well as performance trends over time;

— environmental audits can be used to gather such data and information, either as part of EPE, or as part of an environmental management system, to verify whether objectives and targets are being met;

— environmental management system audits are conducted periodically to verify conformity with specifications and compliance with legal and other requirements (guidance on auditing an EMS is provided in ISO 19011).

Environmental management — Environmental performance evaluation — Guidelines

1 Scope

This International Standard gives guidance on the design and use of environmental performance evaluation (EPE) within an organization. It is applicable to all organizations, regardless of type, size, location and complexity.

This International Standard does not establish environmental performance levels.

The guidance in this International Standard can be used to support an organization's own approach to EPE, including its commitments to compliance with legal and other requirements, the prevention of pollution, and continual improvement.

NOTE This International Standard is a generic standard and does not include guidance on specific methods for valuing or weighting different kinds of impacts in different kinds of sectors, disciplines, etc. Depending on the nature of the organization's activities, it is often necessary to refer to other sources for additional information and guidance on sector-specific topics, different subject matters, or different scientific disciplines.

2 Normative references

There are no normative references.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
benchmark
reference point against which comparisons can be made

Note 1 to entry: Benchmarking is the process for making a comparison.

[SOURCE: ISO/IEC 29155-1:2011, 2.1, modified]

3.2
combined indicator
indicator which includes information on more than one aspect

Note 1 to entry: A combined indicator may also be referred to as a composite indicator.

3.3
environment
surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

Note 1 to entry: Surroundings in this context extend from within an organization to the global system.

[SOURCE: ISO 14001:2004, 3.5]

3.4
environmental aspect
element of an organization's activities or products or services that can interact with the environment

Note 1 to entry: A significant environmental aspect has or can have a significant environmental impact.

[SOURCE: ISO 14001:2004, 3.6]

3.5
environmental condition indicators
ECI
environmental performance indicators that provide information about the local, regional, national or global condition of the environment

Note 1 to entry: "Regional" may refer to a state, a province, or a group of states within a country, or it may refer to a group of countries or a continent, depending on the scale of the condition of the environment that the organization chooses to consider.

3.6
environmental impact
any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects

[SOURCE: ISO 14001:2004, 3.7]

3.7
environmental management system
EMS
part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects

[SOURCE: ISO 14001:2004, 3.8, modified]

3.8
environmental objective
overall environmental goal, consistent with the environmental policy, that an organization sets itself to achieve

[SOURCE: ISO 14001:2004, 3.9]

3.9
environmental performance
measurable results of an organization's management of its environmental aspects

Note 1 to entry: In the context of environmental management systems, results can be measured against the organization's environmental policy, environmental objectives, environmental targets and other environmental performance requirements.

[SOURCE: ISO 14001:2004, 3.10]

3.10
environmental performance evaluation
EPE
process to facilitate management decisions regarding an organization's environmental performance by selecting indicators, collecting and analysing data, assessing information about environmental performance, reporting and communicating, and periodically reviewing and improving this process

3.11
environmental performance indicator
EPI
indicator that provides information about an organization's environmental performance

3.12
environmental policy
overall intentions and direction of an organization related to its environmental performance as formally expressed by top management

[SOURCE: ISO 14001:2004, 3.11, modified]

3.13
environmental target
detailed performance requirement, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

[SOURCE: ISO 14001:2004, 3.12]

3.14
function
combination of processes, products or services that achieve a specific, predetermined end, usually on a repetitive basis

3.15
indicator
measurable representation of the condition or status of operations, management, or conditions

3.16
interested party
individual or group concerned with or affected by the environmental performance of an organization

[SOURCE: ISO 14001:2004, 3.13]

3.17
key performance indicator
KPI
indicator of performance deemed by an organization to be significant and giving prominence and attention to certain aspects

3.18
management performance indicator
MPI
environmental performance indicator that provides information about the management activities to influence an organization's environmental performance

3.19
operational performance indicator
OPI
environmental performance indicator that provides information about the environmental performance of an organization's operational process

3.20
organization
company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

Note 1 to entry: For organizations with more than one operating unit, a single operating unit may be defined as an organization.

[SOURCE: ISO 14001:2004, 3.16]

4 Environmental performance evaluation

4.1 General overview

4.1.1 EPE process

Environmental performance evaluation (EPE) is a management process that uses key performance indicators to compare an organization's past and present environmental performance with its

environmental objectives and targets. The information generated by EPE can help an organization to do the following:

— identify its environmental aspects and determine which aspects it will treat as significant;

— set objectives and targets for improving environmental performance and assess performance against these objectives and targets;

— identify opportunities for better management of its environmental aspects;

— identify trends in its environmental performance;

— review and improve efficiency and effectiveness;

— identify strategic opportunities;

— evaluate compliance or risk of non compliance with legal requirements and other requirements to which the organization subscribes related to its environmental aspects;

— report and communicate environmental performance internally and externally.

Management commitment to EPE is essential and it should be part of the regular business functions and activities of an organization. EPE should be appropriate to the size, location, and type of organization and its needs and priorities.

Internally, EPE can help the organization to achieve its environmental performance objectives and targets and also to enlist the involvement of an EMS. EPE can also be used to report and communicate information on the organization's environmental performance to external interested parties to demonstrate its commitment to improvement.

EPE, as detailed in this International Standard, follows a "Plan-Do-Check-Act" (PDCA) management model. The steps of this on-going process are as follows.

a) **Plan**

Preparing to implement performance evaluation:

— planning EPE;

— selecting indicators for EPE (the process of selecting indicators for objectives and targets may include both choosing from existing indicators and developing new indicators).

b) **Do**

Managing data and information, which includes:

— collecting data relevant to the selected indicators (for guidance on data collection, see ISO/TS 14033);

— analysing and converting data into information describing the organization's environmental performance;

— assessing information describing the organization's environmental performance in comparison with the organization's environmental performance objectives;

— reporting and communicating information describing the organization's environmental performance.

c) **Check and Act**

Reviewing and improving EPE.

4.1.2 Indicators for EPE

4.1.2.1 General

This International Standard describes two categories of indicators for EPE.

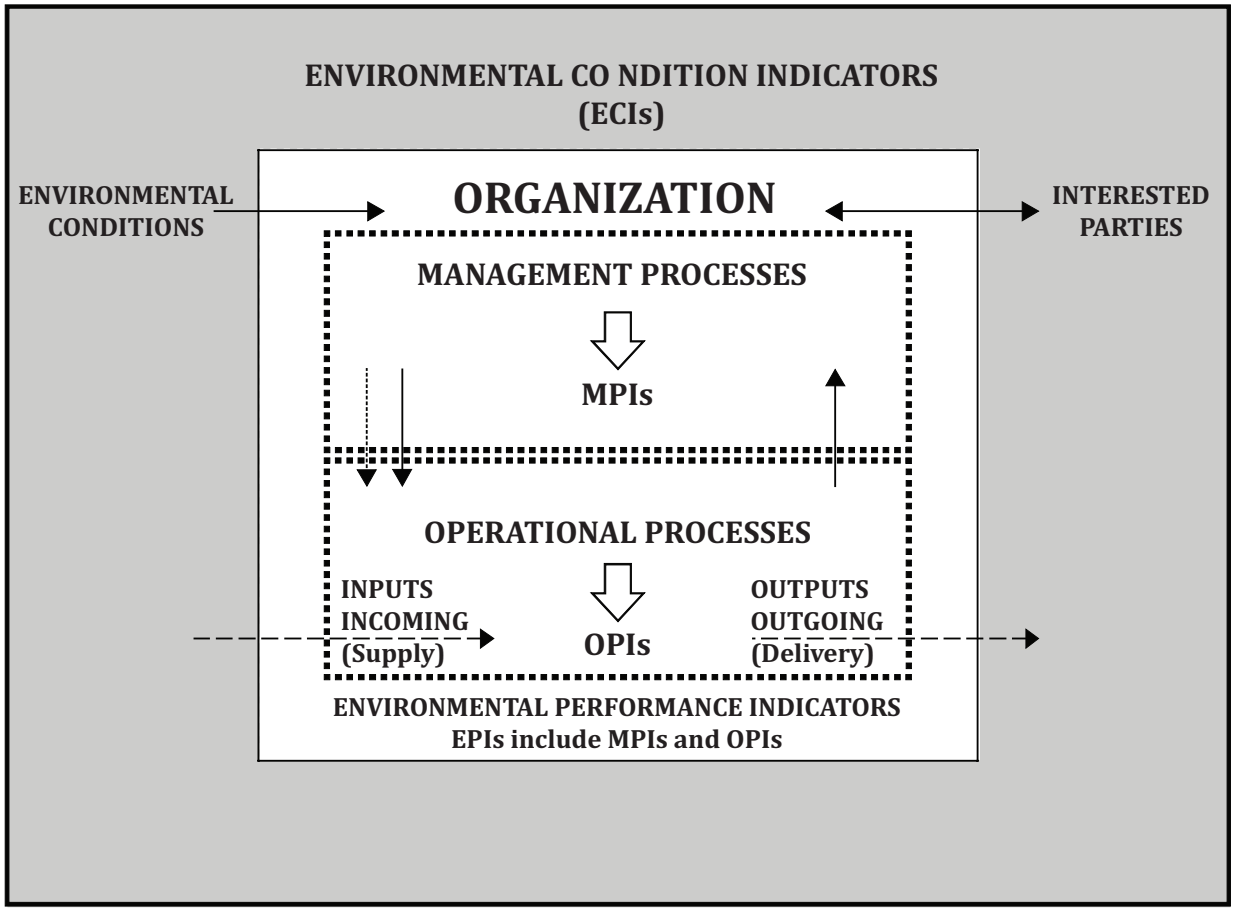
Environmental condition indicators (ECIs) provide information about the condition of the environment which could be impacted by the organization. This information can help an organization to better understand the actual impact or potential impact of its environmental aspects (e.g. process emissions). ECIs are often difficult to link directly to one organization's operations unless they are the only source emitting a particular pollutant. Care should be taken to account for any other sources or factors that might have similar impacts on the environment. ECIs can be used (e.g. by regulators or other local government agencies) to calculate condition baselines, monitor trends, establish permit limits for pollutants, and create incentives.

