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Policy Pathways for Promoting Environmental Management Accounting

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Policy Pathways for Promoting Environmental Management Accounting

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Preface

The introduction of measures of environmental protection going beyond a legally stipulated minimum is still often regarded as undesired cost factor, which is only justifiable in times of economic prosperity. The concept of sustainable economy, however, goes one step further. Long-term strategic economic action, which also accepts social and ecological responsibility may release significant potentials of efficiency and innovation.

As shown by the successful results of the cleaner production approach initiated in Austria at the beginning of the nineties in regional and communal case study programs, strategically planned concepts of avoiding waste and emissions lead to a distinct increase in resource-efficiency. The PREPARE method was developed as an instrument for high-quality preventive concepts of environmental management. Only in very rare cases was it possible to prove that these measures also had an impact on accounting figures, i.e. cost saving.

A solid proof of achievable cost saving in planning and development of strategies, which would meet the requirements of company controlling, calls for new instruments in the field of business economics and accounting. For this reason a cooperation was initiated between the Austrian Federal Ministry of Transport, Innovation and Technology, Environment Canada and the United Nations Department of Economic and Social Affairs / Division for Sustainable Development (UNDSD) and the project was funded as Austrian and Canadian contribution in the framework of the “Expert-Working-Group on Environmental Managerial Accounting".

The project report is based on a review of the international UNCSD expert working group and proposes a number of policy pathways towards the implementation of EMA as a standard tool regarding the calculation of environmental and material (flow) costs. The study is supplemented by a number of case studies in Austria and other countries. The procedure summarized here may be regarded as guideline for actions for broad application and trial and may form a new basis of the calculation of financial profitability of business options of sustainability.

As the Austrian representative in the working group I would like to take the opportunity of thanking the United Nations Department of Economic and Social Affairs / Division for Sustainable Development and the other members of the expert working group for the good cooperation and express my sincere conviction that the method described in this report will turn out to be an efficient and useful business tool.

Vienna, spring 2001

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FOREWORD

This paper was written primarily for the benefit of government representatives who have an interest in promoting Environmental Management Accounting (EMA) among private sector firms or government organisations within their jurisdiction. However, other stakeholders with an interest in environmental and accounting policy, such as business firms and environmental NGOs, may also find this paper useful The paper was developed under the auspices of the United Nations Division for Sustainable Development, as described below.

The United Nations Commission on Sustainable Development (UNCSD) works on many issues critical to sustainable development. During the 1998 session of UNCSD, one general area identified for further study was the topic of business decision-making as related to environmental management. Informal discussions at the session also indicated that Environmental Management Accounting (EMA) as a promising tool for corporate environmental management was of interest to a number of national governments attending.

In response, the United Nations Division for Sustainable Development (UNDSD), in co-operation with other partners, took on the responsibility for organising the series of international working group meetings with the theme of "Improving Governments' Role in the Promotion of Environmental Management Accounting".

The first working group meeting was held in Washington, D.C. (USA) in August of 1999, and was hosted by the US EPA's Environmental Accounting Project. Attendees included approximately 20 government representatives from 12 different countries, as well as approximately 15 other participants from international organisations, the private sector, and academia. Participants made presentations on EMA activities and programs of their governments/organisations, and discussed potential policy instruments for governments to promote EMA in industry *(UNDSD 2000)*.

The discussion of policy options continued at the second working group meeting in Vienna (Austria) in May of 2000, which was hosted by the Austrian Ministry of Transport, Innovation, and Technology. The participants, gave updates and new presentations on government EMA activities and presentations on related topics. In addition, the UNDSD proposed the development of a set of workbooks on three EMA topics of critical interest to the group:

- Workbook I: EMA Metrics, Procedures, and Principles
- Workbook II: EMA Links
- Workbook III: EMA Policy Options

The Vienna meeting participants provided feedback on the UNDSD proposal and approved development of the draft workbooks, which were presented and reviewed at the third working group meeting in Bonn (Germany) in November of 2000. That meeting was hosted by the German Federal Ministry for Education and Research in co-operation with the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety.

Based on comments received at the Bonn meeting, the draft workbooks have been edited and are being distributed in current form for final review. Final review comments will inform a final edit of the workbooks prior to publication by UNDSD and subsequent presentation of the workgroup's findings and recommendations at the 9th session of UNCSD in 2001.

