

# EMA – estimating the benefit side

Maria Csutora, PhD., associate professor  
Corvinus University of Budapest, Fovam ter 8., H-1093, Hungary  
E-mail: maria.csutora@uni-corvinus.hu

**Abstract:** The presentation focuses on estimating benefits of environmental projects and achievements like image improvement, gaining an environmental award, profit from environmentally benign products, risk reduction benefits, etc. The paper integrates the results and experience gained in three different fields: EMA, evaluation of natural resources and working as a consultant

## I. INTRODUCTION

EMA by its nature focuses on estimating the costs of environmental activities.[1], [2] Sustainability issues, however, embrace much more than just costs: product properties, customer relationship, image and reputation, etc. are also included. [3], [4],[5]. We are also frequently approached by environmental managers with the request that benefits should be quantified. This would improve their position when justifying their own role or initiating specific environmental projects. While estimating the benefit side is required by law in Japan [6], a practice controversial in itself, it is still a field to be explored in Europe.

Estimating less tangible benefit is an essential issue in several fields: information technology specialists as well as training experts also struggle with it. The necessity and potential contribution of these fields as well as environmental benefits are widely acknowledged. Still, answering the question of “how much environmental performance” or “how much investment in IT or training” is profitable seems to be question too hard to be answered. Environmental performance improves economic performance only to a certain point, while too much investment in improving environmental performance can actually deteriorate profitability. [7] [8]

## II. ESTIMATING THE BENEFIT SIDE

Benefits should include much more than just cost savings of environmental projects, recycling revenues or subsidies. They embrace items like revenue from environmental, or partly environmental, products, marketing benefits gained by good publicity of environmental achievements, risk reduction benefits, etc.

Special issues also arise like:

- Which products can be labeled as environmental when estimating the revenues of environmentally sound goods?
- For how many years should the benefits of an environmental investment be accounted for?
- Which of the at least three different kinds of methods should be applied when estimating the marketing or image value?

The paper will focus on how the above mentioned items can be quantified by using and adopting methods developed in different research fields. Benefit estimations are common to cost benefit analysis [9] carried out for public projects embracing environmental amenities. Some of the methods applied in natural resource evaluation could also be applied for estimating environmental benefits at company level.[11], [12],[16].

In Japan the government requires companies to report not only their environmental costs, but also their environmental effects, meaning environmental benefits. This is a must-do for many companies, but some of them still use it for international decision making purposes The presentation will integrate all the above mentioned theories as well as experience gained in EMA, in evaluating public environmental projects as well as working as a consultant for a Japanese company.

The presentation will focus on the positive effects gained by companies rather than the society through environmental activities, though some methods will be adopted from the former field. Table I summarizes some examples for value drivers, environmental benefits and estimation methods. Value drivers include both financial and more strategic, less tangible items. [13][14][15]

## III. ENVIRONMENTALLY DIFFERENTIATED PRODUCTS

Contribution to sales of environmentally differentiated products may have a big impact on shareholder value in companies. Estimating the benefits assumes, first of all, a definition of these products. Our first impression would suggest that a product wearing an official eco-logo, either European or national, could be labeled as environmental.

The car industry, however, cannot apply for such a logo in Europe, but can do so in Japan. Moreover, certain products awarded a logo would never ever wear that. The producing companies sometimes apply for such a logo for associated benefits, such as savings on product fees or other tax allowances, rather than for customer attraction reasons.

The decision rule thus should be based on the selling point of products. A product is environmentally differentiated when environment is a unique selling point for that product, no matter of any official rules or regulations. A product is partially environment friendly, when environmental benefits are offered together with some other benefits to consumers. This case a percentage value must be estimated on the contribution of the environmental statement to the sales of product. Thus the actual marketing strategy of the company rather than

science or regulation should guide us when estimating the sales contribution of environmentally sound products.

Environmentally differentiated product may have a so called halo effect on other products, too. This is especially true when environmental products are considered higher quality innovative goods (e.g. hybrid cars, state-of-the-art energy efficient washing machines). The sales of those products might have a positive impact on the sales of other, non environmental products, too. We must be very conservative, though, when estimating those impacts as these have a tremendous impact on the magnitude of environmental impacts.