Environmental performance indicators (EPIs) provide information related to the organization's management of its significant environmental aspects, and demonstrate the results of its environmental management programmes. These may be KPIs that an organization chooses to use for general business purposes:

— management performance indicators (MPIs) provide information about management efforts to influence the environmental performance of the organization's management;

— operational performance indicators (OPIs) provide information about the environmental performance of the organization's operations.

Figure 1 illustrates the interrelationships among an organization's management, operations, and the condition of the environment, noting the type of indicator in brackets for EPE related to each of these elements.



Key

information flows

input and output flows related to the organization's operations

decision flows

Figure 1 — Understanding the organization and its context

4.1.2.2 Relating EPE indicators to environmental, social and economic aspects of sustainability

EPIs and ECIs can be used to demonstrate how an organization addresses the three pillars of sustainability (social, economic and environmental) through the management of its significant environmental aspects.

MPIs can show improvements in the social dimension (e.g. indicators that show how training is being done or will be done so as to improve certain environmental aspects) or in the economic dimension (e.g. investments on new technologies so as to address environmental aspects and cost savings due to improved environmental performance).

OPIs can be linked to the context of the environment (e.g. emission reductions, reduction in the use of energy and water resources).

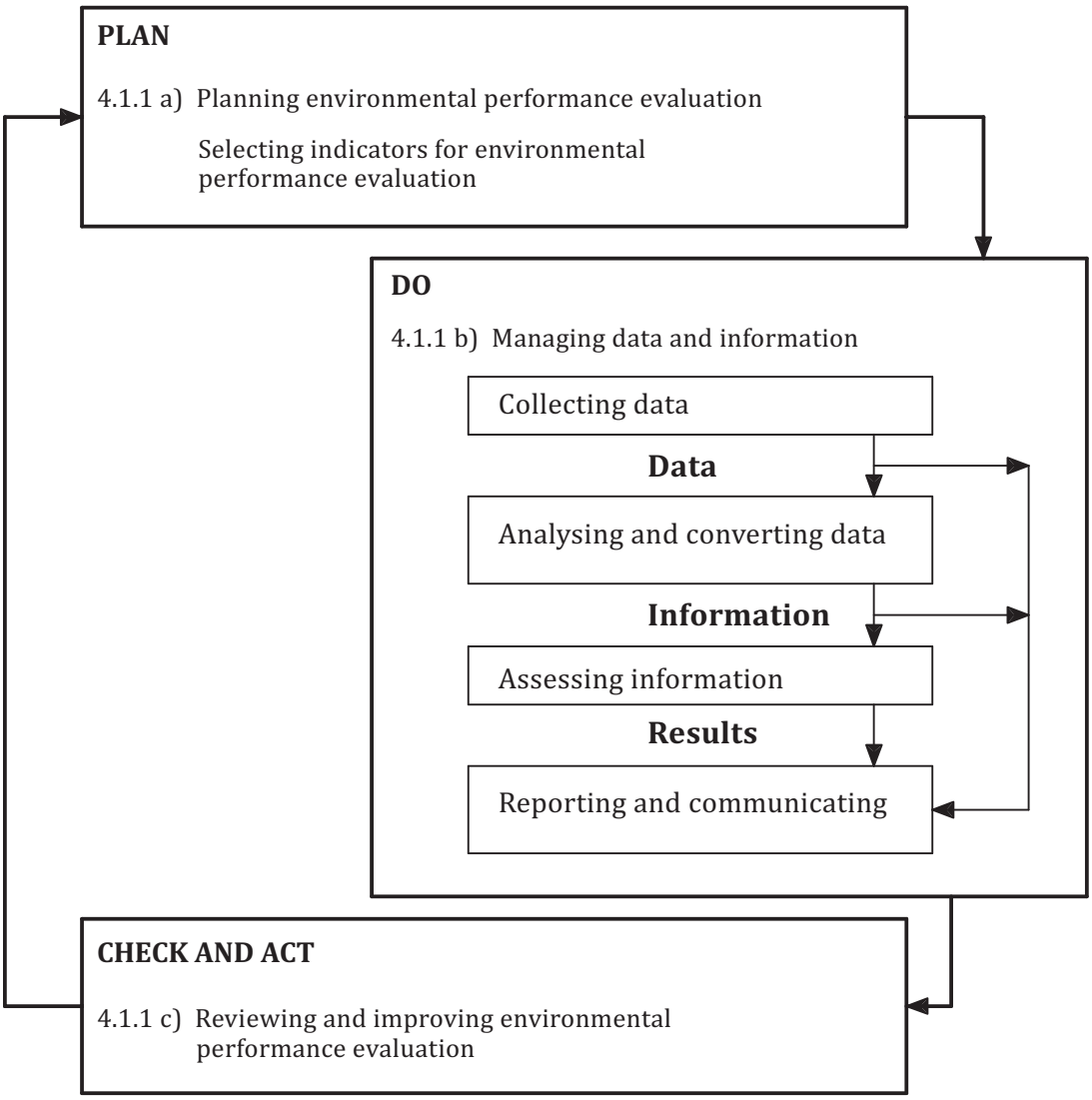
ECIs might not be linked directly with the organization's processes, but in certain instances can be linked to the success of its environmental management, which itself can reflect on all three dimensions of sustainability, e.g.

— improved quality of water resources (environmental);

— improved quality of life - more people having access to drinking water (social);

— reduced costs for obtaining drinking water (economic).

The decisions and actions of an organization's management are closely related to the performance of its operations. Figure 2 provides an outline of EPE, with references to the numbers and titles of relevant clauses in this International Standard. Annex A provides supplemental guidance to support EPE.



NOTE References in this figure are to subclause 4.1.1. Annex A provides supplemental guidance.

Figure 2 — Outline of EPE (following PDCA model)

4.1.3 EPE principles

EPE principles for performance information include the following:

— relevance: performance information should be relevant to the organization's efforts to manage its environmental aspects;

— completeness: performance information should be complete to ensure that all factors will be addressed;

— consistency and accuracy: performance information should be consistent and accurate to allow valid comparisons of past, present and future performance;

— transparency: performance information should be clear and transparent, so that the intended users have access and understanding of performance data to make decisions with reasonable confidence.

4.2 Planning EPE (Plan)

4.2.1 General guidance

4.2.1.1 General

Key performance indicators are selected by organizations as a means of presenting quantitative or qualitative data or information in a more understandable and useful form. They help to convert relevant data into concise information about management's efforts to influence the environmental performance of its operations or the condition of the environment. An organization should select a sufficient number of relevant and understandable indicators to evaluate its environmental performance and reflect the nature and scale of the organization's operations, as well as their environmental impacts. The choice of indicators for EPE will determine what data should be used. To facilitate this effort, organizations can use data already available and collected by the organization or by others.

4.2.1.2 Applying EPE to those organizations with or without an EMS

An organization with an EMS in place should evaluate its environmental performance against its environmental policy, objectives and targets, and applicable legal and other requirements. Whether it has an EMS or not, an organization should plan EPE in conjunction with the setting of its environmental performance goals, so that the selected indicators for EPE will be appropriate for describing the organization's environmental performance against these goals.

Practical Help Box 1

Examples of approaches to identify environmental aspects and their relative significance in the context of EPE:

— identify activities, products and services of the organization, the specific environmental aspects and the relative significance associated with them, and the potential impacts related to significant environmental aspects;

— use information about the condition of the environment to identify activities, products and services of the organization that may have an impact on specific conditions;

— analyse the organization's existing data on material and energy inputs, discharges, waste and emissions and evaluate these data in terms of risk;

— identify the views of interested parties and use this information to help establish the organization's significant environmental aspects;

— identify activities of the organization that are subject to environmental regulation or other requirements, for which data may have been collected by the organization;

— consider the design, development, manufacturing, distribution, servicing, use, re-use, recycling and disposal of the organization's products, and their related environmental impacts;

— identify those activities of the organization having the most significant environmental costs or benefits, including outsourced activities or processes.

4.2.2 Characteristics of EPE indicators

4.2.2.1 General overview

The information conveyed through indicators for EPE can be expressed as direct or relative measures or as indexed information. Indicators for EPE may be aggregated or weighted, as appropriate, to the nature of the information and its intended use. Aggregation and weighting should be done with care to ensure

verifiability, consistency, comparability and understanding. There should be a clear understanding of assumptions made in the handling of data and its transformation into information and indicators for EPE.

