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PART 4. STANDARDIZED ENVIRONMENTAL PERFORMANCE INDICATORS

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4. STANDARDISED ENVIRONMENTAL PERFORMANCE INDICATORS

Introduction

A company's environmental performance is important to the financial markets because improved environmental performance generally leads to higher, more sustainable, financial values. Many stakeholders in general and the financial community in particular need standardised environmental performance indicators (EPIs) that link the financial and environmental performance and thus, support the quality of decision making of company directors, investors and financial analysts. The use of EPIs could increase the effectiveness and efficiency of resource allocation and therefore increases income and welfare.

A number of guidelines for measuring and disclosing environmental performance exist or are under development. Yet, due to lack of standardisation of environmental information, many environmental indicators are of limited benefit. They are of limited benefit for a number of reasons. First, there is no agreement on which indicators to use. Even within the same company, the indicators and information disclosed can change from year to year.

Second, there is no agreed method on how these indicators are to be constructed. Third, the estimation of the relevant environmental and financial indicators is not always based on the same group of companies and/or products. The result is indicators which vary from year to year and may or may not include the same subsidiaries or branches or products. The result is data which cannot be compared.

If EPIs were standardised the value of information to users could be increased. Basic research and discussions reveal that it is possible to design a standardisation process and that many stakeholders are clearly in favour of it. Standardisation of EPIs requires standardised financial data (which exist) and standardised ecological data.

ISAR proposes a standardisation method for five generic EPIs for monitoring progress in resolving five global environmental problems and linking them to financial value. The five indicators measure the five following environmental problems:

- Depletion of Non-Renewable Energy Resources
- Depletion of Fresh Water Resources
- Global Warming
- Depletion of Ozone Layer
- Waste Disposal.

Performance Indicators in General

Concepts of Indicators

There are two types of indicators.

- **Absolute indicators** (one-item indicators): Indicators which consist of one item (such as profits or earnings per period or energy used per period).

- **Relative (normalised) indicators** (two-item indicators). Indicators which consist of two items (such as profit or earnings as a percent of sales per period or solid waste per unit of production per period).

The usefulness of one-item indicators is limited. They only indicate that something is or is not (e.g. profit = yes, loss = no). When disclosed over time, they indicate the progress achieved.

The problem of absolute (one-item) indicators is that it is impossible to assess whether the absolute figure is good or bad. Whether profits of USD 10 million. is a good performance or not can only be assessed by comparing profit with another indicator (e.g. sales).

Relative (two-items) indicators are more useful and meaningful because:

- performance is made relative or it is 'normalised'

- the performance of a company can be compared with the performance of another company.

Therefore, the conclusion can be drawn that indicators are most useful and meaningful to users if they are:

- disclosed over time

- consist of two-items, and

- are comparable with indicators of other entities.

Experience of Financial Performance Indicators

The experience gained in the context of using financial performance indicators for investment decisions reveals that 'two-items' indicators are applied. Important indicators for financial analysts and investors when deciding between possible investment opportunities include:

- Earnings Per Share (EPS)

- Price/Earnings-ratio (P/E) and

- Dividend (yield per share price)

all of which are two-items indicators.

The most relevant method of analysing a company's performance is to measure it over time and compare it with that of other companies in the same industry (benchmarking).

One characteristic of relative (two-item) indicators for financial markets is that both items are calculated using the same system as defined by the financial accounting and reporting regulations. Therefore, both are standardised within the same framework and thus, ratios become useful and meaningful to users and they are reliable because their construction is set out in a legal generally accepted framework.

Definitions of Environmental Performance Indicators

Bartolomeo describes EPIs as:

> *"... quantitative and qualitative information that allow the evaluation, from an environmental point of view, of company effectiveness and efficiency in the consumption of resources. EPIs consist of process, system and eco-financial indicators"* (Bartolomeo 1995).

According to the Tellus Institute, environmental performance indicators:

> *"... provide a metric by which environmental performance may be tracked. Standardised EPIs allow a comparison of a company's current performance with its earlier performance, with other firms in the same sector, or with industry overall.*
>
> *quantify resource use and environmental impacts.*
>
> *serve to bridge the gap between environmental stewardship and the bottom line"* (White/Zinkl 1997a).

The International Organisation for Standardisation ISO 14031.5 defines environmental performance indicators as follows:

> *"Specific expression that is used to provide information about environmental performance"* (ISO 1996).

Analogous to the objectives of the International Accounting Standards Committee (IASC framework 1983) it can be said that the objective of EPIs is to provide information about the environmental performance and changes in the environmental performance of an enterprise that is useful to a wide range of users in making economic and environmental decisions. This information is only useful to users if it is comparable, reliable and understandable.

