ISO 14001 IN GERMANY

A SURVEY OF GERMAN EXPERIENCE

Foreword

Practising environmental protection in industry means more than complying with regulatory duties. Many companies go beyond the statutory requirements and reduce environmental impacts through their voluntary introduction of an environmental management system. Such systems also yield measurable benefits for these companies. Internal auditing makes it possible to identify critical points, minimize liability risks and gain savings in resource consumption and in wastewater and waste management. This can result in a sustained improvement of the environmental situation.

One tool for establishing environmental management systems is – besides the European Eco-Management and Audit Scheme (EMAS) – the international ISO 14001 standard adopted in 1996. The process of revising this environmental management system standard was initiated recently and shall be concluded in the year 2004 at the latest. The goal of this revision is to achieve improved readability of the standard and to clarify problems of understanding that may arise from unclear wording. With some 2,400 certified companies, Germany is presently one of the main participating countries in this system and thus takes a leading position worldwide. While a national survey of the application of the EMAS Regulation adopted in 1993 is already available (Umweltbundesamt 1999), there has been a lack of a corresponding overview of the application of the ISO 14001 system and the needs and wishes of ISO 14001 participants in Germany.

The aim of the present study is to close this gap. It illustrates in detail the results of a research project of the German Environment Ministry building upon the experience gained by German companies with this standard; it also presents their views and wishes. The study is the first comprehensive survey of ISO 14001 participants in Germany. It provides an empirically sound, representative

overview of ISO 14001 practice in German industry. The diverse findings of this study, reflected notably in the recommendations identified by the survey and reported in summarized form, are intended to make a contribution to the ISO 14001 revision process. A notable example of such input is the envisaged clarification that the standard aims not only to improve the environmental management system, but moreover to continuously improve environmental performance and assure compliance with environmental law.

German interests in ISO/TC 207 are represented by the Standardization Committee for Basic Principles of Environmental Protection (Normenausschuss Grundlagen des Umweltschutzes, NAGUS) of the German Institute for Standardization (Deutsches Institut für Normung, DIN). The German Environment Ministry supports these activities and the ISO/TC 207 initiative to revise ISO 14001 and is firmly committed to a high quality of these international environmental management systems.

I owe a debt of gratitude to all those involved in preparing this study – particularly to the companies surveyed, without whose great willingness to provide information on many issues of corporate environmental performance this study would not have been possible.

Jürgen Trittin
German Minister for the Environment, Nature Conservation and Nuclear Safety

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ISO 14001 in Germany

Context:

Planned revision of the ISO 14001 environmental management system standard

A revision of the ISO 14001 environmental management systems standard is currently being negotiated internationally. The revision process seeks to integrate the practical experience and results gained by the users of the standard.

Pertinent reports and case studies are available from many countries outside of the European Union. Within the context of the planned revision, the German experience is now also of interest. To support the development of a German position, the German Environment Ministry (BMU) and Federal Environmental Agency (UBA) initiated the present survey and commissioned the Büro Dr. Glatzner consultancy in Münster to carry it out.

The survey centres on the following questions:

- Is there a lack of clarity in the text of ISO 14001 that causes problems for users?
- Are there problems of compatibility between the environmental management system standard ISO 14001 and the quality management system standard ISO 9001?
- Is there a (future) need to modify existing or introduce new requirements?

In order to be able to consider user experience and opinions within the proper context, the study also examines issues that go beyond the above questions. Similarly, it makes various references to the European Eco-Management and Audit Scheme (EMAS). However, the survey does not aim to compare the two systems.[1]

[1] The two environmental management systems used in Germany are:
- EMAS, an environmental policy instrument, valid across the European Union, with ca. 2500 validated sites in Germany;
- ISO 14001, a private-sector initiative, applicable worldwide, with ca. 2300 certified organizations in Germany

Background

Survey participants – data and structures

In September 2000, the roughly 2300 ISO 14001 certified German organizations and all 34 accredited German certification bodies were contacted. Each received a 4-page questionnaire (see page 21). In addition to users and certifiers, representatives of industry, labour unions and environmental associations were also surveyed. These had the opportunity to express opinions and make suggestions in personal interviews.

Among the certified organizations, 565, i.e. about 25 %, responded to the questionnaire. 17 certification bodies, together responsible for some 90 % of all certificates issued in Germany, also responded. The organizations captured represent all sizes (in terms of number of staff and annual turnover) and all industrial sectors. Worldwide and in Germany, the electrical and chemical sectors are leading – the sectoral makeup of the survey respondents corresponds to this general sectoral distribution.

In Germany, 86 % of the organizations surveyed also have certification to ISO 9001. In most cases the quality management system was certified first. In addition, about half of the organizations captured also have EMAS registration.

Situation:

User motivations and expectations

Most of the organizations surveyed are motivated to use ISO 14001 by internal reasons, external requirements and – in many instances – a requirement by the parent company. The main reasons stated can be subsumed under the headings of ‘image enhancement’ and ‘customer/client requirement’.

The main benefits that the organizations surveyed expect ISO 14001 implementation to yield are: improved organization, greater security in the law and enhanced image. While the internal improvements were generally achieved in accordance with expectations, many respondents are rather disappointed by the external benefits of certification (e.g. enhanced image, positive market effects).

Situation:

Human and financial resource allocations

Setting up an environmental management system to ISO 14001 takes 13 months on average, requiring an internal workload of about 180 person-days and 30 external consultant days. The environmental management system triggers environmental protection investments averaging DM 185,000 (€ 95,000). Further costs of about DM 43,000 (€ 22,000) are incurred for e.g. training, information and auditing. In comparison, the savings achieved average DM 170,000 (€ 87,000). However, only few organizations appear to have precise cost figures, particularly concerning savings, but also the current costs of the environmental management system.

Situation:

Resource allocation compared to other management systems

Compared to other management systems, setting up an ISO 14001 system is relatively less resource-intensive. For instance, establishing a system to ISO 9001 or EMAS takes in each instance about 1 month longer: For one thing, EMAS poses additional requirements (e.g. environmental statement); for another, ISO 14001 users profit from the groundwork and experience provided by the management systems often already previously set up, which are at least partly transferable.

Problems:

User practice

The questionnaire gave the organizations surveyed the opportunity to express freely their concerns regarding the ISO 14001 standard. Considerable use was made of this possibility: A total of 795 comments were received. The general comments on ISO 14001 range from criticism of the wording of the standard through to calls for more explanatory examples and interpretation aids. The wish for alignment of ISO 14001 with ISO 9001 was expressed frequently. Moreover, arguments and views for and against 'integrated management systems' were presented – this underscores the topicality and relevance of this issue in the day-to-day operations of the companies.

In addition, many of the organizations surveyed complain about a lack of clarity concerning certain terms or the corresponding specifications and requirements. Here concrete problematic clauses[2] of the standard are named, e.g. "Environmental aspects" (clauses 3.3 and 4.3.1) and "Operational control" (clause 4.4.6), or the standard requirements concerning "Objectives and targets" (clause 4.3.3) and "Management review" (clause 4.6).

Furthermore, the organizations surveyed voice fundamental criticism concerning the lack of compatibility between the management system standards ISO 14001 and ISO 9001: Here calls are made for alignment, compatible structuring and uniform terminology.

The current difficulties experienced in practical integration or combination do not appear insurmountable, but the improvements desired could substantially facilitate the procedure. However, it would appear that the true difficulties are not caused by lack of clarity in the standard text or lack of compatibility with quality management standards – but rather by the high human and time resource requirement and major documentation and administration effort associated with setting up and maintaining an ISO 14001 environmental management system.

[2] For an overview of all clauses of ISO 14001 see page 59.

Problems:

User perspective on necessary support and tools

The organizations surveyed use – in addition to the text of the standard and its explanatory Annex A – various kinds of support and tools to implement ISO 14001. These include, in particular, guidelines and seminars and also, in some cases, the text of the ISO 14004 standard, the EMAS Regulation and specimen documentation. Many of the respondents also seek the support of external consultants – some even find their services indispensable.

Nonetheless, almost half (48 %) of all organizations surveyed have encountered questions concerning ISO 14001 that nobody could really answer. At all events, a quarter of them consider the available opportunities to receive satisfactory answers to questions to be inadequate in Germany. Some wish a hotline, helpdesk or similar institution.

Problems:

Certifier perspective on nonconformance

90 % of the certifiers find a critical lack of conformity to standard requirements in more than 10 % of first-time audits of environmental management systems. High nonconformance rates continue to be found in the subsequent surveillance audits and re-certification audits. Nonconformance mainly concerns the sections on “Legal and other requirements” (clause 4.3.2), “Environmental aspects” (clause 4.3.1), “Objectives and targets” (clause 4.3.3), “Environmental management system audit” (clause 4.5.4) and “Training, awareness and competence” (clause 4.4.2).

Evaluation:

User and certifier perspectives on current status and future development

Overall, the ISO 14001 standard is evaluated positively: Using the German system of school marks ranging from 1 = ‘very good’ to 6 = ‘unsatisfactory’, the organizations surveyed award the standard an average mark of 2.7 across all grading categories. In these categories, the structure of the standard is graded best (2.5), its clarity/comprehensibility less well (2.9); the grades for content/requirements of the standard (2.6) and its compatibility with quality management standards (2.8) lie in-between.

95 % of the organizations surveyed intend relatively definitely (“yes” and “rather yes”) to continue to seek certification. The certifiers also anticipate dynamic further development – 41 % of them expect ISO 14001 certifications in Germany to triple by 2005, and 18 % expect even higher growth rates. 78 % of the certifiers surveyed estimate the proportion of organizations ‘opting out’ to be 10 % or less.

Opinions and suggestions:

Users

75.5 % of the organizations surveyed take a positive view of the standard requirements and their further development: They support making the auditing of actual compliance with environmental laws and regulations ('legal compliance') a mandatory element of ISO 14001.

More than half of them also support calls to make the preparation of an environmental report mandatory within ISO 14001. This is a reflection of the circumstance that in Germany many ISO 14001 certified organizations also have EMAS-registered sites and already undertake these measures in any case.

The organizations surveyed also plead very clearly in favour of integrating environmental protection more intensively in all functions and procedures, involving staff more closely and placing a stronger focus on actual environmental performance.

A considerable number explicitly wish an expansion or detailing of standard specifications – through to additional requirements, such as an initial environmental review, or environmental reporting. In addition, it is important to them that they gain more recognition and benefits from certification, particularly in terms of competitive advantages and state support. As a further point, they would welcome a reduction of the resource allocation associated with the environmental management system or its certification, for instance in terms of documentation duties and certification costs.

Opinions and suggestions:

Representatives of industry, labour unions and environmental associations

Industry representatives note the following strengths of the ISO 14001 standard: its proximity to the quality management systems already well known in the companies, its comparative openness to individual implementation and its worldwide validity. They propose keeping the standard stable for a lengthier period and clarifying over the medium term whether specific system standards will still be justified or whether the future belongs to an integrated management system.

The German **labour unions** consider that the application of environmental management systems also affects employee interests. They therefore call for improvements within the revision process – notably relating to issues of legal compliance, performance and staff participation.

The criticism voiced by the **environmental associations** goes in the same direction. In addition, they call for more intensive external communication and provision of environmental information; here, they view the European Community Eco-Management and Audit Scheme (EMAS) as a model.

Recommendations

Outcome of the survey – recommendations for revising ISO 14001

Building upon the findings of the survey, recommendations are made that should be considered within the ISO 14001 revision process.

These recommendations are listed in detail on page 83. They essentially correspond to the core issues of the revision process:

Removing lack of clarity by

→ reviewing and revising the unclear definitions and requirements identified and

improving compatibility by

→ aligning parts of ISO 14001 with ISO 9001.

Further recommendations are concerned with

improving staff involvement by

→ underscoring their importance and introducing corresponding specifications,

reducing cost and effort by

→ reviewing where and to what extent documentation is necessary,

providing additional information by

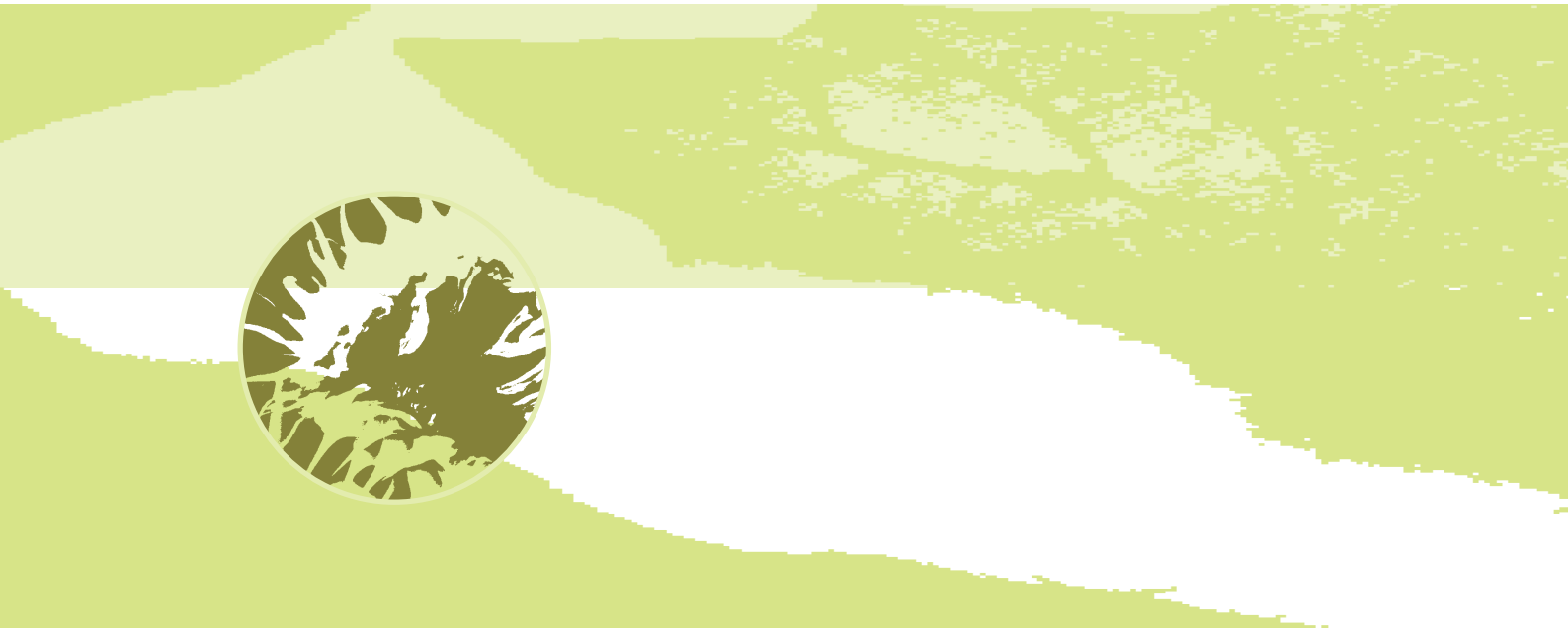
→ expanding the examples and explanations in the annex to the standard,

→ expanding the toolbox of the ISO 14000 series,

improving external effect by

→ expanding the toolbox of the ISO 14000 series.

II. The survey



German Environment Ministry/German Federal Environmental Agency

... "We attach great importance to the revision of the ISO 14001 environmental management system standard, and wish that the highest possible level is achieved in the process of further developing this standard."

II. 1 Context

II.1.1
The environmental management standard ISO 14001

The growing complexity, scope and importance of environmental requirements have triggered a search among companies and organizations for ways to reduce environmental impacts in an increasingly systematic, efficient and effective manner. Environmental management systems have been developed and have become a constituent part of environmental activities. In the past, these systems were often developed individually by each company or organization, with very different focuses and levels of maturity. Today, established models are often used.

In Europe and Germany, EMAS, the European Eco-Management and Audit Scheme, has been available as such a model since 1995.[3] Similarly, the internationally developed and disseminated standard ISO 14001:1996 "Environmental Management Systems – Specification with Guidance for Use" has been in place since 1996. Both systems are recognized and in widespread use in Germany and Europe, albeit with different focuses. Worldwide, ISO 14001 is naturally[4] the key standard.[5]

The environmental management standard ISO 14001[6] was developed between 1993 and 1996 by the International Organization for Standardization (ISO[7]) Technical Committee (TC) 207 "Environmental Management" and adopted through an international voting process.

By the end of 2000, more than 23,000 certificates had been issued according to this standard. It is estimated that by early 2001 about 2400–2600 ISO 14001 certificates had been issued in Germany; when the survey reported here was conducted in September 2000, the figure was approx. 2300.[8]

Germany thus ranks second behind Japan, where some 5500 organizations have been certified.[9] The same ranking applies for the total figure of audited environmental management systems.[10] In terms of certifications per capita and per unit gross domestic product (GDP), Germany ranks 12th and 13th[11] (if EMAS sites are included, it ranks 9th and 10th, respectively).

3 Pursuant to Council Regulation (EEC) No. 1836/93 of 29 June 1993. Now in a revised version as "EMAS II": Regulation (EC) No. 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organizations in a Community eco-management and audit scheme (EMAS).

4 EMAS is limited to the European Union member states.

5 See the "Speedometer" in the annex (also at www.inem.org) or the worldwide ISO 14001 certification statistics maintained by the German Federal Environmental Agency (Umweltbundesamt, UBA) (also at www.14001news.de). The structure of the distribution of use is of course an outcome of the circumstance that EMAS is a European system while ISO 14001 is an international standard.

6 As ISO 14001 specifies a management system, we may speak of an environmental management system standard or EMS standard (environmental management system is often abbreviated as EM system or EMS, in analogy to quality management system, QM system, QMS etc.).

7 www.iso.ch

8 Unfortunately, there is no complete register of ISO 14001 certified organizations in Germany.

9 Cf. Speedometer (www.inem.org), worldwide ISO 14001 certification statistics maintained by the German Federal Environmental Agency (Umweltbundesamt, UBA) (www.14001news.de), ISO Survey (www.iso.ch), and the statistics of the Japanese standards institute (www.ecology.or.jp/isoworld).

10 Currently, about a third of the organizations in Germany that have a certified environmental management system are only ISO 14001 certified, one third are only registered under EMAS and one third have both ISO 14001 certification and EMAS registration.

11 The table of contents of ISO 14001 gives an impression of the specifications – cf. www.14001news.de

ISO 14001 is one of a series of ISO standards on environmental management.[12] The current standards in the series can be categorized as follows:

The ISO 14001 "Environmental Management Systems" standard belongs to the group of standards used for independent certification. It is thus a tool used worldwide to furnish proof of an effective environmental management system that conforms to the specifications of the standard[13] and has been audited and certified by independent certifiers.

In Germany, activities relating to the ISO 14000 series are conducted by the Standardization Committee for Basic Principles of Environmental Protection (Normenausschuss Grundlagen des Umweltschutzes, NAGUS) of the German Institute for Standardization (DIN).[14] NAGUS was constituted on the basis of an agreement concluded in 1992 between the German Environment Ministry (BMU) and DIN concerning the integration of environmental issues into standardization.

NAGUS represents German interests in ISO/TC 207. It is steered by an advisory council. Its subcommittees comprise representatives of industry and academia, environmental administration, environmental and industry associations, technical supervisory and advisory bodies, labour unions and consumer groups. These elaborate, in con-

Figure 1

The ISO 14000ff standard series

By category, listing the respective subcommittee (AA) within the responsible German standardization committee (DIN-NAGUS)

Category	Standard		Sub-committee
Organizational evaluation			
Environmental management systems	ISO	14001	AA2
	ISO	14004	AA2
	ISO/TR	14061	
Environmental auditing	ISO	14010	AA2
	ISO	14011	AA2
	ISO	14012	AA2
	ISO	14015	AA2
Product evaluation			
Environmental labels and declarations	ISO	14020	AA4
	ISO	14021	AA4
	ISO	14024	AA4
	ISO/TR	14025	AA4
Life cycle assessment	ISO	14040	AA3
	ISO	14041	AA3
	ISO	14042	AA3
	ISO	14043	AA3
	ISO/TR	14047	AA3
	ISO	14048	AA3
	ISO/TR	14049	AA3
Mixed organizational and product evaluation			
Environmental performance evaluation	ISO	14031	AA5
	ISO/TR	14032	AA5
Integrating environmental aspects into product development	ISO/TR	14062	AA1
Terminology	ISO	14050	

[12] The series is listed with full titles at www.iso.ch; cf. also the publication list of the German Institute for Stan-dardization (DIN) in the annex.
[13] The table of contents of ISO 14001 gives an impression of the specifications – cf. www.14001news.de
[14] See also www.din.de

sensus, German proposals relating to standardization projects. With the aim of conducting standardization work systematically and ensuring adequate German participation in ISO/TC 207 activities, NAGUS has set up the following subcommittees:

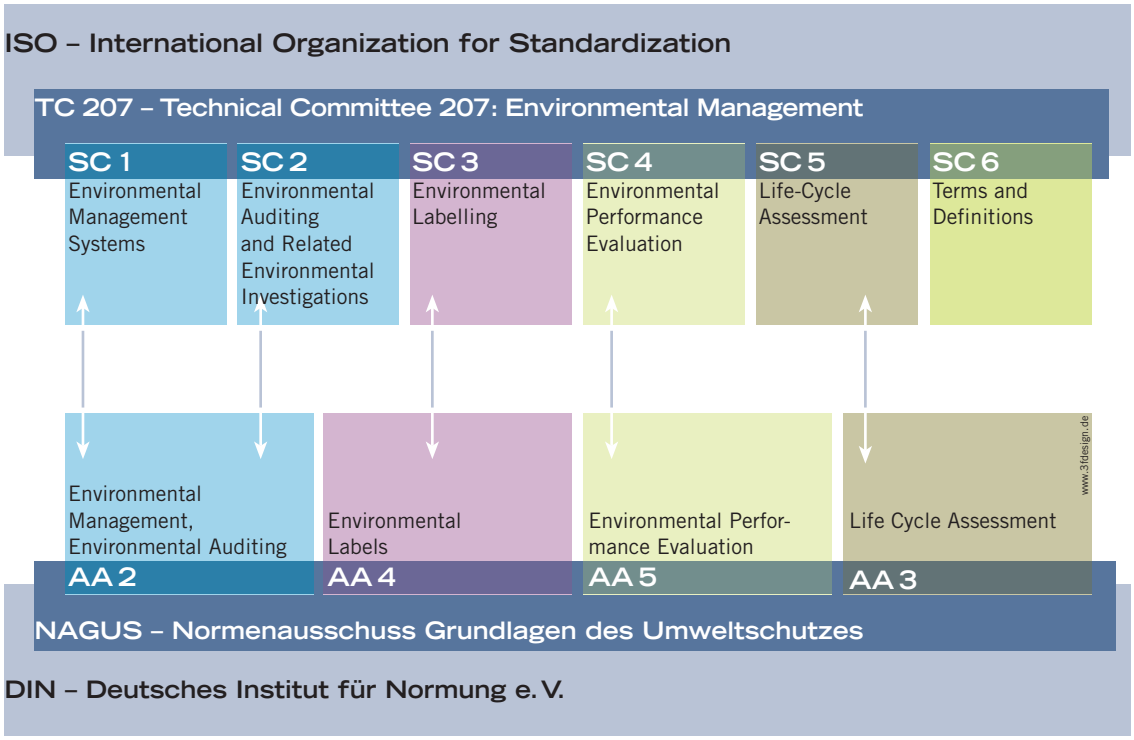
NAGUS Subcommittee 2 (Arbeitsausschuss – AA2) with its Working Group 1 (Unterausschuss – UA 1) is responsible for dealing with and providing inputs to the ISO 14001 revision process; it is the counterpart to the ISO TC 207 Subcommittee SC 1, whose Working Group WG1 is concerned with the ISO 14001 revision process.