Practical Help Box 2

Examples of data characteristics for EPE indicators:

— direct measures or calculations: basic data or information, such as tonnes of contaminant emitted;

— relative measures or calculations: data or information compared to or in relation to another parameter (e.g. production level, time, location or background condition), such as tonnes of contaminant emitted per tonne of product manufactured, or tonnes of contaminant emitted per unit of sales turnover;

— indexed to a reference point: describing data or information converted to units or to a form which relates the information to a chosen standard or baseline, such as contaminant emissions in the current year expressed as a percentage of those emissions in a baseline year;

— aggregated: describing data or information of the same type, but from different sources, collected and expressed as a combined value, such as total tonnes of a given contaminant emitted from production of a product in a given year, determined by summing emissions from multiple facilities producing that product;

— weighted: describing data or information modified by applying a factor related to its significance.

4.2.2.2 Understanding relationships between different measures of performance

Indicators for EPE should be selected so that management has sufficient information to understand the effect that any one environmental performance objective has on other elements of the organization's operations.

Organizations may find it cost effective to select indicators derived from a common set of data, or to use combined indicators which include information on more than one aspect. It is therefore important to ensure that the information on different aspects of such an indicator can easily be extracted and communicated to the intended audience.

Combined indicators (see 3.2) can include information on a group of aspects.

EXAMPLE From the indicator "litres of diesel/t-km" for transports, one can calculate data on emissions of greenhouse gas (GHG) and other pollutants.

Practical Help Box 3

Example to illustrate an organization selecting several indicators for EPE derived from a common set of data, depending on the intended audiences:

An organization discharging treated wastewater to a lake selects the following indicators for EPE:

— total amount of specific contaminant discharged per year (possible intended audience: the local community);

— concentration of contaminant in wastewater (possible intended audience: legal and regulatory authorities);

— amount of contaminant discharged per product produced (management and consumers);

— change in amount of contaminant discharged per year relative to investments in cleaner technology or process upgrade (management and investors).

Regional, national and global condition indicators related to environmental performance or sustainable development are being developed by government agencies, non-governmental organizations, and scientific and research institutions. When selecting indicators for EPE and collecting data, organizations may wish to consider indicators being developed by such entities and compatibility with information which is provided to them.

4.2.2.3 Selecting management performance indicators

In the context of EPE, the management of the organization includes the policies, people, planning activities, practices and procedures at all levels of the organization, as well as the decisions and actions associated with the organization's environmental aspects. Efforts and decisions undertaken by the organization's management may affect the performance of the organization's operations, and therefore may contribute to the overall environmental performance of the organization (see Figure 1).

Management performance indicators (MPIs) should provide information on the organization's capability and efforts in managing matters such as training, legal requirements, resource allocation and efficient utilization, environmental cost management, purchasing, product development, documentation, or corrective action

which have or can have an influence on the organization's environmental performance. MPIs should assist in evaluating management's decisions and actions to improve environmental performance.

For example, MPIs can be used to track the following:

— senior level commitment to environmental management;

— management's understanding of the relevance of environmental management to the organization's mission;

— the effectiveness of policies and programmes;

— resources to implement policies and programmes linked to the organization's mission;

— the degree of engagement with external interested parties (e.g. local communities) on environmental issues;

— changes in roles and responsibilities within the organization;

— supply chain activities and performance;

— how end users of products and services are influenced;

— continual improvement of systems and performance;

— compliance with legal, regulatory and other requirements to which the organization subscribes;

— benefits and costs to the organization from environmental management.

In addition, effective MPIs can help to:

a) predict changes in performance;

b) identify root causes where actual performance exceeds, or does not meet, relevant environmental performance objectives;

c) identify opportunities for preventive action.

Examples of MPIs are provided in A.4.2.2.

4.2.2.4 Selecting operational performance indicators

Operational performance indicators (OPIs) provide management with information on the environmental performance of the organization's operations. OPIs can be identified by listing the organization's inputs, operational processes and equipment, and outputs, as shown in Figure 3.

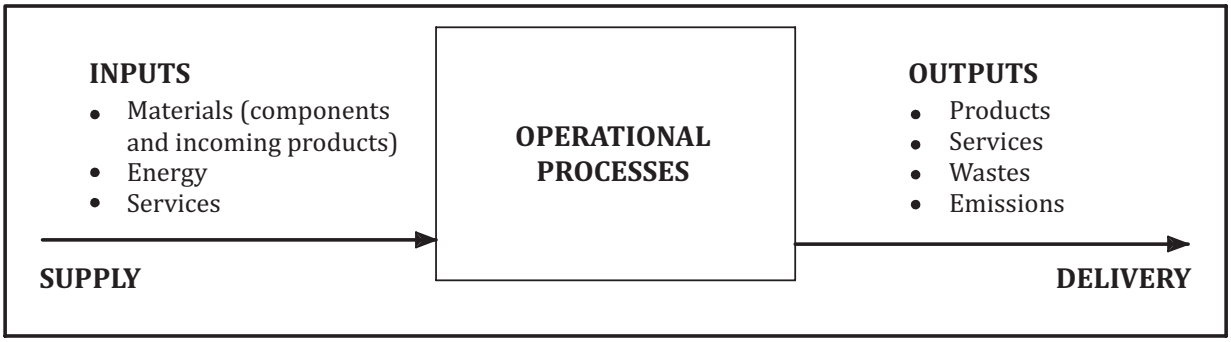


Figure 3 — Operations of the organization (general overview)

NOTE 1 Services can be inputs, operational processes or outputs, and can have significant environmental impacts (e.g. distribution).

NOTE 2 A mass balance or input/output analysis can be performed for the whole company, or for selected processes, services or equipment, as well as for all or single products, depending on the quality of the information systems and company needs.

OPIs can be selected from the following categories and subcategories:

— components, incoming products (e.g. reused, new) and services (direct and indirect);

— raw and auxiliary materials, which are intended to become products as well as operating materials, which assist running the processes (e.g. cleaning materials and lubricants);

— services supporting the organization's operations (e.g. direct, indirect);

— operational processes (e.g. design of processes, operational efficiency, maintenance);

— physical facilities and equipment (e.g. design, installation, operation, maintenance, land use);

— components and outgoing products and services (e.g. design, environmental impact, by-products, used products, distribution);

— waste (e.g. hazardous, non-hazardous);

— emissions (e.g. hazardous vapours, nuisance, GHGs, ozone depleting substances, dust, noise, heat, thermal energy, effluent to water or land).

Examples of OPIs are provided in A.4.3.2.

4.2.2.5 Selecting environmental condition indicators

Environmental condition indicators (ECIs) provide information about the local, regional, national or global condition of the environment, over time or with specific events. While ECIs may not be direct measures of impact on the environment, ECIs can provide useful information on the environmental outcomes of changes to an organization's activities, products and services. ECIs can be developed for environmental categories (e.g. air, water, land, flora, fauna, humans, and aesthetics, heritage and culture including special indicators for biodiversity or ecosystem services).

ECIs provide the organization with an environmental context to support the following:

— establishment of a baseline against which to measure change;

— identification and management of its significant environmental aspects;

— assessment of the appropriateness of environmental performance objectives;

— selection of EPIs (MPIs and OPIs);

— determination of environmental change over time in relation to an on-going environmental programme;

— investigation of possible relationships between environmental condition and the organization's activities, products and services;

— determination of needs for action.

Development and application of ECIs is frequently the function of local, regional, national or international government agencies, non-governmental organizations, and scientific and research institutions rather than the function of an individual business organization. However, organizations that can identify a relationship between their activities and the condition of some component of the environment may choose to develop their own ECIs as an aid in evaluating their environmental performance as appropriate to their capabilities, interests and needs.

An organization that has identified a specific condition in the environment that results directly from its own activities, products and services may wish to select EPIs (MPIs and OPIs) that link management efforts and operational performance to changes in environmental conditions.

Examples of ECIs are provided in A.4.4.2.

Practical Help Box 4

Examples to illustrate an identified environmental issue with selected linked indicators for EPE:

EXAMPLE 1 A service organization located in an area where air quality is known to be unsatisfactory uses air quality information to select appropriate indicators for EPE, consistent with its objective to reduce its motor vehicle emissions.

ECIs:

— concentration of particulates;

— concentration in the air of contaminants associated with motor vehicle emissions (CO,HC and NOx).

MPIs:

— amount of money spent promoting public transportation and its use;

— number of hours of employee training in the benefits of the use of public transportation;

— effectiveness of efforts to reduce fuel consumption, improve vehicle maintenance and fuel efficiency, and use alternative fuels.

OPIs:

— reduction in motor vehicle emissions attributed to the use of alternative fuels;

— quantity of total fuels consumption;

— fuel efficiency by motor vehicle;

— frequency of vehicle maintenance;

— number of vehicles equipped with environmental control technologies.

EXAMPLE 2 In a geographical region where environmental information indicates a diminishing water supply, an organization may select indicators for EPE related to water conservation measures which it would not have chosen without that information.

ECIs:

— groundwater level;

— rate of replenishment.

MPI:

— amount of money spent on research into methods for reduction of water consumption.

OPIs:

— quantity of water used per day;

— quantity of water used per unit of production.

4.2.2.6 Selecting sector-specific operational performance indicators for comparison

Operational performance indicators (OPIs) are typically expressed in terms of quantities per unit of time (e.g. total energy per year) relating to an entire organization or to its sub-units. Though these indicators offer insight into each individual entity, different organizations vary in size, product range, resource inputs, production processes and in many other ways, so that comparisons of their performance is not normally possible by directly comparing their environmental aspects as represented by OPIs.

Similarly, while monitoring OPIs over a period of time can identify performance trends for an organization, increases or decreases of environmental burdens are not necessarily related to performance changes alone, but may be due to other reasons such as organizational expansion/reduction of production or outsourcing/relocations of certain activities. Hence, even internal performance comparisons within the same organization present difficulties that need to be taken into account when doing comparisons.

