

# Thinking in messages - determine key performance indicators and create environmental reports

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After the presentation of monetary and non-monetary information and decision tools in the last chapter should answer the question how these instruments can be used for internal management using indicators and to external reporting.

Environmental reporting aims to measure, disclose and to be accountable to internal and external stakeholders about to what extent the company uses the functions of the environment and takes action to improve environmental performance. Thus, the communication of a company has two objectives: for internal stakeholders' environmental performance is measured in order to prepare decisions of corporate management, for external stakeholders the reporting on the environmental management system, the environmental performance, the ecology orientation of the value-added steps, the dealing with stakeholders and process and product innovations as well as environmental objectives are in the foreground. Finally, it should be noted that environmental reporting is increasingly part of sustainability reporting.

## **1 Environmental key performance indicators for internal management control**

Basic idea of environmental key performance indicators is to represent ecologically relevant issues and developments to the management as report user, existing information is prepared as environmental key performance indicators. These can both provide a holistic overview of the company's operations as well as detailed information. Absolute key performance indicators or cardinal numbers can be quantified as sums, differences or averages in monetary or non-monetary form, i.e. as numbers, for example, greenhouse gas emissions in tonnes of CO<sub>2</sub> equivalent. If the target is an ecology-oriented penetration of the company, the linking of different information in the form of relative indicators or ratios is of major importance. These can be considered in relation as proportion (e.g. share of hazardous waste in the total waste volume), relational (e.g. energy consumption per employee) or indices (e.g. reduction of the water consumption based on the year 2008). If indicators are highly concentrated measurements, which select economically relevant and quantitatively detectable values as absolute or relative numbers, specifically delimit, logically summarize and prepare in concentrated form, environmental indicators meet this task for ecologically relevant situations and contexts.

### ***Key performance indicator systems for representing contexts***

The presentation of situations in a single indicator meets the requirement of targeted, but rarely balanced information. Since relations cannot be detected directly, also the possibilities of influence cannot be derived directly. The requirement for balanced information requires both the representation of an individual situation as well as its embedding in the comprehensive context. An indicator system, which considers interdependencies between the individual indicators and illustrates complex situations, meets these demands. A key performance

indicator system is generally a set of quantitative variables, whereas the individual indicators are in objectively logical connection to each other, complement or explain each other and are generally positioned on a common overarching goal. Key performance indicator systems need to be a reflection of the target system of the company and of its conception a concentrated representation of the current business situation.

**Computing systems or classification systems**

Computational key performance indicator systems represent objectively logical and calculable situations. Thus, single indicators are derived as a computational result of upstream or downstream as a computational factor of downstream indicators. The top key performance indicator of a computing system should embody the most important business goal and is broken down by the allocation, substitution and expansion in sub-indicators. In this way, a hierarchical and pyramidal structure occurs, which can be analysed bottom-up (synthetic procedure: How will my decision affect the overall indicator?) or top-down (analytical procedure: Why the top key performance indicator has changed?). As an example, the represented figure of the EVA™ can be mentioned. Thus, the monetary consequences of ecology orientation with regard to their effect on the EVA™ can be examined:

MOBILITY UNLIMITED has several options to increase the EVA. The calculation rule mentioned above shows, that the EVA consists of three components. By several measures these three components can be selectively influenced. This is exemplified in the following.

1. Net operating profit after tax NOPAT

$$\text{NOPAT} = \text{sales} - \text{cash costs}$$

An increase of NOPAT is possible by increasing the sales and/or the reduction of cash costs. The quantity of 1,000 sold vehicles in one division in 2006 was achieved in 2007, too.

a) Sales

The installation of a biodiesel engine leads to the achievement of a price premium. A market survey indicates that the customer would pay for a vehicle with biodiesel engine € 17,800 (compared to 17,000 € for a model with a petrol engine).

b) Cash costs

In 2006, € 1.5 million cash costs were incurred. In 2007, these were reduced by 50,000 € by energy savings and waste.

$$\text{NOPAT}_{2006} = 17,000 \frac{\text{€}}{\text{vehicle}} \times 1,000 \text{ vehicles} - 1,500,000 \text{ €} = \underline{\underline{15,550,000 \text{ €}}}$$

$$\text{NOPAT}_{2007} = 17,800 \frac{\text{€}}{\text{vehicle}} \times 1,000 \text{ vehicles} - 1,450,000 \text{ €} = \underline{\underline{16,350,000 \text{ €}}}$$

2. Weighted average cost of capital (WACC)

$$\text{WACC} = \frac{(\text{costs of equity} \times \text{equity}) + (\text{costs of borrowed capital} \times \text{borrowed capital})}{\text{equity} + \text{borrowed capital}}$$

a) Costs of equity

The introduction of active risk management and the use of the new drive concept lead to a reduction in the cost of equity from 12% to 10%. The equity of MOBILITY UNLIMITED amounts € 70 million in 2006 and 2007.

b) Costs of borrowed capital

Reducing the cost of borrowed capital from 6% to 5% is realized by a positive external rating, which results from the active risk management and reduced costs. The borrowed capital remains unchanged at € 20 million, too.

$$\text{WACC}_{2006} = \frac{0.12 \times 70,000,000 \text{ €} + 0.06 \times 20,000,000 \text{ €}}{70,000,000 \text{ €} + 20,000,000 \text{ €}} = 10.6667 \%$$

$$\text{WACC}_{2007} = \frac{0.10 \times 70,000,000 \text{ €} + 0.05 \times 20,000,000 \text{ €}}{70,000,000 \text{ €} + 20,000,000 \text{ €}} = 8.8889 \%$$

### 3. Net Operating Assets

$$\text{NOA} = \text{fixed assets} + \text{current assets} - \text{interest-free, short-term borrowed capital}$$

#### a) Fixed assets

The increase in fixed assets is realized through the use of integrated technologies as part of risk management. In particular, the use of a new paint with an environmentally friendly painting contributes to this. The acquisition costs of the investment is € 1 million. The previous fixed assets amount € 7 million.

#### b) Current assets

The former current assets amount € 4 million. There will be no measures to change the current assets. MOBILITY UNLIMITED currently does not have short-term borrowed capital.

$$\text{NOA}_{2006} = \text{fixed assets}_{2006} + \text{current assets}_{2006} = 7,000,000 \text{ €} + 4,000,000 \text{ €} = \underline{\underline{11,000,000 \text{ €}}}$$

$$\text{NOA}_{2007} = \text{fixed assets}_{2007} + \text{current assets}_{2007} = 8,000,000 \text{ €} + 4,000,000 \text{ €} = \underline{\underline{12,000,000 \text{ €}}}$$

### 4. Calculation of EVA

$$\text{EVA}_{2006} = \text{NOPAT}_{2006} - \text{WACC}_{2006} \times \text{NOA}_{2006} = 15,550,000 \text{ €} + 10.6667 \% \times 11,000,000 \text{ €} = \underline{\underline{14,326,666.67 \text{ €}}}$$

$$\text{EVA}_{2007} = \text{NOPAT}_{2007} - \text{WACC}_{2007} \times \text{NOA}_{2007} = 16,350,000 \text{ €} + 8.8889 \% \times 12,000,000 \text{ €} = \underline{\underline{15,283,333.33 \text{ €}}}$$

MOBILITY UNLIMITED thus achieves an increase of corporate value of € 956,667.66 through the implementation of various ecology-oriented strategies compared to the previous year.

#### Legend:

EVA = Economic Value Added

NOA = Net Operating Assets

NOPAT = Net Operating Profit After Taxes

WACC = Weighted Average Cost of Capital

With help of computing systems, networked cause-effect relationships cannot be represented, because only vertical, in no case horizontal dependencies are representable. For a classification system, the computational link between the system elements is missing; but they are in a logically structured relation. Because of their not strictly necessary link various aspects may be included in such a key performance indicator system. The selection of individual indicators is subjective, as they cannot be derived from unique calculation rules. Thus, networked relations of reality can be represented. In the selection and creation of indicators for calculating and classification systems the following aspects are to be considered: quality and currency of the underlying information system and the acquired and processed data as well as correct cause-effect relations (which is a challenge in environmental cross-media aspects).

