

Standardization of Key Performance Indicators for Environmental Management and Reporting in the Czech Republic

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Abstract—The paper presents chosen results of the project No SP/4i2/26/07 “Proposal of new indicators for monitoring the effectiveness of environmental management by industry (NACE) and system of environmental reporting in the evaluation of links between environment, economy and society” of the Ministry of Environment of the Czech Republic. It introduces the proposed standardized key performance indicators of the Czech Republic for environmental management systems. These are used in corporate environmental reporting and also in annual reports of organizations with Environmental Management and Audit Scheme. Key performance indicators are based on the Regulation (EC) No 1221/2009 and enlarged to economic and social area with using G3 and RICON Group guidelines in the Methodical Guideline of the Ministry of Environment.

Keywords—Environmental management, Environmental Management and Audit Scheme, Environmental performance, Key performance indicators, Environmental reporting.

I. INTRODUCTION

MASARYK UNIVERSITY has worked on the project No SP/4i2/26/07 (Project) of the Research Programme of the Ministry of Environment of the Czech Republic (MoE): “*Proposal of new indicators for continuous monitoring the efficiency of environmental management systems with respect to economic activities (NACE) and the system of environmental reporting with evaluation relationships among the environment, economy and society*” since 2007. The main goal of the project is to find out how to continuously and exactly monitor the development of the environmental impacts of chosen sector (economic activities connected with NACE - Statistical classification of economic activities) and find relationships among environment, economy and society and transform them into *Key Performance Indicators (KPIs)* [3], [9] for the environmental reports in environmental management systems (EMS) [29], [31] and EMAS (Environmental Management and Audit Scheme) [6] environmental statements.

The Project has been solved in the years 2007-2010. Its research was divided into three stages according to its particular targets as follows:

- 1) The analysis and proposal of *Environmental Key*

Performance Indicators (KPIs) in selected economic activities.

- 2) The development of the *Methodical Guideline (Methodology)* of the MoE for setting up KPIs and their reporting in the selected economic activities (NACE) [22].
- 3) The analysis, design, development and implementation of the application software *INDICATORS* for the calculation of KPIs and their annual reporting to MoE.

The results of two stages of the Project are summarized in the paper.

We analyzed definitions of indicators of international (OECD, UNECE, ...), European (EEA) and Czech (MoE, CENIA) organizations connected with environment and summarized them on the special web page of the Project [13]. We considered Tyteca [26], who reviewed the literature on environmental performance indicators. In his paper he called for an index that simultaneously accounts for resources used, good outputs produced and pollutants or undesirable outputs emitted. Also Färea, Grosskopf and Hernandez-Sancho [27] provided a formal index number of environmental performance which can be computed using data envelopment analysis techniques. The implicit benchmark is that of finding the highest ratio of good to bad outputs. They apply their method to a sample of OECD countries for 1990. OECD has established a common approach and framework for developing, measuring and using environmental indicators: the OECD Core Set and its core environmental indicators (CEI); several sets of sectoral environmental indicators (SEI) (e.g. transport, energy); a small set of key environmental indicators (KEI) [23], [30]. Hermann, Kroeze and Jawjit [28] presented a new analytical tool, called COMPLIMENT, which integrates parts of tools such as life cycle assessment, multi-criteria analysis and environmental performance indicators. It is based on environmental performance indicators, expanding the scope of data collection towards a life cycle approach and including a weighting and aggregation step. Reporting Guidelines for UK Business [1] was setting out 22 environmental KPIs, together with information on how environmental impacts arising from the supply chain and from the use of products can be taken into account.

We concluded this analysis with the first proposal of environmental KPIs to provide businessmen a tool for measurement of the EP of their organization [5]. Our approach

for setting out KPIs was connected with industry practice. We developed core KPIs to organizations with EMS which hold Responsible Care logo [20] at chemistry industry. It was done with the collaboration of Association of Chemical Industry of the Czech Republic [21]. After KPIs verification we generalized them in the Methodology of the MoE for setting up KPIs. These KPIs can be used in environmental reporting of all organizations with implemented and certified EMS [3] and also in environmental statements of organizations with validated EMAS [6].