By contrast, comparisons can be made of the environmental efficiency of particular activities within processes or products (e.g. quantity of energy per product unit). These relative values will allow (under specific, controlled conditions) qualified comparisons of processes, products or services from different organizations, as well as for the identification of benchmarks, and best and worst practices or ratings.

Any meaningful comparison of performance should be based on the same function. A methodology to develop comparable environmental indicators will need to focus on processes, products or services at a sector (or even subsector) or functional level. Such methods are usually established through joint effort that include industry sectors, standards setting bodies and governmental institutions, rather than by an individual organization.

The environmental aspects compared often need to include those of the whole life cycle of a product, such as raw material acquisition/processing and the use/consumption of the product.

EXAMPLE 1 Automobile use is of far greater importance in calculating the total life cycle CO_2 burden than is its production stage.

Furthermore, comparisons can be made easier by focusing only on the most significant aspects, i.e. the key performance indicators (KPIs).

EXAMPLE 2 The average consumption of its fleet is by far the most important indicator of an automobile company's environmental aspects.

Practical Help Box 5

The following methodology can be used to develop sector-specific environmental indicators. These are indicators for unit comparisons. Comparisons of the overall environmental performance of entire organizations is normally difficult or even impossible to achieve:

1. Clearly identify the process, product or service of interest with an appropriate level of detail to ensure the comparison is based on the same function.

2. Identify the significant environmental aspects associated with the process, product or service.

— Start by finding existing generic sector or subsector indicator listings, descriptions of state-of-the-art technologies or eco-label criteria, studies, scientific publications, regulatory requirements, media reports, public perceptions, etc., that provide clues to significant aspects and impacts.

— Include life cycle data, particularly where environmental aspects and impacts occur outside the organization (e.g. destruction of biodiversity during raw material extraction or during the use stage).

— Seek consensus among materially interested parties on the environmental impacts on which the comparison is to be based. Determine whether values will be weighted, aggregated into a single score, or left separately as an ingredient list where respective values for each indicator type are compared to each other. Different methods (such as scoring and ranking systems) can be used for this comparison and need to be agreed upon by the parties involved. For most processes, products and services, three to ten indicators will usually suffice to establish a sound basis for comparison.

3. Metrics need to be chosen carefully to accurately value the indicators. Some examples include: Production – energy consumption per ton cement produced; fuel burning – CO_2 per kWh electricity; usage – water/electricity consumption of a washing machine per standard wash; consumption – paper consumption per employee; consumption – annual energy consumption per meter^2 of floor space. In some cases, percentages or yes/no indicators (e.g. absence of certain chemicals/dangerous substances) may also be appropriate and useful.

4. While some processes need only to consider a single stage (e.g. car emissions occur mainly in the use stage), others (e.g. CO_2 emissions from cement manufacturing) include the life cycle stages of quarrying, grinding raw materials, clinker production, grinding cement, and storage/transport. This requires a cradle-to-gate life cycle evaluation. More complex systems could require the combination of processes relating to several products or services.

5. Data collection and data quality, including quantification algorithms, need to be well defined. This includes assigning responsibilities for collecting the data, precise definition of the kind and format of data needed, measurement and test procedures, quality assurance and verification, averaging, time coverage, conversion factors, credits and deductions, other aspects. (ISO/TS 14033 provides guidance for acquisition and provision of quantitative environmental information to establish good data quality and data comparability.)

6. The rules for reporting the results of comparisons should include at least the following elements:

— a description of the indicator, including units (e.g. kg CO2-emissions per ton cement from cradle to factory gate);

— a sound rationale for the indicator and its relevance;

— the time coverage (e.g. calendar year, fiscal year, results for one or several subsequent years);

— the geographical coverage (site, country, region, global);

— an explanation of other relevant aspects relating to organizational and indicator boundaries;

— assessment of uncertainty of results.

7. When establishing scales and benchmarks, the following factors should be taken into account:

— geographical coverage (site, country, region, global);

— existing legal or best practice reference documents;

— existing indicator systems (e.g. developed for industry/subsectors);

— an assessment of the minimum/maximum indicator levels measured or observed at a given time;

— the format and graphical representation including the number of levels, graded scales, colour/letter codes, etc.

8. Both the resulting indicators and the rules for the (sub) sector indicators should be regularly reviewed and, where appropriate, updated and revised. The period for review should be predefined.

Practical Help Box 6

Simplified examples of comparable indicators

EXAMPLE 1 Retail banks

1. Function defined: money exchange, account management, granting credits

2. Significant environmental aspects identified: Energy consumption, CO2 emissions, overall paper consumption, IT waste, travel

— Significant environmental aspect (randomly) selected: overall paper consumption

3. Metrics defined:

— Normalised reference value (Functional Unit): per Full Time Employee (FTE) per year

— Percentage of recycled paper to overall paper consumed

— Indicators for comparison: kg paper per FTE per year and percentages of recycled paper to overall paper consumed

4. Boundaries defined:

— Organizational: including office based activities in one country, excluding operations in other countries and marketing materials

— Life cycle stages: overall paper consumed

5. Data collection and calculation rules: described in retail bank procedures

6. Reporting rules: paper consumption expressed in kg per FTE covering overall consumption, including the percentage of chlorine free, recycled and certified ecolabelled paper according to retail bank procedures

7. Benchmarking: comparison of data of previous three years performance ranked against industry sector top performers

EXAMPLE 2 Cement production

1. Function defined: production of cement

2. Significant environmental aspects identified: resource extraction, energy consumption, CO2 emissions, emissions of other pollutants (NOx, SO2, particulate matter), protection and mitigation of biodiversity concerns

— Significant environmental aspect (randomly) selected: CO2 emissions

3. Metrics defined:

— Normalised reference value (Functional Unit): per tonne cement

— Indicator for comparison: kg CO2 per tonne cement

4. Boundaries defined:

— Organizational: production facilities in all European countries including all cradle to gate operations outside the organizational boundaries

— Life cycle stages: quarrying, grinding raw materials, clinker production, grinding of cement and storage/transport

5. Data collection and calculation rules: described in cement industry guidance

6. Reporting rules: CO2 emission expressed in kg per tonne cement covers all CO2 emissions from cradle to gate according to cement industry guidance

7. Benchmarking: comparison of data of previous three years performance ranked against industry sector top performers.

4.3 Using data and information (Do)

4.3.1 Overview

The information generated by EPE can assist an organization to do the following:

— determine any necessary actions to achieve its environmental performance objectives;

— identify significant environmental aspects;

— identify opportunities for better management of its environmental aspects (e.g. prevention of pollution);

— identify trends in its environmental performance;

— increase the organization's efficiency and effectiveness;

— identify strategic opportunities.

Internal reporting and communication of information describing the organization's environmental performance is important to assist employees in fulfilling their responsibilities, thereby enabling the

organization to achieve its environmental performance objectives and also to enlist the involvement of its employees in the implementation, maintenance and improvement of environmental performance. Management may also commit or be required to report or communicate such information to other (internal and external) interested parties.

An organization's EPE should be reviewed periodically to identify opportunities for improvement of the EPE process.

An organization should collect data regularly to provide input for calculating values for selected indicators for EPE. Data should be collected systematically from appropriate sources at frequencies consistent with EPE planning. The data to be considered needs to be relevant and reliable.

Data generated for performance evaluation can also be coherent, transparent and cost effective for use in the implementation of other environmental management tools and standards. This is particularly true for those standards that rely on data derived from a physical mass balance of the organization's operational system.

Figure 4 illustrates the steps for using data and information to evaluate environmental performance. These steps are further described in 4.3.2 to 4.3.5.

