

Environmental Accountability: An
Empirical Analysis of Swiss Corporate
Environmental Reports 1999-2003

Siegenthaler, Claude Patrick / Kasai, Yoko / Frehner,
Thomas

(出版者 / Publisher)

法政大学人間環境学会

(雑誌名 / Journal or Publication Title)

人間環境論集 / 人間環境論集

(巻 / Volume)

5

(号 / Number)

1

(開始ページ / Start Page)

95

(終了ページ / End Page)

118

(発行年 / Year)

2005-03-31

(URL)

<https://doi.org/10.15002/00004496>

Environmental Accountability

An Empirical Analysis of Swiss Corporate Environmental Reports 1999 – 2003

Claude Patrick SIEGENTHALER

Thomas FREHNER

Yoko KASAI

Key Words:

Environmental Accountability, Environmental Reporting, Environmental Management Certification, ISO14001, Environmental Aspects, Continual Improvement, Third Party Verification, ÖBU Method

Abstract:

ISO14001 and other standards for corporate environmental management have become common tools for business to counter the challenge imposed by the required shift towards an ecologically sustainable economy. Although these standards stipulate minimal standards to comply with, the environmental accountability of EMS certificates is rather limited, when it comes to the environmental footprint of an organisation and the respective performance. Hence, the communication of scope and priorities as well as achievements are vital to bring about trust. In this paper, the status quo of corporate environmental accountability is assessed. Starting from a global perspective, the diffusion of such reports is characterised. In a second step, a definition of environmental accountability is elaborated against the ultimate goal and scope of ISO14001. Based on this definition, a detailed set of criteria is derived to evaluate all publicly available corporate environmental reports in Switzerland. The results demonstrate, that the current situation is highly insufficient: only a small fraction of all EMS certified companies does provide reports. But even within the reporters only a small number of companies can be considered to be environmentally accountable.

The Global Rise of Environmental Management Systems

During the last 15 years, the industrialized world has seen a fundamental shift in the perception of environmental issues by business — from “balance sheet poison” towards “ecology as the economics of the future”. Industry is no longer reduced to be a major cause of environmental problems, but is recognised to be the most important actor for creating an ecologically sustainable society by improving the eco-efficiency of processes and products.

The way companies deal with environmental issues has dramatically changed, at least when we listen to the representatives of leading companies or when we read their environmental char-

ters and policies. But it is about more than just words: More and more companies have changed their strategies from defensive and/or reactive towards proactive approaches. Environmental Management Systems (EMS) in accordance with international standards like ISO14001 are based on this proactive philosophy. Such management systems make sure, that companies systematically integrate environmental aspects into their organisational processes on a routine basis. EMS standards require them to check and verify their legal compliance, to define responsibilities from top management down to the workshops and to regularly monitor their progress. Last but not least, organisations have to undergo external reviews to give proof of their compliance with

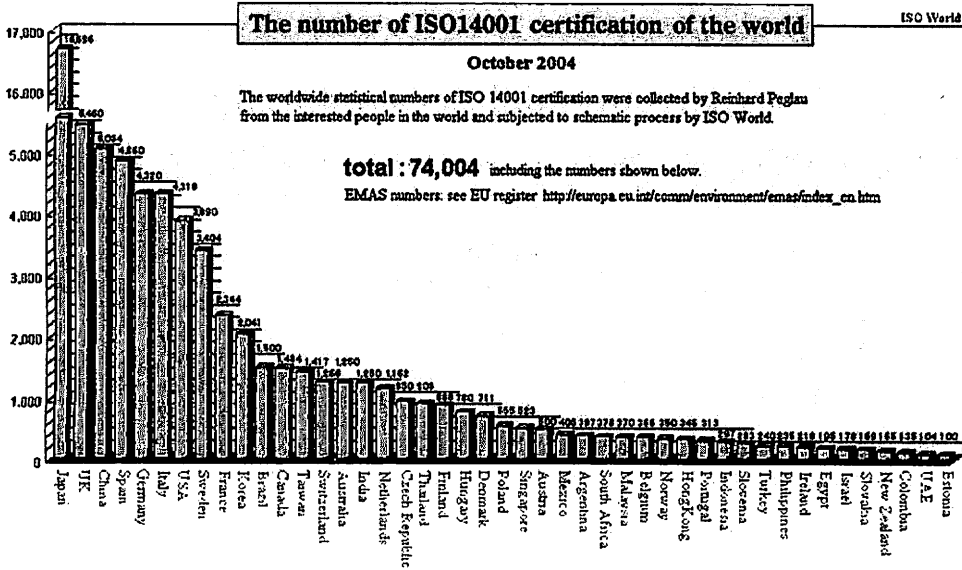


Diagram 1: The Number of ISO14001 Certification of the World as of October 2004 ²⁾

generally accepted “good management principles”. In return for their efforts, the organisations are granted the right to signal their environmental accomplishments by using a respective certificate like ISO14001 or EMAS in their corporate communications.

Since the launch of EMAS — the Environmental Management Auditing Scheme — in 1992, more than 4'000 sites of European organisations have acquired certification ¹⁾. The global standard of ISO14001, launched in 1995, has seen more than 75'000 organisations worldwide being granted certification, with numbers still expanding at a stable rate of growth. If ISO14001 certification follows the trend set by its predecessor ISO9000 Quality Management standard, then one can expect more than 500'000 organisations to implement EMS within the next 15 years.

Limited Accountability of EMS Certification

However, from a stakeholder point of view, it can be argued that EMS certification itself is ambiguous when it comes to the accountability of corporate environmental responsibility: on the

one hand side, certification is a clear proof that the certified companies are running a system to continuously manage environmental aspects and that they comply with the legal requirements (which means this can not be taken for granted for non-certified companies). On the other hand, EMS certification does by no means imply any meaningful signal on the environmental performance of the company.

Although the ultimate goal of EMS standards explicitly is the continual improvement of environmental performance, there is no standard specifying an absolute nor a relative level of pollution to be met for being granted the certificate.³⁾ The standards do require the organisations to define their environmental performance by setting targets by themselves, but in accordance with a common sense of what is considered as environmentally relevant for that individual company.⁴⁾ Thus the individual definition of environmental performance is ambiguous, but controlled by checks-and-balances. The views of the companies have somehow to match with the perceptions of the certifying auditors, which themselves have to keep an eye on the expecta-

tions of the stakeholders to maintain their own public trustworthiness. But at least, this situation is not transparent and difficult to be interpreted or controlled by the stakeholders. As companies are contracting and paying the certification bodies, economic theory would suggest that the incentives are systematically favouring the protection of the stakes of the companies rather than the demands of the environmental stakeholders.

Against this background, the importance of environmental communication beyond certification is obvious. To enhance public accountability of environmental management, the individual company's definition of environmental aspects and its respective performance should be accessible for stakeholders in a transparent way.