ACKNOWLEDGEMENTS

The authors would like to thank the many people who contributed to conception, funding, and development of this paper.

First of all, we would like to acknowledge Mr. Tarcisio Alvarez-Rivero, Mr. Ralph Chipman, and Ms. Terri Olvida of the United Nations Division for Sustainable Development's Division of Economic and Social Affairs, who convened the working group meetings on EMA and conceived the original idea for this paper.

We would also like to thank the organisations who funded development of the paper. The EMA case studies were funded by the Austrian Ministry of Transport, Innovation, and Technology, represented by Mr. Hans-Guenther Schwarz, and Joanneum Research Institute of Sustainable Techniques and Systems, represented by Prof. Dr. Hans Schnitzer and Ms. Andrea Grabher. The remainder of the paper was funded by Environment Canada, represented by Ms. Darlene Boileau.

For information on the case studies themselves, we thank the many working group members and others who took the time to send us materials on their policies/programs and to review the draft case studies for accuracy. These contributors include: Mr. Jan Jaap Bouma of the Erasmus Centre for Environmental Studies (Netherlands); Mr. Antero Honkasalo of the Finland Ministry of Environment; Mr. Will Garvey of the US Environmental Protection Agency's Office of Enforcement and Compliance Assurance; Ms. Amihan Gorospe of the Philippines Board of Investment; Mr. Ari Huhtala of the United Nations Environment Programme's Project on Cleaner Production Financing; Mr. Tsuyoshi Kawakami of the Japan Environment Agency; Ms. Angie Leith of the US Environmental Protection Agency's Office of Solid Waste; Mr. Andreas Lorenz of the German Federal Environment Agency; Mr. Richard Osborn of Green Measures (Australia); Mr. Howard Pearce of the UK Environment Agency; Ms. Kristin Pierre of the US Environmental Protection Agency's Environmental Accounting Project; Mr. Jean-Claude Prevost of Environment Canada; Mr. Kenneth Ratzman of the New Jersey Department of Environmental Protection (USA); Mr. Jan Sage of STENUM GmbH (Austria); Prof. Dr. Hans Schnitzer of the Technical Univ. of Graz (Austria); Ms. Charlotte Thy of the Danish Environmental Protection Agency; Mr. Karel van Hulle of the European Commission DG XV; Prof. Dr. Bernd Wagner of Univ. Augsburg (Germany), and Dr. Teun Wolters of the Institute of Sustainable Commodities (Netherlands).

In addition, we thank the authors of the other two UNDSD workbooks as well as other members of the EMA working group who provided feedback on other issues relevant to this paper: Dr. Christine Jasch of the Institute for Environmental Management and Economics (IOEW - Vienna); Prof. Dr. Stefan Schaltegger of the Univ. of Lueneburg (Germany); Mr. Tobias Hahn of the Univ. of Lueneburg (Germany); Prof. Roger Burritt of the Australian National University; Mr. Richard Osborn of Green Measures (Australia); and Mr. Howard Pearce of the UK Environment Agency.

The authors take full responsibility for the content of the paper, including any errors.

EXECUTIVE SUMMARY

This paper was written primarily for the benefit of government agency representatives who have an interest in promoting Environmental Management Accounting (EMA) among private sector firms or government organisations within their jurisdiction. However, other stakeholders with an interest in environmental and accounting policy, such as business firms and environmental NGOs, may also find this paper valuable.

For the purposes of this paper, EMA is broadly defined to be the identification, collection, estimation, analysis, internal reporting, and use of physical flow information (i.e., materials, water, and energy flows), environmental cost information, and other monetary information for both conventional and environmental decision-making within an organisation. This definition of EMA is similar to the definition of conventional management accounting, but has several key differences:

- EMA places particular emphasis on accounting for environmental costs.
- EMA encompasses not only environmental and other cost information, but also information on physical flows and fates of materials, water, and energy.
- EMA information can be used for any type of management activity or decision-making within an organisation, but is particularly useful for activities and decisions with significant environmental components and/or consequences.

Thus EMA incorporates and integrates two of the three building blocks of sustainable development – environment and economics – as they relate to an organisation's internal decision-making.

