PART I

ENVIRONMENTAL MANAGEMENT ACCOUNTING
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A. Definition: What is EMA?

Monetary environmental management accounting is a sub-system of environmental accounting that deals only with the financial impacts of environmental performance. It allows management to better evaluate the monetary aspects of products and projects when making business decisions.

“‘EMA’ serves business managers in making capital investment decisions, costing determinations, process/product design decisions, performance evaluation and a host of other forward-looking business decisions.”4 Thus, EMA has an internal company-level function and focus, as opposed to being a tool used for reporting environmental costs to external stakeholders. It is not bound by strict rules as is financial accounting and allows space for taking into consideration the special conditions and needs of the company concerned.

B. Why should companies use environmental accounting?

Companies and managers usually believe that environmental costs are not significant to the operation of their businesses. However, often it does not occur to them that some production costs have an environmental component. For instance, the purchase price of raw materials: the unused portion that is emitted in a waste is not usually considered an environmentally related cost. These costs tend to be much higher than initial estimates (when estimates are even performed) and should be controlled and minimised by the introduction of effective cleaner production initiatives whenever possible. By identifying and controlling environmental costs, EMA systems can help environmental managers justify these cleaner production projects, and identify new ways of saving money and improving environmental performance at the same time.

Introducing Environmental Management Accounting at Enterprise Level

The systematic use of EMA principles will assist managers in identifying environmental costs often hidden in a general accounting system. When hidden, it is impossible to know what share of the costs is related to any particular product or process or is actually environmental. Without the ability to isolate and separate this portion of the overall cost from that of production, product pricing will not reflect the true costs of its production. Polluting products will appear more profitable than they actually are because some of their production costs are hidden, and they may be sold under priced. Cleaner products that bear some of the environmental costs of more polluting products (through the overhead), may have their profitability underestimated and be over priced. Since product prices influence demand, the perceived lower price of polluting products maintains their demand and encourages companies to continue their production, perhaps even over that of a less polluting product.

Finally, implementing environmental accounting will multiply the benefits gained from other environmental management tools. Besides the cleaner production assessment, EMA is very useful for example in evaluating the significance of environmental aspects and impacts and prioritising potential action plans during the implementation and operation an environmental management system (EMS). EMA also relies significantly on physical environmental information. It therefore requires a close cooperation between the environmental manager and the management accountant and results in an increased awareness of each other's concerns and needs.

As a tool, EMA can be used for sound product, process or investment project decision-making. Thus, an EMA information system will enable businesses to better evaluate the economic impacts of the environmental performance of their businesses.

1. Product/process related decision-making

Correct costing of products is a pre-condition for making sound business decisions. Accurate product pricing is needed for strategic decisions regarding the volume and choices of products to be produced. EMA converts many environmental overhead costs into direct costs and allocates them to the products that are responsible for their incurrence.
The results of improved costing by EMA may include:

- Different pricing of products as a result of re-calculated costs;
- Re-evaluation of the profit margins of products;
- Phasing-out certain products when the change is dramatic;
- Re-designing processes or products in order to reduce environmental costs;
- Improved housekeeping and monitoring of environmental performance.

Table 1 summarizes the main environmental cost categories found in business.

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**Table 1. Environmental Cost Categories**

<table>
<thead>
<tr>
<th>1 Waste and Emission Treatment</th>
<th>2 Prevention and Environmental Management</th>
<th>3 Material Purchase Value of Non-Product Output</th>
<th>4 Processing Costs of Non-Product Output</th>
<th>5 Environmental Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Depreciation for related equipment</td>
<td>2.1 External services for environmental management</td>
<td>3.1 Raw materials</td>
<td>4.1 Labour costs</td>
<td>5.1 Subsidies, Awards</td>
</tr>
<tr>
<td>1.2 Maintenance and operating materials and services</td>
<td>2.2 Personnel for general environmental management activities</td>
<td>3.2 Packaging</td>
<td>4.2 Energy costs</td>
<td>5.2 Other earnings</td>
</tr>
<tr>
<td>1.3 Related Personnel</td>
<td>2.3 Research and Development</td>
<td>3.3 Auxiliary materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 Fees, Taxes, Charges</td>
<td>2.4 Extra expenditure for cleaner technologies</td>
<td>3.4 Operating materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 Fines and penalties</td>
<td>2.5 Other environmental management costs</td>
<td>3.5 Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6 Insurance for environmental liabilities</td>
<td></td>
<td></td>
<td>3.6 Water</td>
<td></td>
</tr>
<tr>
<td>1.7 Provisions for clean-up costs, remediation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Introducing **Environmental Management Accounting at Enterprise Level**