Comment by survey respondent:

"... the English texts are better and clearer than the German versions!"

Figure 2 **The German Standardization Committee for Basic Principles of Environmental Protection (DIN-NAGUS)**

Subcommittees, responsibilities and international counterparts
(Subcommittee SC= Arbeitsausschuss AA)



II.1.2
Planned revision

Under ISO rules, a regular review is conducted of whether and to what extent there is a need to revise existing ISO standards. The review of ISO 14001 identified a need for revision, and resulted in a revision decision by the responsible ISO Committee TC 207. The process of amending ISO 14001 commenced officially in Stockholm on 16 June 2000. The revision is to be completed by 2003 or 2004 at the latest.

According to ISO resolutions, the present revision is not intended to modify substantially the requirements of the standard but rather to resolve compatibility problems and remove any lack of clarity.[15] In contrast, the parallel revision of ISO 14004 "Environmental Management Systems – General Guidelines" is pursuing a broad approach, with a more intensive substantive debate on requirements and methodologies for their implementation.

Because ISO 14001 – in contrast to ISO 14004 – is used as the basis for certifying thousands of organizations, it has a binding quality and importance far beyond that of a guideline.[16] Consequently, the revision of ISO 14001 must be conducted with particular attention towards and responsibility for the users.

The responsibility of this standardization process for reducing environmental impacts is just as great. The attractiveness, quality and level of the standard's requirements will determine how many organizations worldwide set up environmental management systems, which ultimately serve to prevent the environmental impacts associated with their activities, products and services.

Figure 3 **ISO 14001 revision schedule**

Provisional timeline	Milestones
June 2000	Beginning of revision
July 2001	1st Working Draft (WD1)
Nov. 2001 – anticipated	1st Committee Draft (CD1) expected
June 2002 – either – or	2nd Committee Draft (CD2) Draft International Standard (DIS)
June 2003 – if DIS June 2004 – if CD2	Completion as new ISO 14001 standard

[15] The debate on compatibility generally centres on the issue of compatibility between the EMS standard ISO 14001 and the QMS standard ISO 9001.
[16] Through the integration of ISO 14001 EMS requirements into EMAS II, they have even gained statutory character in Europe.

II.2 Goal and organization of the survey

II.2.1 Goal

The goal of the study was to survey the experience and ideas for revision of German companies and organizations which use or are certified to ISO 14001, in order to support the development of a German position in the international revision process. Comparison with EMAS was not a part of the study.

In accordance with the ISO TC 207 terms of reference (see below), the survey concentrated on identifying any unclear points in ISO 14001 and problems of compatibility between the ISO 14001 environmental management standard and the very widespread ISO 9001 quality management system standard.[17] These issues were not to be examined in isolation, but rather within the context of the practical experience of standard users and certifiers. It was not an aim of the study to carry out a comprehensive examination of the environmental effectiveness of environmental management systems set up in accordance with ISO 14001, and thus no such examination was conducted.

II.2.2 ISO TC 207 terms of reference

ISO membership is made up of the national standards institutes, such as the German Institute for Standardization (DIN). The main actors as well as target groups of the management system standards and thus also of the revision process are those that (want to) implement ISO 14001 as users within their organization.

In addition, there is a multitude of interests and implications that play an explicit or underlying role: differing goals and needs of differently developed countries worldwide, public interest in environmental protection, the business interests of consultants and certifiers, the needs of employees affected by management systems, the interest in equality in competition etc.

From a German perspective, the aim is to integrate the German position on the issues that will and can be covered in the revision process. This needs to be based upon the official ISO terms of reference for the revision process:[18]

The revision of ISO 14001 is limited to consideration of issues related to compatibility of ISO 14001 with ISO 9001 and to clarification of the existing text of ISO 14001. Any changes to the existing text should help understanding and implementation by users without resulting in additional requirements in ISO 14001. The revision of the standard will be guided by the following list of principles: simplicity; clarity; effectiveness and efficiency; impact on resource allocation; meets the aims of the standard; flexibility of the standard; ease of use of the standard; impact on existing users; verifiability; not increasing bureaucracy; compatibility with the other elements of the standards; compatibility with ISO 9001; take special account of the needs of SMEs; impact on developing countries and translatability.

In addition, it was agreed, *...that any identified issues which are not dealt with within its current revision process and*

[17] In industrial practice, the quality management systems with which users have gained experience are in most cases currently still based upon ISO 9001:1994. This will remain so for a certain transitional period. The revision process, in contrast, refers to the current ISO 9001:2000 version.

[18] Resolutions 3/2000 and 8/2000 of ISO TC 207 SC1.

any issues which the members of SC1 identify as potential new issues in environmental management are recorded for future analysis.

The debate on revision thus essentially centres on the following questions:

- Is there a **lack of clarity in the text of ISO 14001** that causes problems for users?
- Are there **compatibility problems** between the environmental management system (EMS) standard ISO 14001 and the quality management system (QMS) standard ISO 9001?
- Is there a (future) need to modify existing or introduce new **requirements**?

II.2.3 Target groups

These questions make clear that the survey must centre on those who are involved directly in applying the standard, i.e. have to read and understand it, integrate it into existing systems and, last but not least, meet its requirements: the companies that have themselves certified. As a second main group, the experience of the certifiers is important, who have to interpret the standard and use it as a basis for their auditing work. On top of this, there are further target groups whose experience and ideas can provide valuable contributions to the further development of the standard:

Figure 4 **Target groups of the survey "ISO 14001 in Germany"**

Target group	Findings sought	Organizations and individuals surveyed	Methods
Certified organizations	- Difficulties in use - Need for development - Costs/benefits - Suggestions for improvement	All traceable organizations certified in Germany	Questionnaire
Certifiers	- Difficulties in use - Difficulties in auditing - Need for development	All certifying bodies accredited in Germany as well as certifying environmental verifiers	Questionnaire
Other interested parties	Appraisals and contributions to a common German position	Experts in German - accreditation bodies, - business associations, - labour unions, - environmental organizations	- Interviews - Discussions in the responsible standardization committee (NAGUS)

II.2.4 Issues and questions

It follows from the goal of the study that the empirical survey must focus on identifying the proposals for revision or further development of ISO 14001 that flow from the experience gained in the standard's practical use. It was therefore essential to give users the opportunity to comment on practical difficulties, on the clarity of the text, its compatibility and further development, and to declare their position. An additional aim of the study was to identify further problematic areas and proposals for improvement by means of determining the costs and benefits of ISO 14001 use and of the tools employed.

In order to generate meaningful results, all certified organizations in Germany and all certifiers (who can be regarded as experts on the standard as a basis for certification) were to be given the opportunity to take part in the survey. Because of the size and unity of these target groups, a written (postal) survey through a questionnaire was chosen.

Depending upon the issue under consideration, different types of questions can be posed. Closed questions with preformulated answers are one type. The survey also placed special emphasis on ample opportunity and space for open comments and thus open questions, despite the greater effort that this involves (both in responding to and evaluating the questionnaires).

Specific attributes of survey participants ('structural data') are surveyed in order to characterize the group captured and assist in interpreting the results. Reasons for certification give an impression of the situation of the organizations surveyed, and can explain certain assessments of and comments on ISO 14001.

The survey of costs and benefits associated with using ISO 14001 delivers a picture of the advantageousness of this environmental management system. A poor cost-benefit ratio is indicative of critical points in the system. It is further assumed that a more or less positive cost-benefit assessment will influence respondents' overall evaluation of the standard or its text, and their proposals for further development.

Experience teaches that implementing and operating a certifiable management system in accordance with standard requirements is a demanding task for those people in charge of it in an organization. Difficulties that may arise can be due either to a lack of clarity in the standard's text or to a lack of compatibility or capability for integration of the system. These issues need to be queried directly, together with other potentially problematic points.

Furthermore, through open questions, participants had the opportunity and space to name specific parts of ISO 14001 (as chapters or keywords) which seem unclear to them or where they see problems of compatibility with their quality management system.

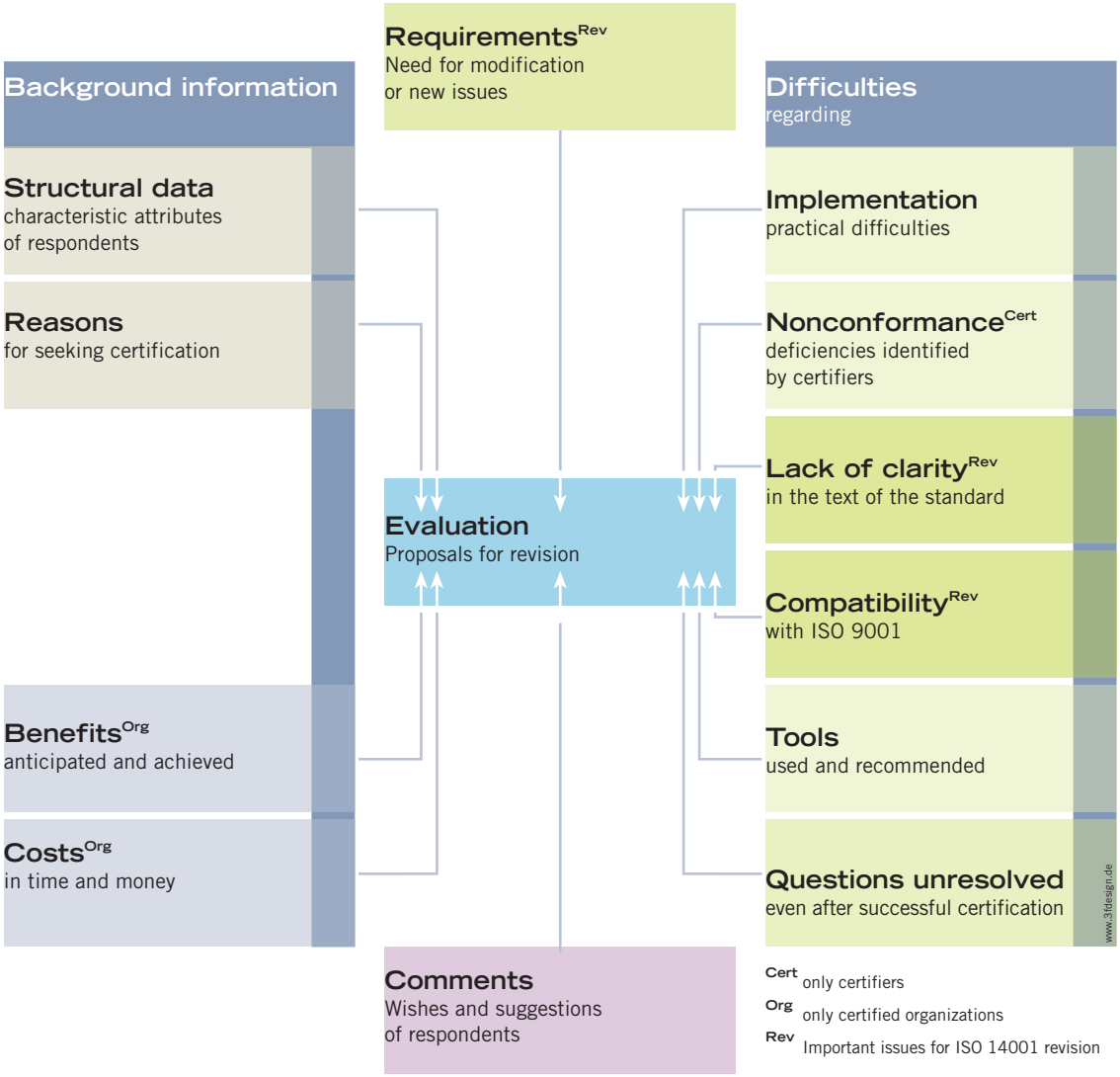
Where specific difficulties arise with the standard, be it because of lack of clarity in the text or because of compatibility problems, it can be assumed that certain tools will be used for support. The use of certain tools indicates which avenues and measures are taken to implement ISO 14001 appropriately within the company, and is thus an indicator of potential critical points in the stan-

dard. Unresolved questions of users regarding the standard point to a lack of clarity and to a lack of possibilities for clarification.

Questions were also posed regarding the possible further development of the standard which could be answered by ticking preformulated answers. The purpose of this was to determine whether a need is seen for fundamental modification or expansion of the standard. Survey participants were to be given the opportunity to express wishes and suggestions that they would like to see taken into account in the revision of the standard. In addition, participants were to provide an overall evaluation of the standard.

Figure 1 gives an overview of the survey elements:

Figure 5 **Structure of the survey "ISO 14001 in Germany"**



For almost all elements, both companies and certifiers can provide information. However, only the companies were asked about the costs and benefits of using ISO 14001, while the certifiers are able to provide valuable information on nonconformance of environmental management systems with the requirements of the standard. All other questions – partly modified – can be directed towards both target groups, enabling direct comparison between the assessments based on different experience.

A draft questionnaire was elaborated, and then optimized taking into account the results of and comments on pretests by experts and company representatives.

For reasons of acceptance, in order to minimize the workload and to have a high return rate, care was taken to keep the questionnaire as short as possible and as long as necessary. The 14 questions with about 100 subcategories filled only four or, respectively, five pages.

Figure 6

Questionnaire for certified organizations
reduced in size

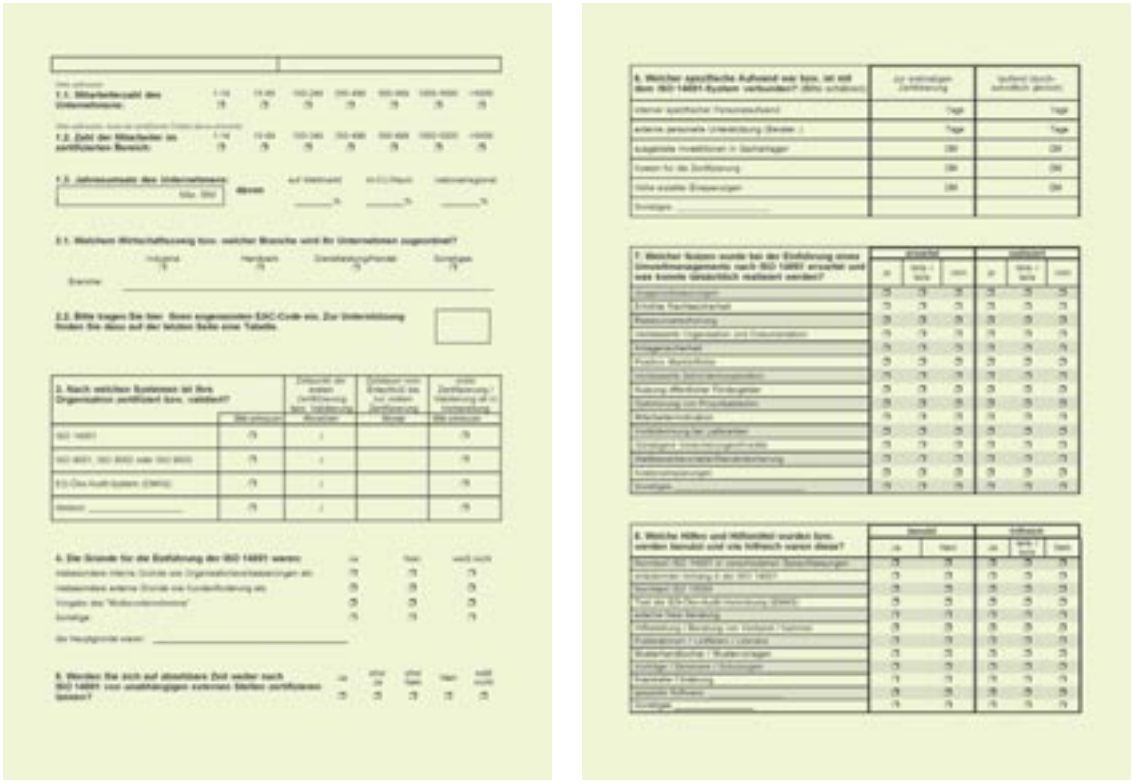
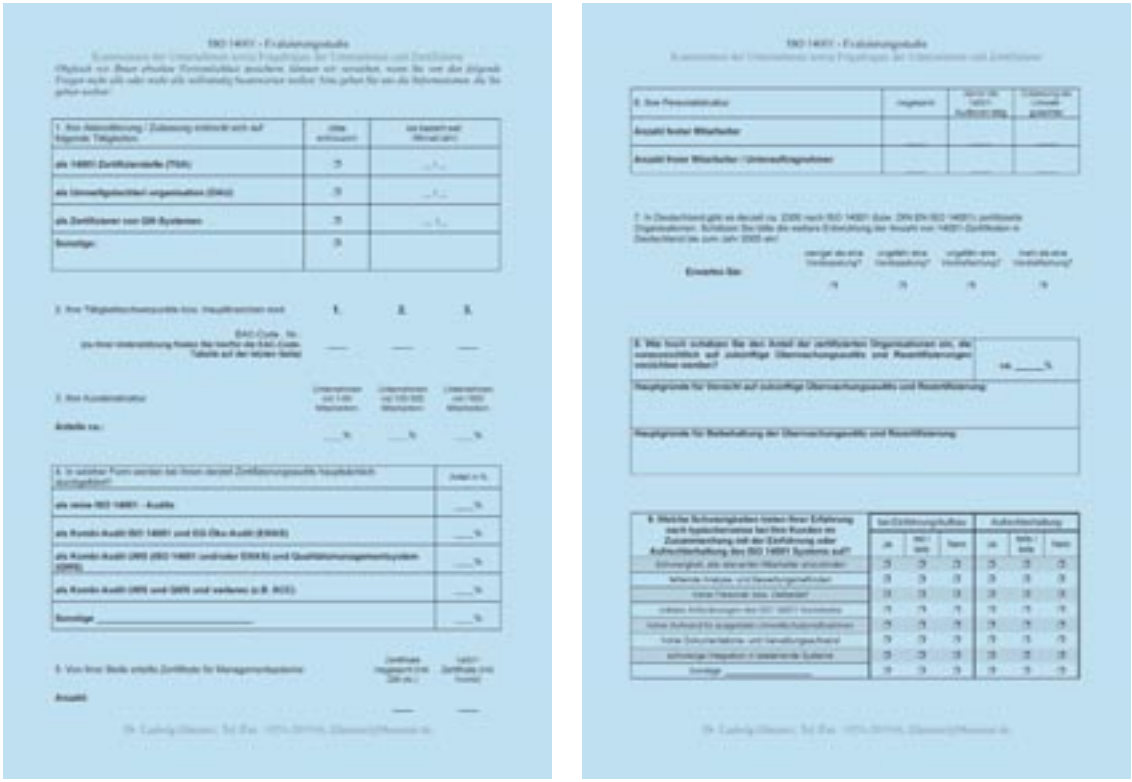


Figure 7

Questionnaire for certifiers
reduced in size



ENDE des Fragebogens - vielen herzlichen Dank!

Figure 7

continued

Questionnaire for certifiers
reduced in size

The experience and proposals of other target groups were surveyed by means of structured interviews. The two German accreditation bodies, the unions and representatives of environmental and industry associations were surveyed in their capacity as 'interested parties'. Interviews proceeded from the following guiding questions (see Fig. 8).

These questions were intended to present an opportunity and encourage the institutions surveyed to express their appraisals, expectations and ideas concerning ISO 14001 revision, thus providing a synopsis of the German position that goes beyond direct user interests.

Figure 8

Guiding questions for the interviews with interested party representatives

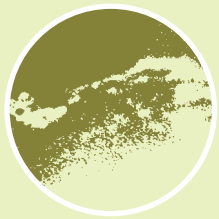
Questions to the accreditation bodies:

- Does the revision of ISO 14001 impact upon the accreditation bodies and their tasks?
- What does ISO 14001 and its further development mean to the certifiers?
- Do you have comments and suggestions concerning ISO 14001, the certification of environmental management systems and the admission/accreditation system?

Questions to the associations:

- What is the impact of ISO 14001 and its further development upon you (as union/environmental organization/industry association) and your work?
- Which role can ISO 14001 play for the further development of corporate environmental performance (in Germany/Europe and worldwide)?
- What do you think are the strongest and weakest points of ISO 14001?
- Which comments and suggestions do you have for the current revision?

II.3
Survey coverage



II.3.1
Certified organizations

Worldwide, the registration and central collection of data on organizations certified to ISO 14001 is common practice. The accreditation guidelines[19] valid in Germany and applied by the TGA (see on the TGA below) require that accredited certification bodies keep a register of certified organizations (including address, date of certification, registration number, scope of validity etc.). Thus, in principle, these data should (or must) be available.

However, so far there is no central, publicly accessible database of certified organizations in the German ISO 14001 certification system.[20]

Thus, for the survey conducted here, no central database with the relevant information was available. Further fundamental difficulties arose from the fact that ISO 14001 certificates are issued to 'organizations': These can be organizational units of any kind, subdivision and size.

The rough estimate of 2300 ISO 14001 certificates in Germany was taken as a starting point. Interviews with experts, corporate reports and press releases, environmental reports and reference lists etc. were used to identify the addresses of the organizations that appeared to be certified. Altogether, 2308 organizations were identified and contacted, of which 22 responded explicitly that they were not certified to ISO 14001.

The questionnaires were sent out with a cover letter and addressed return envelope on 7 September 2000 and during the following days. A small number of addresses that came in at a later stage were included subsequently. The questionnaires were to be completed and returned by 5 October. A dedicated website (www.14001news.de) was established for the project, providing support and information for participants. This also made it possible to refer queries to the information available there.

In total, 565 questionnaires were returned. In relation to the 2286 certified organizations that had been contacted (2308 units minus the 22 'mistaken' units), this represents a return rate of 25%.