Companies can pursue different environmental strategies. Investors increasingly seek out companies that pursue environmental strategies that reduce the damage caused to the environment while increasing or at least not decreasing, shareholder value. Company directors and investors need to be able to assess the outcome of various strategies. They need indicators that measure the eco-efficiency of different companies, in different industries and markets.

Need for EPIs Measuring Eco-efficiency

Eco-efficiency

Eco-efficiency is defined as the ratio between an environmental and a financial performance indicator. The aim of environmentally sound management is to increase eco-efficiency by reducing the environmental impact while increasing the value added of a company. (Schaltegger/ Sturm 1989).

The World Business Council for Sustainable Development (WBCSD) describes how eco-efficiency is achieved:

> "*Eco-efficiency is reached by the delivery of competitively priced goods and services that satisfy human needs and improves the quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle…*"

The WBCSD goes one step further by including a clear target level: An eco efficient state is reached when economic activities are at a level

> "*…at least in line with the earth's estimated carrying capacity*" (WBCSD 1996).

The problem with this concept is that there are no agreed rules or standards for calculating the ecological items either within the same industry or across industries. Most importantly, there are no rules for consolidating ecological data for the entire enterprise so that such indicators can be used together with the enterprise's financial performance indicators.

Eco-efficient companies use less resources, and they cause fewer emissions to soil, water and air in producing the same output as their competitors. This higher productivity leads to an increase in the operating margin due to lower costs. Moreover, in many cases, it leads to higher sales due to an enhanced value of the products to the customer or due to an improved public image. In addition, the risks of environmental liability decreases resulting in a lower discount factor (the price for taking risks) and lower (contingent) liabilities. Wise environmental investment programs also focus on a reduction of working capital. A lower use of resources leads to lower stocks of materials and energy. Focusing on integrated solutions and avoiding end of the pipe investments can decrease incremental investments in fixed assets.

Investors use industry benchmarks to assess the environmental performance of a particular company. EPIs are often used as benchmarks. Benchmarking compares the performance of a particular company with that of the best performing company in the group using the same indicator be it financial, environmental or a composite. EPIs that measure eco-efficiency consist of two different items one of them being measured in physical units (e.g. energy used, water used, global warming emissions, ozone depleting emissions, solid or liquid waste) and the other in financial units. Among the financial items that could be used are e.g: value added (sales minus costs of goods and services purchased); sales; operating profit (EBIT); net income (net profit after tax). ISAR clearly favours value added (see below).

ISAR is proposing a set of five generic EPIs. These EPIs link environmental and financial performance. However, this does not mean that other EPIs are

inappropriate. Depending on the objective of the user other EPIs can be used. There exists a range of possible generic and industry-specific EPIs.

For example, one could use an EPI linking physical input with physical output. Generic indicators should always be seen in conjunction with other possible indicators in general and in particular with industry specific EPIs that take the specific problems and challenges of that industry into account. Moreover, some companies should go beyond the generic EPIs and try to define EPIs for local and regional environmental problems. Industry specific EPIs already exist for many industries or are being identified by industry associations.

Relevance of EPIs to Financial Value: The Link between Shareholder Value and Environmental Performance

EPIs linking the environmental and financial performance can be used to forecast the impact of environmental issues on the future financial performance. Such EPIs will allow better investment decisions. It can be said that an above average environmental performance by a company means that, in all probability, this firm has a higher and more sustainable margin. In addition, the pressure on future investments will decrease compared to competitors with a worse performance. Lower future investments and higher margins are important value drivers, substantially influencing future free cash flows, and thus positively contributing to shareholder value.

Eco-efficiency is relevant to the financial valuation of a company because it induces:

- higher margins
- lower incremental investments in current and fixed assets
- lower discount factors
- lower tax burden.

As a consequence it leads to higher free cash flows and subsequently generates financial corporate value.

Moreover, eco-efficiency leads to lower liabilities and therefore further increasing the free cash flows available to shareholders. This is the logic behind the shareholder value approach to environmental management.

Shareholder Value Approach

> *The shareholder value approach allows for the financial quantification of a business strategy* (Rappaport 1986).

The basic logic behind the financial quantification of a business strategy is that every strategy leads to specific plans and actions. These include an investment programme or an increase in recurring costs for environment and safety. These measures lead to future cash outflows. Yet, plans also lead to future cash inflows e.g. from sales or avoided cash outflows. The difference between in flows and out flows is called 'free cash flows'. They represent the financial value of the strategy.