The purchase value of materials and processing costs of non-product outputs play an important role in EMA. They include the cost for buying and processing that portion of production inputs that goes into the waste or is discarded as scrap such as raw materials, auxiliary materials or water, energy and the labour cost of processing. These costs are often on an average ten to twelve times greater than the waste and emissions treatment costs.\(^6\) Savings associated with this category of environmental costs into project evaluations will make a larger number of cleaner production projects more profitable.

### 2. **Investment projects and decision-making**

Investment project decision-making requires the calculation of different profitability indicators like net present value (NPV), payback periods (PBP) and internal rates of return (IRR) or benefit-cost ratios. Recognizing and quantifying environmental costs and benefits is both invaluable and necessary for calculating the profitability of environment-related projects. Without these calculations, management may arrive at a false and costly conclusion.

Companies should take into account hidden, contingent and image costs for project appraisals. The costs recorded in bookkeeping by conventional accounting systems are insufficient to provide an accurate projection of the profitability and risks of an investment. Many cost items that may arise from long-term operations or projects must be included in the project appraisal. These environmental costs have been grouped into five categories\(^7\) as follows:

- **Raw materials, utilities, labour and capital costs** are conventional costs always considered in project appraisals and cost accounting, however the environmental portion of these costs, e.g. non-product raw material costs, are not isolated and recognized as environmental.
- **Administrative costs** buried in the overhead costs and hidden. Examples include monitoring, reporting or training costs.

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\(^7\) An introduction to Environmental Accounting As A Business Management Tool: Key Concepts And Terms, EPA 742-R-95-001, June 1995, pp. 8-11.
Contingency costs that may or may not be incurred in the future, such as potential clean-up costs from an accident, compensations or fines: the inherent difficulty in predicting their likelihood, magnitude or timing often results in their omission from the costing process. However, these costs very often represent a major business risk for the company.

Image benefits and costs, often called intangible or “good-will” benefits and costs, arise from the improved or impaired perception of stakeholders (environmentalists, regulators, customers, etc.). Changes in these intangible benefits are often not felt until they are impaired. For example, a bad relationship with regulators may result in prolonged licensing process or stricter monitoring.

External costs represent a cost to external stakeholders (communities, customers, etc.) rather than to the company itself. Most accountants agree that these costs should not be taken directly into account when making project decisions. The company should be aware, however, that high levels of external costs may eventually become internalized through stricter environmental regulation, taxes or fees. A good example of this type of cost would be costs of environmental degradation (through “acid rain”), due to sulphur dioxide ($SO_2$) pollution, which later standards strictly regulating $SO_2$ emissions would internalize, as the costs of purchasing and operating a scrubbing and neutralizing system.

A profitability analysis should be done using appropriate time-lines and indicators that do not discriminate against long-term savings and benefits. Net present value and benefit cost ratios are suggested as better investment criteria than simple paybacks or internal rates of return to reflect real costs and benefits. An accurate analysis of the investment’s sensitivity to environmental costs should also be carried out, which takes into consideration the impact of input price changes and future changes in the regulatory regime (fees, fines and penalties). Different scenarios can be examined, also evaluating contingency and external environmental costs reflecting the joint impact of changing several variables at the same time.

Thus, EMA is an important tool for integration of environmental considerations into financial appraisals and decision-making for new investments: environmentally friendly investments will show increased profitability in the long term if all these factors are included in the model.
C. Integration of EMA with other environmental management tools

Environmental accounting will produce the most benefits when it is integrated with other environmental management tools. In particular, EMA will increase the advantages that a company can gain through the implementation of EMS. Linking EMA with cleaner production and environmental reporting show the financial gain which can be achieved by applying these tools, since contingent liabilities represent major environmental, business and financial risks for companies. EMA is a good supplement for risk management programmes as well.

The TEST project has the major advantage of applying different tools within an integrated framework. Below is a brief discussion on how the different tools support each other and can be integrated with EMA.