This is clearly recognised by the European EMAS system: it requires the compulsory publication of a so called Environmental Declaration for each site. However, the globally dominant EMS standard ISO14001 does not foresee such a mandatory publication, but stipulates environmental communication as a voluntary measure. Hence, the number of voluntary corporate environmental reports is in distinct contrast to the number of certified companies. This argument shall be proved by some statistics on the current state of environmental reporting:

Low Global Diffusion of Corporate Environmental Reporting

It is true that environmental reporting — now more and more moving towards so called Triple Bottom Line or Sustainability Reporting, integrating economic, social and environmental performance — has been taken up by a continually rising number of large and multinational companies. But the majority of companies do not give account of their respective results: Since 1993, the KPMG International Survey of Sustainability

Reporting — conducted on a tri-annual basis — monitors the diffusion of environmental disclosure.

The survey 2002 demonstrates that 45% of the biggest 250 global companies do publish some sort of non-financial reports, mostly Environmental Health and Safety Reports. The second sample of the biggest 100 national companies in 19 countries shows a reporting rate of 23% (n=1'900). Unfortunately, the respective number of ISO14001 certified companies is not available for comparison, but it becomes evident, that still the majority of the biggest companies is not accountable for their environmental responsibility.

When one looks beyond the biggest companies, the absence of precise and comprehensive global statistics avoids any precise description. But some indication can be derived from CorporateRegister.com⁵⁾ — a web-based register for any type of non-financial corporate reports. According to their report issued in 2004⁶⁾ the number of documented and registered voluntary environmental reports on a global scale had grown beyond 1'300 by 2003. It shows a strong growth during the last decade, but compared to the total ISO14001 certified companies in the world at that time, the rate of disclosure results in less than 2%, although it is not known, how many of the reporting companies listed by CorporateRegister.com do have implemented ISO14001.

The data provided by this register has to be read with great care: it obviously underestimates the true number of environmental reports. Obviously, the 4'000 site specific EMAS Environmental Declarations are at least not fully included in this register.

Limited Diffusion within leading countries

Having a closer look on a country specific level, the incompleteness of the global statistics

available becomes even more clear. For Japan — the *leading* country in ISO14001 with more than 16'000 certificates in 2004 — national surveys show a different picture: according to the most comprehensive national survey available, conducted by the Ministry of Environment in 2001, some 1'000 Japanese companies issued environmental reports.⁷⁾ Compared to the total number of ISO14001 certificates at that time (8'123)⁸⁾, the disclosure rate for Japan would result in 13% of EMS certified companies. Another publication by IGES, which was partly based on the same sample⁹⁾, showed 746 out of 1'289 responding companies had acquired ISO14001 for at least some of their business units and 549 out of 1'288 of the same sample showed environmental disclosure in some form (report, brochure, website, etc.), whereas 356 said they issued an environmental report. Thus the ratio of environmental disclosure to ISO14001 certification in this sample would be at 70%, the ratio for environmental reporting to certification at 47%.

It must be noted, that this ratios can only be read as indicative estimations; they do not precisely reflect the true situation as there could be many non-certified companies in the sample disclosing environmental data. But it is plausible to reason, that in Japan, the disclosure rate is significantly higher than the average of the ISO14001 world.

From the available statistics, in Switzerland — also considered as a pioneering and leading country in EMS diffusion (on a per capita basis) — the disclosure rate could roughly be estimated as well: according to a survey by Siegenthaler¹⁰⁾ among ISO14001 and stock market quoted companies, in 2003 106 out of 229 respondents disclosed environmental performance data on a regular basis. 182 out of the same sample were ISO14001 certified, which results in a disclosure rate of 58%. However, the most comprehensive register of Swiss environmental reports

collected by the Institute for Economy and the Environment¹¹⁾ shows only 70 entries of environmental reports, which compared to the 1052 certificates¹²⁾ result in a disclosure rate of 6%.

Again, the data has to be read with cautiousness: to begin with, surveys using questionnaires for a self declaration usually show significantly higher rates, because the majority of companies without environmental activities or disclosure practice do not participate. Hence the data is biased and can not be extrapolated to other companies. Second, the registers of environmental reports fail to cover all available reports and thus are biased to underestimate the real situation. Nevertheless, the data provided above clearly support the statement, that environmental reporting is still very limited. A minority of the biggest companies of the industrialised economies do disclose environmental data. And for the ISO14001 certified companies this is true only for a small fraction even in some of the most advanced countries such as Japan or Switzerland. This in contrast to the EMAS certified organisations. Due to the mandatory publication of an Environmental Declaration, environmental communication and EMS certification go hand in hand. It is worth to notice, that EMAS certification has seen a levelling off in recent years, whereas ISO14001 in Europe is still growing at a remarkable rate. The “market share” of EMAS versus ISO14001 in Europe for 2004 stood at some 11% of all EMS certificates.

Reporting does not necessarily bring about Environmental Accountability

Yet the true situation of environmental accountability can not be revealed by looking at the number of environmental reports. Their mere existence does by no means indicate, that a company is environmentally accountable and providing insights into the definition of its environmental aspects or testifying the continual

improvement of its performance. Therefore, scope and significance of the data disclosed is decisive.

In more than 20 countries or regions (Europe and North America), awards for best reporting practices are granted.¹³⁾ These do have an underlying ranking method, but as they select best practice, these rankings do not provide a comprehensive empirical assessment of the overall accountability of the reports under investigation: e.g. the Swiss ÖBU Award for Environmental Reporting¹⁴⁾ – a bi-annual award granted since 1999 – highlights the (5) winners (in 2003) and their merits. But the other (26) participating reports are all listed as equally ranked.

Looking at the current situation concerning the research on the quality of environmental or sustainability reports, there do exist a number of studies: on a global scale, the publications by SustainAbility¹⁵⁾ are most widely recognised. In addition, a number of country specific studies exist e.g. for United Kingdom,¹⁶⁾ Japan,¹⁷⁾ Germany¹⁸⁾ or Switzerland¹⁹⁾ – just to mention a few.

However, most of this research or rankings are looking at a more or less comprehensive lists of qualitative criteria, including e.g. environmental policy, description of environmental management systems, commitment of top management, etc. In recent years, they refer to the emerging standards for Sustainability Reporting, especially the Global Reporting Initiative (GRI).²⁰⁾ Most of these studies conclude, that the majority of the reports under investigation have a low quality against the theoretical benchmark: “few companies reach even 50% on the scoring scale”²¹⁾ or out of 132 reporters on environmental, social or ethical performance in UK “56 companies produce no information of substance.”²²⁾

However, the long lists of criteria usually cover many aspects beyond pure accountability issues

such as the quality of communication, style, etc. Most of this research looks into the practice of the big companies, neglecting that many environmental reports are issued by small and medium sized companies (SMEs), which also account for a majority of EMS certificates.