An organisation's decision-makers can use the physical flow information and monetary information provided by EMA to make decisions that impact both the environmental and financial performance of the organisation. It is important to note that, while EMA supports internal decision-making, the implementation of EMA does not guarantee any particular level of financial or environmental performance. However, for organisations that do have the goals of minimising costs in general, environmental costs in particular, or environmental impacts, EMA clearly provides a critical set of information for meeting those goals.

One key benefit of good EMA data is the opportunity to identify and reduce environmental costs. Reductions in environment-related capital investments or annual environmental operating costs can increase profit margins or allow lower product/service prices, which can help retain or increase market share. Reductions in potential environmental liability can reduce legal liability costs, and improve access to financing and customer contracts.

EMA data is certainly the most valuable for management activities with a specific environmental component, or management decisions with the potential for significant environmental impacts or consequences. However, it is fair to say that the range of decisions affected by environmental costs of one type or another is generally on the rise. Thus, even conventional management decisions, previously considered to be non-environmental, will find themselves increasingly impacted by environmental costs in the future. From this perspective, EMA is and will become increasingly valuable for all types of routine

management decisions, such as product pricing and capital budgeting. EMA is also recognised as being of great value for external reporting purposes.

The implementation of EMA by private sector businesses can benefit government in a variety of ways. First of all, the more that industry is able to recognise and justify conservation and environmental protection programs and expenditures on the basis of financial self-interest, the lower the financial, political, and other burdens of environmental protection, regulation, and enforcement on government.

Secondly, implementation of EMA should strengthen the effectiveness of existing government policies/regulations by revealing to companies the true environmental costs that those policies/regulations impose *(Bouma, 2000)*. For example, natural resource taxes or higher prices for energy and water will not encourage improved environmental performance within a company if those costs are not recognised in management decision-making. Conversely, better EMA will make those policies more effective.

In addition, business-related EMA data can be directly used by government for policy design and decision-making. For example, data on the true costs and benefits of various industrial environmental management strategies (e.g., waste recycling vs. waste disposal) can help government to assess the potential financial impacts of alternative environmental regulations/policies on firms. Industry-specific data can also be used for regional or national-level accounting purposes; for example, EMA information from firms in a particular spatial region such as a watershed could be used to help manage the environmental quality of that region.

Government organisations can also use EMA for environmental and other decision-making within their own operations. Government agencies, offices, and facilities can use EMA to inform purchasing, capital budgeting, and other internal decisions as well as external reporting on economic and environmental performance.

One of the goals of this paper was to collect information for a set of case studies of current government policies/programs that promote EMA concepts. There are numerous interesting and informative examples of government-supported EMA around the world; unfortunately, we did not have the time or resources to develop case studies on all of them. Thus, we selected an illustrative set of case studies, to show the richness and diversity of government efforts in this area, and to inform policy design for future activities.

We selected the case studies to provide a mix of examples that illustrate the promotion of EMA:

- *By* different levels of government (local, regional, national, supranational)
- *For* different target audiences, i.e., EMA users (industry in general, specific industry sectors, small & medium sized enterprises, local government, state/national government)
- In different countries – both technologically developed and developing
- Via other environmental initiatives (e.g., cleaner production, environmental management systems, external reporting) and accounting systems (e.g., financial accounting & reporting, national resource accounting)

↓# Via a range of policy instruments (government regulation, promotion of voluntary adoption; research & concept/tools development, information dissemination, technical assistance, other incentives)

The case studies indicate that there are a wide variety of government-supported policies/programs that promote EMA concepts. In most cases, government agencies with a clear environmental mandate are the primary actors, but other agencies are beginning to get involved. National-level governments have taken the lead in many of these activities, but the level of experience and activity by lower levels of government (regional and local) is increasing. Similarly, supranational government organisations and groups are becoming more active in promoting the sharing of experiences and tools from the national level.

Government organisations are promoting EMA concepts in collaboration with many non-government organisations, including individual industrial firms, industry associations, financial institutions, accounting associations, universities, research & consulting firms, and NGOs. The one type of partner that most programs seem to have in common is that of consultants with technical expertise.

Policy target audiences, i.e., EMA users, have included both industry and government, and EMA has proven valuable to each for internal management and decision-making. Efforts targeted towards EMA for industry to date seem to be mostly focused on manufacturing, rather than the resource extraction or service sectors. Small and medium-sized enterprises (SMEs) are also an audience of specific interest.