The free cash flow of a period is calculated as follows:

Earnings before Interests and Taxes (EBIT)

+	Depreciation on Fixed Assets
–	Taxes on Operating Profit
=	Cash Flow from Operations
+/–	Incremental Working Capital
+/–	Investments in Fixed Assets
=	Free Cash Flow

The total of all future free cash flows leads to the corporate value. In order to add free cash flows from different periods, the annual free cash flows are discounted by a discount factor. The shareholder value approach additionally deducts total debt from the corporate value and thus arrives at the shareholder value which is the dynamic value of the shareholders' equity. It is proven that there exists a high correlation between the stock market valuation and the financial value of a business strategy (based on future free cash flows). Thus, discounted free cash flows are a valuable indicator for the valuation of a company on stock markets and for owners of unlisted companies. Moreover, it is a future oriented approach which emphasises the importance of a real long-term view. It is repeatedly asserted that financial markets focus on the short-term performance. The shareholder value approach shows that approximately 80% of the financial value of a company stem from long-term free cash flows. The dividend valuation model can demonstrate the same. The expected dividends of the next five years only account for approximately 20% of a company's share price.

Case for Generic EPIs and for Industry Specific EPIs

Given the desire to link financial and environmental performance through the concept of eco-efficiency, there is a need to first select the environmental components of the eco-efficient indicators. Generic indicators are not necessarily more important than industry or sector-specific indicators but they merely have wider applicability. Thus, the generic indicators should be seen in conjunction with industry specific EPIs that take the diversity of specific sectors into account. Every enterprise should try to construct both generic and specific EPIs. Generic indicators are indicators that can be applied:

- worldwide
- by all enterprises
- across all sectors

Standardised generic EPIs would fulfil the following criteria:

- address worldwide environmental problems, [worldwide means global and common for all countries/regions]
- link an environmental problem that is relevant for all industries at the macro level to activities of enterprises at the micro level, [macro-micro link means a link of an environmental problem (e.g. global warming) at the macro economic level to enterprise activities (e.g. use of energy) at the micro economic level]

- have a direct impact on both the environmental and financial performance.

In other words the environmental indicator should be of worldwide concern, be related directly to the company's production processes, products or services and have a positive or negative impact on free cash flows of the enterprise.

Generic EPIs are best developed by a process which includes both preparers and users and which is marked by political and technical consensus. In this context, political and technical acceptance are of importance. First, there should be a political consensus or acceptance that the EPIs reflect a significant environmental problem. Second, there must be a consensus on the technique or agreement that includes on the procedure used to calculate the indicator.

ISAR proposes five generic EPIs which link environmental to financial performance. As mentioned earlier a number of experts see the concept of eco-efficiency as establishing a link or at least measuring environmental performance relative to the economic activity of the enterprise. This is particularly important when one wants to compare the environmental performance between enterprises.

Eco-efficient indicators consist of a combination of two independent indicators. Thus, standardising an eco-efficient indicator requires the standardisation of two single variables (environmental and financial).

$$\text{Eco-efficiency} = \frac{\text{environmental performance indicator}}{\text{financial performance indicator}}$$

This ratio measures the environmental impact per unit of value such as per dollar of sales or per dollar of value-added.

Reaching a firm definition eco-efficient indicators requires selecting and defining the environmental and the financial indicators. The following section describes how environmental indicators can be selected and defined.

Selecting and Defining the Environmental Problem

The ideal way to reach politically and technically accepted generic EPIs is to base the indicators on international agreements as far as possible. The basic idea behind this proposal is that all stakeholders (e.g. governments, industrial associations, financial community, NGOs), directly or indirectly, influence the development of international agreements. This also means that the underlying environmental issues have been accepted as being significant problems, which requires a solution.

Generic indicators can thus be designed for issues/problems which have already been debated and for which there is an international agreement or consensus. Currently, the following four agreements seek to remedy universally recognised environmental problems:

- Agenda 21 covering economic and social development that is consistent with the needs of future generations.

- Montreal Protocol covering ozone-depleting substances

- Kyoto Protocol covering global warming gas emissions (yet to be ratified by national parliaments)

- Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal.

Agenda 21

Agenda 21 is the most comprehensive agreement to date, which was adopted by more than 178 governments at the United Nations Conference on Environment and Development (UNCED) known as Earth Summit [held in Rio de Janeiro, Brazil, from 3 to 14 June 1992.

Of the issues contained in Agenda 21 there are three that lend themselves to generic indicators. These are:

- protection of the atmosphere (chapter 9)
- protection of the quality and supply of freshwater resources (chapter 18)
- environmentally sound management of solid wastes (incl. Hazardous waste) and sewage related issues (chapter 21).

The other issues that were looked at do not fulfil the requirements for generic EPIs. They were found to be industry specific (e.g. number 22: radioactive waste). They cannot be directly linked to a company's production processes, products, or services (e.g. number 15: biological diversity). While they dealt with global problems, the impacts depended heavily on local environmental conditions (e.g. number 12: desertification) or on a regional or country specific definition of the problem (e.g.: number 16: environmentally sound management of biotechnology).