### ***Areas of environmental key performance indicator systems***

Environmental key performance indicator systems are in general built as classification systems due to the variety of aspects. But within there may be partially computational links. As environmental key performance indicator systems are designed to represent the environmental performance of the company or its divisions in an overview, it can be used for tasks of planning, control and monitoring: key performance indicator systems support planning tasks by providing the problem situation in an overall context. This allows to detect existing possibilities for action more easily (e.g. by the knowledge of cause-effect relationships) and to analyse the effects of action alternatives. Planning as mental anticipation of future action is therefore possible. For example, MOBILITY UNLIMITED can use the indicator system based on the EVA™, to predict the effect of strategic decisions. To achieve defined corporate goals, these are to be dissolved in the fields of activity and levels of hierarchy by suitable control instruments to provide a tailored control instrument for the respective area. Indicators are particularly suited for control tasks because they can be determined individually for differences between the areas or trans-sectoral for commonalities. In addition, with the help of key performance indicator systems, variables are controlled, which are non-monetary and therefore do not necessarily have to be taken from the accounting. In a procurement guideline MOBILITY UNLIMITED can put specifications for an ecology-oriented procurement with help of indicators in concrete terms (e.g. energy consumption of office communication equipment). The management can also specify target values for its subordinated bodies, which again can derive possibilities from the key performance indicator systems to achieve these targets. A continuous review of the realized values (control task) is a necessary condition for the achievement of defined objectives. The evaluation of the obtained data requires benchmarks. These can be obtained from data from previous periods, from other companies or from standards. Accordingly, one can distinguish between the time comparison, the intercompany comparison and the target-performance comparison. The time comparison shows the evolution of a company or a location over several periods (e.g. energy consumption per ton of output). The intercompany comparison compares companies of the same branch of business with each other making sure that absolute values are comparable only in case of same size of the companies or locations. Therefore, usually ratios must be applied (e.g. space requirements of the production in square meter). A target-performance comparison as an instrument of corporate control is of particular importance because the actual performance of legally prescribed or internally defined critical values can be compared (e.g. emission limit). If the indicators are structured by functional areas, action and decision-oriented information can be provided for all departments with the help of the ecology-oriented key performance indicator system. Thus, vulnerabilities are identifiable in the respective functional areas and potentials can be exposed.

### ***Principles for an environmental key performance indicator system***

In order to use an environmental indicator system equally for purposes of planning, control and monitoring of ecologically relevant facts, the following principles are to be taken into account in the construction of the system.

#### Image of the target system:

The environmental key performance indicator system must be constructed so that the business objectives are reflected. In the case of ecology orientation of a company, this means that both the profit and the ecology orientation should be integrated into the key performance indicator system. Monetary data can be divided into cost and revenue variables, non-monetary data into input-and output-oriented information.

#### Completeness:

The environmental key performance indicator system must meet the criterion of completeness, i.e. all degrees of target achievement intended by the company need to be mapped and monitored by the values included in the key performance indicator system. This requires an in-depth consideration which is to be performed by the analysis of individual value-added steps with the help of subsystems.

#### Concentration of reality:

To serve as a starting point for measures of planning, controlling and monitoring and to be rapidly and comprehensively configurable by the operational decision-makers, environmental key performance indicator system must represent a concentration of reality. This ensures a realistic decision basis and encourages efficiency of decision support by the concentration of the data base.

#### Quantifiability:

Environmental indicators can only be formed from quantitatively detectable information. The basic values must therefore be formulated as a monetary amount or in dimensions of measurable quantities. In addition, the elements have to be consistently referred, assessed and defined over time. Facts which do not meet this condition, i.e. which are only qualitatively representable, cannot be considered in an environmental key performance indicator system.

#### Documentation of absolute values:

Relative environmental indicators, such as the energy consumption of coal equivalent per ton of output, allow an assessment of the environmental situation of a company, especially in comparison with other companies. The basic problem of this approach, however, is that it makes no statement about the absolute burdens or discharges of the ecological environment by the company. In order to document the actual impairment of the ecological environment by a company the absolute environmental indicators of the company must be detected (i.e. in the example, the energy consumption in coal equivalents per se).

#### Materiality:

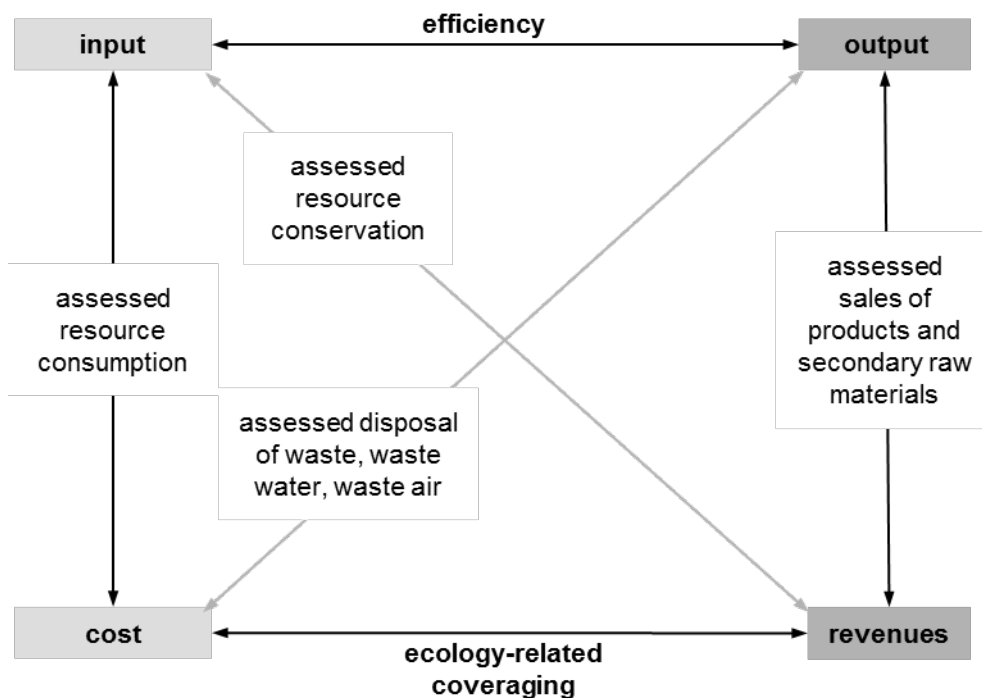
An environmental key performance indicator system must be manageable in scope. This idea also accommodates the economic principle meaning that there has to be an appropriate relationship between the effort of creating a key performance indicator system and the benefits of mediated information. The principles of materiality and efficiency are to be observed.

### ***Monetary or non-monetary key performance indicators***

Ideally environmental key performance indicator systems represent both profit and environmental objectives that are in competition particular according to the maturity: Companies make more economically short-term decisions, whereas environmental objectives have a long-term focus. Exceptions are industries such as forestry, where long-term decisions are natural due to the rotation periods. Also the urban water management and the energy industry are more familiar with long-term formative decisions than other industries due to capital commitment.

Regardless of which rank the objectives take, both profit and environmental goals are to subordinate to the goal of long-term livelihood security of the company. Since the priorities of companies are to be determined individually an environmental key performance indicator system should integrate both monetary values (costs and revenues) and non-monetary values (input and output) (Figure 1).

Figure 29: Relationship between monetary and non-monetary indicators



Source: GÜNTHER 1994, p. 295

### **Monetary environmental key performance indicators**

For the monetary analysis, costs and revenues are studied. In case of costs functional areas are to be considered first, e.g. the environmental costs of research and development, to reveal the meaning of each value-added step for the entire company. From this cost block the ecology costs are to be split and analysed. In case of revenues on the one hand savings and on the other hand additional revenues caused by ecology-oriented measures are considered. Finally, the ecology costs occurred in one value-added step are compared with the ecology revenues or savings of the ecology orientation. This ratio indicates the extent to which the costs of ecology orientation are covered by the revenues (ecology-related covering). Thus it becomes clear how high are the additional cost burdens on this value-added step in balance and whether these are covered by higher prices. Under certain circumstances, the savings and additional revenues already exceeds the ecology costs. Thus there is ceteris paribus increased profitability for the company.