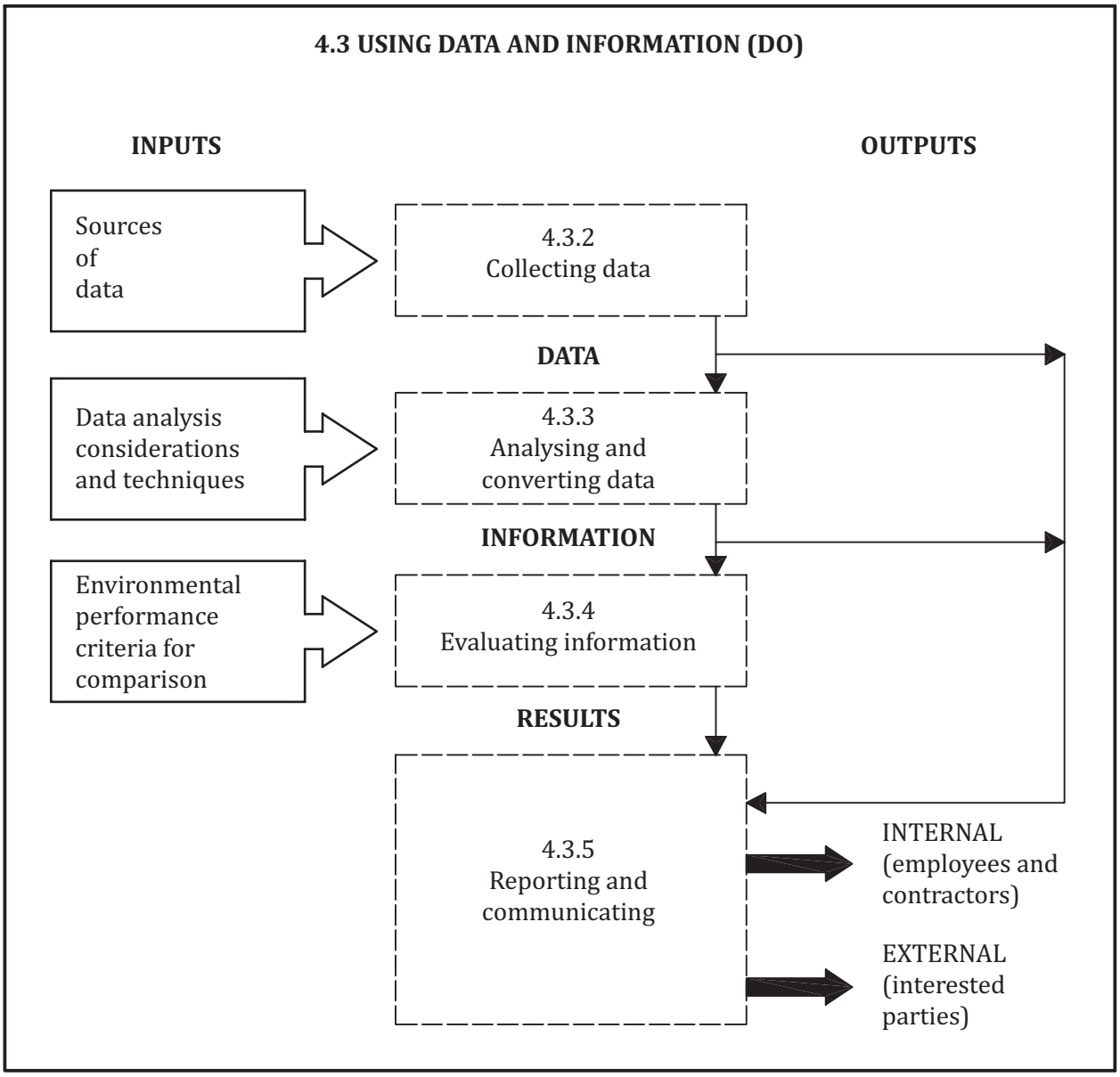


Figure 4 — Using data and information

4.3.2 Collecting data

Data collection procedures should ensure data reliability: this depends on factors such as availability, adequacy, scientific and statistical validity and verifiability. Data collection should be supported by quality control and quality assurance practices that ensure the data obtained are of the type and quality needed for EPE use. Data collection procedures should include the appropriate identification, filing, storage, retrieval, and disposition of data and information (see ISO 14040). Guidance for data collection and provision is given in ISO/TS 14033.

An organization may use data from its EMS or from other sources. For example, data sources could include the following:

— interviews and observations;

— records (e.g. monitoring, measuring, inventory, production, financial, accounting, purchasing, training, emergency situations, compliance and incident records);

— reports (e.g. reviews, audits, assessments, scientific, and studies);

— government agencies, academic institutions and non-governmental organizations;

— suppliers and subcontractors;

— customers, consumers and interested parties;

— business associations;

— other management systems (e.g. quality, occupational health and safety, information, security);

— corrective and preventive measures;

— risk assessment;

— permits and licences;

— innovations.

4.3.3 Analysing and converting data

The collected data should be analysed and converted into information describing the organization's environmental performance, expressed as indicators for EPE. To avoid bias in the results, all relevant and reliable data that have been collected should be considered (see ISO/TS 14033).

Organizations that have developed other recognized programmes (e.g. environmental product declarations) can use this information in EPE without the need for further analysis or conversion of data (see ISO 14025).

Data analysis may include consideration of the data quality, validity, adequacy and completeness necessary to produce reliable information.

Statistical tools may be used to increase the reliability of decisions on whether or not a certain objective was achieved. These tools may include, as appropriate, graphical techniques, indexing, aggregating or weighting.

4.3.4 Evaluating information (Review)

Whether it has an EMS or not, an organization should plan EPE in conjunction with the setting of its environmental performance objectives, so that the selected indicators for EPE will be appropriate for describing the organization's environmental performance against these objectives. All objectives and targets should have corresponding performance indicators.

Examples of sources from which environmental performance objectives can be derived include the following:

— current and past performance;

— legal requirements;

— recognized codes, standards and best practices;

— performance data and information developed by industry and other sector organizations;

— management reviews and audits;

— the views of interested parties;

— scientific research.

The information derived from performance data, expressed in terms of OPIs, and possibly ECIs, should be compared with the organization's environmental performance objectives. Statistical tools such as test hypothesis or other comparison methods can be helpful for these comparisons. Comparisons may indicate progress or deficiencies in environmental performance. Comparisons may also be useful

in understanding why the environmental performance objectives have, or have not, been met. The information describing the organization's environmental performance and the results of comparisons should be reported to management, to support appropriate management actions to improve or sustain the level of environmental performance.

4.3.5 Reporting and communicating

4.3.5.1 General guidance

Environmental performance reporting and communicating provides useful information describing an organization's environmental performance improvements and achievements (see ISO 14063). This information may be reported or communicated to interested parties within and outside the organization, based on management's assessment of needs and its audiences. Communicating environmental performance should be part of the organization's communication plan.

Benefits of reporting and communicating environmental performance can include the following:

— helping the organization's achievement of its environmental performance objectives;

— increasing awareness and dialogue about the organization's environmental policies, environmental performance objectives and relevant achievements;

— demonstrating the organization's commitment and efforts to improving environmental performance;

— providing the mechanism to respond to concerns and questions about the organization's environmental aspects.

4.3.5.2 Internal reporting and communicating

Management should ensure that appropriate and necessary information describing the organization's environmental performance is communicated throughout the organization on a timely basis (see ISO 14063). This may assist employees, contractors, and others related to the organization to fulfil their responsibilities, and the organization to meet its environmental performance objectives. An organization may wish to consider this information in the review of its EMS.

Examples of information describing the organization's environmental performance can include the following:

— trends in the organization's environmental performance (e.g. waste reduction);

— regulatory compliance;

— the organization's conformance with other requirements to which it subscribes;

— natural resources availability and other operational results;

— cost savings or other financial results;

— opportunities and risks.

4.3.5.3 External reporting and communicating

Organizations today are asked or might be required to issue environmental reports or statements providing information describing its environmental performance to external interested parties (see ISO 14063). EPE provides information that an organization may wish to include in its environmental reports or in other communications with external audiences.

A number of factors may influence an organization's decision to voluntarily report information describing its environmental performance. These factors may include an organization's interest in improving its business position and relations with interested parties, including the communities in which it operates.

This communication should be a reliable representation of the organization's environmental performance. Information describing the organization's environmental performance should be substantive and presented in a manner that recognizes the level of technical knowledge of the intended audience. When an organization chooses to conduct external communications, the reporting and communicating methods selected should encourage communication between the organization and interested parties.

Practical Help Box 7

Examples of information an organization can choose to include when reporting or communicating to external interested parties:

— statement of the organization's commitment to EPE as part of environmental management;

— compliance with legal and other requirements;

— statement of its achievements including management and environmental improvements;

— description of its activities, products and services;

— statement of its significant environmental aspects (e.g. GHGs) and related indicators for EPE;

— information relative to its environmental performance objectives (e.g. GHGs);

— actions arising from EPE to achieve management and environmental improvements;

— contribution of environmental management and EPE to the overall success of the organization.

4.4 Reviewing and improving EPE (Act)

An organization's EPE should be reviewed periodically to identify opportunities for improvement. Such a review may contribute to management actions to improve the performance of the management and operations of the organization, and may result in improvements to the condition of the environment.

For those organizations that have implemented an EMS in accordance with ISO 14001, recommendations to improve EPE should be included in the management review. Others should also provide for management's review of EPE data. Any periodic review should examine improvements or potential for improvements in the following:

— costs versus benefits achieved;

— progress towards environmental objectives and targets;

— progress towards environmental performance improvements (e.g. using benchmarking);

— use of selected indicators for EPE;

— data sources, collection methods and quality;

— information from interested parties;

— changes in legal and other requirements, best practices, and best available techniques;

— processes, products, services and discharges to the environment.

Practical Help Box 8 (Check)

Examples of questions to assist in reviewing EPE:

Is the organization's EPE:

— providing adequate information to measure changes in the organization's environmental performance?
— providing appropriate and useful information to management?
— being implemented according to plan?
— utilizing appropriate data sources and frequencies of data collection?
— useful for analysing and evaluating collected data?
— supported by adequate resources?
— relevant to the organization's environmental performance objectives (KPIs) and targets?
— providing information for reporting and communicating environmental performance?
— considering or soliciting input from interested parties when appropriate?
— adding value to the organization?
— responding to change in the organization and its surroundings?
— addressing new environmental issues?
— well-integrated with other accepted organizational measures of performance?

As a result of the review mentioned above, actions can be taken in order to improve the EPE process. When taking action for improving the EPE process, the main focus should be on enhancing EPE as a tool for continual improvement of the overall environmental performance.

Practical Help Box 9 (Act)

Examples of actions to improve EPE:

— improve data quality, reliability and availability;
— improve analytical and evaluation capabilities;
— develop or identify new or more useful indicators for EPE;
— change the scope of EPE;
— update the training of personnel involved in specific issues related to EPE;
— improve the process for selecting indicators;
— improve EPE communication processes.

Annex A
(informative)

Supplemental guidance on EPE

A.1 General overview

This annex is intended to supplement the concepts presented in Clause 4 through examples and illustrations. Table A.1 illustrates correspondence between elements in Clause 4 and Annex A.