In fact, however, these 565 questionnaires cover more than 25% of the certified organizations and certificates. On the basis of the explicit statements by those centrally completing the questionnaire for several certified organizational units, and proceeding from plausible conclusions and attributions of contacted and responding units, it was possible to establish that the 565 questionnaires represent roughly 900 certificates. If one questionnaire represents one company, this would mean that, on average, there are about 1.5 certificates per company.[21]

A large certification body has detailed information indicating that the ratio of sites to certificate averages 1.7:1. It must therefore be assumed that the above number of certificates represents an even larger number of sites. If we take a factor of 1.5, we can broadly assume[22] the following correlation:

[19] Cf. "Allgemeine Anforderungen an Stellen, die Umweltmanagementsysteme begutachten und zertifizieren" (General requirements for bodies operating assessment and certification/registration of environmental management systems – ISO/IEC Guide 66) e.g. at www.tga-gmbh.de.

[20] In the following, "organization", "organizational unit" and "company" are used synonymously unless the special organizational character is elaborated upon.

[21] Cf. Dyllick/Hamschmidt (2000) p.23f., who assume that the 348 ISO 14001 certificates that had been issued by the date of their survey in Switzerland were spread among "some 290" companies (i.e. a factor of 1.2).

[22] The depicted correlation between the number of certified companies, the total number of certificates issued and the number of sites covered by these cannot be established with certainty.

Figure 9 **Estimated correlation between ISO 14001 certified companies, certificates issued and certified sites in Germany (2000)**

	Organizations certified (number)	Factor	Certificates issued (number)	Factor	Sites certified (number)
Estimated ratio	1	x 1.5	1.5	x 1.5	2.25
Survey respondents	**565***	x 1.5	ca. 900	x 1.5	ca. 1300
Total	ca. 1500	x 1.5	ca. **2300***	x 1.5	ca. 3450

*figures ascertained empirically

II.3.2 Certifiers

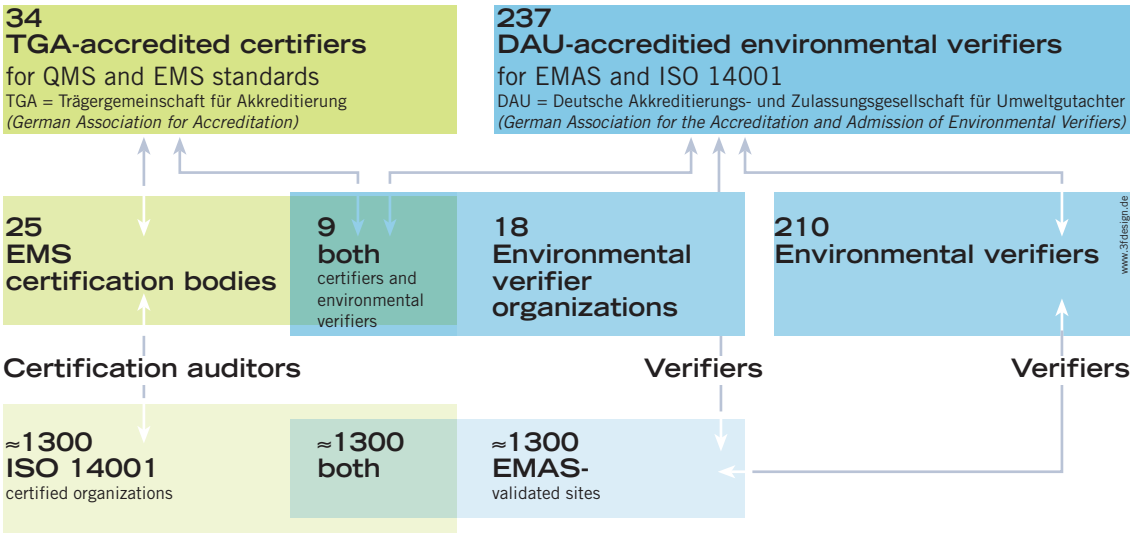
In total, there are in Germany[23] 262 accredited institutions or individuals who, within the framework of a recognized accreditation procedure, are entitled to certify organizations according to ISO 14001. These include 34 certification bodies accredited according to international accreditation rules by the German Association for Accreditation (Trägergemeinschaft für Akkreditierung GmbH – TGA). These are joined by a further 237 environmental verifiers or environmental verifier organizations, which have been accredited by the German Association for the Accreditation and Admission of Environmental Verifiers (Deutsche Akkreditierungs- und Zulassungsgesellschaft für Umweltgutachter mbH – DAU) pursuant to EMAS and the German Environmental Auditing Act (Umweltauditgesetz – UAG). They are entitled to audit organizations according to EMAS, and also according to ISO 14001 in its function as a standard recognized by the European Commission.

Environmental verifiers can consequently certify companies to ISO 14001, in their capacity as so-called 'UAG-certifiers' with DAU-accreditation, without needing to have TGA-accreditation. Nine certification bodies are accredited by both German institutions.

[23] This survey only covers certifiers accredited by the bodies mentioned; other certifiers who have been accredited abroad also operate in Germany in addition.

Figure 10 **Overview of TGA-accredited and DAU-accredited environmental auditors**

and relationships between them and the organizations audited



All certifiers are registered, and the register of accreditation is publicly accessible.[24] In total, 45 questionnaires were sent to all TGA-accredited certification bodies (34) as well as to a selection of environmental verifier organizations (11) which were known to conduct ISO 14001 certification.

Between October 2000 and January 2001, 23 completed questionnaires were returned, which equals a return rate of 51%. 12 of the 17 certifiers that stated the number of certificates issued by them, i.e. 71% of these 17, had issued less than 100 ISO 14001 certificates at the time of the survey; 5 of the 17 (i.e. 29%) can be regarded as 'very large certifiers', having issued more than 100, in some cases more than 500 certificates. These very large certifiers account for 1699 (84%) of the total of 2025 ISO 14001 certificates issued by the 17 respondents. These 2025 ISO 14001 certificates captured by the survey of the certifiers correspond to a capture rate of 89% when based on the 2286 organizations certified at the time of the survey.

[24] The list of TGA-accredited certifiers is available on the website of the TGA (www.tga-gmbh.de). The accredited environmental verifiers can be found on the website of the DAU or of the Association of German Chambers of Industry and Commerce (www.diht.de).

II.3.3 Other interested parties

A revision of ISO 14001 concerns not only the users in a narrower sense – the companies and certifiers. It also affects, directly or indirectly, the bodies responsible for accrediting certifiers in Germany, and, in particular, company employees and those sections of the public affected by the specific use of the environment.
The unions can be viewed as the representatives of the employees, and environmental organizations as the representatives of the affected public. In addition, an overall appraisal was to be requested from an association of German industry, in order to give expression to those voices not directly involved in the standardization process or the ISO 14001 system. Well-known environmental management experts from these circles and individuals known to represent their organization in these matters were asked for an interview. Interviews were conducted with:

Accreditation bodies

The managing directors of the TGA – Dr. Facklam – and the DAU – Dr. Racke.

"The accreditation bodies view ISO 14001 certification as an important market for certifiers, and one that is set to grow; however, no marked rise in the number of accredited certification bodies is anticipated."

Labour unions

A representative of the German Trade Union Federation (Deutscher Gewerk-schaftsbund – DGB, Dr. Schneider) and of a German industrial union (Mr Bahr of the Industrial Mining, Chemistry, Energy Union – Industriegewerkschaft Bergbau, Chemie, Energie – IGBCE).

"Requirements on employee participation are inadequate in ISO 14001. Clear conditions of participation need to be created – this means access to environmental information, sufficient qualification and real opportunities for participation."

Environmental organizations

The managing director of the umbrella organization of German environmental organizations, the German League for Nature and Environment (Deutscher Naturschutzring – DNR, Mr Röscheisen).

"The lack of external effect is a major deficiency; there is no requirement to be accountable in a credible fashion through a verified environmental statement."

Industry associations

The responsible expert of the Association of German Chambers of Industry and Commerce (Deutscher Industrie- und Handelskammertag – DIHT, Dr. Hüwels).

"For the Association of German Chambers of Industry and Commerce, the issue of environmental management and environmental management systems is very important."

The interviews took place in February 2001 on the basis of the structured guiding questions, which were distributed to the interviewees beforehand. The results of the interviews feature in the evaluation part of this report.

III. Survey results

ISO 14001 in Germany

Comment by survey respondent:

"... in practice, departmental heads do not know which laws and regulations they must comply with."

III.1 Current situation

III.1.1 Structural data of organizations and individuals surveyed

Certified organizations

The industry sectors of the organizations covered by the survey were identified according to the EAC sector code[25], as used in the certification and accreditation system.

Figure 11

Industrial sectors of the organizations captured by the survey

(EAC Code Nos. 1-39)

No.	Sector	Number of respondents n=559
1	Agriculture, fishing	1
2	Mining and quarrying	0
3	Food products, beverages and tobacco	30
4	Textiles and textile products	11
5	Leather and leather products	0
6	Wood and wood products	4
7	Pulp, paper and paper products	12
8	Publishing companies	0
9	Printing companies	9
10	Manufacture of coke & refined petroleum products	5
11	Nuclear fuel	2
12	Chemicals, chemicals products & fibres	80
13	Pharmaceuticals	7
14	Rubber and plastic products	40
15	Non-metallic mineral products	13
16	Concrete, cement, lime, plaster, etc.	6
17	Basic metal & fabricated metal products	66
18	Machinery and equipment	34
19	Electrical and optical equipment	74
20	Shipbuilding	0
21	Aerospace	2
22	Other transport equipment	26
23	Manufacturing not elswhere classified	6
24	Recycling	16
25	Electricity supply	6
26	Gas supply	2
27	Water supply	1
28	Construction	10
29	Wholesale & retail trade; repairs of motor vehicles, motorcycles & personal & household goods	6
30	Hotels and restaurants	1
31	Transport, storage and communication	19
32	Financial intermediation, real estate, rental	2
33	Information technology	5
34	Engineering services	4
35	Other services	26
36	Public administration	6
37	Education	2
38	Health and social work	3
39	Other social services	22

[25] Cf. the annex; EAC is the industry sector code of the European Accreditation of Certification; EMAS uses the NACE Code which is based on Council Regulation (EEC) No. 3037/90 on the statistical classification of economic activities in the European Community.

The table[26] illustrates the main sectors represented in the survey: Chemical industry (EAC 12), electrical and optical equipment (EAC 19), basic metal and fabricated metal products (EAC 17). Rubber and plastic products (EAC 14), machinery and equipment (EAC 18) and the food industry (EAC 3) are also strongly represented.

In addition to the EAC sector classification, the classification according to broad branches of industry was also surveyed. This found that 74% of respondents count themselves as belonging to industry, 19% to services/trade, 3.5% to crafts and a further 3.5% to other categories (e.g. agriculture, public authorities). In the course of the above-mentioned analysis of the entirety of ISO 14001 certified organizations in Germany, it was possible to ascertain the EAC Code classification for some of these (n=1449). Comparison with this incomplete group shows that the sector distribution in the present survey only has a slight over-representation of EAC 17 (basic metal and fabricated metal products) and a slight under-representation of the electrical and chemical industries. This balanced structure, in conjunction with the high capture rate of more than 25%, supports the assumption that the informative value of the survey results for Germany is high.

Surveys compiled by ISO and by Japan, the 'leading' country in terms of ISO 14001 certifications, provide statistics permitting a sectoral comparison:[27]

Comment by survey respondent:

"... the standard should support all users in achieving real improvement of performance, and concentrate not so much on improving the system ..."

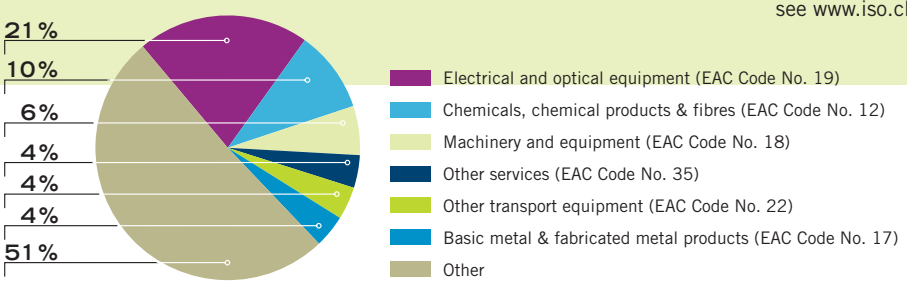
[26] Here and in the following tables or figures, 'n' is the number of responses that could be analysed.
[27] Cf. ISO Survey (www.iso.ch) and the statistics of the Japanese institute for standardization (www.ecology.or.jp/isoworld).

Figure 12 **Industrial sectors of ISO 14001 certified organizations:**

Worldwide; in Japan; in Germany; covered by the present survey (EAC Code)

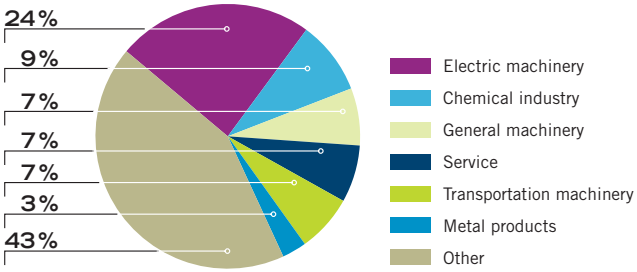
Worldwide 1999
n=10,881

Source:
ISO Survey – Ninth Cycle
see www.iso.ch



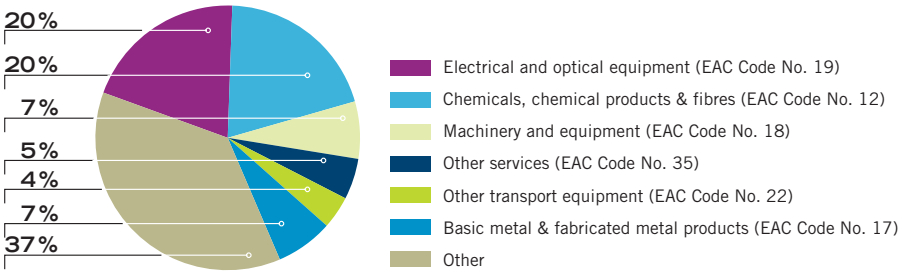
in Japan 2000
n=5,222

Source:
Japanese National
Committee for ISO TC 207



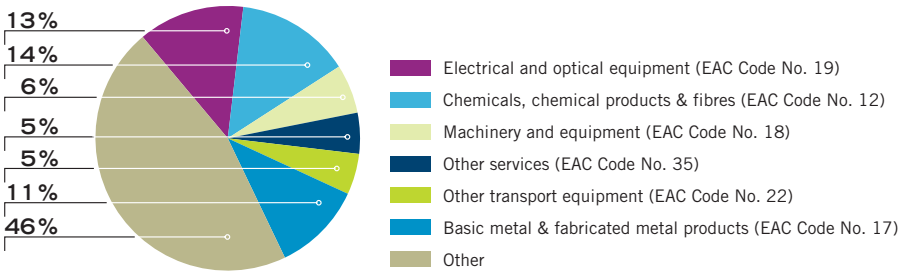
in Germany 2000
n=1,449

Source:
Own research



in the present survey "ISO 14001 in Germany"
n=559

Source:
Own survey



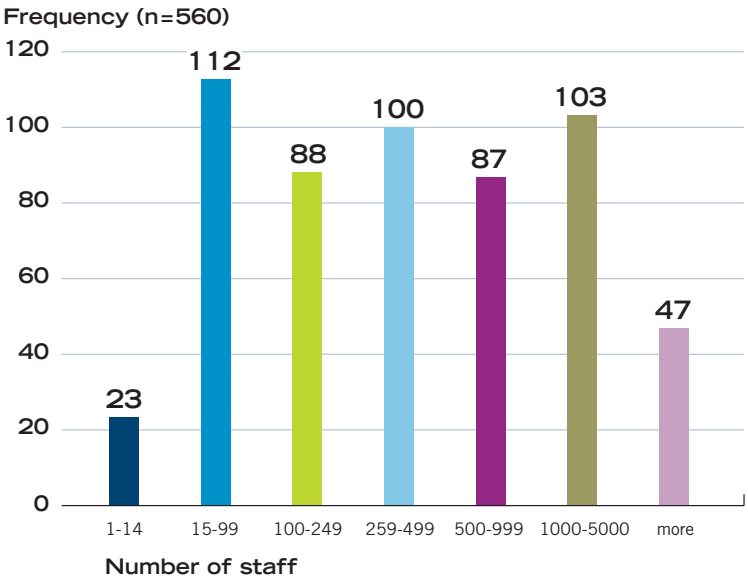
The present survey mirrors well the sectoral distribution of ISO certified organizations worldwide. The general strength of the electrical and chemical industries is striking – among both the surveyed group and organizational units certified in Germany in general, as well as in Japan and worldwide. However, the informative value of this overview and of the comparison is limited. The data of the ISO survey do not seem to be entirely valid: For instance, the number of German certificates in 1999 is stated to be only 962, which is probably too low[28]; moreover, only 10,881 of the 14,106 certificates captured worldwide have been classified in industry sectors. The Japanese industry sector statistics are not based on the EAC system with 39 sectors, but upon a classification in 47 sectors, to which all certifications are assigned. The data base of the German ISO 14001 population is incomplete and possibly biased, as only a sub-group (n=1449) could be classified according to sectors.

Regarding size classes in terms of **number of staff**, the organizations represented in the survey are distributed relatively evenly. Here, as before, no accurate data is available on the attributes of the population of all certified organizations in Germany.

Figure 13

Size of the organizations in the survey

by number of staff



[28] Other sources report about 1400 ISO 14001 certified organizations in Germany in 1999, cf. Umweltbundesamt (Federal Environmental Agency): EG-Umweltaudit in Deutschland, Berlin 1999, p. 16.

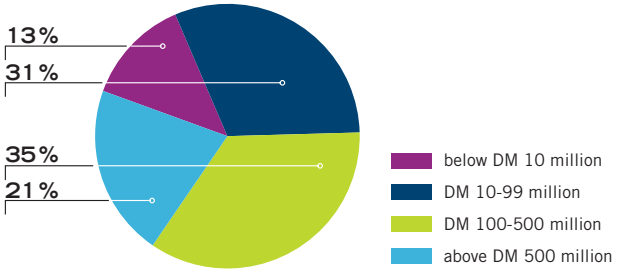
Figure 14

The size-class distribution of the group of organizations surveyed correlates well with that of other surveys of users of environmental management systems in Germany.[29]

The mean annual turnover of the companies surveyed figures DM 1500 million (€ 750 million). Turnover ranges from companies with DM 0.5 million (€ 0.26 million) to the multinational with DM 136,000 million (€ 70,000 million). One third of the companies is in the size class between DM 10 and 99 million turnover, another third between DM 100 and 500 million.

Size of the organizations in the survey

by turnover



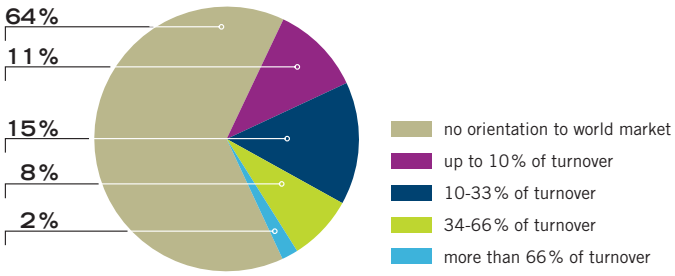
Of the remaining third, the smaller part is made up of companies with less than DM 10 million turnover, the other part being large companies with an annual turnover of more than DM 500 million.

Figure 15

36% of the respondents stated that they generate a certain percentage of their turnover on the world markets outside the European Union (EU). About 10% make more than 1/3 of their entire annual turnover on these markets.

Proportions of organizations surveyed with turnover generated outside the European Union

and the share of this in company turnover



[29] Cf. e.g. Umweltbundesamt (Federal Environmental Agency): EG-Umweltaudit in Deutschland, Berlin 1999, p. 25.

The following overview presents the 'certification status' of the organizations surveyed. Altogether 86 % of the organizations are not only certified to the environmental management standard ISO 14001, they also have a certification to a quality management standard of the ISO 9000 series. 51 % of the respondents have also undergone EMAS validation. 23 % of all respondents have certificates to further standards and requirements (such as QS 9000, VDA 6.1, SCC, EfbV).[30]

The ISO 9000 series came into force in 1994. In terms of the history of the standards, quality management and the certification of quality management systems is several years ahead of the analogous development in the environmental sphere.

The environmental management systems pursuant to ISO 14001 are (on average) the 'youngest' management systems. The longest experience comes from quality management systems, which, on average, were certified three years earlier. The time required for implementation – from decision to first certification – was longest for quality management systems, namely a good 14 months; this was possibly due to a lack of prior experience.

Only 7 % of the companies surveyed have been audited to ISO 14001 alone (see figure 17). In contrast, 93 % have a management system certified to several standards at once. 51 % have both ISO 14001 certification and EMAS registration; 86 % have a quality management system certified to the ISO 9000 series in addition to ISO 14001.

Figure 16 **Certification status of the organizations surveyed in Germany**

(as of October 2000)

Certification status	Percent n=563	First certification/ validation Month/Year	Time from decision until 1st certification Month Ø
ISO 14001	100 %	7/1998	**13**
ISO 9001 or ISO 9002 or ISO 9003	86 %	8/1995	**14**
EMAS (Eco-Management and Audit Scheme)	51 %	12/1997	**14**
Others	23 %	1/1998	**11**

[30] QS 9000 as well as VDA 6.1 are sector-specific extensions of ISO 9001 for suppliers in the automotive industry; SCC is a safety standard in the oil industry; EfbV is a certification according to the German Ordinance governing waste management contractors.

Figure 17 **Management system combinations applied by the organizations surveyed**
and their chosen sequence of introduction

Combination	Share n=560	Sequence of introduction simultaneous: a/b in succession; a before b: a → b	Number n=485
ISO 14001 only	7%	ISO 14001	**39**
	39		
		ISO 14001 → EMAS	2
ISO 14001		EMAS → ISO 14001	8
and EMAS	7%	ISO 14001/EMAS	25
	38		**35**
		ISO 14001 → ISO 9001	10
ISO 14001		ISO 14001/ISO 9001	54
and ISO 9001	42%	ISO 9001 → ISO 14001	154
	237		**218**
		ISO 14001 → EMAS → ISO 9001	2
		EMAS → ISO 14001 → ISO 9001	2
		ISO 14001/EMAS → ISO 9001	6
		EMAS → ISO 9001 → ISO 14001	6
		ISO 14001/EMAS/ISO 9001	17
ISO 14001		ISO 9001 → ISO 14001 → EMAS	20
and ISO 9001		ISO 9001 → EMAS → ISO 14001	56
and EMAS	44%	ISO 9001 → ISO 14001/EMAS	94
	246		**203**

Within each combination, there are varying histories. It is evident that in those organizations that have a certified quality management system next to their environmental management system, the order is: quality management first, then environmental management. Often, ISO 14001 and EMAS were introduced and certified or validated at the same time. In some instances, the certification of environmental and quality management systems was combined. Respondents thus mostly have long-standing experience with several management system standards.