### **Non-monetary environmental key performance indicators**

In the field of non-monetary environmental key performance indicators input and output-related circumstances or transactions are compared with each other. The input-oriented environmental indicators reflect the extent to which natural resources are used. Output-based environmental indicators are related to the exposure of the object function of the ecological environment. Based on the determined input and output values the efficiency factor can be determined. It expresses the ratio of an input value to an output value (efficiency).

Below an excerpt of the environmental key performance indicator system of MOBILITY UNLIMITED for logistics and procurement is represented (Table 18).

*Table 18: Environmental key performance indicators of MOBILITY UNLIMITED*

Indicator	Unit/Calculation	2006	2007
Steel consumption	t	340,325	389,512
Aluminium consumption	t	12,027	11,375
Share of renewable resources	$\frac{\text{Amount of renewable resources in t}}{\text{Total material consumption in t}}$	2.9 %	2.9 %
Varnishes and fillers	t	7,915	7,326
Oils	t	645	589
Binders	t	4,586	4,098
Total amount of packaging	t	80,236	79,294
Share of reusable packaging	$\frac{\text{Amount of reusable packaging in t}}{\text{Amount of packaging in t}}$	56 %	56 %
Total amount of waste	t	65,985	66,210
Waste for recycling	t	41,256	43,021
Waste for disposal	t	24,729	23,189
Metallic waste (scrap)	t	215,036	236,985
Total hazardous waste	t	2,705	2,648
Share hazardous waste	$\frac{\text{Amount of hazardous waste in t}}{\text{Total amount of waste in t}}$	4.1 %	4.0 %
Share of suppliers with environmental management system (EMS)	$\frac{\text{Number of suppliers with EMS}}{\text{Total number of suppliers}}$	64 %	66 %
Share of purchasing volume of suppliers with EMS	$\frac{\text{Purchasing volume of suppliers with EMS}}{\text{Total purchasing volume}}$	88 %	89 %

***Proposal for environmental key performance indicators in the standardization***

As already introduced, control of environmental performance within the company must go ahead the environmental reporting to the public. The DIN EN ISO 14031 is an international standard devoting to the question of how such an environmental performance assessment can be made within an organization and can be created with indicators. The standard defines the environmental performance assessment as "the process to support management decisions for the environmental performance of an organization by selection of indicators, data collection and analysis, assessment of information according to environmental performance criteria, reporting and communication as well as periodical review and improvement of this process" (DIN EN ISO 14031:1999, p. 5). As environmental performance, the actual results of an environmental management system are classified. At the strategic level, the performance of an installed environmental management system in relation to the formulation of ecology-oriented objectives and the creation of appropriate conditions (measures, structures and processes) for planning, controlling and monitoring of the implementation of these objectives is considered (e.g. number of achieved objectives and targets or profitability of projects for environmental improvement). At the operational level, the environmental performance refers to the results of the installed environmental management system. The operational level aims at the determination of the results and thus of the ecological efficiency, i.e. the input/output ratio for the environmental goal achievement, while at the strategic level decisions about questions of ecological efficiency are made by assessing the degree of target achievement and the assessment of the environmental objectives.

### ***Environmental performance assessment according to DIN EN ISO 14031***

The individual steps of environmental performance assessment are assigned to the four basic stages of the process "Planning - Implementation - Verifying - Acting" of the Deming circle (DIN EN ISO 14031:1999, p. 6). Most important within these four steps, is the selection of indicators for the environmental performance assessment. Two categories of indicators are distinguished: The Environmental Condition Indicators (environmental status indicators) and the Environmental Performance Indicators: While the environmental status indicators provide information about the local, national and global environmental situation, the environmental performance indicators aim directly at the individual organization and the mapping their environmental management conditions (e.g. number of environmental objectives, employees in the environmental management sector) and their environmental aspects (e.g. information about emissions into air, water, soil). The assessment of environmental performance takes place by a target-performance comparison, i.e. by the comparison of indicators with the objectives of the organization. The represented and assessed environmental performance can then be subject of the reporting and communication of the organization to external recipients and basis for possible improvements in the determination of environmental performance.

### ***Environmental management information systems (EMIS)***

If IT systems, i.e. corporate environmental information systems are used to gather, prepare and analyse the information, costs and benefits of performance measurement systems can enter into a meaningful relationship. An environmental management information system (EMIS) is an organizational-technical system for the systematic collection, processing and provision of environmentally relevant information in an organization. Its primary purpose is the collection of operational pollution and the support of environmental protection measures (HAASIS 1995 p. 7). Thus EMIS serve on the one hand the internal decision support and on the other hand lay the basis for reporting for information supply of external actors.

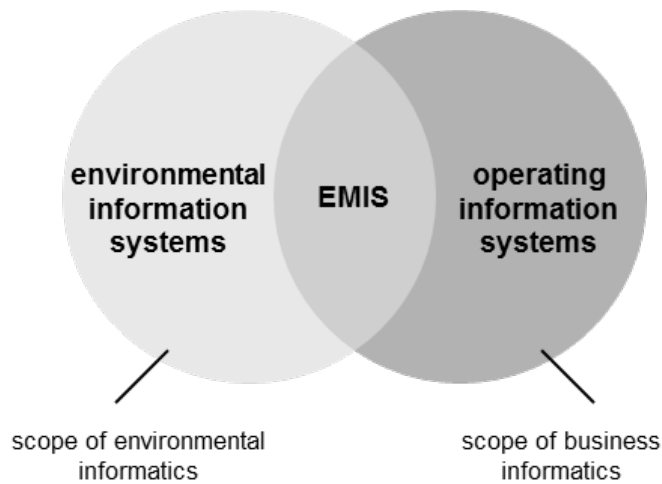
### ***Tasks of EMIS***

Such environmental information systems typically result from the expansion of existing information systems to environmental aspects. In addition, they can include organizational and process data besides quantity and quality indicators of inputs and outputs. Although computing systems that can convert individual indicators into each other, are difficult to apply in the ecology-related field due to the multi-causality, at least classification systems in terms of benchmarking can be built. In the context of the EMIS concepts discussed by HILTY (HILTY 2006, p. 92), such a key performance indicator system can be used to support the controlling. The information obtained can be used both for internal controlling and for the communication of corporate environmental performance to the public (environmental reporting). Besides these controlling oriented EMIS the task oriented EMIS are another category, which are used for special operational tasks such as the waste or hazardous substance management and which are used to the greatest possible extent as stand-alone systems, i.e. isolated from other business information systems.

The third group includes the production-related EMIS. The inclusion of the thoughts of the emission and waste reduction in production planning and control as well as the corresponding information systems are characteristics of this category. Even in the design (Computer-Aided Design, CAD) a product design tailored to subsequent recycling processes (e.g. disassembling, reprocessing and reinstallation of components) can be in the focus of an EMIS.



Figure 30: Environmental management information systems



Source: HILTY 2006, p. 54

## 2 Voluntary external environmental reporting as part of sustainability reporting

### ***Subject of report in the narrow sense***

If the focus is on the environmental functions supply, admission and regulation, the report object in the narrow sense should be the use of these functions, which is represented with the help of environmental indicators. Therefore, the environmental part of sustainability reporting, the environmental reporting, can be organized as follows: Inputs into the company (energy, water and material) use the supply function, outputs from the company (emissions, waste water and waste) use the object function. As an indicator for the control function for example the impacts on biodiversity can be represented. Aspects outside the corporate boundary are the environmental aspects of transportation and products and services of the company.

### ***Subject of report in the broader sense***

Since the provision of corporate environmental performance is integrated in the business control process, the environmental reporting usually includes, beyond the environmental performance, the presentation of the environmental management system, the ecological relevance and measures of individual functional areas, ecological relevant innovation and the management of the stakeholders (see for further readings for the development in the field of sustainability reporting LANGE/PIANOWSKI 2008; ISENMANN/GÓMEZ 2008). The table below provides an overview of the components of a report in a broader sense (Table 2).