Table A.1 — Correspondence between elements in Clause 4 and Annex A

Clause 4 element		Related Annex A element	
4.2	Planning EPE (Plan)	A.2	Guidance on identifying views of interested parties in context of EPE
4.2.2	Characteristics of EPE indicators	A.3	Supplemental guidance on selecting indicators for EPE
		A.3.1	Considerations for selecting indicators for EPE
		A.3.2	Examples of approaches for selecting indicators for EPE
		A.4	Examples of indicators for EPE
4.2.2.5	Selecting ECIs	A.4.4	Environmental condition indicators
4.2.2.3	Selecting MPIs	A.4.2	Management performance indicators
4.2.2.4	Selecting OPIs	A.4.3	Operational performance indicators

A.2 Guidance on identifying views of interested parties in context of EPE

A.2.1 General

EPE planning should include establishing the means for the organization to identify and obtain information from relevant interested parties.

A.2.2 Potential interested parties

Interested parties differ widely in their relationship to the organization, their stake in the organization, their potential contributions to EPE planning, and how they express and communicate their interests.

Examples of interested parties include the following:

— management representatives;

— employees;

— investors and potential investors;

— customers and suppliers;

— contractors;

— lending institutions and insurers;

— regulatory and legislative bodies;

— neighbouring and regional communities;

— communications media;

— business, administrative, academic and research institutions;

— environmental groups, consumer interest groups and other non-governmental organizations;

— general public;

— shareholders and providers of capital;

— employee representatives.

This list of interested parties is illustrative only. Not all of the listed parties may be relevant to all organizations. Other parties may be identified depending on the nature, location, and circumstances of the organization.

A.2.3 Issues and views of interested parties

Issues related to financial interests can include the following:

— management and amount of environmental costs;

— financial impact related to past or present environmental liabilities;

— positive environmental initiatives;

— investments that improve environmental performance;

— commercial advantages derived from environmental issues;

— costs of compliance, or non-compliance, with environmental regulation or legislation:

  — disposal and emission treatment costs;

  — prevention and environmental management costs.

Issues related to environmental interests or to the development of public policy can include the following:

— health and safety;

— real and perceived risks to the environment resulting from the organization's activities, including trends over time;

— impacts on the quality of life (e.g. acoustic climate, odour, visual impact)

— environmental incidents and complaints;

— evidence that organizations are fulfilling their environmental commitments;

— environmental impacts;

— environmental loads (e.g. emissions, discharges, waste disposal) including trends over time;

— biodiversity;

— impacts on ecosystem services;

— sustainability;

— trans-boundary pollution and other global environmental issues;

— impacts of trade on the environment;

— harmonization of regulatory regimes;

— environmental characteristics of products and services;

— compliance with legal and regulatory environmental requirements;

— consumption of resources.

A.2.4 Methods for identifying the views of interested parties

Examples of methods to identify the views of interested parties include the following:

— surveys and questionnaires;

— employee suggestions;

— meetings and workshops;

— citizen advisory groups and public meetings;

— interviews;

— review of public statements, internal programmes and initiatives of interested parties;

— market research;

— regulatory tracking and trending;

— voluntary guidelines and standards;

— electronic information exchange;

— participation in industry and public interest groups;

— direct communications with neighbours, regulatory bodies, customers and suppliers;

— information from the media and other sources of public information.

Organizations should consider the circumstances and characteristics of their interested parties in selecting and using methods to access their views and inputs, both directly and indirectly.

A.3 Supplemental guidance on selecting indicators for EPE

A.3.1 Considerations for selecting indicators for EPE

A.3.1.1 General

When selecting indicators for EPE, an organization should consider whether they are:

— consistent with the organization's stated environmental policy;

— appropriate to the management efforts, operational performance, or the condition of the environment;

— useful for measuring performance against the organization's environmental performance objectives;

— relevant and understandable to internal and external interested parties;

— obtainable in a cost-effective and timely manner;

— adequate for their intended use based on the type, quality and quantity of the data;

— representative of the organization's environmental performance;

— measurable in units appropriate to the environmental performance;

— responsive and sensitive to changes in the organization's environmental performance;

— consistent with recognized programmes that enable comparisons;

— able to provide information on current or future trends in environmental performance.

A.3.1.2 Considerations for selecting KPIs

When selecting an EPI as a KPI an organization should consider the following:

— its importance to relevant interested parties (e.g. customers, regulatory authorities);

— its relevance to business objectives.

A.3.1.3 Considerations for using combined indicators

When considering using combined indicators the organization should consider the following:

— resource efficiency (e.g. effort spent on measuring and monitoring);

— if combined indicators can provide additional valuable information;

— the value of the component indicators that can be extracted from the combined indicator.

An indicator for EPE does not need to satisfy all of these considerations to be useful to the organization.

A.3.2 Examples of approaches for selecting indicators for EPE

A.3.2.1 Cause and effect approach

An organization may wish to develop indicators that address the fundamental or underlying cause of its significant environmental aspects. It may perform an analysis to identify such a cause and select indicators based on this analysis.

For example, an organization may determine that its high emissions of particulate matter are due to inadequate and infrequent preventive maintenance. Therefore, the organization may select an appropriate OPI, such as quantity of particulate matter emissions per day, and appropriate MPIs, such as resources allocated for preventive maintenance and frequency of preventive maintenance. It would be expected that as preventive maintenance is performed more adequately and more frequently, the organization's particulate matter emissions would decrease.

A.3.2.2 Risk-based approach

A.3.2.2.1 General

Indicators for EPE may be selected based on consideration of the risk which the organization's management determines is associated with particular activities, products or services. The following are examples of different risk-based approaches.

An organization concerned about the risks of serious environmental damage posed by their operations may use a probabilistic risk-based approach to identify which specific process is the most likely to cause an explosion or the release of contaminants to the environment.

A possible MPI: hours of process-safety training conducted for workers involved with the identified specific process.

A.3.2.2.2 Human health risk-based approach

An organization concerned about long-term health effects may identify a particular material as having the greatest risk of posing a significant health threat to workers.

A possible OPI: quantity of the specific material to which workers are exposed from the organization's operations.

A possible MPI: hours of contingency response training for handling explosions.

A.3.2.2.3 Financial risk-based approach

An organization may identify those elements related to its environmental performance with the most significant costs, and therefore, may choose to select appropriate indicators for EPE.

Possible indicators for EPE include the following:

— cost of materials used by the organization's operations;

— quantity of this material consumed by the organization's operations;

— cost for reclamation and reuse of this material from waste;

— percentage of this material in a specified quantity of waste.

A.3.2.2.4 Environmental risk-based approach

An organization may be concerned about an environmental aspect which may threaten the environment or the competitiveness of the organization.

An example of an MPI: the organization's investment allocation in replacements for chlorofluorocarbons.

A.3.2.3 Life cycle approach

An organization may select its indicators by considering the inputs and outputs associated with a particular product, and the significant environmental aspects and impacts at any stage of a product's life cycle.

EXAMPLE 1 The organization has identified that fuel efficiency of a product during use might be enhanced. Possible indicators for EPE can be the number of units of energy consumed during use of the product, and the number of changes in product design to increase fuel efficiency.

EXAMPLE 2 The organization has identified that the use of a non-renewable material in manufacturing a product is the most significant environmental aspect of that product. Possible indicators for EPE can be the amount of the non-renewable material used per unit of product, and resource allocation to study possible substitutions for the non-renewable material.

EXAMPLE 3 The organization has identified that the packaging used for transporting a product could be recovered from customers and returned to the manufacturer for reuse. A possible OPI can be the percentage of packaging materials recovered from customers and reused without further processing.

EXAMPLE 4 The organization has identified that a product does not allow for easy disassembly of parts for reuse or recycling. Therefore, possible indicators for EPE are:

— percentage of a product's parts that can be recycled or reused;

— percentage of a product's parts that cannot be recycled or reused;

— number of changes in product design to facilitate easy disassembly.

A.3.2.4 Regulatory or voluntary initiative approach

Organizations may focus their selection of indicators for EPE on those areas for which they have identified regulatory or voluntary performance requirements. In many cases, performance measures, or the data needed to develop related performance measures, have already been developed or collected by the organization. Therefore, an organization required to report the amount of routine or accidental emissions of a specific contaminant to the environment can use that measurement as an indicator for EPE.

Possible OPIs: The number of spills of a regulated contaminant per year and the amount of a regulated contaminant emitted per year.

An organization subscribing to a voluntary initiative [e.g. Responsible Care®, the Sustainable Forestry Initiative℠, the Global Reporting Initiative (GRI), the International Chamber of Commerce (ICC) Business Charter for Sustainable Development, the Coalition of Environmentally Responsible Economies (CERES) Principles] can select indicators for EPE related to such voluntary initiatives. For example, an organization, required as part of a voluntary initiative to implement a specific programme for the prevention of pollution, may wish to track the number of relevant activities undertaken by the organization over the course of a year.

A.4 Examples of indicators for EPE

A.4.1 General overview

Management may find it useful to establish logical groupings of issues or functions to assist in the selection of appropriate indicators for EPE.

Examples of indicators for EPE provided below are for illustrative purposes only. The groupings, lists and examples below are not complete or comprehensive, and should not be construed as necessary or even appropriate for every organization. Organizations, and their policies, objectives and structures, vary greatly. Each organization should select key performance indicators for EPE that it recognizes as important to achieve its environmental performance objectives.