Certifiers

A total of 23 accredited certifiers or EMAS environmental verifiers participated in the study. Among the EMAS verifiers, 8 have only TGA accreditation and 6 are pure environmental verifiers (DAU); 9 state that they have the accreditation of both institutions. This means that, in total, the participants in the survey represent 17 TGA accreditations and 15 DAU accreditations.

The certifiers only certifying environmental management systems are a minority. 16 of the 23 participants are accredited to certify both QM systems and EM systems.

26% of the certifiers state that they work mainly in the EAC 17 sector (basic metal and fabricated metal products), 17% in the EAC 12 sector (chemicals, chemical products and fibres). The 'big five' certifiers (participating in the survey), who represent about 1700 ISO 14001 certificates issued, have their focus on EAC 3 (food products, beverages and tobacco), 12 (chemicals, chemical products and fibres), 17 (basic metal and fabricated metal products), 18 (machinery and equipment), 19 (electrical) and 22 (transport equipment). Certain sectors, notably in services, do not represent a sectoral focus of certifiers

Figure 18 **Accreditation status of ISO 14001 certifiers in Germany**

taking multiple accreditations into consideration

Status (n=23) multiple accreditations possible	Number	Percentage	Date of accreditation average
TGA certifiers of EM systems	17	74%	6/1997
DAU env. verifiers/verification bodies	15	65%	2/1996
TGA certifiers of QM systems	16	70%	3/1995

Comment by survey respondent:

"... in EMAS, the aspects to be addressed are described much better, and the specifications on environmental impacts are clearer."

at all; these include the building industry, catering trade, financial services and data processing.
25 % percent of certification audits are ISO 14001 audits only, 31 % combine ISO 14001 certification with EMAS validation and 39 % combine ISO 14001 with QMS certification.
The certifiers thus adapt to the requests and circumstances of a majority of their clients, who integrate different goals and tasks, such as environmental protection, quality management and safety aspects, into their management system and want it certified according to recognized standards.

Figure 19 **Combinations of different management systems in certification audits**

according to certifiers

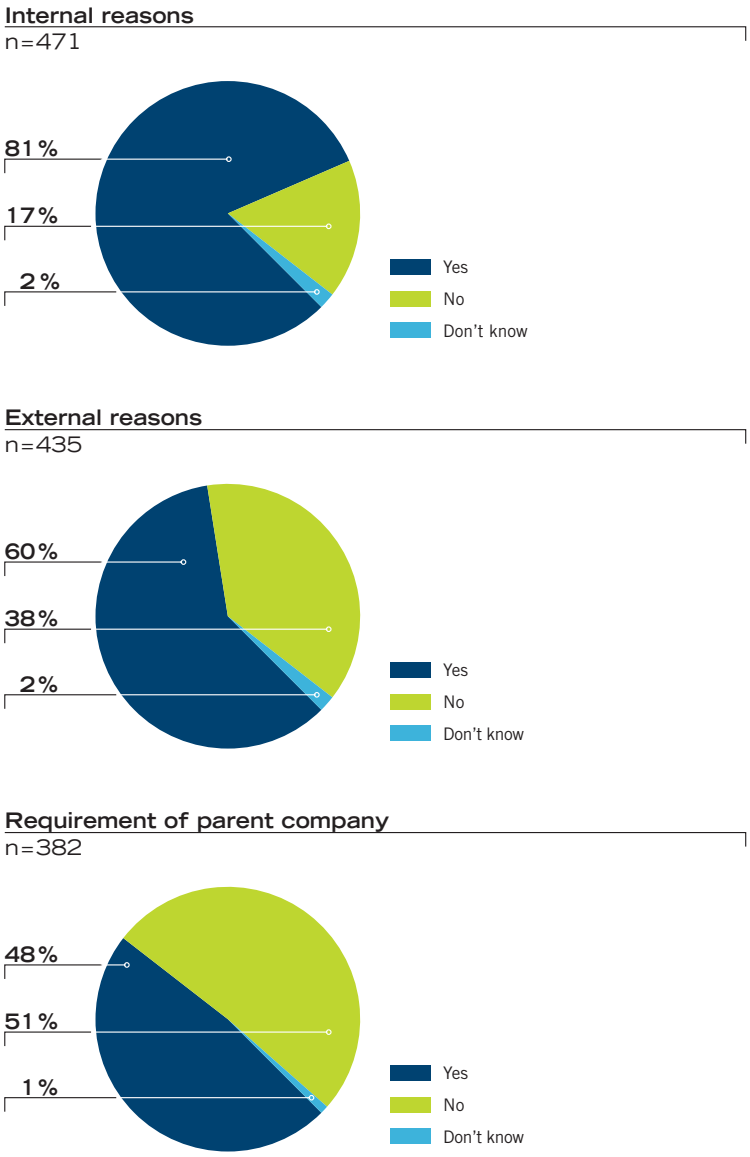
Combination	Percentage Mean values
Single audit ISO 14001	25 %
Combined audit ISO 14001 and EMAS (European Eco-Management and Audit Scheme)	31 %
Combined audit ISO 14001 and ISO 9001	31 %
Combined audit ISO 14001 and ISO 9001 and others (e.g. SCC)	8 %
Others	5 %

Figure 20

III.1.2 Reasons for using ISO 14001

Reasons for setting up an ISO 14001 environmental management system

from the perspective of the organizations surveyed



The reasons for introducing an ISO 14001 management system are diverse. For the **organizations**[31] surveyed, internal reasons, such as envisaged organizational improvements, were evidently the key reason for introducing ISO 14001. Next to this, external reasons, such as client or customer requirements, frequently also played a role. In half of the cases, the implementation of an environmental management system is attributable quite simply to the requirement by the parent company to do so.

Of those which confirmed only one of these three reasons (143 of the 471 respondents=30%), 92 (64%) stated purely internal reasons, 32 (22%) purely external reasons and 19 (13%) a requirement by the parent company. Motivations are thus certainly multi-layered. The following main reasons[32] for implementing an environmental management system to ISO 14001 were stated explicitly by 277 of the organizations in the survey (see Fig. 21).

The reasons for setting up a certified ISO 14001 environmental management system[33] can be assumed to speak in favour of retaining it, too.

31 Corresponding to the research design, the results presented here and in the following are based partly on the survey of organizations and partly on the survey of certifiers. Where both groups were asked about the same issue, the certified organizations' experiences are paramount while the experiences of the certifiers play an ac-cessory role, since the main target group of this survey (and of the revision of the standard) are the users in the certified organizations.

32 The main reasons given by the participants in an unstructured way have been aggregated thematically here.

Figure 21 **Main reasons for setting up an ISO 14001 environmental management system**

from the perspective of the organizations surveyed

Reason	Number	Percentage n=277
1. Image (... PR, good example, credibility, marketing ...)	49	18%
2. Requirement by customer/client (... market requirement, competitive advantage ...)	43	16%
3. Corporate philosophy (... responsibility, sustainability ...)	31	11%
4. Continual improvement (... system, process and organizational improvements ...)	26	9%
5. Security in the law (... legal compliance ...)	20	7%
6. Universality (... acceptance of the standard, worldwide validity ...)	19	7%
7. Integrated management (... link to quality management, to workplace health and safety, synergies ...)	16	6%
8. Cost savings (...cost-effectiveness ...)	14	5%
9. Recognition (... demonstrate performance ...)	10	4%
10. Link to EMAS (... supplement to EMAS, by-product ...)	9	3%
11. Various	40	14%

The **certifiers** were asked which might be the decisive reasons for 'maintaining' certification or possibly 'opting out'.

According to the certifiers, opting out is mostly a question of:

- discontinued client/customer or market requirements,
- organizational changes (closing down, takeover etc.),
- lack of incentives (deregulation, external effect ...), or
- an unfavourable overall cost-benefit relation.

According to the certifiers, certification is mostly maintained in order to

- fulfil prevailing client/customer requirements,
- optimize and improve the transparency of internal processes, promote system performance and the continual improvement process and
- generate internal benefit (security in the law, cost reduction).

[33] Where we speak of an "ISO 14001 environmental management system", this means an environmental management system that is implemented and certified accorduing to ISO 14001;"setting up" the system, and "maintaining" or "opting out" from it therefore always has to be understood within the context of certification.

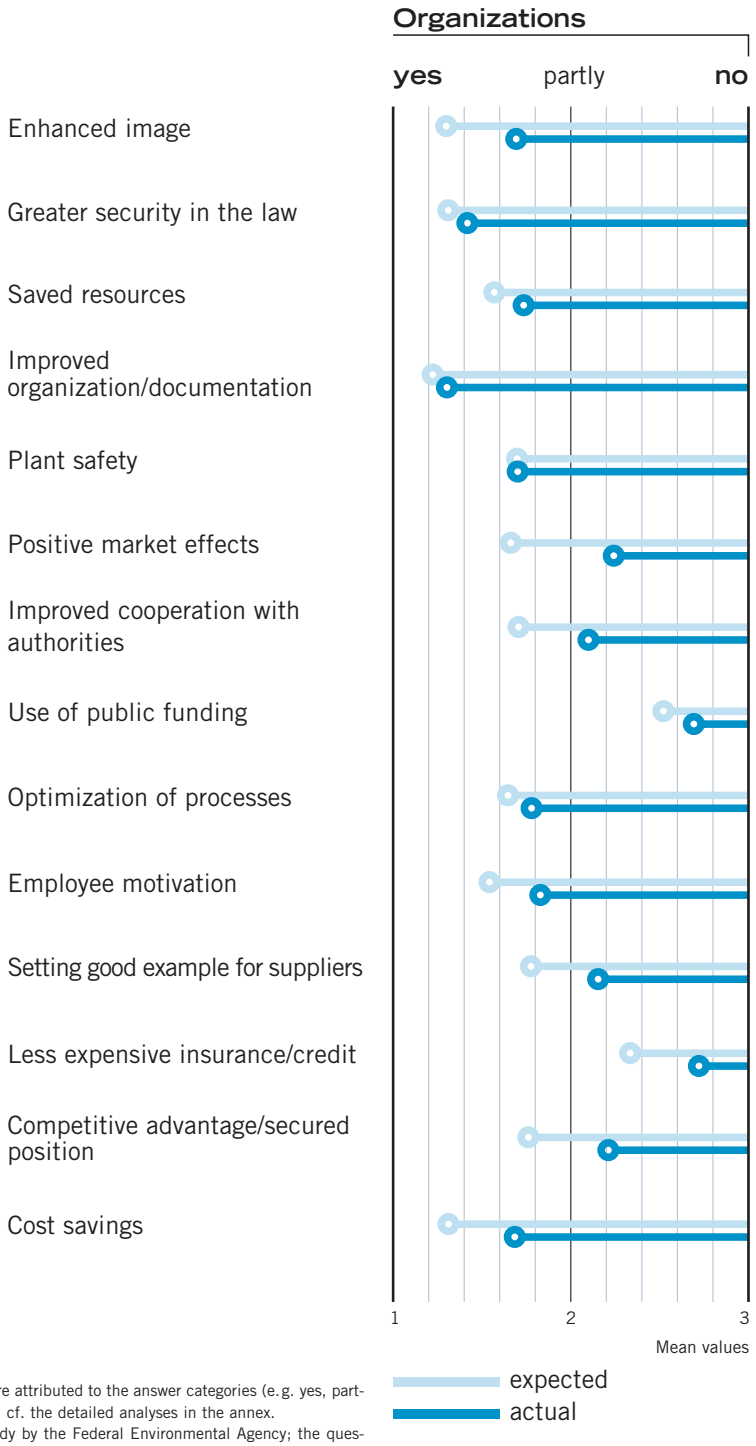
Figure 22 III.1.3

Benefits expected by users

The responses of the participants in the certified organizations to the question of which of the given categories of benefit they had expected and which actually emerged show whether the reasons stated for implementing and maintaining an ISO 14001 certified environmental management system were confirmed and whether expectations were met or not.[34] The main benefits expected from the implementation of an environmental management system were improved organization, greater security in the law and enhanced image.[35]

Benefits

Expected and actual benefits from setting up an ISO 14001 environmental management system in the organizations surveyed



[34] Here and in the following, values (e.g. 1, 2, 3) were attributed to the answer categories (e.g. yes, partly, no) and depicted as means over all answers; cf. the detailed analyses in the annex.

[35] The results correspond closely to those of the study by the Federal Environmental Agency; the questions of that study were used for better comparability, cf. Umweltbundesamt (Federal Environmental Agency): EG-Umweltaudit in Deutschland, Berlin 1999, p. 37.

The actual benefits were mostly an improved organization/documentation and greater security in the law. Regarding these, there is little disappointment, i.e. the difference between the expected and actual benefit is small. 78.7% of the participants had expected an improved organization and documentation and 68.2% found that this expectation was met. 74.4% had expected greater security in the law and 63.9% achieved it.[36]

The largest disappointments arose in terms of lack of recognition: in general (image), among clients/customers (market effects), authorities (cooperation), employees (employee motivation), suppliers (setting good example) and business partners (insurance companies, banks). In addition, expectations regarding competitive advantage/secured position and also regarding cost savings were not met entirely.

Only the benefits gained in terms of plant safety fully met expectations; this aspect, however, does not play any decisive role as a reason for implementing and maintaining an ISO 14001 environmental management system.[37]

III.1.4 Resource allocation and costs

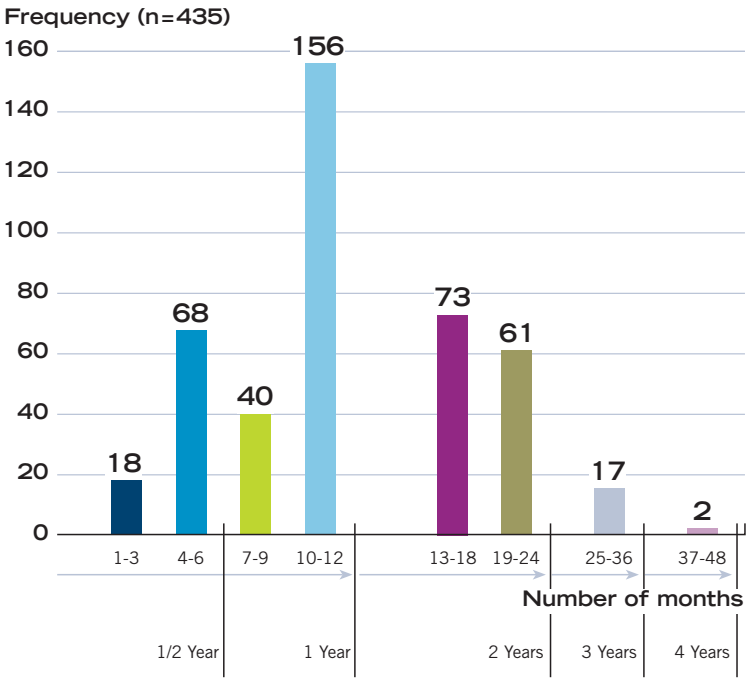
The resources required to establish and maintain an ISO 14001 system can be assessed from the data reported on human resources required and costs incurred, minus the savings achieved:

The staff of the ISO 14001 certified **organizations** had to deal with the implementation of the ISO 14001 management system for months until the first certification: On average some 13 months passed from the decision to the first certification (for both ISO 9000 and EMAS one month longer).

Figure 23

Time needed for necessary preliminary work until first ISO 14001 certification

reported by the organizations surveyed



[36] The detailed results, which are available as a separate data collection, are not included here, in order to focus on the core findings and key appraisals of the participants, and also for reasons of clarity and manageability of the report.

[37] Cf. the section on "Reasons for using ISO 14001".

During a 13-month implementation phase, 183 person-days are required internally. If we assume 220 person-days for 12 months (or 240 days for 13 months), we find that one person has to use 75% of his or her working time for 13 months in order to set up an environmental management system ready for ISO 14001 certification – or that three people have to be employed for a quarter of their working time for 13 months. According to estimates of respondents, roughly 3 months per year continue to be required on a regular basis to operate or maintain the management system.

The 35 working days of external support needed in the course of the implementation add up to DM 42,000 (€ 21,500) if a per diem rate of DM 1200 (€ 615) is assumed. In their order of magnitude, these findings confirm the figures determined by other studies.[38]

Implementing an environmental management system frequently necessitates investment in fixed assets, which the participants estimate on average at about DM 185,000 (€ 94,600). Investment in fixed assets cannot be attributed directly as costs of the environmental management system. Such investment is 'only' triggered by the introduction of the system but is based upon regulatory requirements, technological developments or cost-effectiveness aspects. The implementation of environmental management systems does doubtlessly trigger real operational efforts and improvement measures; these incur costs, but can also generate benefits such as cost savings. The cost savings generated by implementing the environmental management system, as estimated by the respondents, add up to DM 170,000 (€ 87,000). This is in the order of magnitude of the investment triggered (n=82).[39]

Respondents estimate the further costs associated with first certification (e.g. training, information and auditing costs) to average DM 45,000 (€ 22,500).

Figure 24 **Time needed to set up and maintain an ISO 14001 environmental management system**

estimated by the organizations surveyed

Resource allocation	for setting up person-days estimated	for maintenance person-days estimated, yearly
Internal staff	183 days	61 days
External support (consultants)	35 days	6 days

[38] Cf. e.g. Umweltbundesamt (Federal Environmental Agency): EG-Umweltaudit in Deutschland, Berlin 1999, p.36.

[39] Within the given framework, most participants were unable to answer completely the questions regarding non-recurring and current expenditure and savings. Data are evidently not available, only available elsewhere or in a different form.

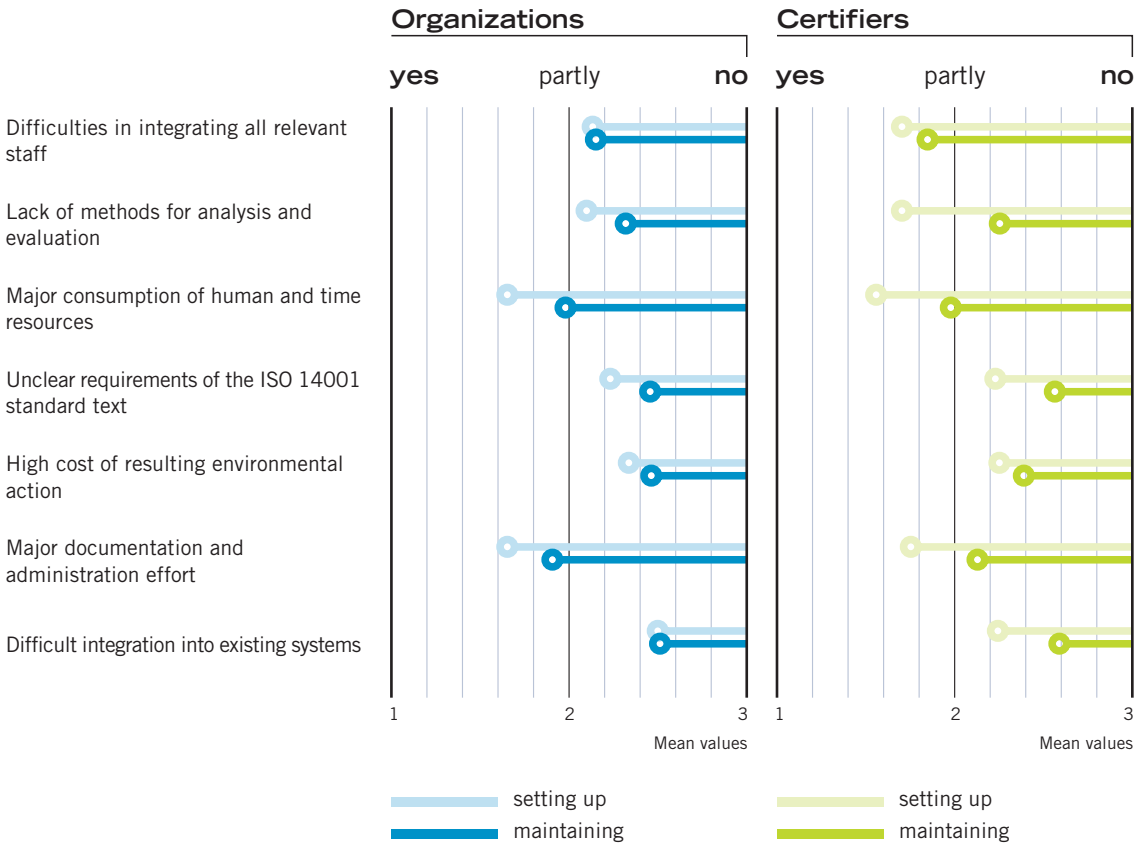
III.2 Current problems

III.2.1 General difficulties

Setting up and maintaining an environmental management system involves not only costs and time spent. Various problems can also arise in the implementation process. In order to assess the role of "lack of clarity" and "compatibility problems" in this, survey participants were asked about the difficulties that arise when setting up and maintaining an ISO 14001 system. Both the certified organizations and the certifiers were asked. Various preformulated answers were offered, including "unclear requirements of the ISO 14001 standard text" and "difficult integration into existing systems".

Figure 25 **Difficulties in setting up and maintaining the ISO 14001 system**

Views of organizations and certifers



From the point of view of the **organizations**, lack of clarity in the standard, difficulties with integration, the lack of analytical and evaluation methods, the cost of the resulting environmental protection measures and the integration of staff are not major problems. The main problems are the human and time resources needed especially during the initial implementation phase as well as the documentation and administration effort associated with the ISO 14001 system.

The assessment of the **certifiers** differs only slightly. Regarding the implementation of the system, they see not only the human resources, time and documentation needed but also – differing from the self-assessment of the organizations – difficulties resulting from the lack of analytical and evaluation methods especially in the initial implementation phase as well as the question of integrating all relevant staff. Certifiers have a greater tendency to see staff integration as a problem not limited to the initial implementation phase.

Overall, it is apparent that a lack of clarity regarding the text and possible problems regarding integration due to incompatibilities may be practical problems of ISO 14001 but they are by no means crucial for the participants in this survey. The high input of human and time resources as well as the documentation and administration effort that comes with setting up and maintaining the ISO 14001 system are viewed as much greater problems.