#### **IV. COST REDUCTION POSSIBILITIES**

Cost reduction possibilities are widely discussed in literature. This category is quite tangible, but unfortunately has less potential in contribution to shareholder value than risk reduction, product differentiation or image improvement factors. Most cases a few percent savings on material and processing (10-20% in very inefficient companies) can be realized through efficiency improvement measures. Even a small reduction of costs can be crucial for companies following a cost leadership position, or striving for good value per price ratio. Still, this item is unproportionally discussed compared to potential contribution of other value drivers.

#### **V. BENEFIT ESTIMATION OF RISK REDUCTION MEASURES**

The following two sections describe some examples for benefit estimation with special regard to reduction in contingent costs as well as image value.

Gambling with pollution is always an option, even though not a wise strategy for the company. Being acquainted with the magnitude of potential liability is not sufficient information; the probability of occurrence also has to be estimated. The expected cost of liability has to be determined, which is the product of its predicted magnitude and the probability of occurrence. Time also matters. Present benefits and costs are more valuable or more painful than future benefits or future costs in cash flow calculation.

A good estimate on contribution to shareholder value can be given when the company enjoys loans on preferential terms compared to other companies in the industry with worse risk characteristics. Reduction of WACC clearly and measurable increases the value of the companies.

Contingent liability costs often play a central role in capital budgeting decisions. Leaving them out of considerations might lead to the fall of a company or even an industry. Asbestos industry serves a dismal example of how denial of liabilities leads to fiasco in longer term.

For major events the expected cost due to an accident is not applicable for giving suggestions how much you should pay to prevent an accident. Much more money

should be spent on prevention if your business is at stake, e.g. it would go into bankruptcy due to high clean-up and compensation costs or would lose its operation permit. The extent of necessary spending depends on the risk acceptance or risk aversion of management: the higher their risk aversion is the more they are willing to pay in order to prevent accidents. For this reason willingness-to-pay of the management for preventing the accident rather than the expected value of costs can be a good estimate for safer operation.

#### **VI. BENEFIT ESTIMATION OF IMAGE VALUE**

Good relationship with authorities means smooth administration of license applications and less frequent inspections. Permitting, e.g. in case of an environmental impact assessment, may become easier and quicker. On the opposite: bad relationship and mistrust results in delayed authorization of applications and the need for tight control from the side of environmental authorities. This will result in a lot of time spent with them instead of focusing on the main functions within the company. An environmental impact statement might be several times turned back for supplementary information that leads to months or even a year delay in the construction work. Time is money, so a long delay means financial loss. Benchmarking with other companies may provide a suggestion on the average time of others spent on permitting or enjoying supervisions. The value of this time can be estimated based on delayed cash flows

The environmental accounting literature supposes that good environmental image contributes to shareholder value. In certain cases, however, bad image can attract cash to the company, too. Surprisingly, these cases are not uncommon. For example under the Kyoto Joint Implementation or Clean Development mechanisms cash typically flows towards companies with extremely inefficient production systems. Reducing greenhouse gas emission is much cheaper in inefficient companies than in the good ones. Reducing GHG emission in developing countries and buying their quota is much cost efficient than reducing GHG emission in more developed countries. Inefficient companies may earn on carrying out innovations for western companies and selling their quotas to them. This transaction may result in net positive cash flow for the inefficient company.

Marketing people are sometimes more supportive towards environmental projects than accountants or financial managers are. Accountants are susceptible to forecast new projects on the basis on previous investments instead of finding more and more opportunities in the future. Financial managers may be interested in future possibilities but usually focus on the short term benefits and short term costs rather than on long term ones. The marketing value of environmental programs can be estimated in three different ways:

- Actual increase in sales due to an environmental program (e.g. well marketed recycling programs). This works only if the major buyers are people rather than institutions and the

company regularly measures the impact of marketing actions.

- Substitution costs for marketing is a proxy when the first method cannot be carried out. Environmental performance may earn free time on TV or free articles in magazines that would otherwise cost hard cash.
- Value of time spent by stakeholders on company exhibitions, reading the reports, attending to conference presentations can be estimated as another proxy for marketing value. The value of time can be approximated by the so-called travel cost method.
- Good relationship with certain authorities may succeed in convincing government to create regulations that favor the company products and increase the costs of competitors. This strategic advantage is called “managing your competitors” by Reinhardt. [10]

Finally due to excellent environmental performance the company may be picked by an ethical investment fund. This could result in increased capital access and/or decreased cost of capital. The impact of reduced WACC on the company value can be easily quantified.