Selecting the Financial Performance Indicator

Two different approaches are currently being used to define the denominator of the environmental performance indicator. The denominator is either in physical or financial terms. That is, the activity or performance is given in units of physical activity (i.e. production in tons) or in units of value (i.e. sales in units of currency).

Value Added

Looking at the different industries and enterprises, it is almost impossible to standardise (as a reference item) a common physical unit of activity or output such as 'tons of production', 'volume of production' or 'amount of service units sold'. Even if it were possible to aggregate the units these indicators will not take into account the concept of eco-efficiency which adds value by minimising resource use and environmental impacts.

EPIs linking environmental and financial performance should use a financial variable as the denominator (e.g. energy used in kWh per unit of value added). Thus, eco-efficiency indicators consist of two variables. The first is measured in physical units and the other in value units. The variables that could be used are:

1. Value added (sales minus costs of goods and services purchased)

2. Sales
3. Operating profit
4. Net income (net profit after tax).

Value added (sales minus costs for purchased goods and services) appears to be the most appropriate choice because it covers only that part of the life cycle where the respective enterprise transforms the economic inputs into products and services while using environmental resources and producing emissions and waste. A more precise correlation between resource use, environmental impact caused and economic output is contained in value added and not in sales or operating profit. This is because enterprises account in their books only for resources, emissions and waste stemming from their own production. The enterprise's environmental and financial performance relates only to that part of the production process the enterprise actually controls. The resources used, the emissions caused and the waste produced by their suppliers are not counted. Only value added can isolate the enterprise's exact contribution to the product or service. For example, the recently introduced 'guidelines for enterprise reporting on greenhouse gas emissions', launched by the United Kingdom and based on the UNEP publication 'Creating a standard CO2 indicator' recognises this and advises enterprises accordingly. It states that 'you need to set boundaries for your report to ensure that as a minimum that all the significant activities your enterprise controls are within the scope of your environmental and greenhouse gas reporting, just as they should be within the scope of your financial reporting'. This position is being adopted by other governments which are developing similar reporting protocols.

On the other hand, the use of sales and operating profits could lead to misleading indicators. Sales and operating profits add up in the whole life cycle of a product or service up to the point where the last enterprise transfers it to the customer. The following example illustrates different results obtained when using sales or value added.

Sales or Value Added

Three enterprises (A, B and C) sell the same kind of goods, windows and doors. All enterprises sell 20 windows for $25 each and 50 doors for $10 each giving, total sales of $1,000 (50 per cent doors and 50 per cent windows). The in-house use (input) of energy of the enterprises ranges from 600 kWh p.a. to 1,000 kWh p.a.

Enterprise A produces only doors. The windows are purchased from a supplier. This means that A outsources 50 per cent of its production ($500 in costs for purchased windows compared to sales of $1,000). Enterprise B outsources 25 per cent ($250 in costs for purchased windows compared to sales of $1,000) and Enterprise C produces all windows and doors in-house (no cost of purchased goods compared to sales of $1,000).

The effect of outsourcing is that part of the sales (in this case windows) is not produced in-house. As a consequence no energy has to be used for the production of the purchased goods. In the following section the enterprises are compared and commented upon based on an EPI using sales and value added as reference items.

Sales as Reference Item

EPIs using sales as a denominator.

Variables	Enterprise A	Enterprise B	Enterprise C
Energy used kWh p.a.	600	850	1,100
Sales in $ p. a.	1,000	1,000	1,000
EPI: Energy used in kWh p.a./ sales in $ p.a.	0.6	0.85	1.10

Ranking

1. Enterprise A: 0.60
2. Enterprise B: 0.85
3. Enterprise C: 1.10

Using the EPI 'energy used per unit of sales', Enterprise A appears to be the most eco-efficient but this is because it is outsourcing some of its production. If we use value-added, a different ranking will appear.

Value Added as Reference Item

The second example uses value added as the reference item. In order to do this the profit and loss accounts are reviewed and the items comprising 'purchased goods and services' are deducted from gross sales to arrive at value added. All of the figures required are published as part of the statutory financial statements and are readily available. No additional figures are required to be collected or external research undertaken in order to calculate value added.

EPIs using Value Added as a Reference Item.

Variables	Enterprise A	Enterprise B	Enterprise C
Energy used kWh p.a.	600	850	1,100
Sales in $ p. a.	1,000	1,000	1,000
Cost of purchased goods & services in $ p.a	-500	-250	0
Value Added in $ p.a.	500	750	1,000
EPI: Energy used in kWh p.a./ value added in $ p.a.	1.2	1.13	1.10

Enterprise A has produced in-house 50 doors for $10 each and purchased 20 windows for $25 each. This means that the value added is $500. This figure must be compared to the energy used by enterprise A. For its in-house production (value added), enterprise A has used 600 kWh. The EPI energy used/value added is 1.2. The energy used by their suppliers for producing the 25 windows is not accounted for in the books of enterprise A but in the books of their suppliers.