In the paper are presented proposed KPIs from the Methodology of the MoE [5]. They are based on the Annex IV of the Regulation (EC) No 1221/2009 about voluntary participation of organizations in the Community Environmental Management and Audit Scheme (EMAS) [6], G3 Guideline [7] of the Global Reporting Initiatives (GRI), RICON Group guidelines [10] and previously proposals of KPIs published in [3], [5], [8] and [9].

II. ENVIRONMENTAL PERFORMANCE EVALUATION ANALYSIS

The *Environmental Performance* (EP) of an organization is defined as results of an organization's management of its environmental aspects [29]. In the context of *Environmental Management Systems* (EMS) these results can be measured against the organization's *environmental policy* (i.e. overall intentions and direction of an organization related to its environmental performance as formally expressed by top management), *environmental objectives* (overall environmental goals, consistent with the environmental policy, that an organization sets itself to achieve) and *environmental targets* (i.e. detailed performance requirements, applicable to the whole organization or parts thereof, that arise from the environmental objectives and that need to be set and met in order to achieve those objectives), and *other environmental performance requirements*.

The *Environmental Performance Evaluation* (EPE) is the subject of the international standard ISO 14031 "Environmental management — Environmental performance evaluation — Guidelines". The EPE is defined as follows: "Process to facilitate management decisions regarding an organization's EP by selecting indicators, collecting and analyzing data, assessing information against EP criteria, reporting and communicating, and periodic review and improvement process".

The *environmental performance criterion* is described by the standard ISO 14031 as *an organization's environmental objective, target, or other intended level of environmental performance sets up by organization's management*.

The *environmental performance indicator* means a specific expression that allows measurement of an organization's environmental performance [6].

The standard ISO 14031 describes also two general categories of indicators for the EPE: *Environmental Performance Indicators* (EPIs); and *Environmental Condition Indicators* (ECIs), but they are not used in practice [2]. The

process of EPE defined by the standard ISO 14031 is too general including methods how to choose appropriate EPIs and ECIs and set up *environmental performance criteria*. Therefore, we will present other approaches [3], [4], [6], [7] and Methodology [5] for selecting KPIs in the paper.

III. SELECTING INDICATORS WITH RESPECT TO EMAS

We considered only core KPIs, which relate to direct environmental aspects of the organizations. The remaining additional KPIs are contained in the Methodology [5] that is the output of the second stage of the above introduced Project.

Organizations of all economic activities (according to NACE [22]) should determine the core KPIs and organizations of the given economic activities should choose additional environmental KPIs according to the significant environmental aspects. To do this, the internal (possibly external) environmental audit can be used, on the basis of which the organization management will propose the additional KPIs in co-operation with an auditor [5], [31] or verifier of EMAS [6], [23]. Furthermore, the European Commission (EC) shall, in consultation with Member States (MSs) and other stakeholders, develop sectoral reference documents that shall include: *best environmental management practice; environmental performance indicators for specific sectors*, where appropriate, benchmarks of excellence and rating systems identifying environmental performance levels [6].

The EC will take into account existing reference documents and EP indicators developed in accordance with other environmental policies and instruments in the European Union (EU) or international standards (ISO, G3 Guidelines, etc).

The Regulation (EC) No 1221/2009 specified in Annex IV the core KPIs in the following key areas of the environment:

- 1) efficiency of material consumption;
- 2) energetic efficiency;
- 3) water management;
- 4) waste management;
- 5) biological diversity;
- 6) emissions into the air;
- 7) other relevant indicators of the influence of the organization's activity on the environment.

When an organization concludes that one or more KPIs are not relevant to its significant direct environmental aspects, it may not report on those KPIs. The organization shall provide justification to that effect with reference to its environmental audit or review.

Each relevant indicator, in accordance with the Annex IV of the Regulation (EC) No 1221/2009 consists of:

- a) *a figure A* indicating the total annual input/impact in the given field;
- b) *a figure B* indicating the overall annual output of the organization; and
- c) *a figure R* indicating the ratio between A and B.

Data of the overall annual output of the organization, i.e. figure B, are the same for all the above-mentioned areas relating to the environment. However, they are adapted to

various types of organizations, depending on their type of activity.