Table 19: Subject of report in the broader sense

<p><b>ecology orientation</b>          corporate guidelines          environmental guidelines          responsibilities and deadlines          type of environmental management system and included locations          external assessments</p>
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<p><b>environmental performance</b></p> <p>LCI of direct environmental aspects</p> <p>ecology-oriented assessment of direct environmental aspects</p> <p>economic assessment of direct environmental aspects</p> <p>measures to control the environmental performance</p> <p>target achievement</p>
<p><b>value-added steps</b></p> <p>procurement (suppliers)</p> <p>utilization (customers)</p> <p>facility management</p> <p>disposal</p> <p>logistics</p> <p>employees</p>
<p><b>innovations</b></p> <p>research and development</p> <p>operating performance</p> <p>institutional innovations</p> <p>environmental investments</p>
<p><b>stakeholder</b></p> <p>competitors</p> <p>politics</p> <p>society</p> <p>education and research</p> <p>ecological framework conditions (nature and climate protection)</p>

*Source: GÜNTHER/KAULICH 2007, p. 36 ff.*

**Guideline for the GLOBAL REPORTING INITIATIVE (GRI)**

But in what form this contents should be represented by the company? For this the guideline of the GRI provides a comprehensive support for companies. The organization already introduced to the actors of environmental policy was founded in 1997 as a joint initiative of the U.S. NGO „COALITION FOR ENVIRONMENTALLY RESPONSIBLE ECONOMICS“ (CERES) and the „UNITED NATIONS ENVIRONMENT PROGRAMME“ (UNEP). Since then the GRI has been worked to settle a globally applicable, mandatory guideline for sustainable reporting and to promote its global acceptance. Because until 2015, more than 60,000 reports were published according to these guidelines and are publicly available on [www.corporateregister.com](http://www.corporateregister.com), environmental reporting based on the guideline for sustainability reporting of the GRI should be presented in this book. This guideline (in the English version: Sustainability Reporting Guidelines) shall serve as a checklist for organizations when reporting. The objective is to represent both the economic and environmental as well as the social dimension of their business activities. After the first version in 2000, the second version in 2002 and the third version in 2006, 2013, the fourth version of the guideline was passed. Superior objective is to support the reporting organizations and their stakeholders on the way to a more sustainable development. The three components of a sustainability report required for this are the presentation of strategy and profile of the

company, the description of management's approach and performance indicators. Hereinafter, all three main focuses are discussed separately, whereas the economic and social performance indicators are presented only in an overview, on the contrary the ecological ones more detailed. The GRI helps companies with two questions of reporting: For the HOW of reporting principles for the content and its quality and for the choice of system boundary were developed and protocols were created or existing ones were chosen as reference. For the WHAT of reporting general disclosure areas were proposed and supplemented by sector specific conditions, so-called sector supplements. This was further extended by national particularities.

### **Reporting principles**

The GRI has formulated four principles for the demarcation of the contents and six for the quality of its presentation, which have their roots in the requirements of reporting of financial data (financial statements etc.). But there were also examples for the environmental sector, e.g. the principles already passed in 1997 by the DEUTSCHES INSTITUT FÜR STANDARDISIERUNG (DIN) e.V. for the preparation of an environmental report (DIN 33922). Each criterion is first defined and then explained. So-called check statements should help the company to verify compliance. Hereinafter, the definitions of the GRI guidelines are presented (Global Reporting Initiative (GRI) 2013 p. 16 ff.):

#### Principles for defining **report content**:

*Stakeholder Inclusiveness:* „The organization should identify its stakeholders, and explain how it has responded to their reasonable expectations and interests. “

*Sustainability Context:* „The report should present the organization’s performance in the wider context of sustainability. “

*Materiality:* „The report should cover Aspects that: Reflect the organization’s significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders “

*Completeness:* „The report should include coverage of material Aspects and their Boundaries, sufficient to reflect significant economic, environmental and social impacts, and to enable stakeholders to assess the organization’s performance in the reporting period. “

#### Principles for defining report quality:

*Balance:* „The report should reflect positive and negative aspects of the organization’s performance to enable a reasoned assessment of overall performance. “

*Comparability:* „The organization should select, compile and report information consistently. The reported information should be presented in a manner that enables stakeholders to analyse changes in the organization’s performance over time, and that could support analysis relative to other organizations. “

*Accuracy:* „The reported information should be sufficiently accurate and detailed for stakeholders to assess the organization’s performance. “

*Timeliness:* „The organization should report on a regular schedule so that information is available in time for stakeholders to make informed decisions “

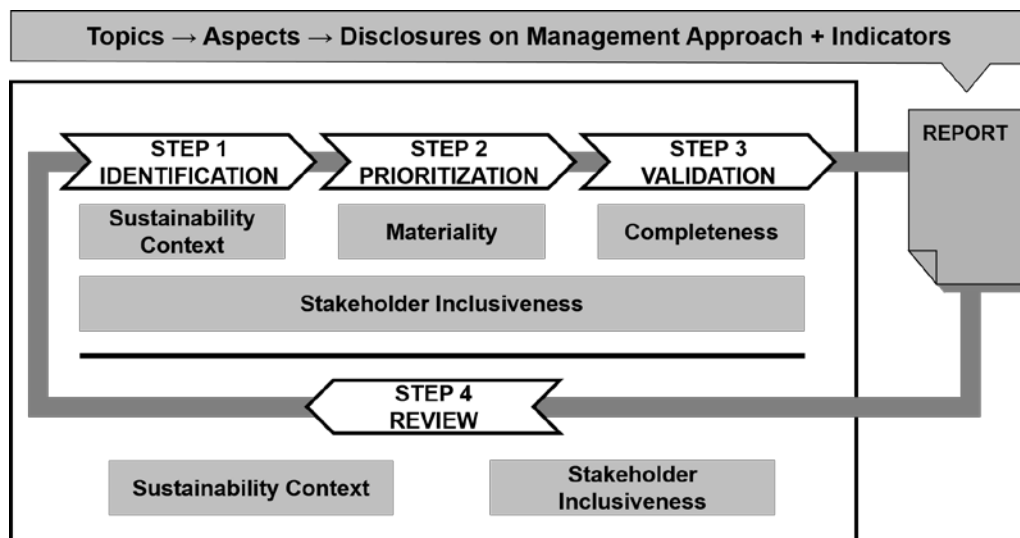
*Clarity:* „The organization should make information available in a manner that is understandable and accessible to stakeholders using the report. “

**Reliability:** „The organization should gather, record, compile, analyse and disclose information and processes used in the preparation of a report in a way that they can be subject to examination and that establishes the quality and materiality of the information.“

### **Defining material aspects and boundaries**

The boundaries are redefined for each essential aspect according to the impact of business activities along the value chain. Therefore, the boundaries may vary for each aspect and may include different business segments or parts of the value chain. For the decision to determine the material aspects and boundaries, the following sequence can be used (Fig. 3).

*Figure 31: Defining material Aspects and Boundaries - process overview*



*Source: GLOBAL REPORTING INITIATIVE (GRI), 2013, p. 90.*

### **Protocols**

The protocols of the GLOBAL REPORTING INITIATIVE (GRI) ensure the consistent representation of the report contents. The GRI guideline distinguishes between indicator protocols and technical protocols. Indicator protocols exist for each economic, environmental and social performance indicator on the GRI guideline. They contain definitions, notes for the preparation of the report and further information, which ensure that performance indicators are interpreted uniformly. For example, the instruction for the indicator EN16 is: "Report the greenhouse gas emissions as the sum of direct and indirect emissions in tonnes of CO<sub>2</sub> equivalent." For determining the company receives one and a half-page explanation. Technical protocols contain statements on issues in reporting, such as determination of boundaries of the report. They should be used in conjunction with the GRI guideline and the sectoral supplements.

### **Content of the report - Standard Disclosures**

There are two different types of Standard Disclosures: General Standard Disclosures and Specific Standard Disclosures.

The General Standard Disclosures are applicable to all organizations preparing sustainability reports. The General Standard Disclosures are divided into seven parts: Strategy and Analysis, Organizational Profile, Identified Material Aspects and Boundaries, Stakeholder Engagement, Report Profile, Governance, and Ethics and Integrity.

The Guidelines organize Specific Standard Disclosures into three Categories - Economic, Environmental and Social. The Social Category is further divided into four sub-Categories, which are Labour Practices and Decent Work, Human Rights, Society and Product Responsibility. Additionally, Disclosures on Management Approach (DMA) are intended to give the organization an opportunity to explain how the economic, environmental and social impacts related to material Aspects are managed.