Enterprise B has produced in-house 50 doors for $10 each and 10 windows for $25 each and purchased 10 windows for $20 each, for a value added of $750. This means that its EPI, energy used per unit of value added, is 1.13. Enterprise C produces 100 per cent in-house or 50 doors and 20 windows using 1,100 kWh. Its value added is $1,000. Its EPI, energy used per unit of value added, is 1.10.

The enterprises are ranked as follows in terms of their eco-efficiency:

Ranking

1. Enterprise C: 1.10 (best performer)
2. Enterprise B: 1.13
3. Enterprise A: 1.20

It will be recalled that in the case of sales as a reference item, the enterprises have the reverse ranking. If value added is chosen, enterprise A ranks lowest and enterprise C is the best performer. Value added reduces some of the distortions in the indicator caused by outsourcing which the enterprise might do to improve its environmental performance. Enterprise directors are responsible for their in-house production and they can directly influence it by appropriate measures. Value added is directly linked with in-house production: the more in-house production, the higher the value added. By using as an EPI energy used per unit of value added two enterprises can reliably be compared. The focus on value added does not mean that life cycle analysis of the entire supply-consumption-disposal chain is not important. However, cost-efficient measures have not yet been developed to detect full impacts over the life of a product. Therefore, for the purpose of constructing useful and meaningful eco-efficiency indicators it is necessary to draw boundaries and for this, value-added is more precise than sales.

Outsourcing

Many enterprises contract out major parts of their operations, such as freight transport (in the United Kingdom this accounts for 7 per cent of national emissions), which may produce substantial environmental impacts and which are integral to their business. There are also other reasons for outsourcing. Enterprises can take advantage of economies of scale available, or avoid the investment needed for costly research and development programmes. When activities are outsourced, enterprises often exercise considerable control and influence over these activities, although they do not have to account for resources used, the emissions caused and the waste produced by the supplier.

In the example above where sales are used there is no indication of the extent of outsourcing and no reliable conclusion can be reached about in-house eco-efficiency. Where value added is used, the improvement achieved via outsourcing is reduced and a more reliable conclusion is reached about eco-efficiency of the entity being analysed.

Using value-added the eco-efficiency indicator is in line with one of the most important principles of financial accounting-the matching principle. That is, an enterprise should report what is within its control, i.e. what it actually does rather than what is outside its control. Value-added reduces the distortions from outsourcing, but it does not completely eliminate the chance that those enterprises which outsource their activities might have better EPIs as will be demonstrated in the next example.

However, outsourcing can also impact on financial ratio analysis where outsourcing can improve financial ratios by reducing low-margin activities. This, however, does not invalidate the usefulness of the financial ratios but requires increased disclosure if they are to be used intelligently. Therefore, when one is comparing enterprise data one wants details on outsourcing.

Outsourcing and the Link Between Financial and Environmental Performance

Investors use consolidated group accounts in order to assess the financial performance of enterprises and therefore have a reasonable expectation that environmental reporting will include all the significant activities that are within the control of an enterprise. The indicators proposed in this report are generic indicators which allow comparison among different enterprises and across different industries. They are not by themselves capable of delivering a comprehensive analysis of the environmental and financial performance of an enterprise or of being able to be used to benchmark particular enterprises or industries. Apparent differences in performance may be due to differences in operating circumstances or enterprise structure as well as differences in the level of contracted out or bought in services. This set of generic EPIs do serve as a suitable starting point for qualitative analysis. A qualitative description of a group with additional information in the notes is important to users who want to reliably compare two groups (see UNCTAD 1994). This includes management discussions where analysts have to address the question of outsourcing and life cycle issues. Based on the received answers the analyst will be better placed to appropriately interpret the quantitative indicators and the ranking between different enterprises.

The following example (see table below) describes four outsourcing scenarios that could be adopted by an enterprise. It is assumed that a group EPI 'energy used per unit of value added' is one (10,000kWH/10,000$). The group EPI of one results from four different segments with different EU scores. There are segments with high energy use and high value added activities (A, EPI = 1)), segments with low energy use and low value added activities (B, EPI 1), segments with high energy use and low value added activities (C, EPI = 4) and segments with low energy use and high value added activities (D, EPI = 0.25).