Most of the examples presented below are expressed in the form of direct measures, events or numbers simply to illustrate the kinds of factors that could be useful to monitor. An organization may find some indicators for EPE to be more useful for management's information needs and the intended use if expressed in terms of fractions or percentages, numbers per unit of time, per employee, per unit of sales, per unit of production or in other relative terms.

A.4.2 Management performance indicators

A.4.2.1 General overview

Management efforts to improve environmental performance may include implementation of policies and programmes, conformity with requirements or expectations, financial performance, and community relations. Depending on the significant environmental aspects of the organization, and the organization's environmental performance objectives, it may choose some or none of the following examples of MPIs for use.

This subclause provides examples of MPIs that can be chosen to measure management efforts in an organization.

A.4.2.2 Examples of MPIs

A.4.2.2.1 Performance indicators related to management policies and programmes

If management's interest is in evaluating the implementation of environmental policies and programmes throughout the organization, possible MPIs include the following:

— resources to implement management policies and programmes;

— roles and responsibilities within the organization;

— monitoring and review of effectiveness of management systems or programmes;

— benefits and costs of environmental management to the organization;

— the achievement of objectives and targets;

— success of pollution prevention initiatives;

— percentage of employees trained versus the percentage that need training;

— percentage of contracted individuals trained versus the percentage that needs to be trained;

— number of environmental improvement suggestions submitted by employees;

— results of employee surveys on their knowledge of the organization's environmental issues.

A.4.2.2.2 Performance indicators related to regulatory compliance

If management's interest is in evaluating the effectiveness of management systems in achieving compliance with requirements or expectations, possible MPIs include the following:

— number and severity of compliance violations;

— number and severity of violations against the organization's requirements;

— time to respond to environmental incidents;

— percentage of identified corrective actions that have been resolved or that are unresolved;

— number of audits;

— frequency of review of operating procedures;

— frequency of emergency drills conducted;

— degree of preparedness for emergencies.

A.4.2.2.3 Financial performance correlated with environmental performance

If management's interest is in evaluating the relationship of environmental performance to financial performance, possible MPIs include the following:

— costs (operational and capital) that are associated with a product's or process's environmental aspects;

— return on investment for environmental improvement projects;

— savings achieved through reductions in resource usage, prevention of pollution or waste recycling;

— sales revenue attributable to a new product or a by-product designed to meet environmental performance or design objectives;

— research and development funds applied to projects with environmental significance;

— environmental liabilities that can have a material impact on the financial status of the organization.

A.4.2.2.4 Performance indicators related to community relations

If management's interest is in evaluating its programmes in local communities with respect to environmental issues, possible MPIs include the following:

— number of external inquiries or comments about environmentally related matters;

— number of press reports on the organization's environmental performance;

— resources applied to support of community environmental programmes;

— number of sites with environmental reports;

— number of sites with wildlife programmes;

— progress on local remediation activities (e.g. local clean-up, recycling initiatives);

— approval ratings from community surveys.

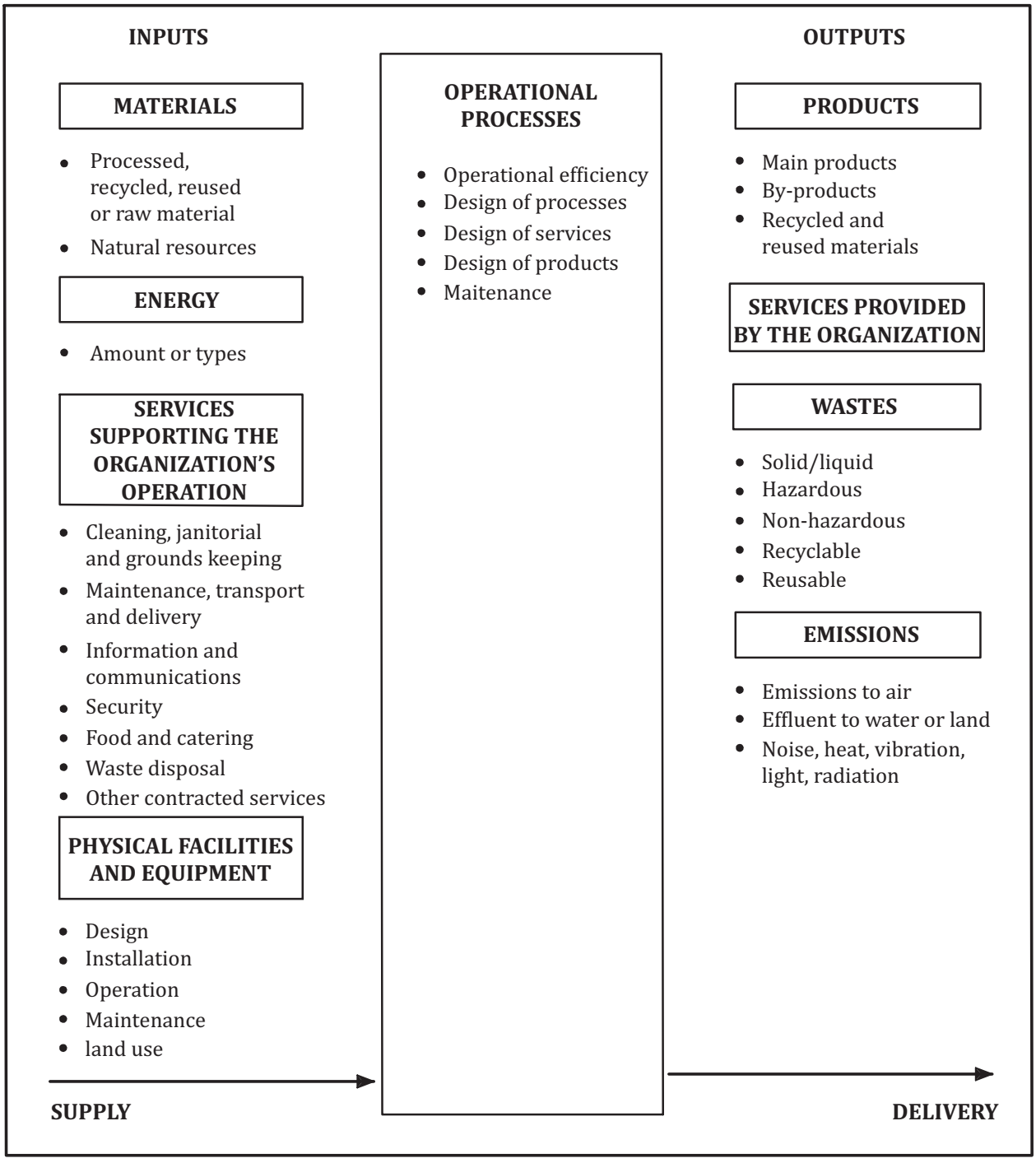
NOTE Other areas of importance for management to consider are fair trade, occupational health and safety, and human rights performance. Guidance for these issues can be found in ISO 26000, GRI, OHSAS 18001 and OHSAS 18002.

A.4.3 Operational performance indicators

A.4.3.1 General overview

This subclause provides examples of OPIs that may be appropriate to measure the environmental performance of an organization's operations. An organization's operations may be logically grouped, based on inputs to and outputs from the physical facilities and equipment of the organization. The organization's operations also include the organization's physical facilities and equipment, as well as the supply to and delivery from them.

Figure A.1 shows the concept of a mass balance of inputs and outputs. In addition, it highlights the question of system boundaries.



NOTE Figure 3 provides a general overview.

Figure A.1 — Operations of the organization

A.4.3.2 Examples of OPIs

A.4.3.2.1 Materials

If management's interest is in environmental performance related to the materials it uses in its operations, possible OPIs include the quantity of the following:

— materials used per unit of product;

— processed, recycled or reused materials used;

— packaging materials discarded or reused per unit of product;

— auxiliary materials recycled or reused;

— raw materials reused in the production process;

— water per unit of product;

— water reused;

— toxic materials used in the production process.

A.4.3.2.2 Energy

If management's interest is in environmental performance related to the total energy or the types of energy used by, or the energy efficiency of, the organization's operations, possible OPIs include the amount of the following:

— energy used per year or per unit of product;

— energy used per service or customer;

— each type of energy used (e.g. renewable);

— energy generated with by-products or process streams;

— energy units saved due to energy conservation programmes.

A.4.3.2.3 Services supporting the organization's operations

If management's interest is in environmental performance related to the services supporting its operations, possible OPIs include the following:

— amount of toxic materials used by contracted service providers;

— amount of hazardous cleaning agents used by contracted service providers;

— amount of recyclable and reusable materials used by contracted service providers;

— type of waste generated by contracted service providers.

A.4.3.2.4 Physical facilities and equipment

If management's interest is in environmental performance related to the organization's physical facilities and equipment, possible OPIs include the following:

— percentage of the total pieces of equipment with parts designed for easy disassembly, recycling and reuse;

— number of hours per year a specific piece of equipment is in operation;

— number of emergency events (e.g. explosions) or non-routine operations (e.g. shut-downs) per year;

— total land area used for production purposes;

— land area used to produce a unit of energy;

— carbon dioxide equivalence per unit driven;

— percentage of vehicles in fleet with pollution-abatement technology;

A.4.3.2.5 Supply and delivery

If management's interest is in environmental performance related to the inputs and outputs of supply to the organization's operations, possible OPIs include the following:

— average fleet carbon dioxide equivalent per unit driven;

— number of freight deliveries by mode of transportation per unit of time;

— percentage of vehicles in fleet with pollution-abatement technology;

— percentage of business meetings conducted remotely;

— number of business trips by each mode of transportation.

