ENVIRONMENTAL COST ACCOUNTING

Bețianu Leontina
FEAA, “A.I.Cuza” University of Iasi, phone: 0232/201388, e-mail: betianu@uaic.ro

Environmental management accounting serves as a mechanism for identifying and measuring the full spectrum of environmental costs of current production processes and the economic benefits of pollution prevention or cleaner processes, and to integrate these costs and benefits into day-to-day business decision-making. For the last decade, corporate environmental accounting has gained increased importance in practice, of which cost accounting receives most attention. This paper gives an overview of the approaches of environmental cost accounting.

Key words: environmental cost, environmental protection, environmental management accounting

Introduction

In recent years, Environmental Management Accounting (EMA) has been attracting increasing attention throughout the world. There are various definitions of environmental management accounting, but essentially, an environmental management accounting system can be thought of as a management accounting system that has been refined so as to enable users of the system to be provided with information that reflects the environmental performance of the organisation. The United Nations Division for Sustainable Development has referred to environmental management accounting simply as “doing better, more comprehensive management accounting, while wearing an environmental hat that opens the eyes for hidden costs”. The information generated from an environmental management accounting system might be of a financial nature (for example, the quantification of environmental costs), or it might be provided in physical terms (such as the amount of electricity used within a particular process). Either way, the motivation for developing such a system would be to provide a foundation for an organisation to improve both its environmental and financial performance.

Generally, companies are spending significant amount of money on pollution abatement and control. In most cases these costs represent the most obvious and most easily measured environmentally related costs. But it is only a top of an iceberg. Hidden environmental costs may be greater than expenditures to pollution abatement and control and uncovering of these hidden costs can provide significant opportunities for decision making and business planning.

Environmental Costs - Define and Classification

Which types of costs should be included under EMA? There is much debate on this subject because of the many different opinions as to the definition of the term environmental costs.

According to USA Environmental Protection Agency the definition of environmental cost depends on utilization of information in a company and the environmental costs can include conventional costs (raw materials and energy costs with the environmental relevance), potentially hidden costs (costs which are captured by accounting system but then lose their identity in overheads), contingent costs (costs in a future time - contingent liabilities), and image and relationship costs.

The Division for Sustainable Development of the United Nations has proposed a definition of environmental costs that distinguishes four types of costs:

- the first one is related to all the efforts made by organizations to reduce the environmental effects of their activities, by using “end-of-pipe” measures and technologies;
- the second one is related to all activities made by organizations to prevent their environmental effects before the end of the production process, for example, by using cleaner technologies, or by establishing environmental management systems;
- the third and fourth types of cost are defined on the idea that anything that does not enter the product produced by a company is a non-product output, such as wastes, waste water or lost energy, and that all costs associated to this non-product output are regarded as environmental costs. These include both the purchasing value of the materials and the production costs of producing the non-product output.

The IFAC Guidance document on EMA draws that distinction between “waste and emission control costs” and “prevention and other environmental management costs”, which, together with research and development projects, help to reduce the material costs of non-product output and thus increase eco-efficiency.

The environmental cost categories by United Nations are:

- waste and emission treatment includes depreciation for related equipment; maintenance and operating materials and services; related personnel; fees, taxes, charges; fines and penalties; insurance for environmental liabilities; provisions for clean up costs, remediation;
- prevention and environmental management includes external services for environmental management; personnel for general environmental management activities; research and development; extra expenditure for cleaner technologies; other environmental management costs;
- material purchase value of non-product output includes raw materials; packaging; auxiliary materials; operating materials; energy; water;
- processing costs of non-product output includes labour costs; energy cost.
- The IFAC environmental cost categories are:
- materials costs of product outputs includes the purchase costs of natural resources such as water and other materials that are converted into products, byproducts and packaging;
- materials costs of non-product outputs includes the purchase (and sometimes processing) costs of energy, water and other materials that become non-product output (i.e., waste and emissions);
- waste and emission control costs: includes costs for: handling, treatment and disposal of waste and emissions; remediation and compensation costs related to environmental damage; and any control related regulatory compliance costs;
- prevention and other environmental management costs: includes the costs of preventive environmental management activities such as cleaner production projects. also includes costs for other environmental management activities such as environmental planning and systems, environmental measurement, environmental communication and any other relevant activities;
- research and development costs: includes the costs for research and development projects related to environmental issues;
- less tangible costs: includes both internal and external costs related to less tangible issues. Examples include liability, future regulations, productivity, company image, stakeholder relations and externalities.

Also, the costs related to environment can be described as costs within internal management account, or external financial accounts.

In this approach, internal environmental costs to the firm are composed of direct costs, indirect costs, and contingent costs. These typically include such things as remediation or restoration costs, waste management costs or other compliance and environmental management costs. Internal costs can usually be estimated and allocated using the standard costing models that are available to the firm.

Direct costs can be traced to a particular product, site, type of pollution or pollution prevention program (e.g., waste management or remediation costs at a particular site). Indirect costs such as environmental training, research and development, record keeping and reporting are allocated to cost centers such as products and departments or activities.

External costs are the costs of environmental damage external to the firm. These costs can be “monetized” (i.e., their monetary equivalent values can be assessed) by economic methods that determine the maximum amount that people would be willing to pay to avoid the damage, or the minimum amount of compensation, that they would accept to incur it.

Allocated Environmental Cost

There are many difficulties associated with identification and allocation of the environmental costs.

