
**Environmental management — Examples of
environmental performance evaluation
(EPE)**

*Management environnemental — Exemples d'évaluation de la performance
environnementale (EPE)*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this Technical Report may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 14032 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 4, *Environmental performance evaluation*.

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Introduction

This Technical Report is a companion document to ISO 14031:1999 and was developed with the understanding that many organizations would benefit from examples illustrating how environmental performance evaluation (EPE) has been applied by a variety of organizations. Please refer to ISO 14031:1999 for guidance on the process and concepts of EPE.

The purpose of this Technical Report is to provide real-life examples for the consideration of organizations undertaking EPE. The examples aim to encourage and assist organizations, particularly small and medium sized enterprises, by showing how EPE can be conducted by a range of organizations.

The examples provided in this Technical Report were developed and written by organizations or individuals and submitted to ISO/TC 207/SC 4 through appropriate ISO member bodies. These examples have been edited to reflect the process of EPE described in ISO 14031:1999. The reader may not find them to be comprehensive regarding environmental aspects, environmental performance criteria, or number and type of indicators selected, as these are issues determined by each organization according to its particular circumstances.

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Environmental management — Examples of environmental performance evaluation (EPE)

1 Scope

This Technical Report provides examples of EPE that represent a range of applications from simple to elaborate. They also represent a range of organizations (e.g., manufacturing and service companies; non-governmental organizations; government agencies; small, medium and large enterprises; organizations with and without certified environmental management systems) and geographic locations.

IMPORTANT -

The examples in this report are included only because they illustrate the use of EPE.

Value judgements in these examples related to the relative environmental benefits of one material over another, one process over another, or one product over another, reflect decisions made specifically by the management of the organizations in the examples. No endorsement is given by ISO/TC 207/SC 4 to those decisions, to the scientific data used, or to their conformity with other ISO standards.

No endorsement is given by ISO/TC 207/SC 4 to any organization or any organization's products or services.

No organization's particular application of the guidance in ISO 14031 is recommended because the management of each organization has selected the application most suited to its needs. No endorsement is given by ISO/TC 207/SC 4 to the choices made by individual organizations or to the relative merits of these different applications of EPE.

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2 Terms and definitions

For the purposes of this Technical Report, the terms and definitions given in ISO 14031 apply.

3 Format for the examples provided in this Technical Report

3.1 General

Examples illustrating EPE and ISO 14031 are provided in Annexes A to Q. The contents of these examples are organized under the headings given in 3.2.

3.2 Headings

3.2.1 Introduction

This section briefly describes the organization and its history. The purpose is to provide:

- a context for understanding how EPE was applied; and
- suitable information for a reader of ISO/TR 14032:1999 to relate his or her own organization to the organization described in the example.

3.2.2 Planning EPE

This section describes how the organization planned its EPE, and can illustrate:

- the identification of environmental aspects;
- the development of environmental performance criteria;
- the consideration of the views of interested parties; and
- other planning activities referenced in ISO 14031:1999.

3.2.3 Selecting indicators for EPE

This section describes how the organization selected environmental performance indicators (EPIs) related to management efforts (management performance indicators - MPIs) and to the organization's operations (operational performance indicators - OPIs). This section also describes how the organization considered environmental condition indicators (ECIs) in developing its EPE.

3.2.4 Using data and information (if applicable to the example)

This section describes (as appropriate) the following as elements of the EPE process:

- collecting data;
- analyzing and converting data;
- assessing information;
- reporting and communicating.

3.2.5 Reviewing and improving EPE (if applicable to the example)

This section describes how the organization used information to examine the EPE process and to identify opportunities for improvement.

3.2.6 Summary/conclusions

This section includes a summary of any lessons learned by the organization from the application of EPE. It may also include the organization's conclusions on its future application of EPE.

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Annex A

Schreinerei Schmid, Abendsberg, Germany

(A small cabinetry/furniture-making company, with 11 employees, developing environmental performance evaluation to inform critical customers that it is environmentally aware)

Introduction

The Schreinerei Schmid company was established in 1895, and since its establishment has been located in Abendsberg, Germany. There is both housing and other industrial facilities in the vicinity of the workshop. Eleven employees are involved in production and administration, and company has annual sales of approximately one million Deutsche Marks. Since 1995, the company has had an internal environmental information and control system. The company also produced its first environmental report in 1995, with a target audience of the company's environmentally conscious private and corporate customers. In late 1997, the existing environmental management features were broadened to establish an environmental management system for registration under the European Eco-Management and Audit Scheme (EMAS). This effort was supported, in part, by the Bavarian State Government's promotional scheme for small and medium-sized enterprises and handicraft businesses.