*Table 20: Report contents Global Reporting Initiative*

Strategy and analysis	Statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability
	Description of key impacts, risks, and opportunities
Organizational profile	Name of the organization
	Primary brands, products, and services
	Location of the organization's headquarters
	Number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report
	Nature of ownership and legal form
	Markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries)
	Scale of the organization
	0 Total number of employees by employment contract and gender, total number of permanent employees by employment type and gender, total workforce by employees and supervised workers and by gender, total workforce by region and gender, significant variations in employment numbers
	1 Percentage of total employees covered by collective bargaining agreements
	2 Organization's supply chain
	3 Significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain
	4 Precautionary approach or principle addressed by the organization
	5 Externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses
6 Memberships of associations (such as industry associations) and national or international advocacy organizations	
7 All entities included in the organization's consolidated financial statements or equivalent documents	

Identified Aspects and Boundaries	Material and	8	Process for defining the report content and the Aspect Boundaries and how the organization has implemented the Reporting Principles for Defining Report Content
		9	Material Aspects identified in the process for defining report content
		0	Aspect Boundary within the organization for each material Aspect
		1	Aspect Boundary outside the organization for each material Aspect
		2	Effect of any restatements of information provided in previous reports, and the reasons for such restatements
		3	Significant changes from previous reporting periods in the Scope and Aspect Boundaries
Stakeholder Engagement		4	Stakeholder groups engaged by the organization
		5	Basis for identification and selection of stakeholders with whom to engage
		6	Organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process
		7	Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting. Report the stakeholder groups that raised each of the key topics and concerns
Report Profile		8	Reporting period (such as fiscal or calendar year) for information provided
		9	Date of most recent previous report (if any)
		0	Reporting cycle (such as annual, biennial)
		1	Contact point for questions regarding the report or its contents
		2	'In accordance' option (Core or Comprehensive) the organization has chosen
		3	Organization's policy and current practice with regard to seeking external assurance for the report and relationship between the organization and the assurance providers
Governance		4	Governance structure of the organization, including committees of the highest governance body
		5	Process for delegating authority for economic, environmental and social topics from the highest governance body to senior executives and other employees
		6	Statement whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental and social topics, and whether post holders report directly to the highest governance body

	7 Processes for consultation between stakeholders and the highest governance body on economic, environmental and social topics
	8 Composition of the highest governance body and its committees
	9 Statement whether the Chair of the highest governance body is also an executive officer
	0 Nomination and selection processes for the highest governance body and its committees, and the criteria used for nominating and selecting highest governance body members
	1 Processes for the highest governance body to ensure conflicts of interest are avoided and managed. Report whether conflicts of interest are disclosed to stakeholders
	2 Highest governance body's and senior executives' roles in the development, approval, and updating of the organization's purpose, value or mission statements, strategies, policies, and goals related to economic, environmental and social impacts
	3 Measures taken to develop and enhance the highest governance body's collective knowledge of economic, environmental and social topics
	4 Processes for evaluation of the highest governance body's performance with respect to governance of economic, environmental and social topics
	5 Highest governance body's role in the identification and management of economic, environmental and social impacts, risks, and opportunities
	6 Highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental and social topics
	7 Frequency of the highest governance body's review of economic, environmental and social impacts, risks, and opportunities
	8 Highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all material Aspects are covered
	9 Process for communicating critical concerns to the highest governance body
	0 Nature and total number of critical concerns that were communicated to the highest governance body and the mechanism(s) used to address and resolve them
	1 Remuneration policies for the highest governance body and senior executives
	2 Process for determining remuneration
	3 Stakeholders' views sought and taken into account regarding remuneration, including the results of votes on remuneration policies and proposals, if applicable

	<p>4 Ratio of the annual total compensation for the organization's highest-paid individual in each country of significant operations to the median annual total compensation for all employees (excluding the highest-paid individual) in the same country</p> <p>5 Ratio of percentage increase in annual total compensation for the organization's highest-paid individual in each country of significant operations to the median percentage increase in annual total compensation for all employees (excluding the highest-paid individual) in the same country</p>
Ethics and Integrity	<p>6 Organization's values, principles, standards and norms of behaviour such as codes of conduct and codes of ethics</p> <p>7 Internal and external mechanisms for seeking advice on ethical and lawful behaviour, and matters related to organizational integrity, such as helplines or advice lines</p> <p>8 Internal and external mechanisms for reporting concerns about unethical or unlawful behaviour, and matters related to organizational integrity, such as escalation through line management, whistleblowing mechanisms or hotlines</p>
Indicators	<p><b>Economic:</b>  Economic performance  Market presence  Indirect economic impacts  Procurement practices</p> <p><b>Environmental:</b>  Materials  Energy  Water  Biodiversity  Emissions  Effluents and waste  Products and services  Compliance  Transport  Overall  Supplier environmental assessment  Environmental grievance mechanisms</p>



<p>5. Management approach and performance indicators (ongoing)</p>	<p><b>Social performance indicators:</b></p> <p>Labour practices and decent work:</p> <ul style="list-style-type: none"> <li>Employment</li> <li>Labour/management relations</li> <li>Occupational health and safety</li> <li>Training and education</li> <li>Diversity and equal opportunity</li> <li>Equal remuneration for women and men</li> <li>Supplier assessment for labour practices</li> <li>Labour practices grievance mechanisms</li> </ul> <p>Human rights:</p> <ul style="list-style-type: none"> <li>Investment</li> <li>Non-discrimination</li> <li>Freedom of association and collective bargaining</li> <li>Child labour</li> <li>Forced and compulsory labour</li> <li>Security practices</li> <li>Indigenous rights</li> <li>Assessment</li> <li>Supplier human rights assessment</li> <li>Human rights grievance mechanisms</li> </ul> <p>Society:</p> <ul style="list-style-type: none"> <li>Local communities</li> <li>Anti-corruption</li> <li>Public policy</li> <li>Anti-competitive behaviour</li> <li>Compliance</li> <li>Supplier assessment for impacts on society</li> <li>Grievance mechanisms for impacts on society</li> <li>Product responsibility:</li> <li>Customer health and safety</li> <li>Product and service labelling</li> <li>Marketing communications</li> <li>Customer privacy</li> <li>Compliance</li> </ul>
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Source: GLOBAL REPORTING INITIATIVE (GRI) 2013 p. 20 ff.

**Content of the report - sector disclosures**

Sector disclosures complement the GRI guideline by industry recommendations for the application of the guideline in specific industries. Moreover, they contain industry-specific performance indicators, which are relevant for each sector, but not for other sectors. GRI has made sector disclosures for the following sectors available: Airport operators, Construction and

real estate, electric utilities, event organizers, financial services, food processing, media, mining and metals, NGOs, and oil and gas. The sector disclosures are available in addition to the GRI guideline and includes notes and comments on the existing indicators for companies in specific sectors in order to adapt the content better to the environmental aspects and specific requirements of each sector. These relate to the aspects materials, energy, water, biodiversity, emissions and contain mainly information about units, definitions and calculation methods. For example, in EN8 not only the water withdrawal according to various sources is reported, also a breakdown according to the use (process and cooling water) is done. It is further recommended that emissions in relation to the generated power are to be indicated (in MWh).

### ***Indicators***

Core of the reporting according to GRI are the economic, environmental and social performance indicators.

Objectives of the GRI reporting are:

- a) Reporting on trends: Information should be presented for the current reporting period (e.g., one year) and at least two previous periods, as well as future targets, where they have been established, for the short- and medium-term.
- b) Use of protocols: Organizations should use the protocols that accompany the indicators when reporting on the indicators. These give basic guidance on interpreting and compiling information.
- c) Presentation of data: In some cases, ratios or normalized data are useful and appropriate formats for data presentation. If ratios or normalized data are used, absolute data should also be provided.
- d) Data aggregation: Reporting organizations should determine the appropriate level of aggregation of information. See additional guidance in the general reporting notes section of the guidelines.
- e) Metrics: Reported data should be presented using generally accepted international metrics (e.g., kilograms, tonnes, litres) and calculated using standard conversion factors. Where specific international conventions exist (e.g., GHG equivalents), these are typically specified in the indicator protocols.