Outsourcing Scenarios

	Segment A	Segment B	Segment C	Segment D	Total Group
Energy used p.a.	4,000	1,000	4,000	1,000	10,000
Value added p.a.	4,000	1,000	1,000	4,000	10,000
EPI (energy used per cent of value added)	1	1	4	0.25	1

The management has the following four options for outsourcing and each will have a different impact on the group performance:

1. Outsourcing of activities with high environmental impact /high value added (segment A) would result in 6,000 units of energy compared to a value added of 6,000 which also equals one.
2. Outsourcing of activities with low environmental impact added/low value added (segment B). This would not affect the consolidated group EPI. The consolidated EPI would be 9,000 units of energy compared to a value added of 9,000 which also equals one.
3. Outsourcing of activities with high environmental impact /low value added (segment C). This would affect the consolidated group EPI. The consolidated EPI would now be 6,000 units of energy compared to a value added of 9,000 which equals 0.67.
4. Outsourcing of activities with low environmental impact added/ high value added (segment D). This would affect the consolidated group EPI. The

consolidated EPI would now be 9,000 units of energy compared to a value added of 6,000 which equals 1.5.

Thus, scenarios one and two would not affect the EPIs whereas three and four can lead to distortions. To avoid the wrong interpretation of EPIs users should discuss the possible effects of different outsourcing options with the enterprises.

Environmentalists rather than financial analysts are concerned about outsourcing. They fear that outsourcing will be used to artificially improve environmental performance. It has to be noted that outsourcing is not merely an environmental issue. Enterprises also outsource low margin activities. Analysts do not reject the financial indicators just because an enterprise is heavily outsourcing. Rather, analysts use the financial indicators as a starting point for the qualitative analysis. It has to be viewed in relation to outsourcing which is additional information. The management of an enterprise achieving an operating profit margin of 25 per cent or more has to be asked about the profitability of their suppliers and customers. Michael Porter has demonstrated that the distribution of power along a value chain (from supplier to enterprise to customer) decides which enterprise on the value chain can achieve the highest margin. Yet, he has also demonstrated that, under a long-term perspective, the success of each enterprise remains linked to the value chain of the respective industry. This also means that outsourcing of highly polluting activities remains detrimental to both the polluting and the outsourcing enterprise. Sooner or later, the environmental problems related to such an activity will fall back on the outsourcing enterprise because the enterprise is still involved in the life cycle through its suppliers.

Outsourcing and the Feasibility Of Life Cycle Analysis for Investors

Life cycle analysis would require a substantial amount of data that would need to be collected from myriad suppliers and customers along the full value chain. The cost of such data collection would be extremely high. It might be of low quality. The boundaries of life cycle analysis are not yet universally agreed and the standardisation of data to be aggregated has not yet been considered. At the current time, the costs far outweigh the benefits and for these reasons the value added approach, capturing those activities within the control of the enterprise, is recommended.

Based on the five universally recognised environmental problems and their corresponding EPIs and combining them with the most suitable financial indicator, the following five eco-efficiency indicators are recommended for linking an enterprise's environmental performance with its financial performance.

Proposed Set of EPIs

Environmental Problem	Environmental Performance Indicators
Depletion of non-renewable energy resources	primary fossil energy use/value added
Depletion of fresh water resources	water use/value added
Global warming	global warming emissions/value added
Depletion of the ozone layer	ozone depleting emissions/value added
Disposal of solid and liquid waste	solid and liquid waste/value added

Three of the five selected problems can also be financially assessed.

Proposed Set of EPIs	
Environmental Problem	Environmental Performance Indicators Financially Assessed
Depletion of non-renewable energy resources	energy costs/value added
Depletion of fresh water resources	water costs/value added
Disposal of solid and liquid waste	solid and liquid waste costs/value added

These EPIs forecast the impact of environmental issues on future financial performance. It can be said that an above average environmental performance of an enterprise means that, in all probability, this enterprise has a higher and more sustainable operating margin. All EPIs relate to an important environmental problem which results in production costs (such as energy costs, water costs, waste costs). Therefore, there is a direct link to the profit-margin. In addition, the pressure on future investments is lower (compared to competitors with a worse performance). Lower future investments and higher margins are important value drivers, substantially influencing future free cash flows, and thus positively contributing to shareholder value.

Current Practice

Novartis: 1998 Health, Safety and Environment Report

Resources (p.24):

> *"Apart from raw materials, the most important resources used by Novartis are energy and water.... During 1998 energy and water consumption rose due to increasing production (expressed in metric tons). Compared to a production increase of 8.5%, energy consumption increased 3.5%, while water use increased by less than 1%. This reflects an overall improvement in eco-efficiency".*

Novartis Group	1997	1998	? 1997/1998
Water consumption (Mio. cubic meter)	123	124	+ 1%
Energy consumption (Mio. GJ)	22.6	23.4	+3.5%
Production in metric tons	1'600'000	1'740'000	+ 8.5%