A.4.3.2.6 Products

If management's interest is in environmental performance related to its products or by-products (e.g. materials other than main products, including recycled and reused materials, that are generated and retained for further commercial purposes), possible OPIs include the following:

— percentage of products introduced in the market with reduced hazardous properties;

— number of products which can be reused or recycled;

— percentage of a product's content that can be reused or recycled;

— percentage of defective products;

— amount of resources consumed during product use;

— durability of the product;

— percentage of products with instructions regarding environmentally safe use and disposal.

— percentage of products with explicit "product stewardship" plans;

— percentage of products designed for disassembly, recycling or reuse;

— percentage of products with instructions regarding environmentally safe use and disposal.

NOTE Guidance on product performance related to environmental performance can be found in ISO 14006.

A.4.3.2.7 Services provided by the organization

If the organization provides a type of service, and management's interest is in environmental performance related to the service, possible OPIs include the following:

— resource consumption per unit of service provided;

— amount of carbon dioxide equivalent per unit of service provided;

— amount of pollutants per unit of service provided.

A.4.3.2.8 Waste

If management's interest is in environmental performance related to the waste generated by its operations, possible OPIs include the following:

— quantity of waste per unit (e.g. product, time, manpower);

— quantity of hazardous, recyclable or reusable waste produced per unit;

— total waste disposed by category;

— quantity of hazardous waste stored on site and/or controlled by regulation;

— quantity of waste converted to reusable material per unit;

— quantity of hazardous waste eliminated due to pollution prevention programmes.

A.4.3.2.9 Emissions

If management's interest is in environmental performance related to the emissions to air from its operations, possible OPIs include the quantity of the following:

— specific emissions per year;

— specific emissions per unit of product;

— waste energy released to air;

— air emissions having ozone-depletion potential;

— air emissions having global climate-change potential.

If management's interest is in environmental performance related to the effluents to land or water from its operations, possible OPIs include the quantity of the following:

— specific material discharged per year;

— specific material discharged to water per unit of product;

— waste energy released to water;

— material sent to landfill per unit of product;

— effluent per service unit or customer.

If management's interest is in environmental performance related to other emissions resulting from its operations, possible OPIs include the following:

— noise indicator measured at a certain and essential location;

— quantity of radiation released per unit;

— amount of heat, vibration or light emitted per unit.

A.4.4 Environmental condition indicators

A.4.4.1 General overview

This subclause provides examples of ECIs.

Development and application of ECIs is frequently the function of local, regional, national or international government agencies, non-governmental organizations, and scientific and research institutions rather than the function of an individual organization. For purposes such as scientific investigations, development of environmental standards and regulations, or communication to the public, these agencies, organizations and institutions can supply and collect data and information including the following:

— properties and quality of major bodies of water;

— regional air quality;

— endangered species;

— resource quantities or quality;

— ocean temperatures;

— concentration of contaminants in tissue of living organisms;

— ozone depletion;

— concentration of GHGs.

Some of this information may be in the form of ECIs which could be useful to an organization in managing its environmental aspects or indicating specific issues that an organization should consider in its implementation of EPE.

Some organizations that can identify a relationship between their activities and the condition of some component of the local environment may choose to develop their own ECIs as an aid in evaluating their environmental performance as appropriate to their capabilities, interests, and needs.

A.4.4.2 Examples of ECIs

If management's interest is the organization's contribution to the local, regional, national or global condition of the environment, the organization can use indicators being investigated and developed by government agencies, non-governmental organizations, and scientific and research institutions. Examples of such indicators include thickness of the ozone layer, average global temperature, and the size of fish populations in oceans.

a) **Air**

If management's interest is in information on the condition of local or regional air, possible ECIs include the following:

— concentration of a specific contaminant in ambient air at selected monitoring locations;

— measured reduction or elimination of GHGs or removal of GHGs;

— ambient temperature at locations within a specific distance of the organization's facility;

— opacity levels upwind and downwind of the organization's facility;

— frequency of photochemical smog events in a defined local area;

— odour measured at a specific distance from the organization's facility (e.g. odours in an adjacent residential area as an indicator of its success in controlling air emissions).

b) **Water**

If management's interest is in information on the condition of groundwater or surface water, such as rivers or lakes, in the local or regional area, possible ECIs include the following:

— concentration of a specific contaminant in groundwater or surface water;

— turbidity measured in a stream adjacent to a facility upstream and downstream of a wastewater discharge point;

— dissolved oxygen in receiving waters;

— water temperature in a surface water body adjacent to the organization's facility;

— change in groundwater level;

— number of coliform bacteria per litre of water (e.g. monitor coliform bacteria upstream and downstream of sewage discharge to determine whether there is a health risk requiring action).

c) **Land**

If management's interest is in information on the condition of land in the local or regional area, possible ECIs include the following:

— concentration of a specific contaminant in surface soils at selected locations in the area surrounding the organization's facility;

— concentration of selected nutrients in soils adjacent to the organization's facility;

— area rehabilitated in a defined local zone;

— area dedicated to landfill, tourism or wetlands in a defined local zone;

— paved and non-fertile area in a defined local zone;

— protected areas in a defined local zone;

— measure of the erosion of topsoil from a defined local zone (e.g. measure of erosion associated with a construction project).

d) **Flora**

If management's interest is in information on the condition of flora in the local or regional area, possible ECIs include the following:

— concentration of a specific contaminant in tissue of a specific plant species found in the local or regional area;

— crop yield over time from fields in the surrounding area;

— population of a particular plant species within a defined distance of the organization's facility;

— number of total flora species in a defined local area;

— number and variety of crop species in a defined local area;

— specific measures of the quality of habitat for individual species in the local area;

— specific measure of the quantity of vegetation in a defined local area;

— specific measure of the diversity of vegetation in a defined local area (e.g. vegetation surveys in the vicinity of a facility to monitor improvements in air emissions control).

e) **Fauna**

If management's interest is in information on the condition of fauna in the local or regional area, possible ECIs include the following:

— concentration of a specific contaminant in tissue of a specific animal species found in the local or regional area;

— population of a particular animal species within a defined distance of the organization's facility;

— harmful noise levels;

— specific measures of the quality of habitat for individual species in the local area;

— number of total fauna species in a defined local area (e.g. measure of biodiversity within the region of influence).

f) **Humans**

If management's interest is in information on the condition of human populations in the local or regional area, possible ECIs include the following:

— longevity data for specific populations;

— incidence of specific diseases, particularly among sensitive populations, from epidemiology studies in the local or regional area;

— rate of population growth in the local or regional area;

— weighted average noise levels and noise annoyance at the perimeter of the organization's facility;

— population density in the local or regional area;

— levels of toxic substances in blood of the local population (e.g. monitor the lead concentration in the blood of the local population against lead released from all sources).

g) **Aesthetics, heritage and culture**

If management's interest is in information on aesthetic factors or the condition of historically or culturally significant structures and places in the local or regional area, possible ECIs include measure of the following:

— condition of sensitive structures;

— condition of places considered sacred in the vicinity of the organization's facility;

— surface integrity of historical buildings in the local area (e.g. measure the effect of air emissions on historical buildings).

Bibliography

[1] ISO 9001, *Quality management systems — Requirements*

[2] ISO 14001:2004, *Environmental management systems — Requirements with guidance for use*

[3] ISO 14004, *Environmental management systems — General guidelines on principles, systems and support techniques*

[4] ISO 14005, *Environmental management systems — Guidelines for the phased implementation of an environmental management system, including the use of environmental performance evaluation*

[5] ISO 14006, *Environmental management systems — Guidelines for incorporating ecodesign*

[6] ISO 14015, *Environmental management — Environmental assessment of sites and organizations (EASO)*

[7] ISO 14020, *Environmental labels and declarations — General principles*

[8] ISO 14021, *Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)*

[9] ISO 14024, *Environmental labels and declarations — Type I environmental labelling — Principles and procedures*

[10] ISO 14025, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*

[11] ISO/TS 14033, *Environmental management — Quantitative environmental information — Guidelines and examples*

[12] ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

[13] ISO 14044, *Environmental management — Life cycle assessment — Requirements and guidelines*

[14] ISO 14045, *Environmental management — Eco-efficiency assessment of product systems — Principles, requirements and guidelines*

[15] ISO 14050, *Environmental management — Vocabulary*

[16] ISO/TR 14062, *Environmental management — Integrating environmental aspects into product design and development*

[17] ISO 14063, *Environmental management — Environmental communication — Guidelines and examples*

[18] ISO 14064-1, *Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*

[19] ISO 14064-2, *Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*

[20] ISO 14064-3, *Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*

[21] ISO 14067, *Carbon footprint of products — Requirements and guidelines for quantification and communication*

[22] ISO 19011, *Guidelines for auditing management systems*

[23] ISO 26000, *Guidance on social responsibility*

[24] ISO/IEC 29155-1:2011, *Systems and software engineering — Information technology project performance benchmarking framework — Part 1: Concepts and definitions*

[25] ISO 31000, *Risk management — Principles and guidelines*

[26] ISO 50001, *Energy management systems — Requirements with guidance for use*

[27] ISO/IEC Guide 51, *Safety aspects — Guidelines for their inclusion in standards*

[28] ISO Guide 64, *Guide for addressing environmental issues in product standards*

[29] ISO Guide 73, *Risk management — Vocabulary*

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™