Planning EPE

As is traditional in the cabinetry/furniture-making field, environmental and health aspects have been primary concerns in product development for a long time. This is also reflected in the company's environmental policy. In planning for environmental performance, the company intends to satisfy the demands of customers for ecologically sound products. Thus, the business strategy of the company is to expand market position, especially through the production of solid wood furniture, and by using natural oils and waxes for ecologically sound surface treatment. In this way, occupational health aspects for staff were improved (i.e., the use of and need for auxiliary agents in certain processes). Furthermore, reducing the environmental impacts of the company's production benefits the company. By increasing the efficient use of resources and materials, and by decreasing the amount of unnecessary waste, a competitive cost basis for production is realized. The company's environmental performance criteria are based on their environmental objectives and targets.

Selecting indicators for EPE

Table A.1 lists the environmental aspects of Schreinerei Schmid as well as their related environmental performance criteria which were adopted from the company's environmental objectives under the company's internal environmental information and control system, which was later registered under EMAS.

TABLE A.1 - Schreinerei Schmid Environmental Aspects and Performance Criteria

Environmental Aspect	Related Environmental Performance Criterion
Electricity consumption	Reduce electricity consumption
Water consumption	Reduce water consumption
Use of solid wood (instead of composite wood products, such as plywood or particle board, due to concerns about releases of formaldehyde and other substances into ambient air)	Increase the use of solid wood instead of composite wood products
Consumption of paints and primers	Reduce the consumption of paints and primers
Treatment of wood surfaces with natural waxes and oils	Increase the percentage of surfaces treated with natural waxes and oils
Consumption of solvents and paint thinners	Reduce the number of litres of solvents or paint thinner used
Generation of waste for disposal	Reduce the amount of waste for disposal

Table A.2 provides informational statistics on the company, as well as the company's indicators for EPE, which were selected based on the company's business strategy and environmental policy.

TABLE A.2 - Schreinerei Schmid Statistics and Indicators for EPE

Company Statistics	1993	1994	1996
Annual sales (in Deutsche Marks)	880 000	900 000	940 000
Number of employees	9	10	11
Workshop area in square metres	640	640	780
Indicators for EPE			
Kilowatt hours of electricity used	17 731	17 965	24 797
Cubic metres of water consumed	345	398	201
Percentage of solid wood used	85 ^a	70	70
Kilograms of paints and primers used	610	435	426
Percentage of surfaces treated with natural waxes or oils	3	22	30
Litres of solvents or paint thinner used	125	110	60
Kilograms of waste for disposal	1 450	1 320	60
^a The percentage of solid wood used in 1993 was greater than in 1994 and 1996 due to an exceptionally large order for furniture received in 1993. Therefore, 1993 production was not typical of Schreinerei Schmid's usual annual production.			

Using data and information

Collecting data

The company's environmental information system provides the basis for data collection to support the development of indicators for EPE. In the initial years of implementing the company's environmental programs, a considerable amount of data had to be estimated. Over time, the scope of the environmental information system was broadened to be able to support all selected indicators. All indicators were expressed as absolute amounts or as proportions. The use of relative data (i.e., per kilogram or per item of furniture produced) was not considered appropriate because individually designed products have unique sizes and natures that do not support comparisons among products.

Assessing information

The assessment of information is carried out by comparing the company's environmental objectives with the selected indicators for EPE. The sharp rise in consumption of electricity in 1996 resulted from the enlargement and construction of a new workshop. Considerable progress has been made since 1994 in other areas, especially regarding decreased water consumption, decreased consumption of environmentally relevant auxiliary agents, and the increased percentage of the surface areas of products treated with natural waxes and oils. Through new waste management practices, involving extensive internal and external recycling of production wastes, waste for disposal has virtually dropped to zero,

Reporting and communicating

For clients, other interested parties and the general public, the company's progress in improving its environmental performance is documented, with the company's 1994/95 environmental report providing baseline information. This report is updated and published every three years as the public environmental statement required by the company's registration to EMAS. In addition, this information is made accessible over the Internet at <http://members.aol.com/schmids40>. Internally, the environmental report is used by the company owner as a basis for company meetings and discussions with staff on environmental issues, and to support dialogue between the company and public authorities.

Reviewing and improving EPE

On the basis of the environmental performance achieved, new environmental objectives and targets were set as the company's environmental performance criteria. These criteria are:

- to increase the use of solid wood in the production of furniture by 10%, making its products more acceptable to its customers;
- to reduce electricity consumption by 10% through optimization of compressed air systems and replacement of heating ovens;
- to reduce the total volume of waste, for both disposal and recycling, by 10%.