Most of the case studies illustrated the promotion of EMA via an intermediate element of some kind, that links the government policy maker to the EMA user. One type of intermediate element is an EMA application, i.e., any environmental initiative, program, or approach that needs EMA information in order to be successful. Another type of intermediate element is any kind of accounting or management system that has potential overlaps with EMA data.

Six of the policies/programs focused primarily on one type of intermediate element, while the remainder identified multiple intermediate elements that linked the policy makers and the EMA users. One of the most common types of intermediate element was the group of EMA applications including: pollution prevention; cleaner production; eco-efficiency; waste minimisation; and waste management. External reporting was another EMA application identified as a useful intermediate element in many of the case studies. A number of the case studies identified Environmental Management Systems (EMS) as an intermediate element, but only two of the case studies significantly promote EMA concepts in connection with other types of accounting systems.

A wide range of methodologies and terminology are used by the various policies/programs in describing their EMA-related efforts. Most of the programs do include monetary data and physical flow data in their definitions/activities, but the primary focus is usually on monetary data. Most of the programs retain the internal management and decision-making focus of management accounting and EMA, but many also go further, to encompass external reporting activities as well.

Partly because the conceptual development of EMA is at a relatively early stage, much of the activity focuses on voluntary programs with a significant amount of research & concept/tools development, and general information dissemination. However, there are also several good examples of programs that require EMA via government regulation. One significant gap in EMA-related policy activities was in the realm of financial incentives.

There has been little formal evaluation of the challenges and successes of these EMA policies/programs to date, probably partly because of the early stage of some of the projects, and partly because formal evaluation itself can be difficult. Thus, the extent and effectiveness of many current policies/programs is unclear. However, some common challenges seem to be challenges of definition, cultural change, and technical capacity.

In comparison to the decades-long (if not longer) process of development of financial accounting and conventional management accounting, EMA is a relatively new field. Thus, government policy efforts to promote EMA are also in the early, experimental phase for the most part. It is too early to draw hard and fast conclusions about what works and what does not. In addition, the best policy approach for promoting EMA concepts will likely differ for different levels of government, for different target audiences, and in different countries. Nonetheless, the existing policies/programs reviewed in the case studies in this paper do provide some preliminary lessons and suggestions about broadly promising policy pathways for the promotion of EMA concepts by government.

One lesson is that EMA usually needs to be promoted in connection with programs that actually require EMA data to succeed. The case studies identified some promising EMA applications (e.g., Cleaner Production, External Reporting), but a number of other EMA applications are available for consideration as intermediate elements that can link policy makers and EMA users (e.g., environmental supply chain management or extended producer/product responsibility).

In addition, there are compelling reasons to promote EMA concepts in connection with other accounting and information management systems. First of all, while some of the environmental initiatives that qualify as EMA applications may or may not be institutionalised, ongoing initiatives, as opposed to one-time projects, accounting and information systems are by nature systems with a long time-horizon. Incorporation of EMA concepts into these systems holds great promise for ensuring that EMA is incorporated into the routine, ongoing operations of the organisation. In addition, the better that EMA and related accounting/information systems are integrated, the more likely that EMA data will be used for all internal management and decision-making, not just environmental decision-making. The most common system that was linked to EMA in the case studies was Environmental Management Systems (EMS), but there are many others.

A second general lesson learned from the case studies is that a number of different policy instruments are probably valuable for promoting EMA concepts. Again, the choice of policy mix will depend on the particular government organisation, target audience, EMA link, country, etc. However, we do have some general recommendations regarding activities in several of the policy categories.

First of all, while the general trend in environmental policy is towards the supplementing of direct regulation with alternative policy instruments such as economic instruments and

information instruments, we should not neglect the potential role of government regulation in promoting EMA concepts. Five of the case studies illustrate the use of regulation to promote EMA. In addition, financial accounting and reporting by publicly held firms is regulated, either by government or by government-authorised industry bodies. The potential for promoting EMA concepts via accounting or other regulations needs further discussion and investigation.

Under the policy categories of Research & Concept/Tools Development and Information Dissemination, we generally recommend better co-ordination of the various efforts of local, regional, and national government bodies. Indeed, the UNDSD international working group was formed specifically for this purpose, with a focus on co-ordinating and sharing national-level efforts.