### ***Classification proposal for environmental indicators***

The environmental dimension of sustainability concerns the organization's impact on living and non-living natural systems, including land, air, water and ecosystems. The environmental category covers impacts related to inputs (such as energy and water) and outputs (such as emissions, effluents and waste). In addition, it covers biodiversity, transport, and product and service-related impacts, as well as environmental compliance and expenditures. GRI designed a classification proposal for the environmental indicators. (Table 21).

Table 21: Overview of the G4 environmental indicators

<b>Materials</b>
EN1. Materials used by weight or volume
EN2. Percentage of materials used that are recycled input materials
<b>Energy</b>
EN3. Energy consumption within the organization
EN4. Energy consumption outside of the organization
EN5. Energy intensity
EN6. Reduction of energy consumption
EN7. Reductions in energy requirements of products and services
<b>Water</b>
EN8. Total water withdrawal by source
EN9. Water sources significantly affected by withdrawal of water
EN10. Percentage and total volume of water recycled and refused
<b>Biodiversity</b>
EN11. Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
EN 12. Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas
EN13. Habitats protected or restored
EN14. Total number of IUCN red list species and national conservation list species with habitats in areas affected by operations, by level of extinction risk
<b>Emissions</b>
EN15. Direct greenhouse gas (GHG) emissions (scope 1)
EN16. Energy indirect greenhouse gas (GHG) emissions (scope 2)
EN 17. Other indirect greenhouse gas (GHG) emissions (scope 3)
EN 18. Greenhouse gas (GHG) emissions intensity
EN29. Reduction of greenhouse gas (GHG) emissions
EN20. Emissions of ozone-depleting substances (ODS)
EN21. NO <sub>x</sub> , SO <sub>x</sub> , and other significant air emissions
<b>Effluents and Waste</b>
EN22. Total water discharge by quality and destination
EN23. Total weight of waste by type and disposal method
EN24. Total number and volume of significant spills
EN25. Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the BASEL Convention Annex I, II, III and VIII, and percentage of transported waste shipped internationally
EN26. Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff
<b>Products and Services</b>
EN27. Extent of impact mitigation of environmental impacts of products and services

EN28. Percentage of products sold and their packing materials that are reclaimed by category
<b>Compliance</b>
EN29. Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations
<b>Transport</b>
EN30. Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce
<b>Overall</b>
EN 31. Total environmental protection expenditures and investments by type

Source: GLOBAL REPORTING INITIATIVE (GRI) 2013, p. 52 ff.

### **Content analysis for the evaluation of information**

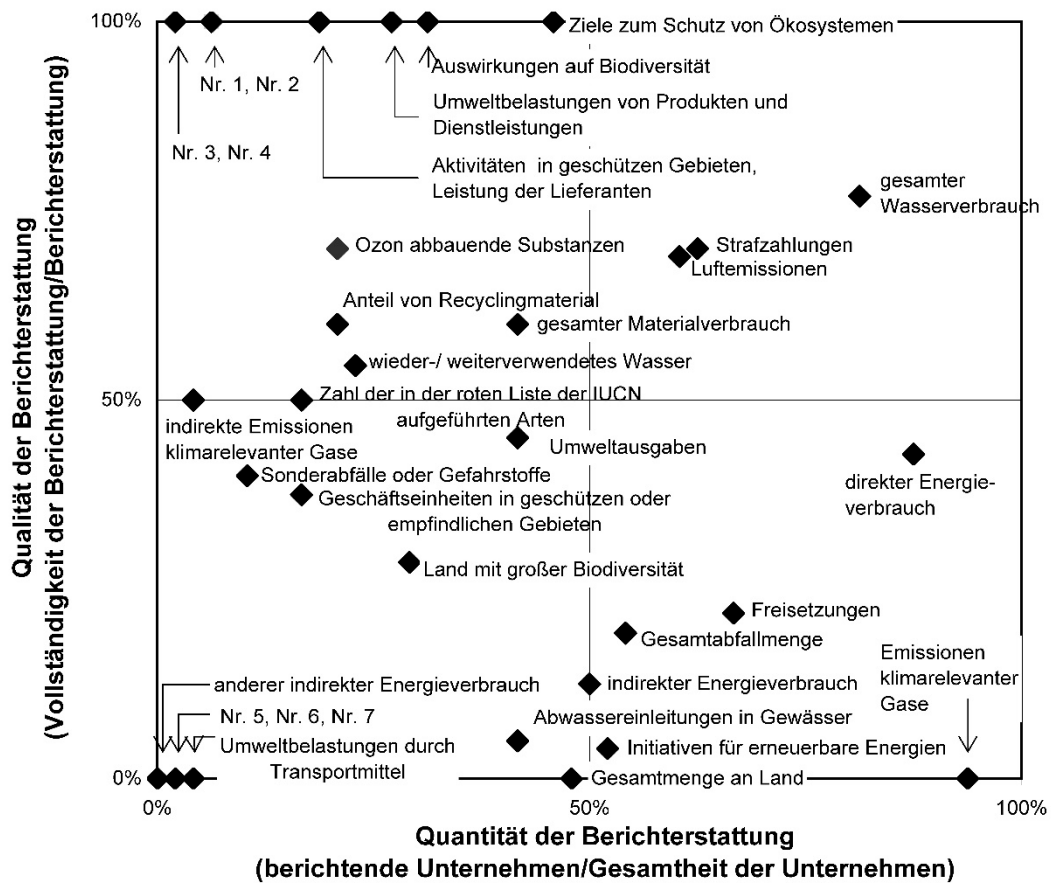
Since the reports do not follow a legally defined structure, they are constructed differently in spite of the guideline and the reader has to gather the information on his own. For this, one can use the tool of content analysis. The aim is generally to systematically and intersubjectively describe characteristics in form and content of messages (FRÜH 2007, p. 25). For this purpose, eight steps are to be completed, for which the implementation of the environmental performance as a report subject in the narrower sense within the framework of the evaluation of the GRI reporting is presented in the following table (Table 22).

Table 22: Content analysis using the example of the Global Reporting Initiative

Formulation of the question	Which statement can be made about the environmental performance of the company/an industry?
Determination of the material sample	all business reports according to GRI in 2007 of an industry
Installing of the category system	all sections of the environmental performance according to GRI (materials, energy, water, biodiversity, emissions, effluents and waste, products and services, legal compliance, transport, total)
Definition of categories	according to the performance indicators protocols for all indicators of the above sections
Determination of the units of analysis	parts of the report devoted to environmental performance indicators in accordance with GRI indicator list
Coding according to the available decision rules for each indicator	2, if category is fulfilled 1, if category is partly fulfilled 0, if category is not fulfilled

Evaluation	<p>quantity = number of reported indicators (not reported: group with all companies coded with 0; reported: group with all companies coded with 1 and 2)</p> <p>quality = degree of performance in case of reporting of the indicator (i.e. coding with 1 or 2): Does the reporting meet the GRI guideline, as they are specified in the indicator protocols? (low quality: group with all companies coded with 1; high quality: group with all companies coded with 2)</p>
Presentation and interpretation of results	The evaluation results can be illustrated as shown in the following example.

Figure 32: Quantity/quality chart



Source: GÜNTHER/HOPPE/POSER 2007, p. 17

To show how the content analysis can look in its implementation, the procedure for the report subject is finally presented in the broader sense, as it has been implemented for the Good Company Ranking in 2006 in the field of environment (KRÖHER 2007 p. 76 ff.) (Table 23).

Table 23: Content analysis using the example of the Good Company Ranking

Formulation of the question	To which extent does the Company take charge of the environment?
Determination of the material sample	environmental report and environmental statement sustainability report or corporate responsibility report or CSR report business report code of conduct and corporate governance code or ethical code websites: sub items „environment“ or „CSR“ as well as „news“
Installing of the category system	five recognised concepts of operational environmental economics: environmental management system (environmental aspects of business processes), environmental performance measurement, added-value circle, innovation management and stakeholder approach
Definition of categories	e.g. the category of "environmental performance measurement", subcategory "economic evaluation": Are economic evaluations performed with regard to direct environmental aspects?
Determination of the units of analysis	phrases or statements that represent the proceeding of the company
Coding according to the available decision rules for each indicator	1, if category is fulfilled 0, if category is not fulfilled
Evaluation	determination of frequencies, intensities, or contingencies
Presentation and interpretation of results	in tabular form: five spreadsheets for each company

### 3 External reporting requirements

Finally, the question arises whether there are reporting requirements in addition to the voluntary reporting. For this purpose, the reporting requirements of the environmental statistics act, the pollutant release and transfer register (PRTR), the German emissions trading authority and the German accounting standard 15 are finally represented. The chapter is completed with the recommendation of the EU for integrating environmental aspects in the financial statements (Table 24).