III.2.2 Nonconformance

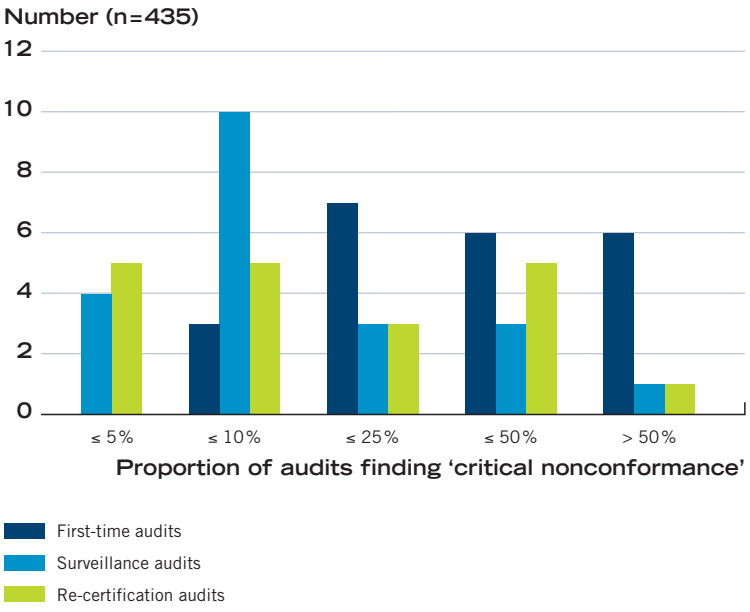
An environmental management system in an organization – even if it was implemented "according to ISO 14001" – can deviate from the requirements of the standard. During audits – which can be first-time audits, regular surveillance audits or audits for re-certification – certifiers regularly detect typical so-called nonconformances. These are instances of non-compliance with the requirements of the standard that can be classified as 'non-critical' or 'critical'. Critical nonconformance is partly or entirely an obstacle to successful certification and needs to be remedied by an organization before it can receive the certificate.

Nonconformance is an indicator of difficulties experienced in meeting the requirements of the standard. These may be due to the requirements themselves, lack of clarity, or problems within the organization. 19 out of 21 certifiers (90 %) find nonconformances which are a hindrance for immediate certification in 10 % of the first-time audits. 6 out of 22 certifiers even find critical nonconformances which make immediate certification impossible in over 50 % of the first-time audits. But even during the surveillance audits after certification, nonconformance is found on a regular basis. Here, still one third of the certifiers find critical nonconformance by 10 % of their clients. 47 % of the certifiers find this 10 % nonconformance rate again in re-certification audits.

Figure 26

Proportions of certification audits in which 'critical nonconformance' is found

Data supplied by certifiers



The most important nonconformances the certifiers find revolve around the following requirements of the standard:

Figure 27

'Critical nonconformance' in ISO 14001 implementation by German organizations

Findings by certifiers in ISO 14001 audits

Critical nonconformances more than10 mentions		Mentions	Percentage (n=20)
1.	Legal and other requirements (clause 4.3.2)	16	80%
2.	Environmental aspects (clause 4.3.1)	14	70%
3.	Objectives and targets (clause 4.3.3)	12	60%
4.	Environmental management system audit (clause 4.5.4)	11	55%
5.	Training, awareness and competence (clause 4.4.2)	10	50%

Deficiencies in handling legal and other requirements (subclause 4.3.2 of ISO 14001) top the nonconformance list. Certifiers especially find non-compliance with legal requirements or that legal requirements management does not meet the requirements of the standard (identification of relevant environmental laws and regulations, implementation and control, tracking of legal requirements).

Often, there are problems with the standard requirements regarding environmental aspects (subclause 4.3.1) – in some instances, not all significant environmental aspects are identified, characterized and evaluated appropriately; in others, no connection is made between the significant aspects and operational control.

Judging from the nonconformance found, the users also have problems with the requirements regarding objectives and targets (subclause 4.3.3). In some cases, objectives are rated as inadequate because targets are not specified sufficiently, the organization's environmental policy and significant environmental aspects are not taken into account, no continual improvement process is apparent or the whole policy-objectives-programme-review control circuit does not work.

The certifiers base their work on the (internal) environmental management system audit (subclause 4.5.4). Often, though, there are faults in the auditing process which can be due to the fact that the audit is not understood as a method, is conducted with too little focus on environmental aspects or too superficially, inappropriate auditing procedures are chosen or the necessary independence of auditors is lacking.

Finally, the area of training, awareness and competence (4.4.2) is a weak point often found by the certifiers. Partly, the necessary training is not conducted, partly the competence or the necessary awareness of staff does not exist and partly there is a general lack of integration and motivation of staff.

Beyond these main nonconformances, the following elements are mentioned sporadically (between 4 and 8 answers each): operational control (4.4.6), management review (4.6), structure and responsibility (4.4.1), emergency preparedness and response (4.4.7) and nonconformance and corrective and preventive action (4.5.2).

The underlying reasons for this are: detected nonconformances in environmentally relevant processes, problems with the management review especially regarding its informative value and its quality of actually activating top management, faults regarding responsibilities (management representative), weak points regarding emergency analysis and preparedness as well as insufficiently implemented and functioning corrective actions.

III.2.3 Problems relating to lack of clarity and compatibility

Given the focus of the revision defined by ISO TC 207, questions relating to possible lack of clarity within ISO 14001 and compatibility of ISO 14001 with ISO 9001 are at the centre of attention in both the revision process and the present study.

The survey sought not to limit the expected criticism, ideas and suggestions for improvement regarding these aspects to a catalogue of pre-defined answers. Structured questions with pre-defined answer categories have the advantage of being easy to answer and analyse. The participants, though, cannot voice their views directly. They cannot set their own focus and introduce new aspects.

For these reasons, there were two open questions in the questionnaire, i.e. questions without pre-defined answers. Firstly, the "lack of clarity" and "compatibility problems" of ISO 14001 were queried. Secondly, the participants were asked at the end of the questionnaire to express "other wishes and comments".

Out of the 563 **organizations** covered by the survey, 300 participants took the opportunity to comment openly on lack of clarity and compatibility, and gave 395 answers with a total of 795 comments.[40]

The comments were subsumed and counted under generic headings. This is the only way to generate universal statements and findings. While the single, individually formulated comments 'disappear' under these generic headings, they are nonetheless the 'backbone' of the interpretation of the results and are thus present in the evaluation and recommendations.[41]

There were 82 comments from the **certifiers**. 37 of these were general comments and 45 clause-specific comments regarding lack of clarity of ISO 14001 and its compatibility with ISO 9001.

Comment by survey respondent:

"... it is essential to align 14001 with 9001:2000 (in its new, process-focused version)!"

[40] Cf. the overview of comments by certified organizations in the annex.
[41] The individual suggestions and comments have been passed on to NAGUS, the DIN committee responsible for the ISO 14001 revision process.

General comments

The following table shows the categories of general comments which were made by the participants in ISO 14001 certified **organizations** regarding lack of clarity of ISO 14001 and its compatibility with ISO 9001.

The general comments show that there are users who have no problems with the clarity and compatibility of the ISO 14001 standard. It becomes clear as well, though, that the majority of the participants had some (critical) comments regarding these issues.

Comments range from criticism regarding language ("poor German translation") over the wish for more concreteness ("too general") to specific suggestions ("more examples and support for interpretation requested"); some contradict others ("abridge" – "elaborate"). Sometimes just explanation is requested, regardless of wording. For instance, the meanings of "shall", "shall not", "should", "should not" in their German translations do not seem to be clear to all of the users.

The frequent general request for more description and support for interpretation can be met to a large extent by ISO 14004 – which is also under revision at present – as a general guideline. In the view of the organizations, the annex and specific references to ISO 14004 and other standards remain matters to be tackled within ISO 14001.

The comments on the compatibility of ISO 14001 with ISO 9001[42] make clear that compatibility is, on the one hand, a key issue for the users and, on the other hand, the question of compatibility has long presented itself in practice as a general issue of integration:

Often, an alignment of the stan-

Figure 28 **General comments on problems of clarity in applying ISO 14001 and problems of compatibility with ISO 9001**

Mentions by organizations

Comments		Mentions multiple	Percentage (n=260)
1.	Text of ISO 14001 and lack of clarity	99	38%
2.	Compatibility of ISO 14001 with ISO 9001	73	28%
3.	For and against integration	71	27%
4.	Explicitly no problems of clarity or compatibility	17	7%

[42] The participating organizations generally referred to the currently valid version ISO 9001:1994, which is used in practice; only few comments referred to the new version ISO 9001:2000.

dards is desired, be it an alignment of structure and clause numbering or be it the terms used or the process structure. Partly, the requests go beyond this to the demand to take over several clauses of ISO 9001 without changing the wording. In addition, cross-references between the standards are suggested.

system' is the goal while others see the danger that existing differences and foci might be blurred.

Next to general demands for a more comprehensible language and an even clearer structure of the standard, the **certifiers** made a few comments on the question of compatibility. According to them, difficulties in

Comment by survey respondent:

"... textual clarity: We found no significant weaknesses."

Environmental management and quality management (and the standards used) or their compatibility or incompatibility are by no means the only issues for users. Now, the concern is to integrate entrepreneurial tasks (environmental, health and safety, security etc.) into the existing management system. The standards should at least not stand in the way of these issues of integration. But they should also not pre-empt specific decisions for integration, as the responses "for and against integration" underscore. For some, the 'integrated management

combining ISO 9001 and ISO 14001 mainly arise from the different structure ("structure", "procedural structure", "same contents not in the same places") and the partly differing terminology ("different terms for the same contents"). In the view of the certifiers, alignment should be sought here.

Clause-specific comments regarding lack of clarity

In addition to general comments, the participating organizations made concrete comments (n=206) regarding the lack of clarity of specific clauses of the standard. These are summarized under headings in the following list, and then discussed on the following pages, in juxtaposition to the original wording of ISO 14001.

The list shows that the definition of and specifications concerning "environmental aspects" (clauses 3.3 and 4.3.1 of the standard) were mentioned particularly often. There is a relatively large need here to provide clarification and delimitation of this term, e.g. vis-à-vis "environmental impacts".

Comment by survey respondent:

"...service providers have trouble interpreting the terminology of the standard. These terms are largely oriented to manufacturing companies. There is a need in many cases for re-interpretation for service providers."

Figure 29 **Comments on problems of clarity in applying ISO 14001**

Mentions by organizations

	Comments on specific clauses of ISO 14001 (more than 10 mentions)	Mentions multiple	Percentage (n=206)
1.	Environmental aspects (clause 4.3.1 = requirement)	27	13%
2.	Operational control (clause 4.4.6)	19	9%
	Environmental aspects (clause 3.3 = definition)	19	9%
4.	Objectives and targets (clause 4.3.3)	13	6%
5.	Management review (clause 4.6)	12	6%

Environmental aspects
Clauses 3.3 and 4.3.1 of ISO 14001

Excerpts from the text of ISO 14001:

"... 3.3 Environmental aspect:
element of an organization' s activities, products or services that can interact with the environment
Note:
A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact. ...

Comment by survey respondent:

"... the definition of 'significant environmental aspect' is empty of meaning, examples would be useful (in conjunction with 3.8); the same applies to 4.3.1."

... 4.3.1 Environmental aspects
The organization shall establish and maintain (a) procedure(s) to identify the environmental aspects of its activities, products or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in setting its environmental objectives.
The organization shall keep this information up-to-date. ..."

Comment by survey respondent:

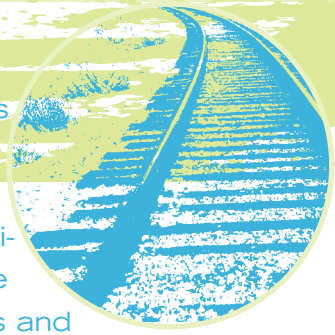
"... on clauses 3.3/3.4, there is a lack of criteria for determining which environmental aspects are relevant/significant and therefore must be taken into consideration."

In the view of many users, the specification of how to identify "environmental impacts" is generally "unclear". In particular, users ask what the underlying "significant environmental impacts" actually are, and in what detail the environmental aspects to be evaluated must in fact be identified. They ask themselves how suppliers or sub-contractors are to be treated and how legal requirements are to be applied in this respect. They miss criteria and examples, although the text of ISO 14004 provides explanations. They wish that the environmental aspects to be taken into consideration were specified or recommended. To many, the term "environmental aspects" (clause 3.3 of ISO 14001) is unclear in itself.

Operational control
Clause 4.4.6 of ISO 14001

Excerpt from the text of ISO 14001:

"... 4.4.6 Operational control



The organization shall identify those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets. The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions by

a) establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets;

Comment by survey respondent:

"... the description of environmental targets and of the environmental programme given by the standard is woolly!"

b) stipulating operating criteria in the procedures;

c) establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicating relevant procedures and requirements to suppliers and contractors. ..."

The section on "Operational control" (clause 4.4.6) is a further focus of criticism. Users miss advice, examples and recommendations that might clarify which operations are to be controlled in the first place. The clause is evidently "not formulated clearly enough", "misleading" in parts for some, outlined "too briefly", "difficult to understand" or formulated "impractically". Survey respondents wish to see a more detailed description or examples and suggestions of relevant operations.

Comment by survey respondent:

"... on 4.4.6, operational control: Simple, short sentences, please – not complicated, multi-clause ones!"

Objectives and targets
Clause 4.3.3 of ISO 14001

Excerpt from the text of ISO 14001:

"... 4.3.3 Objectives and targets

The organization shall establish and maintain documented environmental objectives and targets, at each relevant function and level within the organization.

When establishing and reviewing its objectives, an organization shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties.

Comment by survey respondent:

"... in ISO 14001, management goals are joined by environmental targets: These are exaggerated demands that are not appreciated sufficiently by many staff members!"

The objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution. ..."

The complex surrounding "Objectives and targets" (clause 4.3.3) appears problematic: The terms themselves are felt to be "not self-explanatory" and the pair of terms "difficult to communicate"; there is a lack of sufficient characterization of the required "scope"; it is unclear "in what detail" everything must be presented and documented, and where the borderline to the environmental programme is. Some respondents propose merging this clause with that on the environmental programme. In addition, reservations are voiced regarding the goal of continual improvement – is this only about system improvement, and how long can environmental performance be improved continually?

Comment by survey respondent:

"... 'Zielsetzungen und Einzelziele' is a typically German translation of standard wording that seeks to embrace everything in the title and thus becomes incomprehensible. 'Vorgaben und Ziele' would be a better rendering of 'objectives and targets' ..."

Management review
Clause 4.6 of ISO 14001

Excerpt from the text of ISO 14001:

"... 4.6 Management review

The organization' s top management shall, at intervals that it determines, review the environmental management system, to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. This review shall be documented.

The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management system, in the light of environmental management system audit results, changing circumstances and the commitment to continual improvement. ..."

Comment by survey respondent:

"... on clause 4.2, environmental policy: What does 'appropriate' mean? How do I review this?"

"Management review" (4.6) is unclear to many respondents in terms of its "scope" or wording. Some view this requirement as "superfluous", some call for clear demarcation: What is (terminologically, too) the relationship between the internal audit, the management review of the management system and the regular review of environmental policy?

Other clauses criticized, but less frequently, are: structure and responsibility (4.4.1), environmental impact (3.4 under the general heading of "Definitions"), environmental management programme(s) (4.3.4), legal and other requirements (4.3.2), environmental management system audit (4.5.4) and documentation (4.4.4). This includes the very concrete question, posed by several respondents, of which position the management representative must have. Must he be appointed by top management, or must he be a member of top management, and how can small enterprises proceed here?

Certifiers see a lack of clarity (for the organizations to be certified) in this order: environmental aspects (4.3.1 under the general heading of "System requirements"), operational control (4.4.6), legal and other requirements (4.3.2), objectives and targets (4.3.3 under the general heading of "System requirements") and emergency preparedness and response (4.4.7). In all these aspects, the argumentation of the certifiers is similar to that of the organizations, and concretization is considered helpful.

Comment by survey respondent:

"... the German term for 'environmental performance', 'umweltorientierte Leistungen': Who dreams up this kind of terminology?"

Comments on the compatibility of specific clauses

Compared to the number of general comments and clause-specific comments on lack of clarity, there are less clause-specific points of criticism and suggestions regarding compatibility.

Out of the 295 comments by participating organizations on the open question about clarity and compatibility problems, 10 (=3%) explicitly stated good compatibility, 21 (=7%) responded by making general comments on compatibility and 23 (=8%) made clause-specific comments. If the specific comments of the certifiers are added, certain key issues can be identified.

The following table lists the issues commented upon by both the certified organizations and the certifiers.

Further specific comments by the organizations were on "objectives and targets" (4.3.3), "records" (4.5.3), "environmental management system documentation" (4.4.4), "document control" (4.4.5), "nonconformance and corrective and preventive action" (4.5.2), "organization" (3.12), "environmental policy" (4.2), "environmental management programme(s)" (4.3.4), "environmental management system audit" (4.5.4); in addition, the participating certifiers mentioned "environmental aspects" (4.3.1) and "implementation and operation" (4.4).

In all these clause-specific comments, impeded compatibility or a need for harmonization with ISO 9001 are mentioned only in a very general manner.

Overview of clause-specific criticism

The following table highlights those clauses of ISO 14001 which received the most (critical) comments. Regarding both "nonconformance"[43] and "lack of clarity", five clauses of the standard were criticized more than ten times. Due to the generally small degree of clause-specific criticism on "(in)compatibility", those three clauses are highlighted which were mentioned by both the ISO 14001 certified organizations and the certifiers.

Figure 30 **Comments on problems of compatibility with ISO 9001**

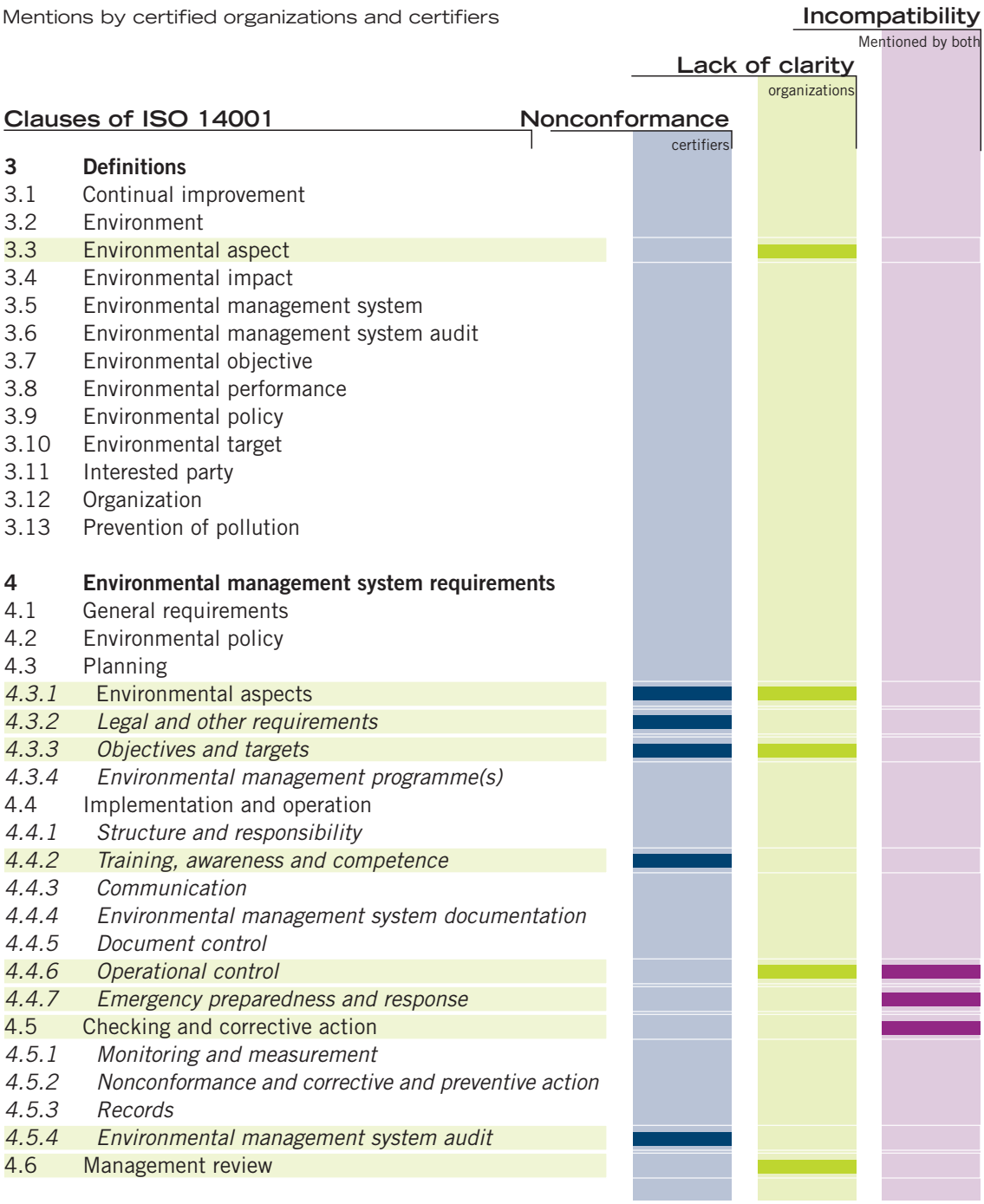
Mentions by organizations and certifiers

Comments on specific clauses of ISO 14001	Mentions Organizations	Mentions Certifiers
1. Operational control (clause 4.4.6)	5	1
2. Emergency preparedness and response (clause 4.4.7)	2	2
3. Checking and corrective action (clause 4.5)	2	1

[43] Cf. the section on nonconformance in the present report.

Figure 31 **Nonconformance, lack of clarity, incompatibility: The criticized clauses of ISO 14001**

Mentions by certified organizations and certifiers



III.2.4 Necessary tools

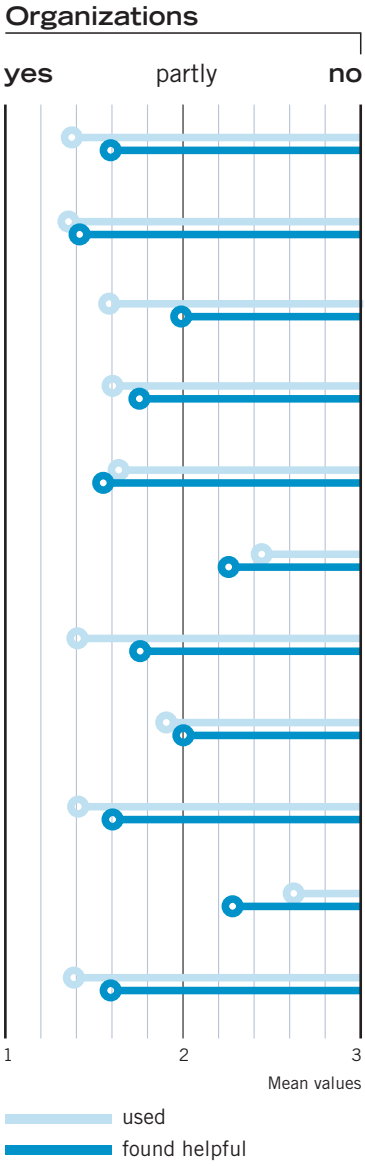
Setting up an environmental management system is a demanding and resource-intensive task. Consequently, external experts are often consulted or other tools employed.