The Regulation (EC) No 1221/2009 distinguished:

- a) *organizations operating in the production sector* (manufacturing industry with NACE code D), where the total gross value-added¹ expressed in million Member State currency (e.g. CZK - Czech Crowns) or total annual physical output expressed in tones must be reported;
- b) *organization in non-industrial sectors* (administration or services with NACE codes G to P), where it shall relate to the size of the organization and expressed in the number of employees;
- c) *small and medium organizations* (SME), where the total annual turnover or the number of employees must be reported.

Figure B is unique for the given organization and is common for all indicators.

Organizations should report on all three figures A, B and R for each indicator [6]. We proposed in the Methodology [5] to report figures A and R only.

Data on the total annual inputs/impacts in the given area, i.e. figure A, are described in the following paragraphs, where numbering of indicators is in compliance with numbering of indicators of G3 Guidelines [7], which is mostly used in practices.

A. Material efficiency

Indicator EN1 - concerning the “annual mass-flow of different materials used” (excluding energy carriers and water), expressed in tones.

Explanation: This is the material consumption in the organization according to weight, possibly volume. These are used materials in the organization including materials purchased from external suppliers, and further, the materials that are obtained from internal sources (bound production and mining activities). This indicator describes the contribution of the organization to the preservation of the global basis of sources and the efforts of the organization to reduce material intensity and to improve efficiency of its economy. These are the explicit aims of the OECD Council according to *OECD Recommendation C(2008)40*. For internal managers and other persons interested in the financial situation of the organization, the material consumption is related directly to the total operating costs. Internal monitoring of this consumption either according to product or according to the category of products enables monitoring of material efficiency and material flow costs.

The weight of all used material including material purchased from external suppliers, and further, the materials that are obtained from internal sources (bound production and mining activities) will be reported.

Indicator EN2 – ratio of the used recycled input materials

¹ Gross value-added or gross profit is calculated as sales of organization minus all costs directly related to those sales. These costs can include manufacturing expenses, raw materials, labor, selling, marketing and other expenses.

expressed in units % of the total input materials.

Explanation: Requirement of this indicator is to ascertain the ability of the organization to use recycled input materials. Use of these materials helps to reduce the demand of new natural materials and contributes to the preservation of the global basis of natural resources. The percentage content of the used recycled input material will be reported, with the use of the following formula:

$$EN2 = (\text{Total amount of input used recycled materials} / \text{All used input materials}) \times 100$$

Substitution of common material with the recycled one can contribute to the reduction of total costs of operation, which is important information for internal and other employees that are interested in the financial situation of the organization.

B. Energy efficiency

Indicator EN3 – concerning the “total direct energy use”, the total annual energy consumption, expressed in MWh or GJ. The total annual energy consumption of the organization is possible to express also in units *tones of oil equivalents (TOE)*².

Explanation: The direct energy may be either in the primary form (e.g. natural gas for heating), or in the form of transient (intermediate) energy (e.g. electricity for lighting). Energy may be purchased, mined (e.g. coal, natural gas, oil ...), harvested (e.g. energy of biomass), captured (e.g. solar, wind power) or brought within the organization by other means.

Total direct energy consumption = direct primary energy purchased + direct primary energy produced - a direct primary energy sold.

Indicator EN4 - concerning the “total renewable energy use”, the percentage of total annual consumption of energy (electricity and heat) produced by the organization from renewable energy sources; it could be expressed in units: *tones of oil equivalent (TOE)* produced from renewable resources of energy.

Explanation: Renewable energy is obtained from natural processes that are continuously renewed. It includes electricity and heat generated from sun, wind, ocean, water power, biomass, geothermal resources, bio fuels and hydrogen obtained from renewable sources.

C. Water Management

Indicator EN8 - concerning the “total annual water consumption”, expressed in m³, i.e. in units m³/year.

Explanation: The total volume of taken water in cubic meters per year (m³) will be reported according to the following resources:

- a) surface water, including water in rivers, lakes and wetland;
- b) groundwater;
- c) rain water collected directly and stored by the organization;
- d) waste water from some organization and
- e) water supplies from water distribution system or other

² 1 TOE = 41,868 × 10⁹ Joule

public water supply service.

Information on water consumption in the organization can be obtained from the water meters, water bills, calculation derived from other information on water that are available or (if there are no water meters, bills or reference data), the organization's own estimates.