A different approach: Defining Environmental Accountability against the goal of ISO14001

The research on environmental reporting practice elaborated in this paper takes a different approach in two respects: first, we do not limit the sample to reports from the biggest companies, but do include all available corporate reports as well as environmental information provided by a companies website. Second, we do not intend to look at formal requirements of “good reporting practice” nor at “do’s and don’ts” in corporate environmental communication. This survey takes a rather focused view on reporting from a narrowly defined environmental accountability point of view. The question we want to find an answer to, is as follows: “Are corporate environmental reports accountable against the ultimate goal of ISO14001 and key elements of its scope ?” This translates into three core questions:

A. Environmental Aspects

Does an organisation provide information on the significant environmental aspects “of its activities, products and services within the defined scope of the environmental management system, that it can control and those which it can influence taking into account planned or new developments, or new or modified activities, products and services”²⁴⁾ ?

From an environmental accountability point of view, it should be made understandable, if the organisation has seriously assessed all relevant aspects within its processes and explicitly within the life cycle of its products and/or services. In addition, it should be identifiable, if the aspects

have been defined taking somehow into account scientific and political realities and the viewpoint of stakeholders.

B. Objectives, Targets and Programme(s)

Does the organisation disclose information on its environmental objectives, targets and programme(s) against which it can be measured and controlled?

ISO14001 requires, that “objectives and targets shall be measurable where practicable and consistent with the environmental policy, including the commitments to prevention of pollution, compliance with legal and other environmental requirements and continual improvement.” And “the organization shall establish and maintain(a) programme(s) for achieving its objectives and targets. It shall include ... the means and time-frame by which they are to be achieved.”²⁵⁾

Hence, environmental accountability requires the communication of explicit qualitative and/or quantitative targets for each of the relevant aspects. By clearly stating obliging targets and programmes, stakeholders are enabled to control the seriousness and progress of the organisations environmental activities.

C. Continual Improvement of Environmental Performance

Does the organisation provide clear and comprehensive information on the continual improvement²⁶⁾ of its environmental performance, which is defined as the “measurable results of an organisation’s management of its environmental aspects,” whereas “results can be measured against the organisation’s environmental policy, environmental objectives and environmental targets”²⁷⁾?

Finally, environmental accountability requires the disclosure of appropriate indicators to trace the effectiveness of the environmental management system on the environment. Therefore, the disclosure of time series indicating trends of the

absolute levels of environmental impacts or at least trends of environmental efficiency/ intensity is indispensable.

As environmental policy, objectives, targets and programmes do not solely have to be based on consideration from an environmental point of view, but explicitly on the economic feasibility with respect to cost-benefit and the overall financial situation of an organisation, it would foster accountability, if the organisation provides information on the costs and benefits of environmental activities. This would help environmental stakeholders to grasp the economic realities and scope for improvements and to assess the appropriateness of the measures taken and performance achieved, respectively.

For a proper understanding, the scope of the data should be comprehensible and — in best case — the data should have undergone verification by a trustworthy external verification body similar to validation of financial statements.

It is considered to foster accountability, when the organisation refers and implements external standards for the evaluation of environmental aspects, continual improvement or environmental reporting.

Whereas other surveys emphasise formal reporting criteria, the approach of this paper does emphasise indications on the environmental aspects discussed by the reporters, the corresponding scope of data, the disclosure of concrete commitments as well as trust providing measures.

Scope and Procedure of the Survey

Based on the definition of environmental accountability elaborated above, a list of criteria has been derived to evaluate all publicly available environmental reports in Switzerland.

In a first step, publishing organisations were identified by desk research. Starting from the already mentioned list of Swiss environmental

Reporting Period: 1998-2003	Characteristics of Reporter					
	Reporting Organisation	N=	Stock Market Quoted / Multinational / Big Companies (>500 Employees)	Small & Medium Sized Companies	Manufacturing Industries	Services: Retailing, Transportation, Communication, etc.
All Reporters	64	73%	27%	64%	20%	16%
>500 Employees	47	100%	0%	55%	23%	21%
SMEs	17	0%	100%	88%	12%	0%
Industry	41	63%	37%	100%	0%	0%
Non-financial Services	13	85%	15%	0%	100%	0%
Financial Services	10	100%	0%	0%	0%	100%

Table 1: Number of collected Swiss Corporate Environmental Reports and Characteristics of the Reporting Companies

reports published by the Institute for Economics and the Environment as well as from an unpublished survey conducted among ISO14001 companies by ESPRIT for Sinum Inc - EcoPerformance Systems, a first list of reports was collected and the organisations were asked to provide their documents for this survey. From the total of 70 reporters identified, we received 60 documents. After seeking the documents, some undated brochures as well as a video declared as an environmental report were excluded. The remaining reports referred not just to one specific period: many organisations do not publish an environmental report on an annual but on a bi- or tri-annual basis. As a result, we included all reports into the sample which refer to a period between 1998 and 2003. For 2003, only a few reports were available, as we closed our search in February 2004. Hence, some 55 documents remained in the sample. Finally, we cross-checked and completed the sample with the Swiss entries into the CorporateRegister.com database, where we could identify another 9 reports and the respective PDF-files for download. In total our sample accounts for 64 reports.

To define an appropriate scope for detailing the three core questions outlined above into specific criteria, the list of criteria was developed

after seeking all of the reports. The criteria were set in more detail, were we found a broad range of different information provided by a certain number of organisations. This is especially true for the selection of environmental indicators, such as CO₂, etc. We found the number of environmental indicators in most reports to be quite limited, whereas waste and emissions into air were covered most detailed, but specific emissions into water or soil almost absent. Against this background, we limited detailed indicators to the most common air emissions and waste categories and limited water emissions to just one category "waste water".

When we identified some characteristics in a remarkable number of reports, we added a specific criteria to make this visible. This was the case for information concerning so called Ecobalance methods for the assessment of environmental aspects and the evaluation of environmental performance. The specific practices provide meaningful insights for accountability as they are based on a holistic life cycle approach and make use of (more or less) scientific environmental impact assessment models (LCIA). A respective example is the EcoScarcity²⁸⁾ method, which allows users to identify environmental aspects by weighting interventions (resource extractions and emissions) with reference to

environmental and political priorities. The resulting “Environmental Impact Points” provide a comprehensive view on relevant environmental aspects as well as on the trend of improvement (Total Eco-Efficiency or total environmental impact). As the weighting factors are publicly available and standardised, they indicate somehow an external view beyond the organisations individual perceptions, fostering the accountability of the data disclosed.

We identified that in many reports, verbal descriptions help to realise, how the organisation defines aspects and where it defines objectives. However, this information is often scattered throughout the report and lacking a systematic overview. The quantitative indicators do not necessarily correspond with the verbal descriptions and give another indication on the comprehensiveness of the scope covered. Therefore, we distinguished between qualitative scope and quantitative scope of the reports, especially when it comes to find out, where reporters draw the line of their responsibility according to their disclosure practice.