One change in the set of indicators for EPE has been necessary as a result of reviewing the EPE process. Since the total volume of waste for disposal has been reduced to almost zero through intensive recycling measures, the strategy of the company owner is now focused on globally reducing all waste streams of the company. Therefore, "total volume of waste for both recycling and disposal" will be integrated as a new indicator replacing the old indicator "kilograms of waste for disposal".

Summary/conclusions

EPE has proven to be environmentally and economically valuable for a small company. Data to support some of the selected indicators for EPE was readily available at the beginning. Data sources and data collection mechanisms to support other indicators for EPE had to be developed or improved during the process.

The most important benefit of conducting EPE for the company owner was that he finally had access to hard figures about the environmental performance of the company. Together with regularly updated environmental objectives and targets, the owner is able to control and improve effectively the company's environmental performance, and to communicate it successfully to the market. Through the information provided in the environmental report, the company could expect a steady increase in its regional customer base and a steady increase in demand for its products.

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If you have questions or would like additional information regarding this example, please contact the ISO member body for Germany:

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Annex B

Clemens Härle Brewery, Leutkirch, Germany

[A family-owned and operated brewing company, with 33 employees, implementing environmental performance evaluation starting with a company eco-balance study (an input/output scheme for mass and energy) and management commitment to environmental protection]

Introduction

Clemens Härle is a small brewery run by the Härle family. Despite a trend to the contrary in the brewing industry sector, the brewery is able to maintain its share of the market against competition from larger breweries. The company is located in the town center of Leutkirch in the Allgäu region (State of Baden-Württemberg, Germany). The company produces 28 500 hectolitres of beer and sells 16 000 hectolitres of other beverages annually. Clemens Härle brewery had a turnover of approximately 8,1 million Deutsche Marks in 1997. The majority of the 33 employees are employed in sales and the production process.

The brewing of beer involves producing wort in a mashing and boiling process in the brewing house from the raw materials, which are hops, malt and water. After cooling, the wort is fermented. This fermented immature beer is then stored and filtered. The finished beer is then decanted into bottles or pumped into kegs (pressurized containers). All processes are subject to the strict food standards and purity laws that apply to Bavarian breweries. The supporting infrastructure consists of an energy supply, water supply and treatment plants, wastewater treatment and disposal, as well as facilities for the maintenance of technical equipment and vehicles.

The finished products are stored at the brewery until the company transports them, using its own vehicles, to its customers. All vehicles are fuelled by organic diesel, refined from rapeseed oil. The sale of the finished product is limited to an area with a 50 kilometre radius from the brewery to guarantee premium quality. This also helps to reduce the environmental impacts of distribution activities.

The raw materials (i.e., malt and hops) are only purchased from farms controlled by two independent institutions. No pesticides or artificial fertilizers are normally applied. Where their use is essential, only the application of the minimum quantity that achieves the necessary effect is permissible.

Numerous measures have also been carried out for many years to reduce the consumption of resources, in particular water and energy, and the volume of emissions. A new wort-boiling system in the brewing house reduced the consumption of heating oil by 25%. The use of waste heat was also improved. A heat recovery system achieves annual savings of approximately 45 000 litres of heating oil. Optimizing processes have leveled out peaks in electricity consumption. Water consumption has been reduced by nearly 50% in the last twenty years. Because waste is sorted with care, few recyclable materials are to be found in the non-recyclable waste. Organic waste from production processes is reused in agriculture. Only reusable containers (i.e., bottles and kegs) are used.

Noise pollution problems were addressed with noise abatement measures. These were accompanied by independent surveys to guarantee that the noise levels on neighboring properties are considerably lower than the legal noise emission limits. Thus, adequate margins were always maintained to avoid disturbance to the neighbors.

There were a few difficulties with wastewater acidity (i.e., pH values) at the municipal sewage plant before a neutralization system could be put into operation. Since then, the fluctuations in the pH values have been reduced and the relationship with authorities responsible for water standards has improved.

Environmental activities are used to promote the company to the public, through mechanisms such as press releases and guided tours. The company's profile has been raised by many reports in the media and by winning awards for its environmental activities. Overall, Härle has managed to maintain a long-lasting well-balanced relationship with interested parties (e.g., local residents and authorities).

Planning EPE

The establishment of an environmental management system certified to either the European Eco-management and Auditing Scheme (EMAS) or ISO 14001 has not been an objective of the company. The owners feel that these systems would be too time-consuming and bureaucratic for a company of this size and that the environmental benefit that normally results from certification could also be achieved by the company's less formal environmental management system. A detailed environmental report and a company eco-balance study (an input/output scheme for mass and energy) were compiled for the first time in 1995.