The following overview shows which kinds of support and tools the surveyed organizations have used and whether they have found them helpful.[44]

The official German edition of the standard, DIN EN ISO 14001, includes the text and the annexes in German and English. Almost all participants in the survey have used the text of the standard. Those that have not used the ISO 14001 standard (still 18%) must have relied on external consulting or gained ISO 14001 certification 'in passing' within the context of their EMAS participation. This is underlined by the high degree of use of the EMAS Regulation (64%) (which, moreover, is available free of charge). In comparison, the guidance standard ISO 14004 is used less frequently; not even half of the organizations (49%) have made use of it.

Even general publications, guidelines and literature are used more often; in addition, lectures, seminars and training are attended frequently. The support of associations or chambers, financial support or specific

Figure 32 **Support and tools**
used or found helpful when implementing ISO 14001 – view of the organizations surveyed



[44] To calculate the means only the valid answers could be used. It thus has to be accepted that there is a (slight) bias in the overview because the number of valid cases varies (slightly).

software are used relatively rarely. In comparison, freelance consultants are drawn upon often: 64 % of all participating organizations have made use of a consultant. The consultants are generally seen as helpful, in some cases even indispensable as some comments have shown. This indicates that the practical application of environmental management systems is a demanding task. It also supports the comments of some respondents that to implement ISO 14001 it is essential to use an 'interpreter'.

For the **certifiers**,[45] next to using standards and other publications the "exchange with colleagues" plays an important role. They engage in this frequently and find it very helpful.

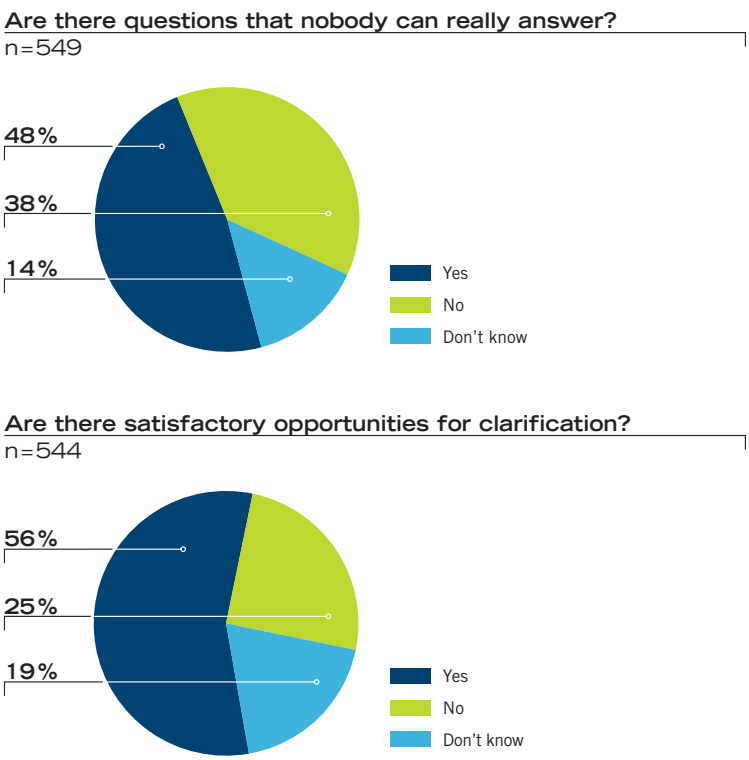
III.2.5 Lack of answers to questions

Unresolved questions suggest difficulties in understanding, problems of definition and a need for interpretation. Almost half of the **organizations** have experienced questions concerning ISO 14001 which could not be resolved unequivocally. Moreover, a large part of the organizations finds that the possibilities to receive satisfying answers to their questions about the standard are insufficient. There is a definite need in this area.

Figure 33

Frequency of unresolved questions concerning ISO 14001 and evaluation of available opportunities for clarification

View of organizations surveyed



The comments made in this regard call for e.g. a "hotline" or an "information desk". It would presumably be crucial that such an information office is authorized to answer questions on the interpretation of the standard.[46] Especially the **certifiers**, half of which are of the opinion that the existing possibilities are not sufficient, could benefit from such an institution.

[45] The certifiers were given a slightly modified list of possible answers.
[46] For Germany, NAGUS would be responsible, which neither propagates this, nor develops a list of answers to frequently asked questions, nor has defined a question-answer procedure (such as e.g. the American National Standards Institute has).

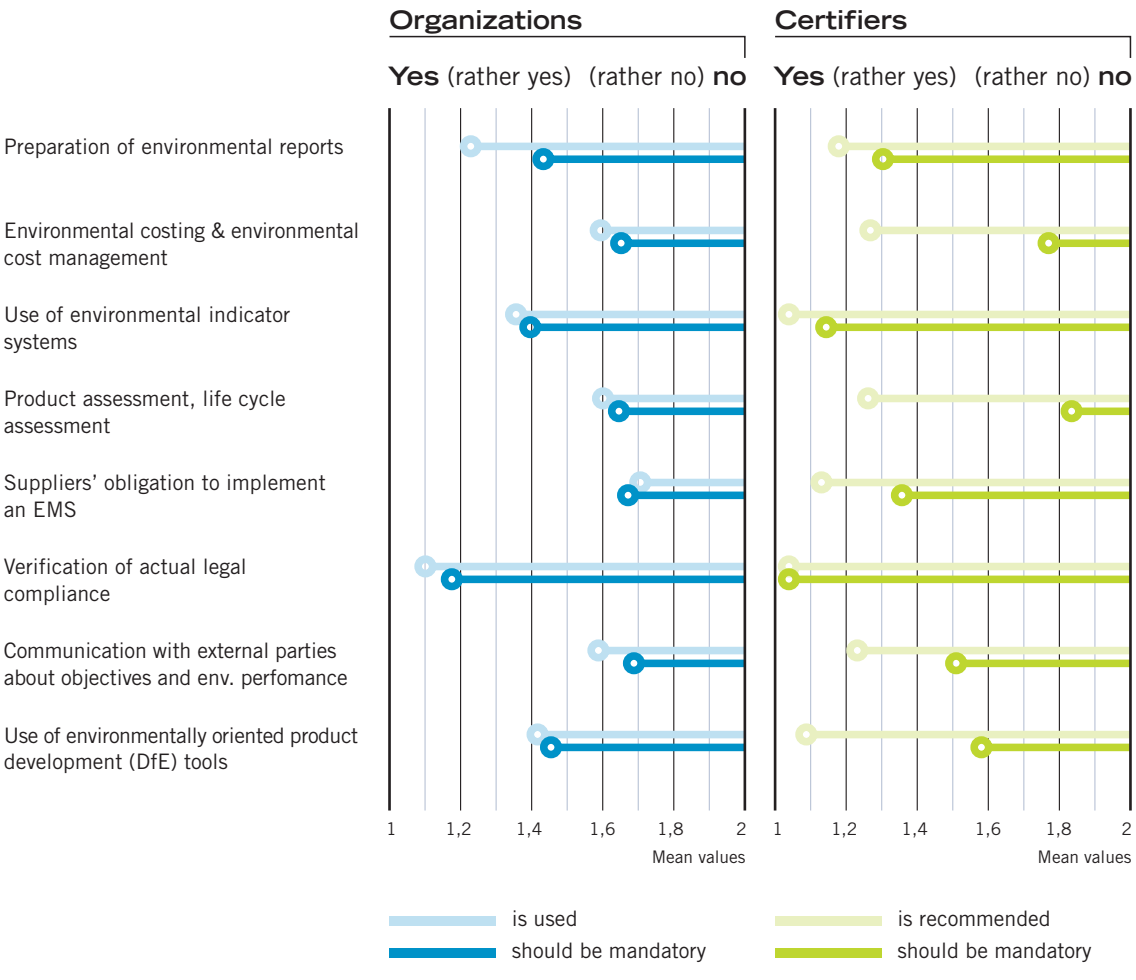
III.3 Evaluation

III.3.1 Further development of ISO 14001 requirements

The environmental management standard ISO 14001 reflects a worldwide compromise based on the state of the art of 1996. In the meantime, rapid development of concepts, instruments and practical experience with environmental management systems and tools has taken place in Germany and many other countries across the world. Additional standard requirements are not on the agenda of the current revision process. Nevertheless, even small adjustments or terminological considerations should be embedded in a forward-looking overall approach which includes elements that in some instances are already common practice. This is highlighted by the following figure[47] which shows measures implemented by German organizations in their environmental management.

Figure 34 **Measures**

Environmental management measures implemented and recommended, and their rating as desirable additional requirements of ISO 14001 – from the perspective of certified organizations and certifiers



[47] While the question on the practical application of certain measures was to be answered clearly with "yes" or "no", the question regarding introduction as a compulsory element sought to identify tendencies through the answers "rather yes" and "rather no".

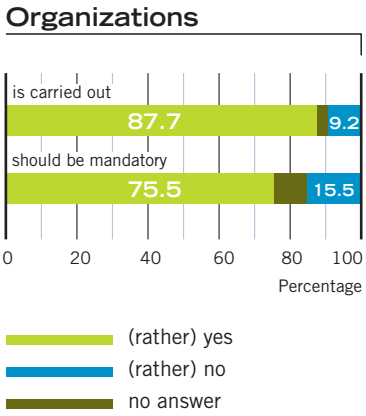
For the participating **organizations**, the following measures are neither of great practical relevance, nor are they an issue for introduction as a mandatory element of ISO 14001: "environmental costing & environmental cost management," "product assessment & life cycle analysis" and "suppliers' obligation to implement an environmental management system."

"Environmental indicator systems", "communication with external parties" and "application of DfE tools" are already practised and there is no distinct position against their introduction as a mandatory element, with one exception: A compulsory, externally oriented communication of targets and environmental performance, which goes beyond environmental reporting, is rejected by a strong majority (86 % of the answers) as a mandatory element of ISO 14001.

"Verification of actual legal compliance" and "preparation of environmental reports", although not mandatory measures, have already been put into practice by many of the organizations. To the question whether legal compliance auditing should be a mandatory part of ISO 14001, 75.5 % responded "rather yes" and 15.5 % "rather no".[48] In practice, this seems to be largely matter-of-course[49], as laws and regulations must be complied with in any case, and one purpose of environmental management systems is to ensure legal compliance.

Figure 35 **Legal compliance** in practice and its evaluation as an additional ISO 14001 requirement – perspective of certified organizations

Verification of actual legal compliance



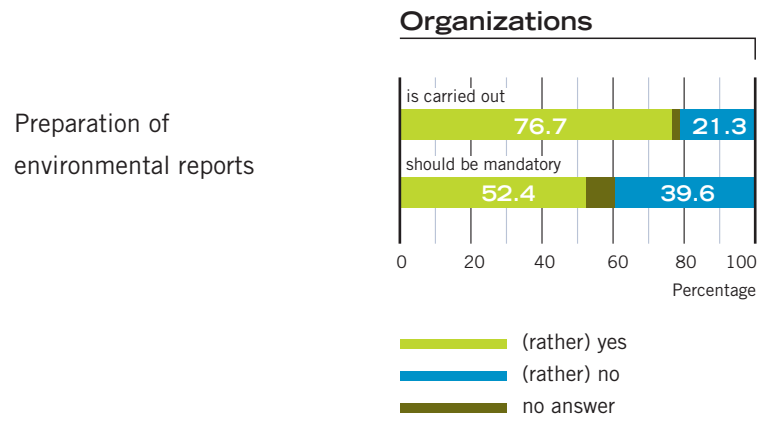
While most respondents agree on the question of "legal compliance", views on whether the "preparation of environmental reports" is a desirable element of ISO 14001 are not as unequivocal. Nonetheless, 76.7 % of the organizations surveyed prepare environmental reports (for instance in the form of the EMAS environmental statement); and more than half tend to support the introduction of this element as mandatory in ISO 14001 (this also holds for 47.3 % of the organizations certified only to ISO 14001).

[48] Cf. preceding footnote.

[49] The discussion on legal compliance (especially in Germany) is mostly about the question of to what extent a certificate confirms compliance with all relevant regulations and, moreover, whether it can be sufficient to establish and certify system procedures or whether the actual compliance with relevant regulations has to be audited as part of the requirements for certification.

Figure 36 **Environmental reporting**

in practice and its evaluation as an additional ISO 14001 requirement – perspective of certified organizations



The **certifiers** clearly recommend the application of all measures listed. They support making mandatory the "preparation of environmental reports", the "use of environmental indicators", a "suppliers' obligation to implement an environmental management system" and the "verification of legal compliance". They rather reject, though, mandatory environmental costing or obligatory product-related measures within the ISO 14001 system.

In order to broaden the perspective on future standard development, the participants were presented with further, more basic aspects of environmental management with respect to the further development of ISO 14001. Almost all principles established in ISO 14001 (see the following overview) were evaluated positively, i.e. were judged by most organizations and certifiers as important, with one substantial exception: The application of demanding technological standards (e.g. "best available technology" or "state of the art of technology")[50] is rated as less important and, from the point of view of the participants, needs (should?!) not be enshrined more firmly in the standard in the future.

In contrast, the respondents deem the following principles as important and deserving support: to integrate environmentally responsible action into all functions and procedures, to integrate all staff and to focus on actual environmental performance and results.

The participating **organizations** are rather reserved regarding the integration of the supply chain and a generally enhanced transparency and external communication.

The **certifiers** – in contrast to the certified organizations – find the consideration of sustainability criteria and the integration of the supply chain into environmental management important and consider that these should be strengthened. Furthermore, they find the guarantee of an independent certification system very important but see no need for further reinforcement.

[50] In Council Regulation (EEC) 1836/93 (EMAS I) the technological specification was the "economically viable application of best available technology"; the revision of EMAS removed this requirement. The level of "best available technology" corresponds to "Stand der Technik" ("state of the art of technology") under German environmental law – cf. Feldhaus, Gerhard: Beste verfügbare Techniken und Stand der Technik, in: Neue Zeitschrift für Verwaltungsrecht, Frankfurt/Main 2001, 20. Jahrgang, Heft Nr. 1, S. 1.

Figure 37 **Evaluation of environmental management principles**

from the perspective of certified organizations and certifiers

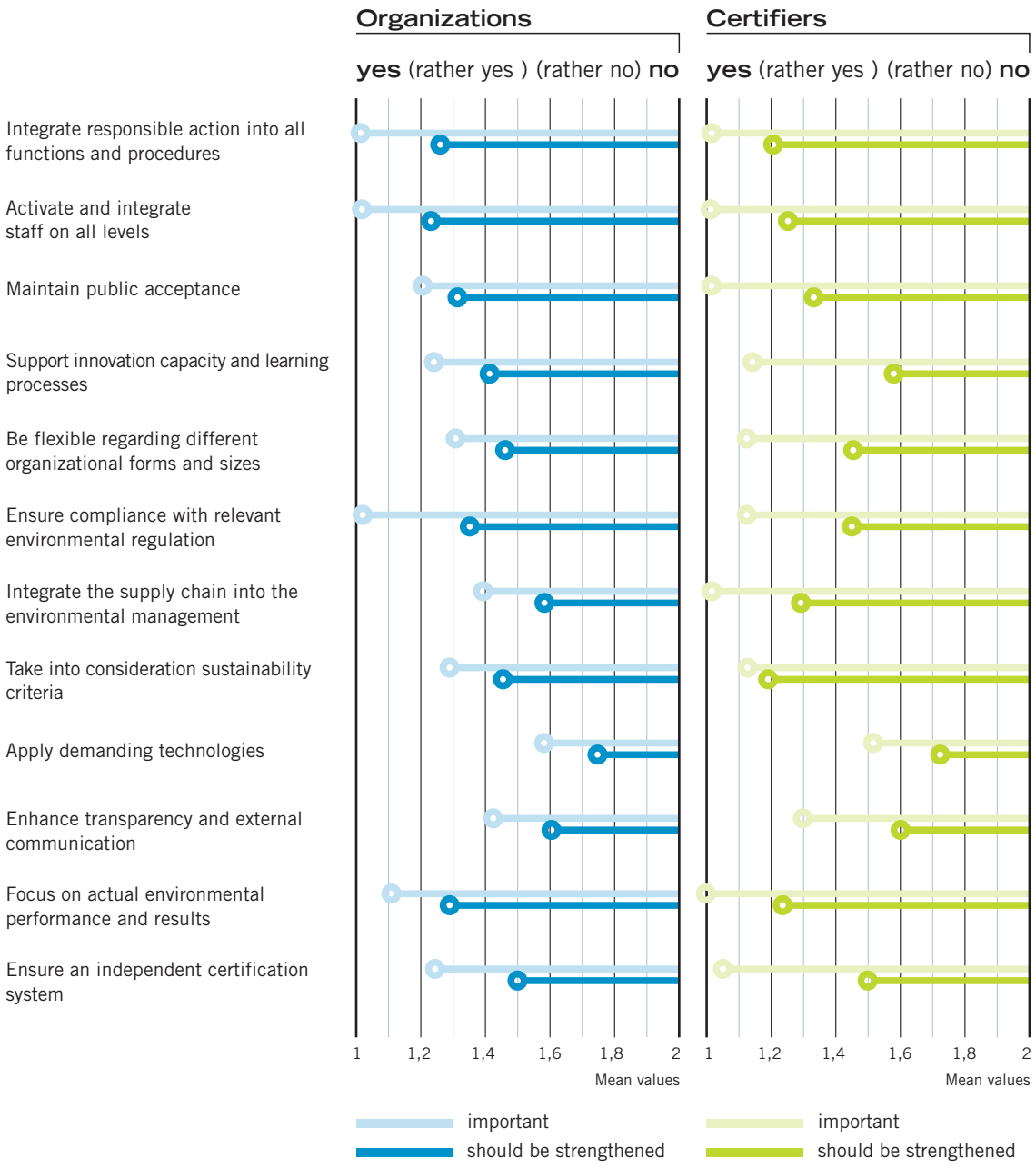
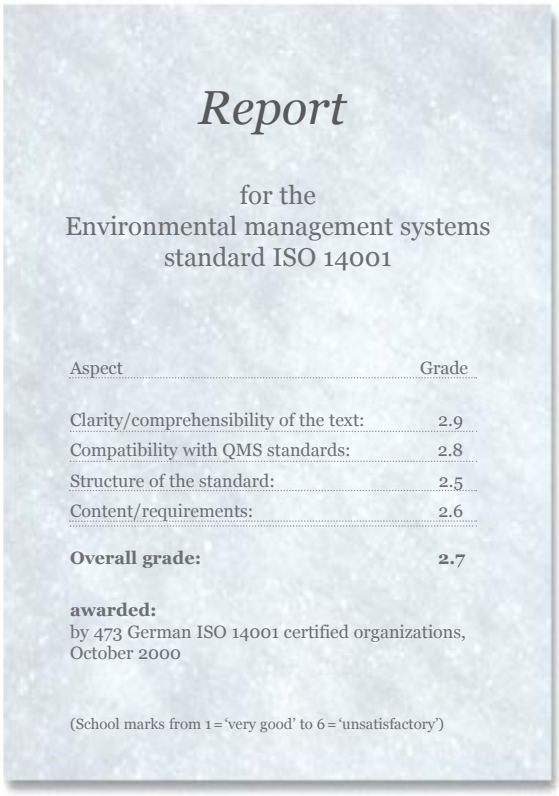


Figure 38



Report

for the
Environmental management systems
standard ISO 14001

Aspect	Grade
Clarity/comprehensibility of the text:	2.9
Compatibility with QMS standards:	2.8
Structure of the standard:	2.5
Content/requirements:	2.6
Overall grade:	**2.7**

awarded:
by 473 German ISO 14001 certified organizations,
October 2000

(School marks from 1 = 'very good' to 6 = 'unsatisfactory')

III.3.2 Overall evaluation

The users in certified **organizations** award ISO 14001 the following report, which is based on German school marks ranging from 1 (very good) to 6 (unsatisfactory), including half grades:

The ISO 14001 standard thus receives a "good-to-satisfactory" mark from the certified organizations. The report given by the certifiers is slightly better, especially because of a more positive judgement of the standard's structure, which was on average awarded a grade of 2.2.

The satisfaction of those using the standard can also be measured by a 'migration quota'. This evaluation indicator is the quota of those organizations that want to continue with certification and those that want to opt out.

If this is not an option for users, e.g. because of client/customer requirements, another way of expressing user satisfaction is the voicing of criticism and suggestions for improvement. Concerning the intention to continue certification, the survey found that:

More than 95% of the participating **organizations** respond to the question about their intention to continue with certification with "yes" (83%) or "rather yes" (12%).

This makes clear that there are permanently good reasons for keeping up an environmental management system according to ISO 14001 and its certification.

Figure 39

Intention of organizations surveyed to continue certification

Will you continue to seek ISO 14001 re-certification in the foreseeable future?

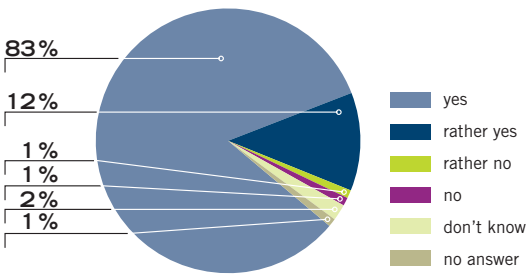


Figure 40

The **certifiers**, too, anticipate a dynamic development of ISO 14001 certifications: The majority expects at least a tripling of certificates by 2005.