It is important to notice, that the purpose of this research was not to define best practice nor to identify the best or worse reporters. Our main purpose was to map the information provided in the reports from the perspective of our accountability definition. This is important to note, because ISO14001 — the underlying reference for our accountability definition — does not require the companies to select specific aspects nor specific indicators. So we just limit our investigation to list, what kind of indications we can find across all the organisations from different sectors to proof accountability. If we could find a specific indication for a specific criteria, we list it, be it implemented just partially or very comprehensively. We do not qualify the comprehensiveness of how an organisation meets a specific cri-

teria, but limit ourselves to map, that it has some practice concerning this criteria.

This shall be illustrated by the criteria in the section “Performance Indicators for the Evaluation of Continual Improvement”: if an organisation shows a time series for one single indicator, such as total energy consumption, then the criteria “Input absolute” and “Time Series” are ticked. This does not imply, that the organisation does provide “Input absolute” and “Time Series” for all of its environmental aspects or indicators, e.g. CO₂, NO_x, etc. Same is true for targets or achievements: it is sufficient to list just one target or to disclose just one statement on achievement of a specific target to get the criteria ticket.

It is important to keep this in mind, when interpreting the results. They reflect an absolute minimal requirement only. In accordance with ISO14001 it is up to the organisation to define the scope and level of detail individually.

When it comes to evaluate verbal descriptions or to categorize information that is not very apparent or unclear, there is a subjective element to decide whether to tick the criteria or not. So some of the criteria might be evaluated in a different way, if other people would try to apply the same criteria. To limit this subjective judgement, the reports were evaluated by three people and differences in judgement were discussed to find a common perception.

Finally, for some criteria we found that there are two levels of information: the criteria is apparently met or we can conclude indirectly, that the criteria is met. For Example, some indicators are presented within a sum parameter: Electricity is not explicitly found as an indicator, but from the text we learn, that in the indicator for total energy consumption, electricity is included. Or to give an other example, CO₂ emissions from electricity supply are listed within the total CO₂ emis-

sions, but there is no separate indicator for electricity consumption. Hence, we learn that the company does consider electricity as a relevant environmental aspect, at least when it comes to CO₂ emissions. In such cases, we ticket the criteria "electricity", but put it in brackets. All rudimentarily or indirectly apparent cases to meet a criteria are shown by using (X).

The resulting evaluation matrix follows the structure outlined below:

1. Qualitative Scope of Reports (11 Criteria)

The qualitative scope of environmental aspects shall indicate, where an organisation theoretically draws the line for its EMS beyond the site-level: does it — at least verbally — address processes and impacts linked to its operations and the life cycle of its products or services? For example, it is relevant to know, if an organisation does address emissions from energy supply, external transportation or from the use of its products. The list of criteria applied in this section corresponds with typical elements of a products life cycle.

2. Disclosure of Environmental Data (35 Criteria)

More stringent than in section 1, the criteria of this section cover several characteristics to evaluate the organisation's environmental accountability from a quantitative point of view. Does it explain, how data is collected or just present some data without any specification? Are common tools to illustrate the mass and energy flows of an organisation provided (Input-Output-Balance, Flow Chart)? How detailed are the indicators to describe the environmental aspects and to monitor changes? Here we distinguish between systematic or arbitrary selections of indicators. Although this is a very ambiguous criteria, we realised that some companies present data without convincing reference to the sector's

significant environmental aspects. E.g. if a transportation company limits its indicators to waste, without addressing energy consumption, etc. this is considered as arbitrary. On the other hand a systematic presentation of indicators is assumed, when indicators correspond to the generally plausible profile of the respective sector.

As already explained, the specific indicators listed in this section are a result from the first seeking of all reports and correspond as well to generally accepted priorities of environmental policy such as Waste, Energy, CO₂, NO_x, etc.

In addition, the corporate Ecobalance framework published by the Swiss Association for Environmentally Conscious Management ÖBU²⁹⁾ is used to summarize the indicators scope. Site Balance means, that the indicators are limited to interventions at the site, whereas Core Balance includes interventions occurring from waste treatment, waste water treatment and energy supply. The Complementary Balance contains upstream and downstream interventions. Thus this categorisation is useful to indicate, if the data provided corresponds to the ISO14001 scope (operations and products).

Finally, several assessment score criteria are listed in this section to search for accountability on how to systematically identify environmental aspects. ABC-Analysis is a qualitative priority categorisation approach (e.g. A=High Priority, B=Medium, C=not relevant) for a range of criteria like risk, cost, impact, etc.. ABC-Analysis in Switzerland is known to be used by most ISO14001 certified companies. The question is: Do they provide their assessment to the stakeholders? Impact Scores and Single Score represent the disclosure of aggregated environmental impact data as commonly used in Life Cycle Impact Assessment (LCIA). Impact Scores describe the contribution to a specific environmental effect like Global Warming, Ozone

Depletion, Acidification, etc. whereas a Single Score is used to calculate one comprehensive impact score. The above mentioned EcoScarcity is one kind of Single Score methods, but there exist many more.

One may question, why this section is limited to interventions only and does not include indicators for legal compliance such as concentration values in exhausts or waste waters. The reason from an environmental accountability point of view is, that the certification by ISO14001 itself already accounts for legal compliance as a minimal requirement. We concentrate on the question, how are environmental aspects beyond legal compliance identified and disclosed — and finally improved.

3. Performance Indicators & Evaluation of Continual Improvement (17 Criteria)

The third section deals with the disclosure of environmental performance indicators and the informative basis to evaluate the reporter's achievements. The section contains a characterisation of disclosed indicators according to their usefulness to monitor continual improvement. From an environmental point of view it is decisive to be able to understand, if the absolute level of impacts is reduced (Strong Sustainability) or, if at least some relative improvements in terms of reduced intervention-intensity (e.g. CO₂/product produced) or enhanced Eco-Efficiency (e.g. higher cash flow per ton CO₂) is achieved. Relative indicators help to understand the effectiveness of the EMS as changes in the economic situation of the organisation can be understood (e.g. an absolute reduction of CO₂ can be the result of a economic downturn rather than the fruit for hard and effective work within the EMS). From an accountability point of view, benchmarks are considered to be an excellent way to demonstrate improvements. And — as already explained — environmental cost account-

ing and benefit data can help to properly understand the situation and appropriateness of the efforts taken by the organisation.

Again, it must be kept in mind, that ISO14001 does not require organisations to reach out for a certain level of pollution nor a certain level of Eco-Efficiency nor a sector specific benchmark. The only requirement indeed is the achievement of the organisation's self imposed targets and programmes. Hence, true accountability would require the organisation to disclose this information.