1. Environmental Management Systems (EMS) according to the ISO standard

The ISO14001 standard requires the evaluation of environmental aspects during the planning phase of the environmental management system. In ISO 14001 environmental aspects are “elements of an organization's activities, products and services that can interact with the environment.”

The company shall:

- Identify the aspects which have an impact on the environment and
- Assign a level of significance to each environmental aspect

“When establishing and reviewing its objectives, an organization shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties”.

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8 ISO 14004: 1996 Environmental management systems—general guidelines on principles, systems and supporting techniques, normative references, p. 2.
9 ISO 14001: 1996 Environmental management systems specification with guidance for use, section 4.3.3.
Experience shows that financial implications play a very important role in companies’ decisions about significant environmental aspects they choose to tackle first. Measures that will bring higher savings will most likely be implemented first. By clarifying the environmental cost structure of a process or of a product, EMA will allow managers to have an accurate understanding of where to focus to make processes more cost efficient.

When EMA is in place, environmental costs are calculated and traced back to the source of their generation within the production process. In this way, environmental costs can be associated to specific environmental aspects, and can provide additional quantitative criteria for the setting of priorities, targets and objectives within an EMS. Thus, having an EMA system in place will help managers to effectively implement the EMS.

2. Cleaner production

When cleaner production is combined with an EMA system, significant synergies can be reached. The optimum time to build up the EMA is just after completing a cleaner-production detailed analysis, where the input/output analysis and the material flows analysis can provide basic information on the amount of production inputs physically lost. These data are essential for assessing the non-product output costs.

A cleaner-production assessment (CPA) can be a major source of data during the design of an EMA information system: especially in companies that do not have a well-established management accounting system and environmental controlling system to provide information on material flows and the costs associated with them. This is especially true for small and medium sized companies. If neither a CPA nor EMA exists, it is recommended a company perform the CPA before the EMA, especially if the company does not have accurate data on the process.

Regardless of whether any of these systems have been implemented or assessments performed, the adoption of an EMA would immediately result in the adoption of tools like CPA to identify measures to reduce environmental costs on a continual basis.
3. Environmental performance evaluation and sustainability reporting

The calculation of the financial impacts of environmental performance has recently been introduced within the environmental performance evaluation and reporting.

According to ISO 14031 financial costs and benefits are a sub-group of management performance indicators. Examples for financial indicators in the standard include: costs that are associated with environmental aspects of a product or process, return on environmental investment, savings achieved through reductions in resource usage, prevention of pollution or waste recycling, etc. While most companies have an estimate of their environmental costs, it is usually underestimated. Moreover, savings and profitability of waste reduction programmes cannot be reliably estimated without a proper EMA in place.

An EMA system can separate end-of-pipe costs from prevention costs. It also helps in calculating the savings gained through the reduced use of raw materials and energy. Without these data from environmental programmes, companies will continue to think of environmental management as a strictly non-profit-generating part of business that always costs money. Cleaner production can save money and thereby increase profits. With an EMA these savings can be captured and reported.

EMA generated data improves the bargaining power of environmental managers with a company’s top managers and shareholders, to create or obtain funding for environmental programmes, CP projects and EST investments. It will also provide precise numbers on environmental costs, when required by external stakeholders. While shareholders are concerned about their liabilities, external stakeholders (authorities, civil societies, NGOs, etc.) are interested in seeing the company’s efforts toward environmental management supported by substantial environmental expenditures. Data generated by an EMA will help demonstrate these efforts.
D. Conclusions

EMA is a relatively new tool in environmental management. Decades ago environmental costs were very low, so it seemed wise to include them in the overhead account for simplicity and convenience. Recently there has been a steep rise in all environmental costs, including energy and water prices as well as liabilities. In Europe the Pollution Prevention Pays programme of 3M played a crucial role in the spread of the EMA concept, while in the United States the high level of potential liabilities pushed companies to better evaluate their environmental costs. Now, especially transition economies are going through a fast change that will impose a requirement for more accurate control of production inputs and outputs.

Environmental costs are no longer a minor cost item that can be pooled together with other costs: the use of EMA saves money and improves control.

Still, many companies need external help in creating or improving their EMA, as those skills are not widespread and rarely available internally. EMA has to be tailored to the special needs of the company rather than be applied as a generic system. The costs and benefits of building such a system has to be considered and the scope of the EMA properly selected. Building the EMA incrementally is a common implementation strategy among companies.