We also recommend that efforts should focus on organising the various individual approaches to EMA into a single coherent framework. Otherwise, we run the risk of simply confusing stakeholders with the variety of terminology and tools that currently exist; this problem was pointed out by several of our case study contacts and was also evident at the second working group meeting in Vienna.

Activities that fall under the policy category of Information Dissemination should be expanded as well as co-ordinated. To date, policies/programs seem to have focused their Information Dissemination activities primarily towards their most direct constituents and stakeholders. However, a much wider potential audience of EMA stakeholders could benefit from the work to date and could assist in promoting the basic concepts and tools developed.

And finally, we would like to note that the policy category of Financial Incentives has not really been discussed or tested as a pathway for promoting EMA concepts. Since the potentially high cost of implementing EMA has been a challenge or barrier to some firms, this policy instrument category bears further consideration and investigation.

A third general lesson from the case studies is importance of partners in promoting EMA. The primary government sponsor of an EMA program will often have other government organisations as partners. Whenever possible, the primary government sponsor of EMA efforts try to involve at least one or two government agencies that do not have environmental protection as a primary mandate. Examples would include government organisations that focus primarily on economic development, finance, and energy. This will help speed the integration of EMA principles into mainstream, non-environmental activities and help strengthen the sustainable development connection between economics and environment.

Another critical partner for government is, or should be, the accounting community. Accounting and related finance associations can put the industry seal of approval on EMA practices and approaches. When government itself is the EMA user, government finance and accounting associations can also play a critical role in promoting EMA. Accounting academics and organisations can promote the integration of EMA concepts into academic accounting curricula and the continuing professional education courses that most practising accountants are required to take for periodic certification. Other good EMA promotion partners might be the accounting firms that assist business with such transitions, and the firms that develop popular accounting software packages in various parts of the world.

And finally, engineering academics and professional associations might be another valuable partner. Engineers and other technically trained professionals are in a particularly good position to apply EMA-related concepts in the early research and design stages of projects. Chemical engineers, for example, routinely learn how to assess the potential profitability of industrial projects as part of senior design courses.

As mentioned previously, the best policy or combination of policies for promoting EMA concepts will likely vary from place to place. Thus, we thought it might be useful to propose a very broad framework for EMA policy design to assist policy makers. An initial version of this framework was designed to assist our case study identification, development, and assessment efforts, and evolved as the case studies were actually written. The basic components of the framework are given here.

Tier I – Scoping

↓# Clarify the core policy goal and the primary target audience
↓# If the policy core goal is to promote EMA itself – identify the most promising intermediate elements to link the policy maker and the EMA user
↓# If the core policy goal is some other element, clarify the prominence of EMA within the policy or program

Tier II – Partners &Content

↓# Recruit the most important partners
↓# Determine the most appropriate EMA methodology & language
↓# Select specific EMA policy instruments & program activities

Tier III - Details

↓# Design an Implementation Plan
↓# Design an Assessment Plan
↓# Design an Institutionalisation Plan

Policy designers may choose different starting points for program design. For example, one government organisation may start out with a particular EMA link in mind, e.g., EMS, and design the remainder of the program around that initial decision. Another government organisation might have a particular partner in mind, e.g., an accounting association, and work with that partner to determine the policy/program details. Thus, the framework described in the paper is not meant to be rigid or prescriptive – it is meant to be a general taxonomy of the principle decisions and steps we see as valuable in EMA policy design, arranged in tiers that indicate a suggested logical order.

In conclusion, we make some brief suggestions for next steps for both the UNDSD international working group and for individual governments. These suggestions are a combination of our own ideas and the ideas of other participants of the working group. Indeed, some of these recommendations are already being explored or implemented by members of the group. The major categories of recommendations are given below.