D. Waste management

Indicator EN22 - concerning the “*total annual generation of waste*”, broken down by type, expressed in *tones*.

Indicator EN22a - concerning the “*total annual generation of hazardous waste*” expressed in *kilograms or tones*.

Explanation: Data on the quantity of waste created in the sequence of several years can indicate the level of development achieved by the organization in its effort to reduce waste. They can indicate also the potential improvement in the process of effectiveness and productivity. From the financial point of view, reduction of waste contributes to direct reduction of costs of materials and waste treatment.

E. Biodiversity

Indicator EN11a – concerning the “*use of land*”, expressed in *m² of built-up area use of land*.

Explanation: Operating places owned, leased, managed by the organization will be reported. They can be located within or adjoin protected areas and areas with high value of biodiversity or such places that include protected areas and areas with high value of biodiversity outside protected areas.

In reporting on the use of land by the organization, we can identify and understand certain risks connected with biodiversity. Monitoring of its activities take place both in protected area and in areas with high value with respect to biodiversity outside protected areas, it enables the reporting organization to reduce risks of environmental impacts. It also enables the organization to manage impacts on biodiversity and to avoid bad decisions making. Failure in adequate management of such impacts may result in impairment of reputation, delay in obtaining building permissions and a loss of social approval with the organization's activity.

F. Emissions into the air

Indicator EN16 - concerning the “*total annual emission of greenhouse gases*”, including at least emissions of CO₂, CH₄, N₂O, HFCs, PFCs and SF₆, expressed in *tones of CO₂ equivalent*³.

Explanation: Direct emissions of greenhouse gases from all sources owned or managed by the organization will be reported, including:

- a) generation of electricity, heat or steam (as reported in EN3);
- b) other combustion processes, like burning;

³ Equivalent CO₂ (carbon dioxide) is a measure used to compare emissions from different compound of greenhouse gases on the basis of their potential for global warming potential (GWP). Equivalent CO₂ gas is derived by multiplying the number of tons of the gas potential of the relevant GWP, for example, methane has a GWP 21.

- c) physical or chemical processing;
- d) transportation of materials, products and waste;
- e) conveyance of combustion gases (out gassing) and
- f) volatile emissions.

Emissions from combustion processes and resources will correspond to direct primary energy from non-renewable and renewable sources, as reporting in EN3. Note that CO₂ emissions from burning of biomass are not supposed to be included here but should be reported separately according to GHG Protocol Corporate Standard (The Greenhouse Gas Protocol Corporate Standard - reworked edition).

Further, also indirect emissions of greenhouse gases arising in generation of purchased electricity, heat or steam will be reported (this corresponds to the energy consumption reported according to EN4).

Indicator EN20a - concerning the “*total annual air emission*”, including at least emissions of SO₂, NO_x and PM, expressed in *kilograms or tones*.

IV. OTHER RELEVANT INDICATORS OF THE EFFECT OF THE ORGANIZATION'S ACTIVITY ON THE ENVIRONMENT

Each organization will annually reporting on its effect on the environment concerning specific environmental aspect determined in the environmental report or statement, and possibly will take into consideration sector reference documents, which will be prepared by the EC later on the basis of EMAS [6].

A. Additional indicators

We did not used in the Methodology economic KPIs from G3 Guidelines, but we oriented to Japan approach, where RICOH Group [10] established an another system for economic KPIs that we used. Environmental KPIs must accurately evaluate the status of sustainable EMS of organization and facilitate its further improvement. It introduced terms *Economic benefit* and *Environmental conservation costs* [10].

Economic benefits refer to benefits that organization obtained by environmental conservation activities and which contributed to its profits in some form. Economic benefits are classified into five categories as follows:

- 1) *Substantial effect:* This means economic benefits that fall into either of the following two cases:
 - Cash or cash equivalent is received as a benefit. This corresponds to “*realized gain*” in financial accounting.
 - The amount of savings in such costs that would have occurred if environmental conservation activities had not been conducted. This amount is not recognized in financial accounting.
- 2) *Estimated substantial effect:* Substantial contributions to sales or profits whose value cannot be measured without estimation. They include improving the EP of a product, which leads to an increase in sales or profit.
- 3) *Secondary effect:* The expected amount of contribution in the case that expenditure on environmental conservation

activities is assumed to have contributed to profits for the organization. If environmental conservation costs are assumed to be costs that are indispensable for the organization to conduct its operations, for example, it can be safely said that such costs contribute to profit in some form. In practice, out of the effects generated by environmental conservation activities, those which do not appear as an increase in sales or profit or a reduction in costs are represented in monetary value calculated by the formula specified for each item.