Novartis: 3 Divisions	Healthcare 1998	Agribusiness 1998	Consumer Health 1998
Water consumption (Mio. cubic meter)	67.5	37.0	10.4
Total 3 divisions= 114.9			
% of Total 1998 (114.9 = 100%)	59%	32%	9%
Energy consumption (Mio. GJ)	11.4	7.19	4.11
Total 3 divisions= 22.7			
% of Total 1998 (23.4 = 100%)	50%	32%	18%
Production in metric tons	122'000	1'000'000	611'000

Total 3 divisions= 1'733'000 % of Total 1998 (1'733'000= 100%)	7%	58%	35%

(GJ = Gigajoules)
(G = grams)

Airlines: SAS, Environmental Report 1997

Emissions per ATK in g	British Airways	KLM	SAS
CO2	800	670	897
Nox	3.1	2.4	3.3
HC	0.26	-	0.46
H2O	294	219	352

(ATK = available ton kilometres)

Sulzer: Environmental Report 1997/1998, 1998/1999

Environmental Performance Indicators (p.8)

Energy Consumption	1993	1994	1995	1996	1997	1998
kWh/employee	20'800	20'100	21'800	18'600	21'500	21'800
kWh/ CHF value added	234'000	234'000	265'000	225'000	230'000	232'000

CO2-Emissions	1993	1994	1995	1996	1997	1998
tonnes/employee	5.6	5.2	4.5	5.1	6.3	6.5
kg /CHF value added	63'100	60'000	55'000	61'000	67'000	70'000

Water Consumption	1993	1994	1995	1996	1997	1998
m3/employee	68	74	60	56	63	59
litres/CHF value added	720'000	858'000	727'000	679'000	668'000	633'000

Waste + Recycled Materials	1993	1994	1995	1996	1997	1998
kg/ employee	1390	1510	1380	910	1180	1140
kg/CHF value added	15'700	17'500	16'800	11'000	12'500	12'000

Other Initiatives to Develop EPIs

As stated in the introduction of this report there are at least three other major initiatives involving the development of EPIs either at the international level, the NGO level or the business association level. The activities of the following key actors which have major initiatives in this area, are highlighted.

- The International Organisation for Standardisation (ISO)
- The Global Reporting Initiative (GRI)
- The World Business Council for Sustainable Development (WBCSD).

Global Reporting Initiative

The most comprehensive project is the NGO led Global Reporting Initiative (GRI). The GRI was established in 1997 to develop a framework (or guideline) for enterprise-level reporting on sustainable development including environmental, social and economic aspects.

The framework will serve as:

- An internal vehicle for checking consistency of sustainability policy with performance
- A logical structure for applying sustainability concepts to enterprise operations
- A framework for dialogue between internal and external stakeholders

The GRI is convened by CERES (Coalition for Environmentally Responsible Economies) and incorporates the active participation of corporations, non-governmental organisations (NGOs), consultants, accountancy organisations, business associations, universities, and other stakeholders from around the world.

The GRI Sustainability Reporting Guidelines comprise three sections.

1. The preamble describes the rationale, value, applicability, general reporting principles of the Guideline.
2. The Guidelines are divided into nine parts: CEO statement; key indicators; profile of reporting entity; policies, organisation and management systems; stakeholder relationships; management performance; operational performance; product performance; and sustainability overview.
3. The Appendices provide additional explanation and illustrations pertaining to various parts of the Guidelines.

These guidelines aim to provide guidance to enterprises preparing sustainability reports. The guidelines do not provide guidance for data collection, information and reporting systems. Nor do they give guidance on the methods to be used for calculating the indicators. The generic indicators identified by GRI correspond to those identified in this report and WBCSD. This report should be viewed a 'complementary' to GRI in that it fills in a methodological gap.

Among the indicators recommended by GRI are:

- Total energy use
- Total electricity use
- Total fuel use
- Other energy use
- Total materials use other than fuel
- Total water use
- Non-product output (NPO) defined as waste
- Quantity to NPO to land by material type

- Emissions to air by type

- Discharges to water by type

The guidelines are applicable to any size and any type of enterprise that chooses to prepare a sustainability report. The Guidelines are not specific to any industry or business sector. That is, they are designed to incorporate information common to most enterprises regardless of business sector.

International Organisation of Standardisation (ISO)

The ISO has 133 member bodies which set technical standards for manufacturing and good processing in their countries. It has developed ISO 14000 which is a series of international, voluntary environmental management standards. Developed under ISO Technical Committee 207, the 14000 series of standards address the following aspects of environmental management, Environmental Auditing & Related Investigations, Environmental Labels and Declarations, Environmental Performance Evaluation, Life Cycle Assessment and terms and definitions.