4. References (3 Criteria)

Finally, standards on environmental evaluation and reporting as well as verification of the information disclosed by a third party are also considered as effective means to foster accountability. The external standards mentioned by the reporting organisations are listed in this section, without any check of compliance. Their citation does not necessarily mean, that the respective standards have been fully implemented.

We use these criteria to statistically search for characteristics of the reports compared to the average of all reporters.

After seeking the reports, specifying the detailed criteria of the evaluation matrix, all three authors thoroughly checked each report individually. Then their results were consolidated and different evaluations of certain criteria of a specific report were discussed to reach a common perception. Finally, the results were entered into a spreadsheet and the results were grouped by certain characteristics, for which we would expect differing patterns of disclosure (Table 2).

In addition to the criteria "Reference to external Standard" and "Third Party Verification", we selected organisations disclosing "Single Score"

Criteria Based Grouping	Characteristics of Reporter					
	Reporting Organisation	N=	Stock Market Quoted / Multinational / Big Companies (>500 Employees)	Small & Medium Sized Companies	Manufacturing Industries	Services: Retailing, Transportation, Communication, etc.
With Reference to Standard	31	81%	19%	52%	16%	32%
Without Reference to Standard	33	67%	33%	76%	24%	0%
Verified	13	85%	15%	62%	8%	31%
Not Verified	51	71%	29%	65%	24%	12%
Single Score	22	77%	23%	55%	18%	27%
Without Single Score	42	71%	29%	69%	21%	10%

Table 2: Groups for Structural Comparison with all Reporters

indicators as a third criteria based group, because the use of Single Score indicators historically has been prominent in Switzerland. These methods cover a wide range of interventions and we wanted to learn, if this has any effect on the environmental accountability.

When interpreting the results, it has to be taken into account that the sample is too small to result in statistically valid evaluations, but the results are based on a full sample of all available and known Swiss corporate environmental reports for the period specified. Therefore the results represent the situation at the time of collection (February 2004).

Discussion of Results

In the following section the results of the survey are presented and discussed. The most important data is provided in the text, whereas the complete data is enclosed in annex A "Evaluation Matrix".

1. Qualitative Scope of Reports

A first important finding of the survey is the fact that only 33% of the reports discuss environmental aspects of products. The percentage among industrial manufacturers is especially low at 20%, whereas 60% of reporting companies from the financial sector discussed green finance

products. Of course, this is a special case and not looking at the negative impacts of financial products, but at least they signal their responsibility is not limited to running offices. Some 54% of reporters from the non-financial sectors, like retailing, communication or tourism discuss environmental aspects of their services; the same rate was found among companies undergoing third party verification. The lowest rate was found among small and medium sized companies (SMEs) with 18%.

This finding is confirmed by the qualitative scope of the environmental aspects addressed by the reporters (Table 3): typical elements of the life cycle of products yield a low rate of discussion. Only very few reporters discuss environmental aspects within their EMS related to products or services, to suppliers or to the commuting of their staff.

A majority of companies does not consider internal transportation - transports carried out by company owned vehicles -, business trips, energy supply or waste water treatment as important environmental aspects to be discussed in their reports.

Looking at the several grouped results, the picture changes somehow: especially the financial sector shows a different pattern, as 90%

Reporting Organisation	Organisation	Internal Transportation	Business Trips	Commuting	Energy Supply	Waste Treatment	Suppliers	Products / Services
All Reporters	91%	38%	27%	14%	47%	27%	16%	6%
>500 Employees	87%	40%	30%	9%	53%	28%	15%	9%
SMEs	100%	29%	18%	29%	29%	24%	18%	0%
Industry	88%	32%	12%	15%	34%	22%	15%	5%
Non-financial Services	92%	46%	23%	15%	46%	38%	8%	15%
Financial Services	100%	50%	90%	10%	100%	30%	30%	0%
With Reference to Standard	94%	52%	48%	19%	77%	52%	29%	6%
Without Reference	88%	24%	6%	9%	18%	3%	3%	6%
Verified	92%	62%	46%	8%	69%	31%	23%	8%
Not-Verified	90%	31%	22%	16%	41%	25%	14%	6%
Single Score	91%	50%	50%	32%	86%	64%	32%	5%
Without Single Score	90%	31%	14%	5%	26%	7%	7%	7%

Table 3: Verbal Coverage of Typical Processes as an Indication for the Scope of an EMS

of these reporters address business trips and 100% energy supply. Also among third party verified reports the scores especially for energy supply and internal transportation are clearly above average. The highest scores for energy supply were found among companies disclosing results with reference to a single score, followed by reporters that referred to an external reporting standard. SMEs demonstrate an environmental sensibility well above average concerning the commuting of their employees.

2. Disclosure of Environmental Data

Most reporters give some description on the data they provide, but 20% do not give any explanation on the scope or quality of their data or do not provide any data at all. However, this does not imply, that the descriptions provided are sufficient to fully understand, how the data was collected. Not surprisingly, third party verified reports scored 100% against 75% among not verified reports.

In 28% of all reports an Input-Output-Balance provides a comprehensive view on the interventions disclosed, whereas 20% illustrate their scope of data by using a flow chart.

When it comes to the number of input and output indicators, one has to be reminded that the selection of meaningful indicators is depending on the industrial sector. However, the number of indicators does provide an indication on the level of detail an organisation is monitoring its environmental aspects. We counted all indicators provided, hence the number is not identical with the number of interventions disclosed (e.g. CO₂ from fuel, CO₂ from heating, CO₂ from electricity would add up to three indicators).

In average, more than 10 input indicators and about 13 output indicators were disclosed in the reports (Table 4). As we draw a line between reporters of arbitrarily selected indicators and reporters of a systematic selection of indicators in relation to the environmental aspects of the specific sector, these figures show a great variation: the average among the systematic reporters was found at 15 input and 18 output indicators. Among the systematic reporters the financial sector again scored the highest rate with 100%, followed by the third party verified at 92%.

It is worth noting that almost 40% of the reporters were categorized as arbitrary for both the selection of their input data and their output

Reporting Organisation	Average Number of Input Indicators			Average Number of Output Indicators		
	Total	Systematic	Arbitrary	Total	Systematic	Arbitrary
All Reporters	10.45	15.09	3.96	12.97	18.03	5.38
>500 Employees	9.22	12.85	3.78	13.11	18.50	5.86
SMEs	14.13	22.63	4.43	12.58	25.67	4.70
Industry	11.53	19.83	4.05	13.28	21.05	5.47
Non-financial Services	8.83	12.57	3.80	13.17	19.00	5.00
Financial Services	8.30	8.30	-	11.60	11.60	-
With Reference to Standard	10.13	11.46	5.57	13.00	16.22	3.75
Without Reference to Standard	10.79	23.00	3.33	12.93	21.23	6.19
Verified	19.31	20.25	8.00	17.85	19.17	2.00
Not Verified	8.00	12.39	3.79	11.62	17.46	5.52
Single Score	10.62	12.19	5.80	11.76	15.64	4.00
Without Single Score	10.36	17.53	3.55	13.62	19.55	5.94

Table 4: Average Number of Quantitative Indicators in Swiss Corporate Environmental Reports

data. The average number of inputs is below 4 indicators and for outputs slightly above 5 indicators, making a wide gap evident. In this group we found significantly more SMEs when it comes to output indicators, and for both (input and output indicators) especially non-verified organisations or companies not referring to external standards.