## VII. METHODS FOR ESTIMATING LESS TANGIBLE BENEFITS

In Table I I suggested the use of certain methods uncommon to environmental accounting. This section gives an overview of those methods and their potential function in measuring environmental benefits.

*Replacement costs* approximate the value of a measure by the saved cost of an alternative measure. Better working conditions, for example, might result in decreased turnover. The value of decreased turnover can be estimated by the saved replacement and training costs of new entrants.

*Value of changes in productivity* predicts the value of environmental measures by the productivity improvement reached. For example training or education of workers might result in reduced occurrence of nonconformance. Thus, the cost of corrective measures can be saved. Saved costs impact the cash flow for several years. More training of human resource base may also result in higher output efficiency, e.g. through less defective products or higher output per day. Unfortunately the more gifted and unique the employee is, the harder to tell how education or training would impact his productivity. Managerial qualities, for example, have longer-term strategic effects that heavily impact the cash flow, but are usually justified posterior by cash.

*Damage costs avoided* can be used to value of avoiding some potential damage. Involving the public in the beginning of the investment planning process has high costs (organizing meetings, a lot of managerial time, etc.) It also has value, however, by avoiding the damage demonstrations, objections and delayed permitting of the investment might cause. Delayed environmental

permitting might delay the construction process and the realization of profit.

The *travel cost method* is based on the assumption that time is value. People spending time on a company presentation at a conference sacrifice their time, pay the travel costs to get there and may pay some attendance fee, too. The travel cost method summarizes these three contributions. . [11][12][16] The value of time is based on the income of participant. The environmental PR (conference presentation, magazine article, report, exhibition, etc.) is more prized when a higher number or more important people, usually with higher income, are impacted. This is deemed impact, though, rather than the contribution to operating cash flow. Still, the impacts of different actions can be compared this way.

*Willingness to pay* is a widely used method in resource economics for measuring the value people contribute to environmental amenities. It subjective by nature and can be used for measuring risk acceptance of managers or their willingness to pay for risk avoidance. Risk aversion is a psychological attribute, so there is no objective way to decide about the acceptability of risk. Risk distribution, probability function of expected cost or risk, must be given whenever possible in order to ease the managerial decisions on big risks threatening the survival of the business.

*Option value* is the value of leaving our opportunities open. For example a company may invest in exploring new natural gas fields even if it knows that extraction costs would be too high there, e.g. the resource lies too deep to extract in a profitable way. Still, as prices change, the situation might become more favorable from business point of view. So even not explored, but not profitable resources has value. The area is still worth to be explored if this option value is higher than exploration cost.

## VIII. SPECIAL CONSIDERATIONS

We can calculate environmental benefits in a gross or net way. Contribution to the shareholder value is based on net cash. It means that either we have to subtract costs from gross benefits or calculate net contribution of benefits to the cash flow. E.g. the latter case contribution to operating profit rather than contribution to sales must be calculated.

An environmental measure usually impacts the cash flow for several years. How long should we consider the savings due to substitution of some hazardous raw material? In theory these saving emerge indefinitely. Still, we cannot suppose that the company would be able to keep this cost advantage forever. Sooner or later competition reacts and carry out similar measures to reduce its costs. The average technological lifecycle gives some direction on how long the deemed effects should be taken into account. The older and less efficient processes and inputs fall out as technology develops and usually there is no choice of going back to some outdated

method. The average life of technology is industry and company dependent.

There is one exemption to this suggestion. Some companies use state-of-the-art technologies and innovate constantly. Their competitive advantage stems from their capacity to innovate. Under these circumstances we can assume that the company would introduce newer and newer technologies and keep the advantage offered by innovative processes.

## IX. CONCLUSION

There should be much more emphasis on estimating the advantages of environmental activities. Although even more difficult and slippery area than cost estimation, benefit estimation has much to offer to companies, as well as to the society. Unfortunately the magnitude of environmental intangible benefits can be much bigger than that of tangibles. This underlines the importance of creative and visionary management that is not blinded by quarterly income statements and balance sheets.