Table 24: External reporting requirements

EMAS-Privilegierungs-VO (EMASPrivilegV) (EMAS Privilege Regulation)	Umweltstatistik -gesetz (UStatG) (Environmental Statistics Act)	Gesetz zur Ausführung des Protokolls über Schadstoff-freisetzungs- und -verbringungsregister (SchadRegProtAG)	Treibhausgasemissionshandels-gesetz (TEHG) (Greenhouse Gas Emission Trading Law)	Deutsche Rechnungslegungsstandards 5 und 15 (DRS 5 und 15) (German)	Empfehlung zur Berücksichtigung von Umweltaspekten in Jahresabschluss und Lagebericht von
copy of the reports referred to: § 12 Abs.6 for limiting emissions of highly liquid halogenated organic compounds; § 8 Abs. 5 Satz 3 of the regulation on the control of volatile organic compounds. § 6 Abs. 3 Satz 4 of the ordinance on the control of	public or private water supply and wastewater disposal climate-effecting and wastewater hazardous substances,	Releases to air, water and land of any pollutant when exceeding a threshold (Annex II E-PRTR-VO); transfer of hazardous and non-hazardous waste, (from certain minimum quantities)	report on the greenhouse gas emissions; CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, SF <sub>6</sub> and perfluorocarbons	DRS5: operational risk: risks in operating systems or processes, in particular legal and operational risks DRS15: presentation of important legal	recognition, measurement and disclosure of environmental liabilities, expenses and risks and related assets recognition and measurement of environmental
<b>Subject</b>					
<b>Measuring method</b>	not specified	Declaration, whether: measurement.	measurement or calculation	quantitative representation	not specified
<b>Obligation to report</b>	authorities and companies according to § 18 UStatG	companies which carry out the activities listed in Annex I E-PRTR-VO and exceed the capacity thresholds	companies in the energy conversion and forming, iron and steel production and processing mineral	parent companies, which are obliged by § 315 HGB to prepare consolidated financial	companies covered by the provisions of 1999/60/EWG and 90/605/EWG
<b>Legal validity</b>	2005	2006	2005	2005	2001
<b>Period</b>	annual	annual	annual	annual	annual
<b>Access to data</b>	GENESIS ( <a href="https://www-genesis.desta">https:// www-genesis.desta</a> )	electronic database ( <a href="http://www.home.prt.r.de/index.php">http://www.home.prt.r.de/index.php</a> )	CSR Reports, corporate environmental	group management report	financial statements and management report of the
2002					
annual					
-					

	Bundesimmissionsschutzgesetz	12. Verordnung zur Durchführung des Bundes-	Kreislaufwirtschafts-Abfallgesetz (KrW-AbfG)	Bio-Abfallanlagenverordnung (30.
<b>Subject</b>	emission declaration (§ 27 BImSchG): Air contaminants within a period (amount, spatial and temporal distribution)	safety report: concept to prevent accidents, safety management system; threats and countermeasures; report on the design, construction, operation and maintenance of hazardous operating areas; internal emergency plans; information for	waste balance (§ 30 KrW- / AbfG) type, quantity and stay of hazardous waste (threshold: § 18) report on the measurement and monitoring measures prescribed in the ordinance; emission	measurement methods and equipment for continuous measurement of emissions: results of calibration and verification of functionality evaluation of the continuous
<b>Measuring method</b>	not specified	not specified	not specified	not specified
<b>Obligation to report</b>	operators of plants that cause serious environmental damage, or endanger the public by other means	plant operator for operating areas where dangerous substances exceed certain amounts (see Annex I, column 5, StörfallVO)	producers of hazardous waste (creation of the waste balance) dump operators (creation of emission	operator of the facility for the biological or biological-physical disposal of municipal waste
<b>Legal</b>	2002	2000	1994	2001
<b>Period</b>	annual	annual	annual	annual
<b>Access to</b>	-	-	-	-

#### 4 Russian Additions to the chapter

In the Russian Federation environmental reporting is legally binding and regulated by the orders of the Federal State Statistics Service. For example, the reports of the railways in the Russian Federation - JSC "Russian Railways" is formed in accordance with the following regulations:

1. Order of the Federal State Statistics Service dated October 19, 2009 № 230 "On approval of statistical tools for organizing federal statistical monitoring of the water use by the Federal Agency for Water Recourses" (<http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=161673>).
2. Order of the Federal State Statistics Service dated August 9, 2012 № 441 "On approval of statistical tools for the organization of federal statistical monitoring of agriculture and environment" (<http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=161,673>).
3. Order of the Federal State Statistics Service dated January 28, 2011 № 17 "On approval of statistical tools for organizing federal statistical monitoring of production and consumption



wastes by the Federal agency of Supervision of Natural resources (RosPrirodNadzor)" (<http://www.garant.ru/products/ipo/prime/doc / 12082841 />).

4. Order of the Federal State Statistics Service dated August 6, 2013 № 309 "On approval of statistical tools for the organization of federal statistical monitoring of agriculture and environment» ([http://www.consultant.ru/document/cons\\_doc\\_LAW\\_172154/](http://www.consultant.ru/document/cons_doc_LAW_172154/)).

5. Order of JSC "Russian Railways" dated November 12, 2004, № 3570r "On approval of the internal form of statistical reporting ZO-1" Report on the environmental performance of structural divisions of the branches of JSC "Russian Railways".

Rosstat (Federal State Statistics Service) reporting templates contain the following sections (See Figure 27 and Figure 28):

1. "Current costs for environmental protection" and kinds of environmental activities.
2. "The payment for a negative impact on the environment (environmental payments)"

Statistical reporting form ZO-1 "Report on the environmental performance of structural divisions of the branches of JSC" Russian Railways "is the internal corporate documents and filled only in the structural units of JSC" Russian Railways "(See Figure 29 and Figure 30). The data from this form are the basis for the environmental reporting in the whole country.

*Figure 33: The performance indicators of Rosstat for "Current expenditure on environmental protection"*