- 4) *Incidental effect:* Expenditure on environmental conservation activities can help avoid the occurrence of environmental impact. Therefore, it can be safely said that the expenditure contributed to the avoidance of such damage of environmental impact that would have taken place without the expenditure. In practice, the incidental effect is computed by multiplying the expected amount of damage by an occurrence coefficient and impact coefficient.
- 5) *Social effect:* Social effect means such effect that is generated by expenditure on environmental conservation activities not for the organization but for society. In practice, social effect means the amount of reduction in the expense of electric power and waste disposal that is enabled through environmentally-friendly products for customers.

Environmental conservation costs refer to expenditure on environmental conservation activities (in a broad sense), and consist of *Environmental Investments* and *Environmental Costs* (in a narrow sense). *Environmental Investments* correspond to “*Investments in fixed assets*” in financial accounting. The amount of environmental investments is distributed as environmental costs over the service life of fixed assets in accordance with depreciation procedures. *Environmental Costs* correspond to the “*period cost*” in financial accounting. (Depreciation cost of environmental investments is included.)

Now, we can set out economic KPIs based on the three elements shown below:

1) *Economic Benefits of Environmental Conservation Activities*

Indicator EC1 - indicating whether activities in environmental conservation are economically rational expressed by

$$EC1 = \text{Economic benefits} / \text{Environmental conservation costs}$$

Explanation: Activities in sustainable EMS can be considered economically rational if the EC1 is one or greater (i.e., the economic benefits are equal to or greater than the environmental conservation costs).

Indicator EC2 - indicating whether activities in environmental conservation are economically and social rational expressed by

$$EC2 = (\text{Economic benefits} + \text{social cost reduction}) / \text{Environmental conservation costs}$$

Explanation: Activities in environmental conservation can

be considered economically rational if the quotient is one or greater (i.e., the sum of economic benefits and social cost reduction is equal to or greater than the environmental conservation costs).

Indicator EC3 - indicating the efficiency of environmental improvements made by the project/investment activity which is expressed by

$$EC3 = \text{Environmental impact reduction} / \text{Environmental conservation costs}$$

Explanation: EC3 is used to evaluate the efficiency of environmental improvements made by the project/investment activity concerned.

2) *Environmental Efficiency of Business Activities*

Indicator EC4 - indicating the environmental impact of business activities and whether those activities respond to public needs and expectations is justifiable which is expressed by

$$EC4 = \text{Sales} / \text{Total environmental impact}$$

Explanation: Total environmental impact is considered as physical or monetary amount. EC4 is used to evaluate the environmental impact and whether it is appropriate in relation to the size of the business.

Indicator EC5 - indicating whether the business activity generates an appropriate level of profit in relation to its environmental impact which is expressed by

$$EC5 = \text{Value-added business activities} / \text{Total environmental impact}$$

Explanation: EC5 is used to determine whether the business activity generates an appropriate level of profit in relation to its environmental impact.

V. ENVIRONMENTAL REPORTING IN THE CZECH REPUBLIC

Environmental reporting as an inseparable part of corporate sustainability reporting [3] and [11]. It has become a popular discussion topic in the academic and consulting spheres during the few past decades [12], [24]-[25], [31]. The majority of literature sources stresses the advantages of additional sustainability reporting that can help organizations to improve their relations with the core stakeholders, establish sustainable supply chains and therefore to create additional value of their business [26]-[28].

The development of environmental reporting in the Czech Republic reflects the overall global trends [8], [11], [12]. The available statistics show that through all objective benefits the environmental reporting can bring to businesses, the existing motivation is not sufficient to make this a normal business practice as compared to the financial accounting and reporting. On the one hand, some large corporations are actively performing environmental reporting initiatives; on the other hand, the relative share of these organizations is rather small.