Further development of number of ISO 14001 certifications

Estimates by certifiers

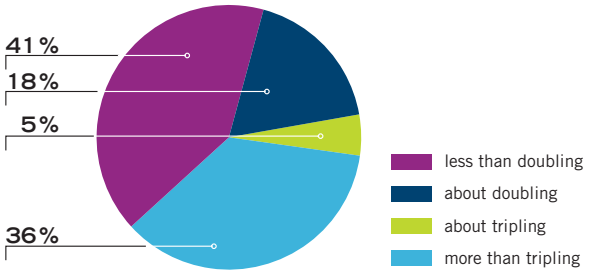


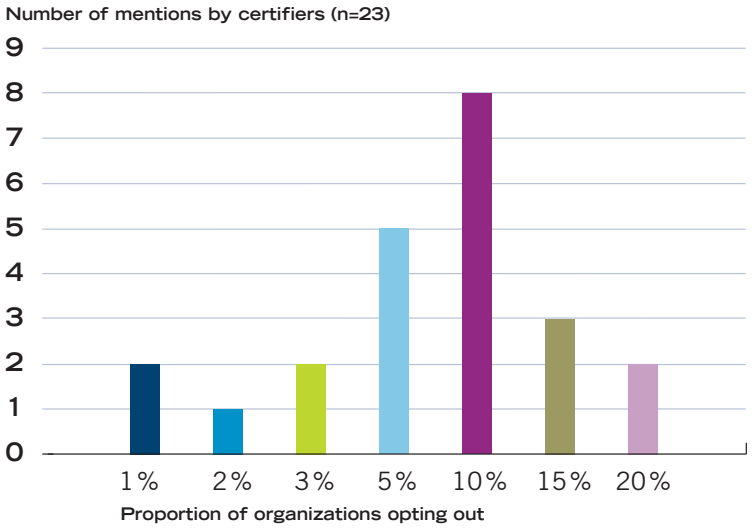
Figure 41

In contrast, the share of organizations opting out is estimated to be low. A majority of certifiers is of the opinion that in Germany, only 10% of the participants, at most, will not opt for surveillance audits and re-certification.

Ultimately, a positive decision in favour of an environmental management system or its certification and re-certification indicates that the advantages of the system outweigh its disadvantages and costs. This does not mean, though, that there is no room for improvement that would increase benefits or reduce costs.

Opting out

Proportion of those opting out of ISO 14001 in the future – estimates by certifiers



III.4 Comments and suggestions

III.4.1 Certified organizations

The comments made by the participating **organizations** underscore that these consider an optimization of ISO 14001 desirable in several respects:

A large portion of these comments (55 responses) refers to suggestions for extending or detailing the requirements of the standard, namely: Mandatory environmental statement/environmental reporting, an initial environmental review, stronger orientation towards performance and results, emphasis on legal compliance, introduction of methods and tools (assessment methods, inventories, eco-controlling, environmental indicators), consideration of the products, of the suppliers, of the risk/insurance situation, strengthening internal communication, obligation to dedicate resources, integration of ISO 14010.

This does not in every case mean that the requirements of ISO 14001 should be raised; it could also mean dropping the additional requirements of EMAS. Central to these comments is probably the desire to have only one system without unnecessary duplication of effort, multiple auditing, terminological confusion etc. – and with national and international acceptance.[51]

Next to this 'factual' argumentation an 'environmental policy' argumentation can be seen in some of the comments: Aligning the standard with EMAS is hoped to support the acceptance of ISO 14001 as a prerequisite to deregulation, and render superfluous or displace EMAS. Some of the participants (17 responses) expressed opposition to additional

Figure 42 **Wishes and other comments of the organizations surveyed**

		Mentions (multiple)	Percentages (n=306)
1.	Extension of standard requirements	120	39%
2.	Wishes regarding more recognition and facilitation	86	28%
3.	Remarks on resource expenditure and costs	42	14%
4.	Wishes regarding certifiers and certification	15	5%
5.	Other comments and wishes	43	14%

Out of the 563 participants, 306 commented. These comments round off the questionnaire. The responses provided on the participants' own initiative partly just confirm statements made in other parts of the questionnaire. In some cases, though, the space was also used to voice "other" comments and suggestions that go beyond the focus of this survey.

The largest complex of responses (120=39%) can be summarized under the heading "extension of standard requirements".

[51] The revision of EMAS has fulfilled this wish to a great extent since EMAS II now contains the environmental management system requirements of ISO 14001.

or higher requirements or an alignment with EMAS.

The wish for stronger recognition and facilitation for ISO 14001-certified organizations forms the second largest complex of issues and was mentioned by 86 of the participants (28 %). This means general demands for more attention and public relations work but also e. g. the possibility of advertising on products. Most of all, though, facilitation in terms of environmental law and regulatory enforcement is desired. Next to this, there is a wish for certification to be recognized positively in the placing of orders and in public procurement. Tax reductions are also mentioned. Furthermore, calls are made to remove the disadvantages due to high German environmental standards or the distortion of competition due to varying environmental standards abroad.

In third place (42 responses = 14 %) are demands to reduce the resource expenditure and financial cost associated with applying the standard and gaining certification. Especially the cost of documentation is often criticized, but also the price of the standard itself and the cost of certification. Regarding the latter, some participants suggest that the annual surveillance audit be removed and that the frequency of external audits be extended.

Wishes regarding certifiers and certificates (15 responses = 5 %) concern more consulting and support by certifiers instead of monitoring and formal inspections. It was also suggested to issue neutral certificates which are independent of the certification body; according to some suggestions, certificates could also include more information about environmental performance and the environmental management system.

Other comments (43 responses = 14 %) refer to a multitude of different suggestions which range from an improved consideration of the situation of small and medium-sized companies to the wish to see German interests represented more strongly in the standardization process and the request to better coordinate surveys in order to minimize the workload for the organizations involved.

III.4.2 Certifiers

The **certifiers** that made comments call for, among other things, the introduction of an initial environmental review when an environmental management system is set up, the use of environmental indicators, an improved measurability of environmental targets and a stronger consideration and evaluation of actual environmental performance. They are in favour of enhanced transparency e. g. through the introduction of (voluntary) environmental reports.

III.4.3 Other interested parties

The following sections present summarized statements derived from interviews with accreditation bodies, labour unions, environmental organizations and associations of German industry.[52]

Comments made by the accreditation bodies

- For the accreditation bodies (TGA, DAU), the revision of ISO 14001 is relevant at most with regard to the admission and supervision of certifiers.

- In this context, those provisions that cover the certification process and the competence of certifiers are more important to the accreditation bodies than ISO 14001.

- The new ISO 19011 standard ("Guidelines on quality and environmental auditing"), which is soon due for publication, should not result in dilution of the requirements placed upon the qualification of EMS certifiers.

- The accreditation bodies see an important market for certifiers in ISO 14001 certification, and are of the opinion that this importance is set to grow; however, the accreditation bodies do not anticipate any major growth in the number of accredited certifiers.

- Because of the increasing demand for information on the number and distribution of ISO 14001 certified organizations in Germany, the TGA is considering setting up a database, as is common practice in other countries.

- DAU, at least, sees no need to align ISO 14001 and EMAS ("We consider EMAS' focus on environmental performance, environmental law and environmental information as an attribute providing special benefits and thus as a mark of quality distinguishing it from other systems"). Nevertheless, compatibility problems – e.g. regarding definitions – are recognized which make an alignment desirable.

[52] Where interviewees had a focus that differed in some respects (e.g. the two accreditation bodies, the two union representatives), the present overview seeks to identify the common points in the statements made.

Comments made by the unions

- Unions see their task in securing the interests of their members in the area of worker health and safety as well as environmental and neighbourhood protection.

- For them, an environmental management system safeguards these interests if basic substantive legal requirements and environmental and health protection standards are laid down as requirements upon the management system and are verified in order to achieve improvements going beyond minimum statutory requirements.

- Environmental management systems according to ISO 14001 must not be used to undermine more demanding, effective and legally binding instruments and standards.

- ISO 14001 contains weak points: During certification, compliance with national environmental regulations is not verified, the organizational focus makes it possible that only parts of sites are certified and problematic sites excluded, and there is a lack of orientation to performance standards or technology standards (e.g. best available technology). As a result, arbitrary improvements, even such below the minimum legally permitted level, do not stand in the way of certification.

- Provisions regarding the participation of staff are insufficient in ISO 14001; clear participation requirements have to be established – this means access to environmental information, sufficient qualification and real opportunities for participation.

- The revision process should be used to establish a high level for ISO 14001: Part of this is the elimination of the weak points mentioned. In addition, the participation of the relevant societal groups in the standardization and revision process has to be ensured, i.e. next to companies and business associations, environmental organizations, unions, consumer organizations and representatives of science have to be involved in a binding way and with equal rights (on a worldwide scale if possible).

- An advantage of ISO 14001 is that – if applied worldwide – it establishes the organizational framework for the improvement of environmental protection and that it is part of a series ('tool box') which can help bring about actual improvements. ISO 14001 applied on its own and minimally is not sufficient.

Comments made by the environmental organizations

- Exemplary corporate environmental action is expressed in a consistent, credible integration of environmental protection into corporate strategy as well as in concrete, environmentally sound outcomes, products, services and concepts.

- Against that background, an environmental management system according to ISO 14001 can only be a very first step.

- In addition, the environmental management system according to ISO 14001 is not designed for communication and external effect.

- The European environmental management system (EMAS) appeals more to the public and environmental associations. It goes beyond ISO 14001 regarding performance requirements and external orientation and is thus a model for the further development of ISO 14001.

- ISO 14001 is only a management system: No concrete minimum standards are demanded (environmental performance, state of the art technology). In addition, it does not ensure compliance with environmental law. Nevertheless, it does integrate environmental aspects and environmental instruments into business on a daily basis.

- The weakest point is the lack of an external effect: There is no (normally matter-of-course) obligation to give account of the use of natural resources and to support environmentally friendly principles via a verified environmental statement.

- The achievement orientation, the assurance of compliance with relevant environmental regulation, the participation of staff as well as the external communication and provision of environmental information should all be strengthened. Furthermore, product-oriented environmental management should be intensified.

- In the process, a stronger, equal representation of environmental organizations – especially on an international level – is to be supported.

Comments made by the associations of Germany industry

- For the chambers of commerce, environmental management and environmental management systems are very important issues because we are interested in making the achievements of commerce and industry for environmental protection transparent.

- The DIHT (Deutscher Industrie- und Handelskammertag), the Association of German Chambers of Industry and Commerce, supports companies in setting up ISO 14001 and/or EMAS although the system as such says nothing about the results achieved: Important benefits of an EMS can be realized through EMAS as well as through ISO 14001.

- The DIHT thinks that ISO 14001 as a world standard is important for the dialogue on corporate environmental protection. The standard creates a platform for the continual improvement of corporate environmental protection. The exchange of experience, best practice etc. is easier when the basis – the management system – is the same.

- The strongest point of ISO 14001 is the proximity in its procedures to the quality management systems and also the comparatively large openness of the system for individual implementation. Finally, the worldwide validity and thus the meaning of the certificate is very important for users.

- For the medium-sized companies, the comparatively high 'paper burden' of the system is its greatest disadvantage – also compared to EMAS I.

- The DIHT would wish the ISO 14001 standard to be stable for a lengthier period in order to evaluate the experience from two or three auditing cycles, perhaps in five years time. In the medium-term, though, the question will arise whether specific system standards will still be justified or whether the future belongs to an integrated management system.

III.4.4 Findings of other surveys and international experience

Results of the survey concerning ISO 14001 revision, conducted by the Federal Association of German Industry (Bundesverband der Deutschen Industrie, BDI) and the Association of German Chambers of Industry and Commerce (DIHT)

In preparation for the upcoming revision of ISO 14001:1996, the BDI and the DIHK, in cooperation with the German Association of Chemical Industries (Verband der Chemischen Industrie, VCI), launched in late 1999/early 2000 a survey among the users of the standard in German industry. This concentrated essentially on the issues that had emerged in the revision process within ISO TC 207 SC1 at that point in time. Some 400 companies participated in the survey.

Issues and findings of the survey

Compatibility of ISO 14001 with ISO 9001?

The responses of German industry confirmed the work undertaken at the ISO level. The companies strongly support an improved alignment of the ISO environmental and quality management system standards, in order to enhance compatibility between the environmental management standard and the ISO 9000ff series. This does not imply a call for integration by merging the two to create one management system standard.

Legal compliance: Is there a need for amendment?

Companies in Germany have an open attitude to the issue of legal compliance. They are willing to furnish proof that their operations comply with the law, and are in favour of concretizing ISO 14001:1996 in accordance with EMAS provisions. Indeterminate and negative responses do not mean that these companies do not aim to comply with environmental law. They rather do not expect 'improved' standards to yield improved compliance, and therefore do not anticipate any value added by the work of ISO TC 207 SC1.

Initial environmental review: The European EMAS scheme already provides for an initial environmental review as the first step towards setting up an environmental management system. Most (50%) of the companies surveyed are in favour of introducing this system element in ISO 14001, too.

External communication (reporting) as a 'new' element of ISO 14001?

This issue is already contained today in ISO 14001:1996. The growing interest at ISO level in addressing environmental reporting prompted the German industry associations to include this issue in the survey. A majority (167) of the companies reject a modification of ISO 14001:1996. However, a considerable number (142) view such modification positively. The industry associations interpret this as a reflection of different company sizes. On the one hand, environmental reporting is established practice in many companies; on the other hand, sobering experience has already been made with standardized reporting pursuant to EMAS (lack of interest among the public).

Focus ISO 14001 more strongly on product design for the environment (DfE)?

In the industry responses, approval slightly exceeds rejection (158:147). Particularly considering the current European debate on IPP (integrated product policy), deliberations on developing environmental management system standards in this direction come as no surprise to the industry associations. This issue was already deliberated in detail in Europe during the EMAS revision process (from 1997 to 2001), and has been included in EMAS II.

Integrating the ISO 14031 (environmental performance evaluation) guideline?

A large majority of German industry (65%) rejects integration of the ISO 14031 guideline. The companies do not call into question the issue of environmental performance evaluation as such, but doubt whether its standardization within ISO 14001 can bring the issue forward – after all, this was debated at length in the course of work on ISO 14031.

German Federal Environmental Agency (Umweltbundesamt, ed.): Betrieblicher Umweltschutz mit System – EG-Umweltaudit in Deutschland. Erfahrungsbericht 1995 bis 1998 (Systematic corporate environmental protection – EC eco-auditing in Germany: Experience from 1995 to 1998), Berlin 1999

This report is based on a survey of all EMAS-registered German sites until the end of 1998 (1806 participants, return rate 70%, 1228 questionnaires analysed). Amongst others, the following issues were examined: Reasons for participation, cost-benefit ratio of participation, environmental statement, experience with the environmental verifier, further support, wishes regarding improvement, relationship between EMAS and ISO 14001.

Partly, there is a strong correspondence between the results of this report and those of the present survey. This does not come as a surprise since a considerable proportion of EMAS companies is also certified to ISO 14001. For the participating EMAS companies, worldwide validity, positive effects of combining the two systems, good compatibility with ISO 9001 and greater practicability and user friendliness are points that determined the decision to opt for additional ISO 14001 certification. Decisions not to opt for additional ISO 14001 certification are explained by the duplication of effort that this would involve, and various pro-EMAS arguments such as greater public-relations impact or stronger focus on performance.

Dyllick, Thomas; Hamschmidt, Jost: Wirksamkeit und Leistung von Umweltmanagementsystemen: eine Untersuchung von ISO 14001-zertifizierten Unternehmen in der Schweiz (Effectiveness and performance of environmental management systems: A survey of ISO 14001 certified companies in Switzerland); Zurich: vdf, 2000

This Swiss survey focuses on the reasons for as well as environmental and economic effects of the implementation of environmental management systems. For this, a written survey of ISO 14001 certified organizations in Switzerland was conducted in 1999 and 158 questionnaires analysed.

One result of this study is the uncovering of a "strategic deficit" of the ISO 14001 standard. This is an important result within the revision context, since it concerns the debate on the terminology, delimitation and purposefulness of the standard requirement 4.3.3 "Objectives and targets", which plays a role in the present survey (see the section on clause-specific lack of clarity) as well as in the standardization committees' discussions. Combining these terms and requirements would certainly not serve to strengthen the strategic management level, nor would it serve clarity and systematic structure. Indeed, a stronger emphasis on the strategic environmentally oriented setting of targets and their integration into general corporate strategy could help remedy both the strategic deficit and the lack of clarity regarding terminology.

Wehrmeyer, Walter (ed.): ISO 14001 – Case Studies and Practical Experiences, Greener Management International – The Journal of Corporate Environmental Strategy and Practice, Issue 28, Sheffield, 1999

The case studies presented highlight the breadth of possible applications: from group certification of 30 SMEs to the global certification of a globally operating bank. One contribution emphasizes the comparatively greater stringency, performance and communication focus of EMAS. Other studies deal with the inclusion of environmentally oriented product development and of suppliers and other interested

groups, with the application of environmental indicator systems (ISO 14031), the requirement of better provision of environmental information and the perspectives of environmental management systems within the context of sustainable development.
The characterization of ISO 14001 by the editor as the "Model T among the environmental management systems: not the most progressive but affordable" is confirmed by the case studies. One of the main problems for users is the fact that with the intended general applicability shown impressively in the case studies, the concrete character of ISO 14001 as a tool and guideline must remain limited. This is confirmed by the results of the present survey, in which the participants call for more support, e.g. through further information and examples in the annex of the standard.

PhD Students' Network on Environmental Auditing (Doktoranden-Netzwerk Öko-Audit e.V., ed.): Umweltmanagementsysteme zwischen Anspruch und Wirklichkeit – eine interdisziplinäre Auseinandersetzung mit der EG-Öko-Audit-Verordnung und der DIN EN ISO 14001 (Environmental management systems between demands and reality – an interdisciplinary discussion of the EMAS Regulation and ISO 14001), Berlin, Heidelberg: Springer-Verlag, 1998

Various authors in this collection of articles focussing on eco-auditing deal with ISO 14001: Peter M. Thimme gives a comparative overview of the development of EMAS and ISO 14001 as well as their goals and requirements; Gabriele Poltermann presents the results of an empirical study of 75 ISO 14001 certified companies (return out of 164 questionnaires sent out).
Thimme elaborates on the differences between EMAS and ISO 14001. According to him, the aim of ISO 14001 is to provide a formal framework for environmental management systems, and one advantage of it is the comparatively clearer structure of the standard, one disadvantage the lack of environmental reporting. Poltermann, in her empirical study conducted in 1997, arrives at results largely similar to those of the present survey. She finds that the overall evaluation of ISO 14001 by its users is positive, but slightly poorer than that of EMAS, which can be put down mainly to the poorer credibility of ISO 14001.

Steger, Ulrich et al.: Umweltmanagement in der Praxis – Teilergebnisse eines Forschungsvorhabens (Teile I bis III, V und VI) zur Vorbereitung der 1998 vorgesehenen Überprüfung des gemeinschaftlichen Öko-Audit-Systems (Environmental management in practice – parts of the results of a research project (Parts I – III, V and VI) for the preparation of the review of the Community eco-audit system envisaged for 1998), ed.: German Federal Environmental Agency (Umweltbundesamt), Berlin 1998

In order to provide support to German environmental policy in the review of EMAS envisaged for 1998, a research group was commissioned by the Federal Environment Ministry and the Federal Environmental Agency to evaluate experience made with EMAS. EMAS experience was examined from six perspectives ("spotlights"): literature review, pilot projects, environmental statements, legal analysis, participating companies, other parties.

The majority of the findings concern EMAS or environmental management systems in general. ISO 14001 is mentioned in the literature or literature review and in the context of the future of EMAS. The additional or higher requirements of EMAS are picked out as a central theme but also the user friendliness of ISO 14001, its "clearer structure" and "more comprehensible language". As a disadvantage of ISO 14001 the (potential) "bureaucratic burden" is mentioned. The recommendations emphasize the necessity and purposefulness of positioning the two systems in a differentiated manner: EMAS as the more demanding system compared to ISO 14001, with an "ecological star performance".

Schwarz, E.J., Vorbach, S., Grieshuber, E.: Analyse des Nutzens unterschiedlicher Umweltmanagementsysteme (Analysis of the benefit of different environmental management systems), ed.: Austrian Ministry of the Environment, Youth and Family, Klagenfurt, 1999

Commissioned by the Austrian Environment Ministry, the University of Klagenfurt conducted 204 expert interviews with CEOs or environmental managers of 133 Austrian companies with environmental management systems, as well as a literature review.

The study finds that, compared to Austrian EMAS sites, ISO 14001 companies place more emphasis on cost-benefit arguments. According to the findings, the EMAS-specific requirement of an environmental statement drives one third of the companies interested in setting up an environmental management system into the arms of ISO 14001. For ISO 14001 certified companies, the impulse to set up the system came mostly from clients/customers or suppliers, which are also the targets of their communication efforts. That ISO 14001 companies receive more (positive) responses from their customers than EMAS companies is put down to this circumstance. Regarding the further development of both environmental management systems, a differentiation strategy is preferred that highlights the special strengths of EMAS.

A number of further case studies, surveys and reports from all over the world give an impression of the international range and importance of ISO 14001:

Further case studies and reports (a selection)

International Network for Environmental Management e.V.:
Perspectives on ISO 14001 & SMEs from Australia, Hungary, Ireland, Slovakia and Thailand, Hamburg 1999

Industrial Development Bureau, Ministry of Economic Affairs:
ISO 14001 in Taiwan, Taipei, March 2000

National Standardization Agency of Indonesia (BSN):
Standardization, Industry and ISO 14001, Jakarta, June 2000

The World Bank's official report for the Guadalajara (Mexico):
Environmental Management Pilot; prepared for Mexico's environmental agency (SEMARNAP)

Zackrisson, M., Enroth, M.:
Environmental Management Systems – Paper Tiger or Powerful Tool; Swedish Institute of Production Engineering Research IVF, April 2000

Hillary, R.:
Small and Medium-sized Enterprises and ISO 14001: What are the Implications, London, May 1998

Morrison, J. et al.:
Managing a Better Environment: Opportunities and Obstacles for ISO 14001 in Public Policy and Commerce, Pacific Institute for Studies in Development, Environment and Security, USA, Oakland, March 2000

Engel, H.:
EMAS and ISO 14001 in Belgium, Brussels 1999

Edwards, B. et al.:
The Effectiveness of ISO 14001 in the United States, University of California, April 1999

Tejera, J.:
Report on the Implementation of ISO 14001 and the Use of ISO 14004 by SME's, AENOR, Madrid, April 1998

OECD Group on Pollution Prevention and Control:
Review of the Development of International Environmental Management Systems – ISO 14000 Standard Series, Paris, May 1998.

Multi-State Working Group (MSWG) on Environmental Management Systems:
Statement of Considerations for the Review and Revision of 14001, Raleigh, NC, USA, September 1998

California Environmental Protection Agency:
ISO 14001 Environmental Management System (EMS) Pilot Study, January 1998

ISO 14001 Workshop, San Francisco, June 1998:
Stans, J.: Experiences with certification under ISO 14001 in the Netherlands; Nakamaru, S.: Implementation of ISO 14001: Japanese experience and expectations; Labbé, E.: Experiences on ISO 14001 – Implementation and Certification in Argentina; Andersen, T.: Implementation of ISO 14001 in Denmark; Soutter, D.: ISO 14001 implementation issues in South Africa; McKiel, M.: ISO 14001 and EMS implementation in the USA; Larsson, K.: Using ISO 14001 together with EPE, LCA and Environmental Product Declaration in Sweden; Guan, P.: ISO 14001 implementation in Singapore; Carvalho, A.: ISO 14001 – Implementation in Brasil; Prando, R.: Recent advances on implementation of ISO 14001 in Uruguay; Lister, N.: UK experience in the implementation of ISO 14001, ISO 14001 Workshop, San Francisco, June 1998

Corbett, C.J./Kirsch D.A.:
The Linkage between ISO 9001 and ISO 14001 Standards: An International Study, Ciber Working Paper Series, The Anderson School at UCLA, Los Angeles, 1999; ISO 14001: An Agnostic's Report from the Frontline, April 2000; International Diffusion of ISO 14000 Certification, January 2000.