When environmental costs are not adequately allocated, cross-subsidization occurs between products. In most cases, different products are made by different processes, and each process tends to have a different environmental cost. For example, consider a facility with two processes, A and B that use the same number of direct labor hours for a batch of product. Process A, however, uses hazardous chemicals whereas process B does not. The facility incurs environmental costs from the use of the hazardous chemicals in a number of ways: specification and procurement of the chemical which includes evaluation of Material Safety Data Sheets; design of the process to minimize worker exposure; shipping costs associated with transporting hazardous chemicals; monitoring, reporting, and permitting to meet applicable regulations; employee training in handling and emergency response; storage and disposal costs; and liability for the chemical from purchase to grave. In addition, there may be less tangible costs such as tarnished corporate image and inability to meet delivery or quality requirements.

If all of these costs are bundled as “environmental” overhead and allocated to processes A and B on the basis of direct labor hours or production volume (both common practices), products made by process B are in effect subsidizing those made by process A. In other words, a traditional accounting system would show process B to be more costly than it really is and process A to be less costly. Armed only with this information, managers are inclined to overestimate the profitability of products made by process A and correspondingly underestimate the profitability of those made by process B. Eventually, this type of accounting can put the company at a considerable competitive disadvantage. Conversely, by more accurately allocating these costs, managers can make better decisions about product mix and about where cost-saving opportunities lie, thereby putting their companies ahead of the competition.

Examples of Environmental Cost Accounting

It is generally accepted that managers within organizations are coming under increasing pressure to not only reduce costs, but also to minimize the environmental impacts of their operations. This pressure is coming from a broad group of stakeholders, including government, media, consumers, investors, employees, finance providers,
and non-government organizations. To help minimize the environmental impacts of an organisation, individuals need to be provided with information about the environmental costs associated with their operations.

In 2006 the research has evaluated the environmental costs of both aircraft noise and engine emissions at different sized airports in Europe. The total environmental costs have been estimated to range from 11 million € to 645 million € per year depending on the airport size and traffic and operation characteristics. Of the five airports studied, Heathrow has the highest noise and engine emission social costs (1,779 € per landing), which is the result of its large number of aircraft movements and high population affected by noise. With a high volume of aircraft movements and a large surrounding population, Schiphol has lower noise and engine emission social costs (1,219 € per landing) than Heathrow. Maastricht has higher noise costs than Gatwick and Stansted but fewer emission costs. The aggregated costs of noise and engine emissions were calculated to be 651 €, 492 € and 237 € per landing for Gatwick, Stansted and Maastricht respectively.

The Murauer bier from Austria uses materials accounting and cost accounting data to calculate the cost of waste generation at the facility, including the purchase value of raw materials lost in the form of waste and the cost of waste disposal. Based on the data collected, Murauer has implemented waste minimization efforts with the following results from 1995-2000:

- reduction in fresh water use per unit product by 19%;
- reduction in fuel oil use per unit product by 30%;
- reduction in wastewater per unit product by 32%.

These efforts have saved the firm approximately 186,000 $ in the year 2000.

In Japan, many companies voluntarily report on their environmental and sustainability performance. Of all the companies listed on the Tokyo Stock Exchange, companies representing approximately 58% of the total value of listed stocks report this information. Physical and monetary information are both reported widely in annual performance reports, per guidelines developed by the Japan Ministry of Environment. Toyota uses the EMA information it gathers to plan activities in areas such as resource conservation and recycling, energy conservation, and pollution prevention. In addition, Toyota is able to estimate the total costs and benefits of the company’s environmental activities. In 2005, total environmental costs were 237.8 billion yen. This represents an increase of 6.7 billion yen from the previous fiscal year and accounts for 2.3% of net sales. In 2005, total environmental costs of Mitsubishi were 12.754 billion yen, and for Honda were 143.34 billion yen.

In Denmark, EMA materials accounting by Danish companies is promoted via the requirements of the Green Accounts Act, which requires that a priority set of companies report the following: data on consumption of water, energy, and raw materials; significant types and volumes of pollutants emitted to air, water and soil; significant types and volumes of pollutants in production processes, waste or products. 40% of the companies have achieved environmental improvements. 50% of the companies have involved employees in preparing the Green Account. 60% of these companies have experienced a positive effect of this. For several companies, working with Green Accounts has also contributed to the establishment of new environmental policies, setting up environmental action plans or introduction of environmental management.

In 2005, Baxter promoted best practices across the company, increased the number of facility energy reviews, tracked more closely the completion of identified energy savings projects and expanded the use of utility invoice payment services.

Facility-based energy-efficiency projects included the following:

- replacing metal halide lamps and high-pressure sodium lamps with energy-efficient lighting systems, installing improved control technologies, conducting lighting surveys and installing improved lighting reflectors. This produced estimated annual savings of 40,000 $ to 250,000 $ per facility;
- improving motor efficiency by using intelligent controls for motors with varying loads. Efficiency gains vary but range from 5 to 60 percent;
- optimizing the generation and distribution of compressed air used in manufacturing processes.

In 2005, total environmental costs of Baxter were 21.8 million $.

Conclusion

Limits of traditional financial and cost accounting methods to reflect efforts of organizations towards sustainability and to provide management with information needed to make sustainable business decisions have been broadly recognized. Information on environmental performance of organizations might be available to some extent, but, decision-makers of internal company, as well as those in public authorities, are seldom able to link environmental information to economic variables and are crucially lacking environmental cost information. As a consequence, decision makers fail to recognize the economic value of natural resources as assets, and the business and financial value of good environmental performance. Beyond “goodwill” initiatives, a few market-based incentives exist to integrate environmental concerns in decision-making.

Reference:

1. Bețianu L., Environmental management accounting - an essential component of business strategy, in vol. International Conference The Impact of European Integration on the National Economy, organized


5. Jasch C., Stasiskiene Z., From Environmental Management Accounting to Sustainability Management Accounting, Journal Environmental research, engineering and management, No. 4/2005, pp. 77-88