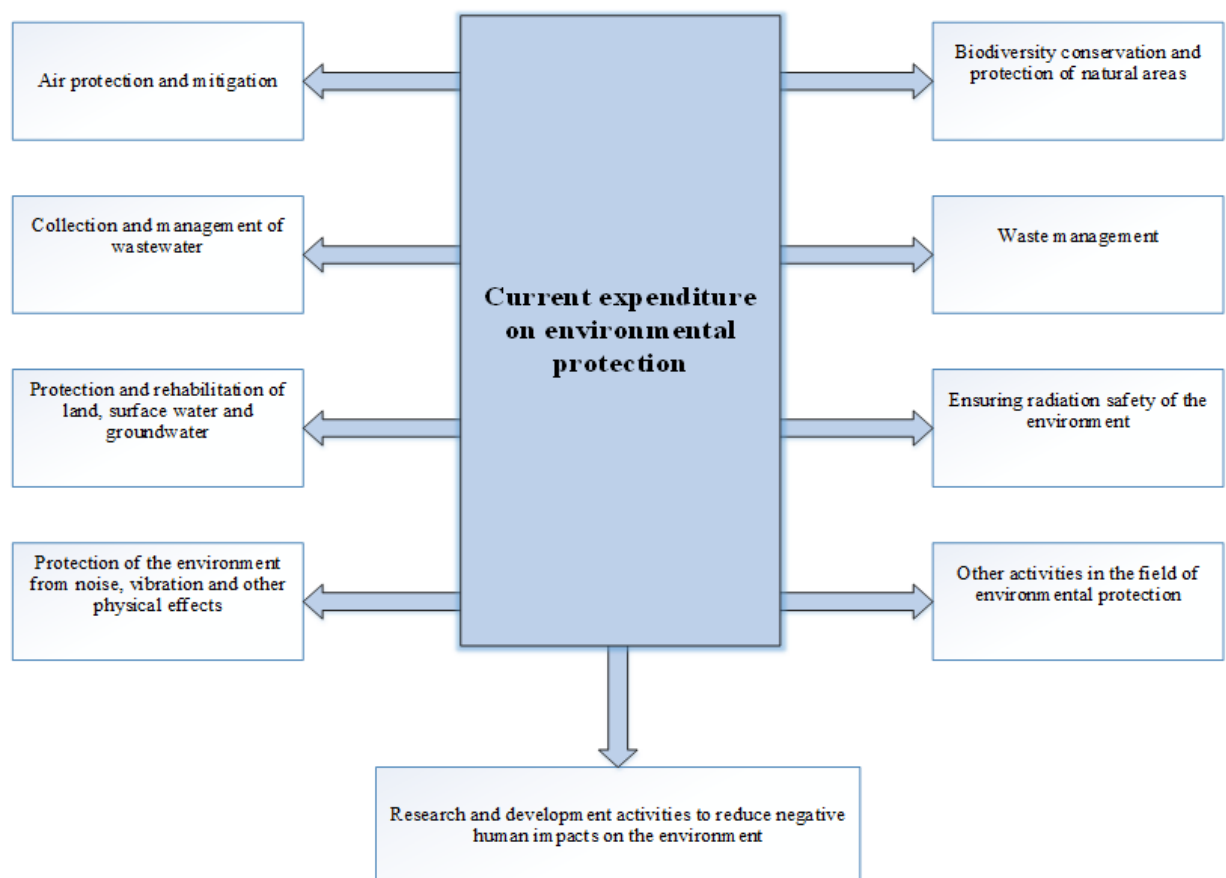


Figure 34: The performance indicators of Rosstat for: "Payment for the negative impact on the environment (environmental payments)"

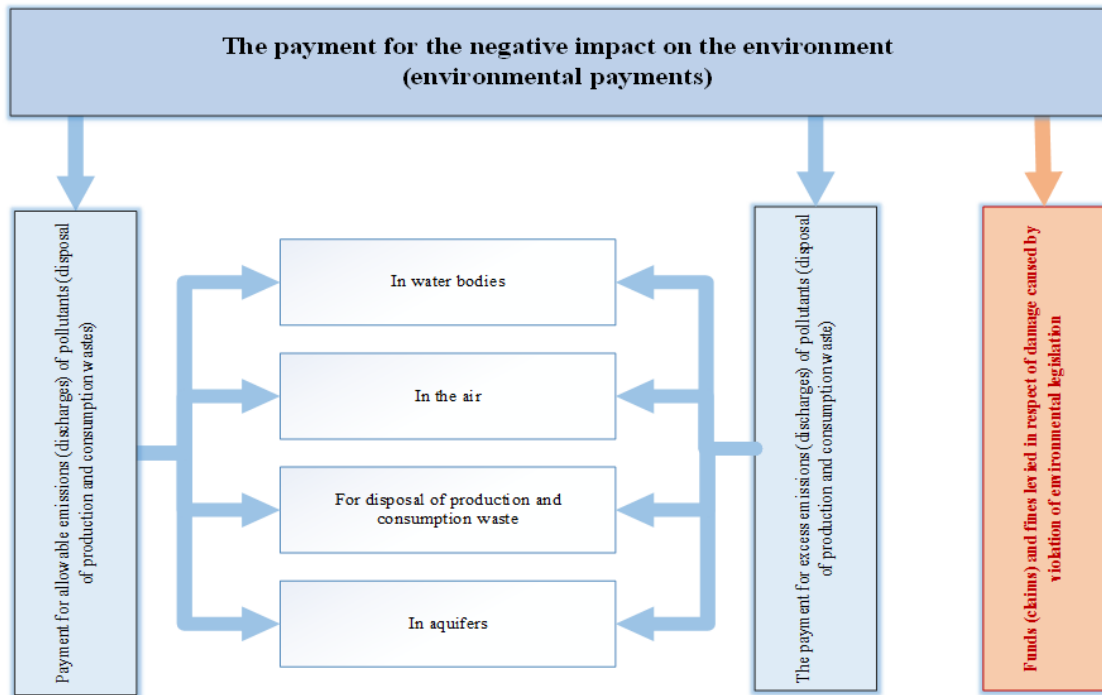


Figure 35: Indicators of statistical reporting of JSC "Russian Railways" (Beginning)

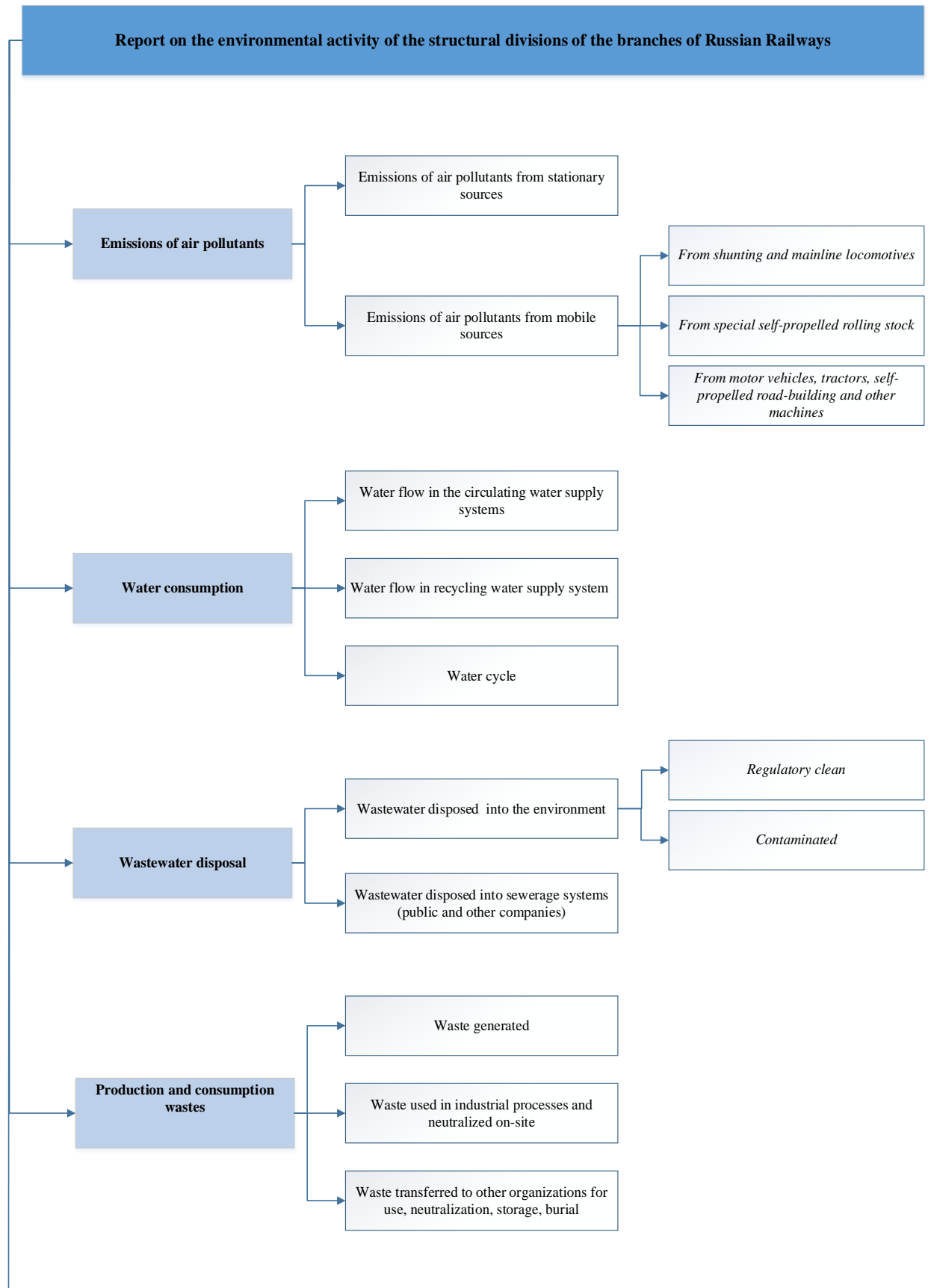


Figure 36: Indicators of statistical reporting of JSC "Russian Railways" (Ending)