The divide between reporters providing detailed indicators and the ones limiting the number of disclosed indicators is also clearly found, when looking at the distribution. Verified reports are clearly identified as the most comprehensive reporters. On average more than half of all

reporters (2. Quartile) disclose less than or exactly 7 input and 10 output indicators.

When looking at the type of input indicators (Table 5), the picture becomes more detailed again: 91% of all companies provide some data on their energy consumption in general, 83% on heating, 80% on electricity, but only 33% on fuel, corresponding to the low rate found for the qualitative scope of environmental aspects for transportation already identified in section 1. Although fuel and transportation is commonly considered as a top priority in national environmental policy, most organisations do not consider it relevant for disclosure and one might assume that this also indicates

Reporting Organisation	Quantified Input Indicators								
	Raw Materials	Components	Utilities / Chemicals	Water	Packaging	Paper (Office)	Electricity (Total Energy)	Heating	Fuel
All Reporters	28%	8%	38%	69%	19%	33%	80%	83%	33%
>500 Employees	21%	6%	36%	77%	17%	40%	79%	83%	36%
SMEs	47%	12%	41%	47%	24%	12%	82%	82%	24%
Industry	39%	12%	41%	71%	27%	10%	78%	80%	27%
Non-financial Services	15%	0%	46%	48%	8%	54%	69%	77%	62%
Financial Services	0%	0%	10%	90%	0%	100%	100%	100%	20%
With Reference to Standard	26%	6%	42%	71%	16%	48%	94%	97%	39%
Without Reference to Standard	30%	9%	33%	67%	21%	18%	67%	70%	27%
Verified	31%	23%	69%	100%	38%	62%	92%	92%	46%
Not Verified	27%	4%	29%	61%	14%	25%	76%	80%	29%
Single Score	27%	6%	50%	73%	23%	45%	91%	95%	45%
Without Single Score	29%	7%	31%	67%	17%	26%	74%	76%	26%

Table 5: Disclosure of Quantified Input Indicators

a low priority within their EMS system.

Remarkable is the result for water data provided by some 70% of reporters — especially from the bigger companies —, although water is not considered as scarce in Switzerland as in the surrounding Europe. A reason for this could be the cost of water procurement and the fact that data is very easy to collect in most cases.

The reporting ratios for raw materials and components in average are low, but here the manufacturing reporters' average is considered more meaningful, because the financial sector puts a bias on the total average. Still, the clear majority of companies does not provide quantitative data concerning their materials. This might be taken as an indication that resources are not a focal subject for EMS at the reporting organisations. Only utilities like chemicals — which are usually linked to some risks, emissions or hazardous waste when processed — are reported at least by more than a third of all companies, whereas third party verified reporters seem to put more often an emphasis here (69%).

From the list of output indicators (Table 6), waste indicators are most common, provided by 72% of reporters, followed by CO₂ (61%), products and/or services (50%) and waste water

(45%). The grouped results show significant differences: waste indicators (waste, hazardous waste, recycling) can be found in most of the third party verified reports as well as in reports of financial companies and is quite common in the reports of big companies and companies which refer to external standards or single score impact assessment. At 47% SME's show a rate of disclosure far below the average.

Waste water data is provided by a majority of industrial manufacturers, reporters referring to external standards and undergoing verification. However, waste water is usually disclosed as a sum parameter without detailed indicators on specific emissions.

For CO₂ the disclosure rate is a remarkable 100% in the financial sector, whereas a mere 50% of the other two sectors report data on this top priority of environmental policy. Again, verified reports score high and SMEs particularly low.

The rates for NO_x and SO_x are significantly higher for reports from the industrial sector, whereas financial organisations do score a low 10% disclosure rate, although their scope of environmental aspects showed high rates for energy supply, transportation and business trips, processes closely linked to these emissions.

Reporting Organisation	Quantified Output Indicators									
	Products / Services	Waste	Hazardous Waste	Recycling	Waste Water	CO ₂	NO _x	SO _x	VOC	other Emission to Air
All Reporters	50%	72%	64%	67%	45%	61%	39%	34%	36%	36%
≥500 Employees	43%	81%	72%	81%	45%	74%	43%	36%	40%	38%
SMEs	71%	47%	41%	29%	47%	24%	29%	29%	24%	29%
Industry	56%	68%	66%	61%	54%	56%	48%	44%	48%	44%
Non-financial Services	69%	69%	38%	69%	31%	46%	38%	23%	23%	31%
Financial Services	0%	90%	90%	90%	30%	100%	10%	10%	10%	10%
With Reference to Standard	48%	81%	74%	74%	58%	68%	42%	39%	32%	35%
Without Reference to Standard	52%	64%	55%	61%	33%	55%	36%	30%	39%	36%
Verified	54%	92%	85%	92%	62%	92%	54%	54%	46%	62%
Not Verified	49%	67%	59%	61%	41%	53%	35%	29%	33%	29%
Single Score	50%	82%	64%	73%	50%	59%	32%	32%	23%	23%
Without Single Score	50%	67%	64%	64%	43%	62%	43%	36%	43%	43%

Table 6: Disclosure of Quantified Output Indicators

Overall, it is remarkable, that we found only very few reporters disclosing data on ozone depleting substances, on heavy metals and on specific toxic substances. In most reports, environmental impacts seem to be limited to energy, waste, CO₂, NO_x, SO_x and VOC as a sum parameter.

An important characteristic of the data provided is its scope (Table 7). Here it becomes evident, to what extent a reporter includes upstream or downstream interventions into his calculation and most probably into his continual improvement process. Following the ÖBU framework, we can find that 45% of all reporters look beyond their site level and do integrate interventions from electricity supply into their indicators (this is especially true for CO₂), whereas the complementary interventions from suppliers of materials or components or the use and disposal of products/services are rarely integrated. The Core Balance does include site-level interventions, plus energy supply, waste water treatment and waste treatment. This comprehensive scope indicates the interventions a company can directly and indirectly influence during operations. Some 23% of all reporters calculate at least some of their indicators based on this scope.