The Methodology recommends that the environmental report of organization shall contain at least the elements and shall meet the minimum requirements as set out for example in [5]-[7]:

- a) a description of the organization and a summary of its

- activities, products and services and its relationship to any parent organizations as appropriate;
- b) the environmental policy and a brief description of its EMS;
 - c) a description of all the significant direct and indirect environmental aspects which result in significant environmental impacts of the organization and an explanation of the nature of the impacts as related to these aspects;
 - d) a description of the environmental objectives and targets in relation to the significant environmental aspects and impacts;
 - e) a summary of the data available on the EP of the organization against its environmental objectives and targets with respect to its significant environmental impacts. Reporting shall be on the core KPIs and on other relevant existing EP indicators as set out previous chapter of this paper;
 - f) other factors regarding EP including performance against legal provisions with respect to their significant environmental impacts;
 - g) a reference to the applicable legal requirements relating to the environment;
 - h) the name of accreditation company or the license number of the environmental verifier and the date of validation.

The annual environmental report of any organization shall contain at least the elements and shall meet the minimum requirements as set out in points e) to h) [6].

The organization shall be able to demonstrate to the auditor company or the environmental verifier that anybody interested in the organization's EP can easily and freely be given access to the information required for evaluation of KPIs.

The organization in the Czech Republic shall ensure that this information is available in Czech language if the organization is certified or registered in the Czech Republic, and if applicable in (one of) the official language(s) of those MSs, in which sites covered by the corporate registration are located.

A. Mandatory environmental reporting in the Czech Republic to state authorities

Organization (notifier) in the Czech Republic must notify environmental reports in the relevant legal standards, which impose an obligation to keep environmental report. A notifier duty is to deliver relevant annual environmental reports to state or public administration authorities that are concerned by the legal standard required to control the report. These reports contain information on air and water pollution, waste management, used electrical equipment, wrecked cars etc. and the treatment with them at the relevant facilities.

The part of eEnvironment [32] services of the Czech Republic is the web portal of the *Integrated System for the Implementation of Reporting Obligations* (ISIRO) [17]. It is processing certain mandatory environmental reports (environmental data and information) and distributes these to state and public administration bodies and chosen part of them

to public. The ISIRO was established by the MoE and is runnig by the Czech Environmental Information Agency (CENIA).

Operating information system ISISO was launched on January 1, 2010 and it is directed by § 4 of Act No 25/2008, *on the integrated pollution register and ISIRO*. Environmental reports are submitted into ISIRO in electronic form with the prescribed data standards.

The ISIRO receives the environmental reports, saves them in databases and submits them to the relevant verifying state administration bodies pursuant to law. Reporting can be done using a remote electronic access.

One of the legal tools directly connected with the corporate environmental reporting in the Czech Republic is the law No 25/2008 which incorporates the requirements of the Directive No 2008/1/EC *on Integrated Pollution Prevention and Control* (IPPC). According to this law, organizations are required to identify, evaluate, register and report to the ISIRO their emissions and transfers of 93 substances in the case if their quantity is above the defined limits.

In addition to that, organizations have further reporting duties for notification to ISIRO according to the number of further national environmental legislation. For example, the Czech law No 185/2001 *on waste* stipulates the reporting duty to ISIRO for the organizations producing per year more than 100 kg of hazardous waste or over 100 tones of other waste. According to the Czech law No 86/2002 *on air*, organizations are required to measure emission volumes and report these data on standardized format to ISIRO. The reporting duty to ISIRO is additionally stipulated concerning water, natural resources, hazardous chemical substances, etc.

Environmental reporting is also concerning the registration of chemical substances according to REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) — the Regulation EC 1907/2006 *on chemicals and their safe use*.

In the Czech Republic, certain organizations (notifiers) have a so-called "reporting duty" which can be imposed by the Czech Statistical Office (CZSO) in accordance with the Czech Act No. 89/1995 *on the State Statistical Service*. The CZSO publishes the annual *Programme of Statistical Surveys* (PSS) to coordinate the reporting activities of chosen organizations. A particular reporting duty occurs when an organization is invited by the CZSO to fill out the special reporting form at its own expenses. Among others, the CZSO is carrying out the annual survey *ZP 1-01 on environmental protection expenditures* [15].