United States-Asia Environmental Partnership:
Global Environmental Management – Candid Views of Fortune 500 Companies, 1997

Terui, K.:
Implementation of ISO 14001 and Japan's Perspectives, MITI, 1998

Japanese National Committee for ISO/TC 207/SC1/SME:
Implementation of ISO 14001 in Japanese SMEs, 1998

Nakamaru, S:
Establishment of EMS in Japanese SMEs, May '99; Implementation of ISO 14001 – the Japanese Experience, June '99

IV. Conclusions

ISO 14001 in Germany

IV.1
Considerations and recommendations for a German position

IV.1.1
General considerations

Formulating a position regarding the individual issues of ISO 14001 revision is unproblematic when it comes to efforts to ensure greater clarity and compatibility without changing the level of the standard: All of the participants in the revision process strive for these goals.

The borderline, though, between changes that serve clarification or compatibility with ISO 9000ff and "additional requirements", which are not to be considered in the current revision process but only recorded, is fluid. The final decision on what is to be regarded as clarification, compatibility or additional requirement will be taken by the relevant standardization committees.[53]

The suggestions, wishes and comments made by participants in the present survey, however, make it very clear that "lack of clarity" refers not only to lack of clarity in the text or wording but also to a large extent to content- and methodology-related questions and uncertainties. For instance, regarding the "Environmental aspects" part of ISO 14001, the issue is not essentially what this term means, it is how the user can and should identify those environmental aspects that have a significant environmental impact. The indeterminate term "significant environmental impact" creates uncertainty among users. After all, this is a pivotal issue for environmental management, because these environmental aspects have to be taken into consideration when setting environmental targets, developing the environmental programme, in organizational structures and staff qualification etc.

So if the ISO 14001 revision process is thus also – at least latently – about questions of content and requirements, then from a German and European perspective the basic question of desired contents or requirements arises and, with this, the desired relation between ISO 14001 and EMAS with their differing requirements. This was elaborated in some of the studies mentioned and identified by some of the participants in the present survey. Three different (opposed) strategic approaches were suggested:

Strategy 1:
Not to increase the quality of ISO 14001 too much, in order to retain the differences to EMAS and prevent EMAS from becoming superfluous.

Strategy 2:
To extensively align and bring up ISO 14001 requirements to those of EMAS in order to make EMAS superfluous.

Strategy 3:
To render ISO 14001 upwards-compatible with EMAS, in order to make it possible to apply ISO 14001 in a first step and then, building upon this, implement EMAS.

ISO 14001 is the most important environmental management system worldwide. EMAS, though, has (in Europe) the potential to deliver added value – due to its specific additional requirements

[53] The specifications for the revision process formulated by the responsible committee ISO TC 207, and the question of how to interpret them, have therefore led to major discussions in the working group responsible for the process – to some, the specifications seem too restrictive.

(legal compliance, performance, communication/environmental statement, staff participation, registration) and due to its legal establishment as an EU Regulation.

If the basic environmental policy decision in Europe and Germany in favour of keeping EMAS, i.e. keeping two systems, is to be upheld (and there are good reasons for doing so), a differentiation strategy must follow because, in the long run, two equal and similar systems would have no chance or right to exist in parallel. EMAS, as a 'higher positioned stamp of quality', must always provide (even if ISO 14001 is enhanced in terms of quality) a sufficiently higher capability and more binding nature – and at the same time a corresponding benefit for users – if it is not to become obsolete.

Of course, it would be false to conclude that the level of ISO 14001 should be lowered or not raised, to the detriment of environmental protection and the more progressive economies, in order to 'save' EMAS. On the contrary: Integrating major elements "of EMAS into a more demanding ISO 14001 (ISO 14001plus)" would "not only support the worldwide introduction of environmental management systems but would speed it up".[54] The recommended strategy would thus be: Further development of ISO 14001 without making EMAS obsolete. Therefore, the European task is to guarantee the added value of EMAS in the shape of more demanding requirements upon and additional benefits for users.

Further development of ISO 14001 does not automatically mean that too much is expected of less capable companies and societies. The prominent calls for legal compliance (oriented towards national environmental requirements), best available technology (oriented towards economic feasibility) or communication (oriented towards existing and suitable communication methods) are always relative and show that 'additional requirements' do not mean 'additional burdens', especially since 'additional benefit' can follow, to varying degrees, for the organizations using these elements.

[54] Rat von Sachverständigen für Umweltfragen (SRU, German Council of Environmental Advisors): Umweltgutachten 2000. Schritte ins nächste Jahrtausend (Kurzfassung Teil I), Nr. 36, p.15, Stuttgart 2000.

IV.1.2 Concrete recommendations

The conditions of the current revision do not permit any fundamental changes to ISO 14001. This is welcomed by those who wish 'standard stability'. On the other hand, some call for fundamental changes, e.g. a rigorous alignment with the process orientation of ISO 9001:2000. These changes cannot be addressed within the current revision process. Other suggestions, e.g. listing all relevant environmental laws and regulations in the annex of ISO 14001, refer to specific national circumstances and thus cannot be integrated into an international standard. These are therefore not included in the following list of recommendations. Apart from this pre-selection, all suggestions made by respondents to the survey are included in the following list of recommendations. No decisions were taken on whether they are to be classified as clarification only, or rather as modifications to requirements.

Figure 43

Recommendations

Aspect	Comment	Recommendations
Definitions in general	For the users, the improvement of terminological clarity, comprehensibility and consistency within the standard and between the standards of the ISO 14001 series and ISO 9001:2000 (as well as EMAS) is a major issue.	General review and standardization of the terminology; linguistic revision of the definitions and their German translation; matching of differing definitions (environmental performance in ISO 14001 and ISO 14031); explanation of the meaning (in the German translation) of the words "shall", "shall not", "should" and "should not".

Aspect	Comment	Recommendations
Environmental policy	A large part of the German ISO 14001 certified companies supports placing emphasis on performance and legal compliance, moving away from pure system orientation; for most of the German ISO 14001 companies this would merely confirm their normal practice.	In the requirements regarding environmental policy, it should be made clear that the management system must be oriented not only towards itself, but towards achieving and assuring results in terms of legal compliance and environmental performance with regard to all significant environmental aspects; clarification of the meaning (in the German translation) of "commitment to compliance", "continual improvement", "prevention of pollution" and "aspects".
Environmental aspects	There is a lack of clarity in application especially regarding the question of what "significant environmental impacts" are and how the respective environmental aspects can be identified.	Revision and more concrete terms of the requirements as well as the explanations in annex A (taking into consideration the results of the ISO 14004 discussion and referring to these); clarification of the meaning (in the German translation) of "aspects", "impacts" and "significance".
Legal and other requirements	When auditing German companies, certifiers often find nonconformance; this is also an outcome of the complexity of German environmental law and its indeterminate boundaries (e.g. to occupational health and safety); users want more support for compliance with this requirement.	Clarification and more concrete terms for the specifications regarding legal requirements and compliance, and alignment of these with the specifications regarding environmental policy, monitoring and measurement and auditing.

Aspect	Comment	Recommendations
Objectives and targets	The terms and their delimitation as well as their relation to the environmental policy and "environmental programmes" is not clear to many users; the strategic component tends to be neglected.	Clarification of the requirement, greater differentiation of terms and emphasis on the strategic component of environmental objectives.
Organizational structure and responsibility	German users are occasionally uncertain whether the management representative of top management has to be from top management as well.	Clearer wording.
Training, awareness and competence	German certifiers relatively often find nonconformance to this requirement; staff participation is seen as a core issue by all participants.[55]	The meaning of this requirement for the effectiveness of an environmental management system should be made clearer; introduce more far-reaching specifications on staff participation – cf. "additional requirements".
Communication	Environmental protection is an issue of social needs and not only has to do with organizations and their customers; environmental reporting is in some instances normal practice.	Pro-active external information and communication about objectives and performance should be more strongly grounded in ISO 14001 – cf. also "additional requirements".

[55] "Sustained integration of environmental protection into daily corporate routines succeeds all the better if the environmental management system is supported jointly by management, staff and, where appropriate, staff representatives." Cited from: National foreword to the German version DIN EN ISO 14001:1996.

Aspect	Comment	Recommendations
Environmental management system documentation, document control and records	The requirements for documentation are often seen as unnecessary and very costly; business practice is burdened on one hand by standard-independent requirements for documentation and on the other hand by the (by now obsolete) document orientation of quality management.	Clarification and more precise definition of “records”, “documents” and “documentation” in coordination with the requirements of the quality management standard ISO 9001:2000; make clearer when, whether and which process due to be established should be a documented process.
Operational control	The German users and certifiers judge the wording of this central requirement to be inadequate; this is aggravated through the lack of explanation in the annex of ISO 14001:1996.	In a manner commensurate with its significance in terms of both substance and presentation, formulate more precisely and explain in the annex, taking into consideration the results of the discussion on ISO 14004; include reference to other relevant standards in the ISO 14000 series (e.g. on product development).
Emergency preparedness and response	This requirement is partly judged as not sufficiently explained; explanation in the annex is missing; in addition, a certain need for alignment with ISO 9001 is seen.	Formulate more precisely and explain in the annex, taking into consideration the results of the ISO 14004 discussion; pay attention to alignment with ISO 9001:2000 (“nonconformity control” and “preventive action”).
Checking and corrective action	Occasionally, problems of demarcation to and a need for matching with ISO 9001:2000 are perceived.	Pay attention to matching with ISO 9001:2000 (“control”, “nonconformity control” and “corrective action”).

Aspect	Comment	Recommendations
Environmental management system audit, management review	There are questions regarding the evaluation and demarcation of internal audit and management review; a major part of the German ISO 14001 certified companies supports an emphasis on performance and legal compliance (moving away from pure system orientation); for most of the German ISO 14001 certified companies, this would merely confirm their common practice; some respondents miss more concrete specifications and information on conducting audits and the necessary qualification of internal auditors.	Explain demarcation between internal audit and management review in the annex; make clear in the requirements (and title) that the audit is not only oriented to the management system but also to the question of whether the desired results have been achieved. Provide references to methods of environmental performance evaluation (ISO 14031); explain the connection to ISO 14040ff (or ISO 19011) and clarify to what extent the qualifications of internal auditors must match those of external auditors; align with the requirements and definitions of the quality management system (ISO 9001:2000).
Annex	The users often feel left alone with the pure, abstract requirements of the standard; they make diverse suggestions for expanding the annex, especially with explanations, examples, industry-specific interpretations, register of relevant regulation, notes on the integration of different management systems.	Use the annex to improve the 'tightrope walk' between generally valid requirements and concrete reference; for this, make more concrete the purposes, positions of and relationships among the 'specification laying down requirements', the 'explanatory annex as guidance on use' and 'further guidelines (ISO 14004)'; revise annex A and add explanations of "operational control", "emergency preparedness and response" and "monitoring and measurement".

Aspect	Comment	Recommendations
Additional requirements	One advantage of ISO 14001 is the fact that it is part of a whole series of standards; extensive requirements such as those concerning the use of environmental indicator systems (ISO 14031), external communication (standardization activities regarding reporting), integration of products (product development: ISO/TR 14062, environmental labels and life cycle assessment: ISO 14020 series and ISO 14040 series) therefore do not have to be treated within ISO 14001; an environmental management system according to ISO 14001, though, should have a certain level of completeness, operability and credibility; requirements only then exert binding effect and come into widespread use if they are established within ISO 14001 itself.	In ISO 14001, the (existing) minimum standards e.g. regarding external communication should be elaborated upon and phrased in such a way that they lead to an acceptable, sustainable level if applied by themselves; they should moreover provide the basis or interface for the application of ISO 14031, the ISO 14020 series and the ISO 14040 series; the 'tool box' of the ISO 14000 series should be expanded to include support regarding reporting/external communication and environmental cost management. Specifications regarding the integration of staff as a core success factor and requirement of the management system should be introduced into ISO 14001.
Certification	Mostly for cost reasons, the users partly want to extend the certification cycle[56]; some call for a "confidence audit" or "more consulting than monitoring"; the cost of certification must yield a benefit that stems from the independence and credibility of the certification.	Ensure the independence, competence and qualification of external environmental management system certification auditors; the future text of ISO 19011 should not fall short of ISO 14010ff.

Aspect	Comment	Recommendations
Information and public relations work	Without external advice, many organizations are unable to set up an environmental management system according to ISO 14001; for the users, questions arise again and again that remain unresolved; consultants and certifiers are not authorized to interpret the standard.	More information on the ISO 14000 series; establishment of an authorized help desk, which supplies answers to frequently asked questions, aids for interpretation etc. or brings about clarification by the standardization committees; establishment of a database of certified organizations.

The problems emphasized by the survey participants are already topics of debate within the current revision process. However, substantive debate takes place mostly within the context of ISO 14004 revision. Therefore attention and effort needs to be focussed on ensuring that the outcomes of this debate express themselves as improvements within ISO 14001, too. For it is this standard that is relevant to companies as a specification and basis for certification.

56 In EMAS, the opposite path was taken and annual reviews introduced (with exemptions for small companies).

V. Lists and imprint

Comment by survey respondent:

"... we wish a free-of-charge hotline or helpdesk."

V.1 Lists

V.1.1 References

Bundesverband der Deutschen Industrie/Deutscher Industrie- und Handelstag:
Ergebnisse der Umfrage zur Revision von ISO 14001, Unterlage des DIN – NAGUS, 7/2000

(Federal Association of German Industry/Association of German Chambers of Industry and Commerce: Results of the survey concerning ISO 14001 revision; on file at DIN-NAGUS, 7/2000)

Doktoranden-Netzwerk Öko-Audit e.V. (Hrsg.):
Umweltmanagementsysteme zwischen Anspruch und Wirklichkeit – eine interdisziplinäre Auseinadersetzung mit der EG-Öko-Audit-Verordnung und der DIN EN ISO 14001, Springer-Verlag, Berlin, Heidelberg 1998

(PhD Students' Network on Environmental Auditing (Ed.): Environmental management systems between demands and reality – an interdisciplinary discussion of the EMAS Regulation and ISO 14001)

Dyllick, Thomas;
Hamschmidt, Jost: Wirksamkeit und Leistung von Umweltmanagementsystemen: eine Untersuchung von ISO 14001-zertifizierten Unternehmen in der Schweiz; Zürich: vdf, 2000

(Effectiveness and performance of environmental management systems: A survey of ISO 14001 certified companies in Switzerland)

International Organization for Standardization:
The ISO Survey of ISO 9000 and ISO 14000 Certificates – Ninth cycle: up to and including 31 December 1999, Geneva 2000

Schwarz, E.J., Vorbach, S., Grieshuber, E.:
Analyse des Nutzens unterschiedlicher Umweltmanagementsysteme, Hrsg.: Bundesministerium für Umwelt, Jugend und Familie, Klagenfurt, 1999

(Analysis of the benefit of different environmental management systems; published by the Austrian Ministry of the Environment, Youth and Family)

Steger, Ulrich et.al.:
Umweltmanagement in der Praxis – Vorläufige Untersuchungsergebnisse und Handlungsempfehlungen zum Forschungsprojekt sowie Teilergebnisse eines Forschungsvorhabens (Teile I bis III, V und VI) zur Vorbereitung der 1998 vorgesehenen Überprüfung des gemeinschaftlichen Öko-Audit-Systems, Ed.: Umweltbundesamt, Berlin 1998

(Environmental management in practice – results of a research project for the preparation of the review of the Community eco-audit system envisaged for 1998; published by the German Federal Environmental Agency)

Umweltbundesamt (Ed.):
Betrieblicher Umweltschutz mit System – EG-Umweltaudit in Deutschland – Erfahrungsbericht 1995 bis '98, Berlin 1999

(Systematic corporate environmental protection – EC eco-auditing in Germany: Experience from 1995 to 1998; published by the German Federal Environmental Agency)

Wehrmeyer, Walter (Ed.):
ISO 14001 – Case Studies and Practical Experiences, Greener Management International – The Journal of Corporate Environmental Strategy and Practice, Issue 28, Sheffield 1999

V.1.2 Figures

V.1.3
Internet addresses

www.din.de
DIN: Deutsches Institut für Normung e.V.
(German Institute for Standardization)

www.iso.ch
ISO: International Organization for Standardization

www.tc207.org
ISO/TC 207: International Organization for Standardization Technical Committee 207 – Environmental Management

www.ihk.de
IHK/DIHK: Deutsche Industrie- und Handeslkammer
(Association of German Chambers of Industry and Commerce)

www.umweltbundesamt.de
Umweltbundesamt, Berlin
(German Federal Environmental Agency)

www.bmu.de
Bundesumweltministerium, Berlin/Bonn
(German Environment Ministry)

www.tga-gmbh.de
TGA: Trägergemeinschaft für Akkreditierung GmbH
(German Association for Accreditation)

www.14001news.de
Umweltmanagementnorm ISO 14001
This site provides, among other things, all the in-depth analyses on which the present study is based.

www.emas.org.uk/iso14001/mainframe.htm
Database of ISO 14001 certified companies in England

www.iso14000.com/isodiscussions/index.htm
International ISO 14000 information and discussion center

www.ecology.or.jp/isoworld/english/iso14k.htm
Statistics of ISO 14001 and EMAS registration worldwide, plus ISO 14000 registered industry analysis of Japan

www.ecologia.org
ECOLOGIA: ECOlogists Linked for Organizing Grassroots Initiatives and Action

www.inem.org
International Network for Environmental Management
This site contains the ISO 14001 Speedometer, ranking the number of ISO 14001 certificates issued in relation to the population or gross national product of a country.

www.tisi.go.th/114000/14000.html
Thai Industrial Standards Institute
Databank of ISO 14000 registered organizations in Thailand

V.1.4 The ISO 14000ff series

Excerpt from list of DIN-NAGUS publications (as per 29 January 2001)

	Document	German title	English title
Currently undergoing revision	DIN EN ISO 14001	Umweltmanagementsysteme – Spezifikation mit Anleitung zur Anwendung	Environmental management systems – Specification with guidance for use
Currently undergoing revision	DIN ISO 14004	Umweltmanagementsysteme – Allgemeiner Leitfaden über Grundsätze, Systeme und Hilfsinstrumente	Environmental management systems – General guidelines on principles, systems and supporting techniques
Will be replaced by ISO 19011	DIN EN ISO 14010	Leitfäden für Umweltaudits – Allgemeine Grundsätze	Guidelines for environmental auditing – General principles
Will be replaced by ISO 19011	DIN EN ISO 14011	Leitfäden für Umweltaudits – Auditverfahren – Audit von Umweltmanagementsystemen	Guidelines for environmental auditing – Audit procedures – Auditing of environmental management systems
Will be replaced by ISO 19011	DIN EN ISO 14012	Leitfäden für Umweltaudits – Qualifikationskriterien für Umweltauditoren	Guidelines for environmental auditing – Qualification criteria for environmental auditors
	ISO/DIS 14015	Umweltmanagement – Umweltbewertung von Standorten und Organisationen	Environmental assessments of sites and organizations
2nd edition – German draft standard to be published in April 2001	ISO 14020	Umweltkennzeichnungen und -deklarationen – Allgemeine Grundsätze	Environmental labels and declaration – Basic principles
Draft amendment	ISO 14020 DAM 1	Umweltkennzeichnungen und -deklarationen – allgemeine Grundsätze – Änderung 1	Environmental labels and declarations – General principles – Amendment 1
	E DIN ISO 14021	Umweltkennzeichnungen und -deklarationen – Selbstdeklarierte Umweltaussagen (Umweltkennzeichnungen Typ II)	Environmental labels and declarations – Self declared environmental claims (Type II environmental labelling)
NEW!	DIN EN ISO 14024	Umweltkennzeichnungen und -deklarationen – Umweltbezogene Kennzeichnung vom Typ I – Grundlagen und Verfahren	Environmental labels and declarations – Type I Environmental labelling – Principles and procedures
	ISO/TR 14025	Umweltkennzeichnungen und -deklarationen – Umweltdeklarationen Typ III	Environmental labels and declarations – Type III environmental declarations
	DIN EN ISO 14031	Umweltmanagement – Umweltleistungsbewertung - Leitlinien	Environmental management - Environmental performance evaluation - Guidelines
	ISO/TR 14032	Umweltmanagement – Beispiele für Umweltleistungsbewertung	Environmental management systems – Examples of environmental performance evaluation (EPE)
	DIN EN ISO 14040	Umweltmanagement – Ökobilanz – Prinzipien und allgemeine Anforderungen	Environmental management – Life cycle assessment – Principles and framework
	DIN EN ISO 14041	Umweltmanagement – Ökobilanz – Festlegung des Ziels und des Untersuchungsrahmens sowie Sachbilanz	Environmental management – Life cycle assessment – Goal and scope definition and life cycle inventory analysis
	DIN EN ISO 14042	Umweltmanagement – Ökobilanz – Wirkungsabschätzung	Environmental management – Life cycle assessment – Life cycle impact assessment
	DIN EN ISO 14043	Umweltmanagement – Ökobilanz – Auswertung	Environmental management – Life cycle assessment – Life cycle interpretation
	ISO/TR 14049	Umweltmanagement – Ökobilanz – Anwendungsbeispiele zu ISO 14041 zur Festlegung des Untersuchungsrahmens sowie zur Sachbilanz	Environmental management – Life cycle assessment – Examples of application of ISO 14041 to goal and scope definition and inventory analysis
	ISO 14050	Umweltmanagement – Begriffe	Environmental management –Vocabulary
Draft amendment	ISO 14050 DAM 1	Umweltmanagement – Begriffe Änderung 1	Environmental management –Vocabulary Amendment 1
	ISO/TR 14061	Informationen zur Unterstützung der Forstwirtschaft in der Anwendung der ISO 14001 und ISO 14004 Umweltmanagementsystem-Normen	Informative reference material to assist forestry organizations in the use of ISO 14001 and ISO 14004 Environmental Management System Standards

ISO/Technical Committee 207

„Our vision is the worldwide acceptance and use of the ISO 14000 series of standards which will provide an effective means to improve the environmental performance of organizations and their products, facilitate world trade and ultimately contribute to sustainable development.“

V.1.4 Imprint

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