Looking at the grouped results, the reporters using single score impact assessment as well as the ones referring to external standards show the highest rates for Complementary and Core Balance. This is mainly due to the fact that the Swiss ÖBU method for Corporate Ecobalancing recommends to apply both, this framework for data collection and the application of the EcoScarcity single score. On the other hand, the financial industry scores a 100% rate for the integrated consideration of electricity, which is recommended by the German VFU standard. Hence, the rates for industry and non-financial services are below average.

3. Performance Indicators & Evaluation of Continual Improvement

Most organisations report time series for some of their quantitative indicators and hence readers can check for improvement from an environmental point of view (Table 8). However, some 12% of manufacturers and 11% of big companies do not allow to see any trend in their data. Even some 8% of verified companies do not provide any indicator as a time series.

Similar is the situation concerning the absolute level of interventions (inputs or outputs): 19%

Reporting Organisation	Site-Balance	Site Balance plus Electricity	Core-Balance	Complementary Balance
All Reporters	94%	45%	23%	14%
>500 Employees	94%	51%	23%	15%
SMEs	94%	29%	24%	12%
Industry	93%	34%	20%	10%
Non-financial Services	92%	38%	23%	23%
Financial Services	100%	100%	40%	20%
With Reference to Standard	100%	74%	48%	29%
Without Reference to Standard	88%	18%	0%	0%
Verified	100%	69%	31%	8%
Not-Verified	92%	39%	22%	16%
Single Score	100%	86%	68%	41%
Without Single Score	90%	24%	0%	0%

Table 7: Scope of Environmental Data according to the ÖBU Framework

Reporting Organisation	Time Series	Input absolute	Output absolute	Input relative	Output per production	Output per Input	Output per value added	Output per Employee
All Reporters	91%	86%	81%	50%	33%	8%	16%	20%
>500 Employees	89%	87%	81%	53%	32%	9%	17%	26%
SMEs	94%	82%	82%	41%	35%	6%	12%	6%
Industry	88%	85%	83%	49%	39%	10%	17%	7%
Non-financial Services	92%	92%	85%	23%	38%	8%	23%	8%
Financial Services	100%	80%	70%	90%	0%	0%	0%	90%
With Standard	97%	84%	84%	68%	35%	6%	13%	32%
Without Standard	85%	88%	79%	33%	30%	9%	18%	9%
Verified	92%	92%	92%	62%	23%	8%	15%	31%
Not Verified	90%	84%	78%	47%	35%	8%	16%	18%
Single Score	91%	77%	77%	50%	27%	9%	18%	27%
Without Single Score	90%	80%	83%	50%	36%	7%	14%	17%

Table 8: Characteristics of Indicators to Evaluate the Level of Impacts as well as the Environmental Effectiveness of the EMS

do not disclose their total emissions for at least one indicator. Even within the financial reporters, some 20% avoid to communicate the absolute level.

Understanding the Eco-Efficiency or intervention-intensity is even more limited: on average of all reporters, only 50% provide any ratios showing how much input is required per some kind of unit such as production or value added or number of employees. The respective rates for output indicators is again lower: apart from the financial sector only 38/39% of reporters provide some

indicators per level of production. And their average for output per value added is at a low 16%. The concept of Eco-Efficiency as put forward by the World Business Council for Sustainable Development (WBCSD), is not widely used in Switzerland at least when it comes to reporting on continual improvement.

In absence of the type of information surveyed in this section — be it absolute or relative — it is not possible for stakeholders to check the benefit for the environment nor the environmental effec-

Reporting Organisation	Internal Benchmark	External Benchmark	Environmental Cost	Monetary Benefit	Total Eco-Efficiency
All Reporters	9%	6%	33%	6%	19%
>500 Employees	13%	9%	32%	6%	19%
SMEs	0%	0%	35%	6%	18%
Industry	5%	2%	48%	10%	17%
Non-financial Services	15%	0%	15%	0%	31%
Financial Services	20%	30%	0%	0%	10%
With Standard	16%	13%	19%	3%	32%
Without Standard	3%	0%	45%	8%	6%
Verified	15%	8%	31%	0%	38%
Not Verified	8%	6%	33%	8%	14%
Single Score	18%	5%	23%	5%	55%
Without Single Score	5%	7%	38%	7%	0%

Table 9: Indications for the Appropriateness of Environmental Targets and Programme(s)

tiveness of the EMS itself.

On the other hand, 90% of the reporters from the financial industry provide some results on a per employee basis and therefore enable benchmarking among this sector, which is published by 30% of them (Table 9). Only one industrial company does external benchmarking against the sectors average. From all reporters only 6 use their data to benchmark internally by comparing the indicators of their sites or offices.

Some data on environmental cost is disclosed by 33% of all reporters, with 46% of all manufacturers. But comprehensive cost accounting is quite rare as most of the data provided is referring to some specific activity discussed in the report rather than a systematic overview. Economic benefit information is even more rare on the reports: only 4 of the manufacturers indicate some numbers on cost savings or other benefits.

A special type of indicator — the Total Eco-Efficiency (value added per unit of single score impact) — could be identified in 20% of the reports. Hence, for this 12 companies a comprehensive environmental indicator allows stake-

holders to monitor the trend of continual improvement.

Most important for the evaluation of environmental accountability from an ISO14001 point of view are the scores for targets, achievements and programmes (Table 10): this is the benchmark for every certified company as its own targets must be achieved — at least in the long run — to qualify for certification. Do they disclose the basis of this requirement to the stakeholders? The answer is sobering: 30% of all reporters do not provide any information on targets, some 19% communicate some qualitative targets only, whereas 17% disclose some kind of quantitative targets. 28% show both types of targets.

Some information on achievements are disclosed by 36%, with third party verified reports, the single score and the external standard groups showing the highest rates.

And some indication on specific action scheduled for implementation — programme(s) — were found only in 22% or 14 of all reports.

Reminding, that the low scores are based on the criteria, that any kind of information can be identified in the reports, the rate of disclosure does by no means indicate the comprehensiveness of the respective information. There are

Reporting Organisation	Qualitative Targets	Quantitative Targets	Achievements	Programme(s)	External Standards	Third Party Verification
All Reporters	47%	45%	36%	22%	48%	20%
>500 Employees	45%	43%	38%	23%	53%	23%
SMEs	53%	53%	35%	18%	35%	12%
Industry	41%	51%	37%	17%	39%	20%
Non-financial Services	69%	46%	38%	38%	38%	8%
Financial Services	40%	20%	30%	20%	100%	40%
With Standard	55%	39%	42%	26%	100%	32%
Without Standard	39%	52%	30%	18%	0%	9%
Verified	54%	46%	54%	31%	77%	100%
Not Verified	45%	45%	31%	20%	41%	0%
Single Score	55%	41%	45%	27%	86%	27%
Without Single Score	43%	48%	31%	19%	29%	17%

Table 10: Key Indications for Environmental Accountability: Targets, Achievements, Programme(s) and External References

only few reports, which provide truly comprehensive views on their targets and achievements.