Chosen organizations must report in the annual survey tangible fixed assets for environmental protection, i.e. spending on the acquisition, costs of acquisition, as zoning, financing sources, non-capital costs of internal and external aspects of business and economic benefits from activities on environmental protection and consumption of natural resources, their fees and charges in the environment. It enables them to calculate above additional indicators EC1-EC5.

These organization needs to have certain elements of

environmental accounting implemented within its accounting system to complete the annual survey. So in order to receive the correctly completed survey ZP 1-01, the CZSO is concerned about stimulating the organizations to implement environmental accounting and environmental reporting practices.

B. Voluntary environmental reporting in organizations with EMS in the Czech Republic

The *Czech Republic Strategy for Sustainable Development* [18] and the *State Environmental Policy of the Czech Republic* [19] support the voluntary activities of organizations aimed at the improvement of environmental situation, implementation of environmentally friendly technologies, eco-design, eco-labeling, etc.

The Czech Republic is one of the leaders among the new MSs of EU according to the percentage of organizations with certified EMS (both EMAS and ISO 14001). Furthermore, the Czech Republic's position in this rating is quite comparable with such highly developed states as Denmark, Spain, Italy, or Finland. However, the figures witness that the share of such organizations among the small, medium and large business agents is quite insignificant. Under these circumstances, it is hard to call environmental management and respectively environmental accounting and furthermore environmental reporting a "normal business practice".

According to the existing business practice, EMS are usually being established in accordance with the requirements of ISO 14001:2004 or EMAS [6]. The last development of implementation of EMS in the Czech Republic is provided in the Table 1. By the end of 2008, around 84 % of the organizations that have implemented EMS were represented by medium and large organizations with over 50 employees.

TABLE 1
NUMBER OF ISO 14001/EMAS CERTIFIED ORGANISATIONS IN THE CZECH REPUBLIC [11]

Year	2005	2006	2007	2008
ISO 14001	2122	2211	3182	3547
EMAS	14	25	28	22

Consider only organizations with EMS certified by ISO 14001:2004 (that represents around 90 % of all ISO 14001 certificates in the Czech Republic). It was derived [11] that the following distribution is apparent: almost 30 % of certified organizations belong to manufacturing industry, 27 % represent construction industry and the third biggest group (15 %) represents real estate, renting and business activities. Among the leaders in the manufacturing industry one can name manufacture of electronic and optical instruments and devices (around 30 %), manufacture of basic metal and fabricated metal products and manufacture of machines and equipment (around 20 % each).

The Table 1, however, also turns out to be relatively small in comparison with the overall number of organizations in the Czech Republic: for instance, according to the information of the CZSO by the end of 2008 the number of non-financial organizations with more than 20 employees was more than 23

thousand. All above-mentioned facts show that quite a low number of organizations are being involved into EMS implementation and connected environmental reporting activities.

Voluntary environmental reporting practices of organizations in the Czech Republic are particularly connected with the implementation of EMS in accordance with EMAS or standard ISO 14001 [12].

The Ministry of Industry and Trade of the Czech Republic has established the institutional framework for EMAS verification and certification. The MoE has introduced an *Environmental Management Accounting Implementation Guideline* in 2003 to support the development of systems of Environmental Accounting and Reporting at the organization level, which issued from Jasch [20]. The guideline provides definitions and requirements on monitoring of single environmental costs, revenues, and on material and energy flow balance.

VI. CONCLUSIONS

The presented Project has developed as the proposal of the Methodology [5] for environmental reporting as the core KPIs based on the Regulation (EC) No 1221/2009, G3 Guidelines and RICOH Group approaches. We tried to fulfill Project aims, which brought a number of new visions in the area of development of environmental KPIs in the Czech Republic. It has also a potential to introduce completely new views on voluntary environmental reporting in selected economic activities.

A very important aspect of the whole Project consists in requests on the completeness of collected data and information about KPIs, which results not only from Czech legislative requirements, but also from the EC and international standards (OECD, UNEP, GRI, etc). For this reason the developed new Methodology for setting up individual KPIs is very important for practice in the Czech Republic to increase the standardization of environmental reporting in the Czech Republic.

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