ISO (TC 207 subcommittee 4) published ISO 14031.5: on Environmental Management – Environmental Performance Evaluation in 1999. It emphasises the management process in terms of environmental performance evaluation (EPE). ISO defines EPE as:

"...a management process which can provide an organisation with reliable and verifiable information on an ongoing basis to determine if its performance is meeting the criteria set by its management. The information generated by EPE may also assist an organisation to:

- *achieve continual improvement of its environmental performance;*

- *report and communicate its environmental performance;*
- *identify opportunities for prevention of pollution;*

- *increase efficiency and effectiveness and*

- *identify strategic business opportunities"* (ISO 1996).

The standard prescribes the process for evaluating if an enterprise has adopted an environmental management system. It is important to note that working group TC 207 has also identified environmental indicators which could be used for international environmental management purposes. They were not intended to communicate performance to external stakeholders.

It is important to note for environmental management systems (EMS) in general and ISO in particular, that EMS-standards are process, not performance standards (Sturm 1997). In other words, these standards do not tell organisations what environmental performance they must achieve (besides compliance with environmental regulations).

> *"Instead, the standards describe a system that will help an organisation to achieve its own objectives and targets. The assumption is that better environmental management will lead indirectly to a better environmental performance"* (Tibor/Feldmann 1996).

In paragraph 4.1.2, Selecting Indicators', the working draft states:

> *"Indicators help to condense relevant environmental data into compact and useful information about management's efforts, the organisation's environmental performance, or the condition of the environment. An organisation should select and develop a sufficient number of relevant and understandable indicators to evaluate its environmental performance" (ISO 1996).*

ISO/WD 14031.5 lists environmental loads, quantitative information on emissions, discharges, climate change and others. The WD lists many types of environmental indicators.

- Absolute: (e.g. total tons of SO2 emitted per year)
- Relative: information scaled to, or relative to another parameter such as production (e.g. tons of SO2 emitted per tone of primary product)
- Indexed: various indices constructed for either absolute or relative information, such as baseline year at 100%; or, weighting of equivalents to consolidate data (e.g. total green house gases emitted expressed as carbon dioxide equivalents)
- Qualitative: data that cannot be quantified by scientific measures, but is placed on a value scale decided by the organisation
- Financial: costs or benefits associated with environmental performance (e.g. waste handling costs, environmental performance improvement investments per ton of release reduction, reduced costs of purchased materials resulting from recycling or reuse).

WBCSD

The WBCSD is a coalition of some 150 transnational corporations united by a shared commitment to the environment and to the principles of economic growth and sustainable development. One essential consequence of this commitment is that most enterprises strive towards sustainability by increasing their eco-efficiency. The progress achieved is, in many cases, communicated by annual environmental reports. Sometimes, these reports are known as 'eco-efficiency reports'.

The WBSCD has developed a set of eco-efficiency indicators to help measure progress toward economic and environmental sustainability in business. According to WBSCD eco-efficiency indicators primarily serve as a decision-making tool for internal management to evaluate performance, set targets and initiate improvement measures. EPIs are also an important tool for communicating to internal and external stakeholders. The objective of eco-efficiency is to maximise value while minimising resource use and adverse environmental impacts. In order to calculate eco-efficiency, the WBCSD uses the follow equation:

$$\text{Eco-efficiency} = \frac{\text{Product or service value}}{\text{Environmental influence}}$$

So far WBSCD has identified the following core indicators to be tested in a pilot application:

Product/Service value

- Mass or number of products or services produced or sold
- Net sales

Product/Service Creation Environmental Influence

- Energy consumption
- Materials consumption
- Net water consumption
- Greenhouse gas emissions
- Ozone depleting substance emissions.

As in the case of GRI these are largely consistent with what is recommended in this report. WBCSD is developing core indicators, which are internationally agreed upon. Although these generic indicators are valid for virtually all businesses, they are not of equal value or importance for a given enterprise nor are they necessarily comparable between different businesses. WBCSD recommends that ISO 14031 Environmental Performance Evaluation be used to guide the selection of relevant supplemental indicators for a specific enterprise or sector. (WBCSD, Executive Brief, August 1999)

Conclusions

Given the initiatives of all the above mentioned organisations, it can be said that there is much support for standardising EPIs for external communications.

A substantial number of industrial associations and companies in particular have created EPIs. These EPIs are published periodically in environmental reports. Companies regard their development as being among the most important issues for the next five years (also see findings of UNEP Consultative Meeting with Industry & Trade Associations in Paris on October 1997). As a consequence, many groups use or would like to have EPIs. All, however, suffer from the lack of standardisation of EPIs and therefore, should support a standardisation of EPIs. Moreover, the knowledge of how to standardise is well established (ISO and IASC). It is less complicated than it appears.

For a recent update on this section see: Sturm, A. Mueller, K., and S. Upasena 2002; *Eco-efficiency Indicators: Conceptual Framework and Guidelines – A Manual for Preparers and Users*. UNCTAD, Geneva.