The binding character of data which stakeholders could use for monitoring the continual improvement against the — ISO14001 required elements of an EMS (targets and programme) — seems to keep most reporters from disclosure.

4. References

The low disclosure rate concerning targets, achievements and programme(s) corresponds with the rate of third party verified reports: 20% undergo some procedure to audit the quality of their data collection systems and the appropriateness of their reporting. 77% of these companies refer their reports to external standards. Across all criteria they score well above average in many criteria.

Finally, the survey found 48% of the reports to refer to some external standards, whereas only few (9%) mention to refer to internal standards. Overall, 11 different external standards were identified, but only a few were often referred to: the Swiss ÖBU method for Corporate Ecobalancing scored 13 entries, followed by 10 entries for the German VfU standard of Environmental Performance Indicators for the financial industry, 4 entries for the GRI Global Reporting Initiative and 2 entries for RC/CEFIC Responsible Care / European Chemical Industry Council.

In the absence of any authorised national standard for environmental reporting in Switzerland, the standards for environmental accounting (ÖBU / VfU) are dominating and had a significant impact concerning the rate of disclosure for various criteria, especially on the scope of the quantified indicators. Reporters as a group following these standards are — according to the results of this survey — significantly more accountable than others. This is especially true

for the reporters referring to the ÖBU method.

Conclusions: Low Environmental Accountability and the Power of External Standards

Starting from the global context of the diffusion of EMS and the availability of corporate environmental reports, this paper discussed the current state of environmental accountability in Switzerland.

It was argued that the EMS certificates alone do not provide stakeholders with sufficient indications concerning the seriousness of the environmental activities beyond organisational and legal aspects. Hence, environmental reporting is required to make companies accountable.

The data presented on the global and national scale demonstrates, that the sheer number of environmental reports available to stakeholders is very limited. Only a fraction of companies do actually provide any information on their environmental aspects and their respective performance. The rate of reporting was estimated to be below 15% of all ISO14001 certified organisations even in some of the most advanced countries such as Japan.

But not only do just a fraction of companies publish environmental reports. Many reports are limited in their content and do not bring about environmental accountability. This finding from major international surveys looking at the biggest companies were confirmed by a full sample survey of all publicly available corporate environmental reports in Switzerland.

Applying a narrow definition of environmental accountability derived directly from the ultimate goals of ISO14001, it was found that a majority of the reports do not address issues required for environmental accountability. This is even more striking as our survey just searched for minimal requirements without assessing the completeness of the reported information, but only looked for any type of indications concerning the out-

lined criteria. Thus the conclusion is drawn, that only few reporting companies — below 30% — can be considered as truly environmental accountable. It was found, that those companies very often are referring to external standards in combination with external third party verification of their reports and/or their data collection systems.

In Switzerland, there are no official standards for environmental reporting available so far nor are there discussions going on to create such guidelines. Looking at the situation in Japan, where a high compliance of the many reports available with the voluntary guidelines issued by the Environmental Ministry has been proven in comprehensive surveys³⁰⁾, we conclude that such standards are vital for attaining environmental accountability and hence to leverage the impact of EMS certification for the creation of an ecologically sustainable economy. For this endeavour the Swiss ÖBU methodology for corporate Ecobalancing, released in 1991 and followed by some 14 out of the 64 corporate environmental reporters so far, could provide a suitable starting point.

Endnotes

- 1) As of January 2005 from http://europe.eu.int/comm/environment/emas/documents/articles_en.htm
- 2) <http://www.ecology.or.jp/isoworld/english/analy14k.htm>
- 3) "It should be noted that this International Standard does not establish absolute requirements for environmental performance beyond commitment, in the policy, to compliance with applicable environmental legal requirements, prevention of pollution and to continual improvement. Thus, two organizations carrying out similar operations but having different environmental performance may both comply with its requirements." ISO14001: 2003, Introduction.
- 4) "When establishing and reviewing its objectives and targets an organization shall consider the legal and other environmental requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties." ISO14001: 2003, 4. 3. 3.
- 5) www.corporateregister.com
- 6) Next Step Consulting / CorporateRegister.com (2004): Towards Transparency — Progress on Global Sustainability Reporting 2004, p. 8.
- 7) Environmental Ministry of Japan (2001), cited in: Hirayama (2003), p. 42.
- 8) ISO International Standards Organisation (2004) The ISO Survey of ISO9001:2000 and ISO14001 Certificates — 2003, p. 26.
- 9) Kanda, Y., Lee, B.-W. (2003): Japanese and Korean Corporate Sustainability Management — A Comparative Study based on Questionnaire Survey Results, p. 2.
- 10) Siegenthaler (2005): Ecobalance — 30 years of Research at the Interface between natural science and economics — a methodological and empirical analysis, Chapter 6.
- 11) www.iwoe.unisg.ch
- 12) ISO (2004), p. 25.
- 13) According to www.environmentalreporting.com
- 14) www.oebu.ch
- 15) SustainAbility (2002): Trust Us, The Global Reporters 2002.
- 16) salterbaxter / Context (2004): Trends in CSR reporting in the FTSE 250 in 2003.
- 17) Hirayama, K. (2003): Environmental Reports by Japanese Companies — An analysis of environmental reports of companies listed on the First Section of the Tokyo Stock Exchange.
- 18) <http://www.ranking-umweltberichte.de/ranking.html>
- 19) Daub, C.-H., et.al. (2004) : Auf dem Weg zum nachhaltig integrierten Geschäftsbericht? Nachhaltigkeitsberichterstattung Schweizer Unternehmen 2004.
- 20) www.globalreporting.org
- 21) SustainAbility (2002) cited by Rice, S., MacLean, R. (January 2003) in: Ask the Expert, GreenBiz.com.
- 22) Salter Baxter / Context (2004), p. 15.
- 23) For an example have a look at: The European Sustainability Reporting Awards ESRA Criteria,

http://www.oebu.ch/oebu/downloads/esra_kriterien_03.pdf

- 24) ISO14001: 2003, 3. 6
- 25) ISO14001: 2003, 4. 3. 3
- 26) Definition of Continual Improvement: “recurring process of enhancing the environmental management system in order to achieve improvements in overall environmental performance (3. 9) consistent with the organization’s environmental policy. NOTE The process need not take place in all areas of activity simultaneously.” ISO14001: 2003, 3. 2
- 27) ISO14001:2003, 3. 1
- 28) BUWAL Swiss Federal Agency for Environment, Forests and Landscape (1998): Ökologische Bewertung mit der Methodik der Ökologischen Knappheit, Ökofaktoren 1997.
- 29) Braunschweig, A., Müller-Wenk, R. (1991): Ökobilanzen für Unternehmungen – Eine Wegleitung für die Praxis.
- 30) Hirayama, K., (2003)