## REFERENCES

- [1] S. Schaltegger and R. Burritt: "Contemporary Environmental Accounting, Issues, Concepts and Practice", Greenleaf Publishing, 2000.
- [2] UNDSO, "Environmental Management Accounting, Procedures and Principles" UNDSO, New York, 2001.
- [3] Wagner, M. – Schaltegger, S: Mapping the Links of Corporate Sustainability, in: Wagner, M. – Schaltegger, S: "Managing the Business Case for Sustainability", Greenleaf Publishing, Sheffield, 2006.
- [4] Chousa, J.P – Castro, N.R: A Model of Financial Analysis at the Service of Sustainability. in: S. Schaltegger and M. Wagner (editors): "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [5] Chousa, J.P -Castro, N.R.: Integrating Sustainability into Traditional Financial Analysis. In: S. Schaltegger, M. Bennett and R. Burritt: Sustainability Accounting and Reporting, Springer, 2006.
- [6] Ministry of the Environment, Japan: "Environmental Accounting Guidelines", Japan, 2005.
- [7] Lankovski, L.: Environmental and Economic Performance – The Basic Links, in: S. Schaltegger and M. Wagner (editors): "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [8] Schaltegger, S. – Wagner, M.: Managing and Measuring the Business Case for Sustainability, in: S. Schaltegger and M. Wagner (editors): "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [9] Mishan, E. J, " Cost-Benefit Analysis,". London: Allen & Unwin, 1979.
- [10] Reihardt, F: "Bringing the Environment Down to Earth", Harvard Business Review, July-Aug 1999.
- [11] Pearce, D. W. - Turner, R. K., "Economics of Natural Resources and the Environment", The John Hopkins University Press, Baltimore, 1990.
- [12] Pearce, D., Atkinson, G. and Mourato, S.: "Cost Benefit Analysis and the Environment": Recent Developments. OECD / Edward Elgar, Cheltenham, (2005)
- [13] Schaltegger, S.: How Can Environmental Management Contribute to Shareholder Value? In: "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [14] Spirig, Kuno: Social Performance and Competitiveness. In: "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [15] Pineiro, J. – Castro, N. R. : A Model of Financial Analysis at the Service of Sustainability, in: "Managing the Business Case for Sustainability. The Integration of Social, Environmental and Economic Performance", Greenleaf Publishing, Sheffield, 2006.
- [16] Szerényi, M. Sz: "A természetvédelemben alkalmazható közgazdasági értékelési módszerek", KVM Természetvédelmi Hivatal, Budapest, 2005.

**Table 1: Value drivers, environmental benefits and measuring**

<b>Value drivers</b>	<b>Customer attraction (sales)</b>	<b>Cost reduction and efficiency improvement</b>	<b>Risk profile</b>	<b>Reputation and brand value</b>	<b>Human, natural or financial capital</b>	<b>Licence to operate</b>	<b>Innovation</b>
<b>Environmentally different. products</b>	Sales						
<b>recyclable waste</b>	Sales						
<b>non environmental products</b>	Sales due to halo effect						
<b>Tradable permissions</b>	Deemed value						
<b>Cleaner production measures</b>		Cost reduction (resource savings, O&M, Fees and tax)	Reduced risk of accidents		Reduced need for emission treatment capital		
<b>Efficiency improvement, defects</b>	contribution to sales	cost reduction					
<b>Reduction of emissions and discharges</b>		Cost reduction on fees, fines, reduction on monitoring cost		Value of good or bad image			
<b>More efficient operation of env. management</b>		Cost reduction					
<b>Risk reduction measures</b>	Sustaining or increasing sales	Cost reduction in fines, penalties, reduced interest rate, reduction in monitoring and reporting costs	Reduction in expected costs of accidents, willingness to pay for cost reduction	Goodwill	Value of access to loans or venture capital (future cash flows)	Sustain future cash flows	
<b>Environmental PR (exhibitions, environmental report)</b>	Sales increase or stabilisation	Substitution cost of marketing		Deemed travel costs of attendants			
<b>Better work conditions, training and education</b>		Reduced turnover costs, medical costs					
	Output efficiency	Higher input efficiency					
<b>Awards, benchmarking</b>		Substitution cost of marketing			Capital costs due to ethical funds		
<b>Good relationship with authorities, environmentalists</b>		Reduced cost of licensing					cash flow produced sooner
<b>Green purchasing (less hazardous inputs, recycled materials)</b>		Reduced cost of secondary material		Substitution cost of marketing			
		Less hazardous inputs: monitoring costs					
<b>Environmental R&amp;D</b>	Sales of env. sound products	Reduced costs of new processes, new inputs					Sales of products or savings