Company Eco-Balance Studies

A "company eco-balance study" is an internal annual recording of all incoming (input) and all outgoing (output) material and energy streams of the company. Input streams include raw materials, physical plant and equipment, water and energy. Output streams include wastewater, air emissions, products and wastes after production. These environmental data are systematically recorded for the entire company year after year and are the basic data supporting indicators for EPE.

Three areas for action were identified:

- conserving electrical and heating energy;
- changing to more environmentally friendly energy sources;
- altering the use of cleansing agents and disinfectants.

Härle intends to produce additional environmental reports in future.

The company's many environmental activities and the 1995 eco-balance study have provided a good basis and information for planning its environmental performance evaluation (EPE). A very good data base existed for the operational area, but the information base on management efforts was rather limited. The following tables illustrate how the important environmental aspects were being managed before the EPE initiative began.

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TABLE B.1 - Significant Environmental Aspects
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Significant Environmental Aspects	Management Status
Water and energy consumption	Taken into account at Härle (for approximately 20 years), as is usual in breweries. Reason: Water and energy consumption account for a great share of production costs, and are therefore analyzed precisely for economic reasons.
Air emissions, wastewater effluent and solid waste	Accurate data is available from the eco-balance study for the most relevant environmental aspects of wastewater (both volume and quality), solid waste and air emissions.
<ul style="list-style-type: none"> • Possible leakage of ammonia from the cooling system; • Use of cleaning agents and disinfectants; • Purity/quality of water and raw materials. 	<ul style="list-style-type: none"> • Monitoring of the cooling system (ammonia) and the use of cleaning agents and disinfectants is related to safety. • The health of consumers has to be guaranteed by regular monitoring to ensure that water and raw materials meet food safety regulations.
Local/regional environmental conditions	No direct local/regional environmental objectives

TABLE B.2 - Environmental Performance Criteria

Environmental Performance Criteria	Management Status - Data Availability
Legal and other requirements	<ul style="list-style-type: none"> • Legally relevant federal laws on emission protection, technical guidelines on noise, technical guidelines on air and hazardous substances regulation. • Legal requirements are routinely monitored and checked to avoid problems with authorities. • The aim of the company is to achieve a continually improving environmental profile; consumers' environmental concerns are determined by random surveys on individuals.
Past and present performance	Good planning data is available at Härle, since water and energy consumption have been systematically recorded over a long period of time.
Standards and good management practices	Although an environmental management system certified to EMAS or ISO 14001 is not an objective for Härle, internally set standards are documented in the environmental report.
Performance data from industrial associations	Comparisons with other breweries is a traditional "craftsman's tool" in the brewing sector.
Checking/auditing the management	Not considered appropriate at Härle, because it is a small family business.
Scientific research	Research results, as far as they are relevant for small breweries, are used for setting the company's objectives (Example: Brewing Guidelines from the Bavarian Environment Ministry).

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TABLE B.3 - Views of Interested Parties

Interested Party	Comment
Management representatives, employees	<ul style="list-style-type: none"> Company strategy is biased towards environmental awareness and protection by the personal commitment of the Executive Director. As is typical for a small enterprise, informal exchange is favored over formal rules for employee suggestions ("We know each other and talk to each other"). Special meetings are held on environmentally relevant topics with the master brewer and the head of purchasing.
Customers	Customer interests are identified through focused surveys.
Suppliers	Conducting discussions with suppliers and establishing purchasing guidelines (quality and source of raw materials, packaging to be used).
Banks, insurance companies	Building confidence with the environmental report.
Supervisory bodies, legislator	Regular contact is maintained with authorities.
Local community	Regular personal contact with those responsible.
Media (and Publicity)	<ul style="list-style-type: none"> Arousing interest by publicizing environmental activities, interviews; in exchange, reports are made and company data is disclosed. Active exchange of public opinion in regional newspapers, national news agencies and specialist journals about industry sectors and environmental affairs.
Research institutes	Active participation in research projects.
Environmental groups and other organizations	Contact and information exchange with environmental organizations and the conduct of mutual activities.

Selecting indicators for EPE

The company's environmental report explicitly outlines the environmental performance objectives at Härle. The majority of the environmental objectives focus on technical and organizational measures. If possible, the objectives are expressed quantitatively. For example objectives related to energy are:

- qualitative (organizational/ technical) objective:
To plan and arrange investment in a combined heating and power plant.
- quantitative (operational process) objective:
To improve the electrical efficiency in the whole company by at least 1 kW · h per hectolitre of beer produced over the next three years.

Operational performance indicators (OPIs) derived from the control of production (e.g., energy and water consumption) and from the eco-balance study were selected and directly used to check progress towards the objectives set. Absolute values were listed in the eco-balance report on the Härle brewery products for the inputs and outputs indicated in Table B.4.