Suggested Next Steps for the UNDSD International Working Group:

- ↓# Formalise and Expand the Group
- ↓# Coordinate Information Dissemination Efforts
- ↓# Develop Internationally Accepted EMA Definition/Framework/Taxonomy
- ↓# Commission Related Studies/Case Studies
- ↓# Commission Other Materials for (Free) Distribution

Suggested Next Steps for Individual Governments:

- ↓# Evaluate Existing Program Challenges & Successes to Inform Future Program Design
- ↓# Coordinate Internal EMA Efforts
- ↓# Target Industry Sectors/Sizes and Geographic Regions of the Most Interest
- ↓# Identify and Explore the Most Promising EMA Links and Partners

CHAPTER I – INTRODUCTION

This paper was written primarily for the benefit of government agency representatives who have an interest in promoting Environmental Management Accounting (EMA) among private sector firms or government organisations within their jurisdiction. However, other stakeholders with an interest in environmental and accounting policy, such as business firms and environmental NGOs, may also find this paper valuable.

In this introductory chapter, we will: define EMA for newcomers to this topic; briefly discuss some of the limitations of conventional management accounting that led to the development of EMA; mention some of the benefits and uses of EMA; and discuss why government should be interested in promoting EMA both within private and public sector organisations.

What is Environmental Management Accounting (EMA)?

Before attempting to define Environmental Management Accounting (EMA), it is informative to first define conventional management accounting (also sometimes called "managerial" accounting). One conservative definition of management accounting might be: the identification, collection, estimation, analysis, internal reporting, and use of monetary information (e.g., costs, savings, earnings) for management decision-making within an organisation.

In contrast, *financial* accounting is the collection and reporting of monetary information (i.e., expenditures, revenues, assets, liabilities) to external stakeholders such as government agencies, bankers, and stockholders and other investors. For publicly held companies, financial accounting practices usually are regulated by a government agency or government-recognised industry association. Management accounting practices are not regulated in this way, and can vary quite widely from organisation to organisation.

It should be noted that there is no single, exact definition of management accounting. For example, according to the Chartered Institute of Management Accountants in the UK, management accounting is "an integral part of management concerned with identifying, presenting, and interpreting information used for formulating strategy; planning and controlling activities; decision-taking; optimising the use of resources; disclosure to shareholders and other stakeholders external to the entity; disclosure to employees; safeguarding assets" (Bennett, 1999). This UK definition broadens the scope of management accounting information to include not only monetary information, but any type of useful management "information". It also broadens the scope of the use of management accounting information to include not only internal management and decision-making, but also external disclosure/reporting.

Regardless of the exact definition, management accounting informs many different types of management activities and decisions, some of which are mentioned in the UK definition. As such, management accounting is a critical internal management tool for both private sector and public sector organisations. Therefore, this paper discusses conventional management accounting and Environmental Management Accounting as approaches of value to both business firms and government organisations for the purposes of internal management and decision-making.

Similarly to conventional management accounting, Environmental Management Accounting (EMA) has no single, universally accepted definition. In addition, many related concepts and terms overlap in some fashion with EMA: Environmental Accounting (EA); Full Cost Accounting (FCA); Total Cost Assessment (TCA); Materials Accounting; Natural Resource Accounting, and many others. A detailed definition and description of the relationship of EMA to other management accounting approaches and systems is given in the Workbook on EMA Metrics, Procedures, and Principles.

However, for the purposes of this paper, EMA is broadly defined to be the identification, collection, estimation, analysis, internal reporting, and use of physical flow information (i.e., materials, water, and energy flows), environmental cost information, and other monetary information for both conventional and environmental decision-making within an organisation.

This definition of EMA is similar to the definition of conventional management accounting, but has several key differences:

↓# EMA places particular emphasis on accounting for environmental costs.

↓# EMA encompasses not only environmental and other cost information, but also information on physical flows and fates of materials, water, and energy.

↓# EMA information can be used for any type of management activity or decision-making within an organisation, but is particularly useful for activities and decisions with significant environmental components and/or consequences.

Thus EMA incorporates and integrates two of the three building blocks of sustainable development – environment and economics – as they relate to an organisation's internal decision-making.

The Limitations of Conventional Management Accounting

The need for EMA was conceived in recognition of some of the limitations of conventional management accounting approaches for management activities and decisions involving 1) significant environmental costs, and/or 2) significant environmental consequences/impacts. What are these limitations of conventional management accounting?

Failure to Adequately Account for Environmental Costs

First of all, conventional management accounting practices tend to track environmental costs inadequately. The exact definition of "environmental" costs is a frequently debated topic, and is discussed in more detail in the Workbook on EMA Metrics, Principles, and Procedures. However, we will use some obvious examples of environmental costs during the remainder of this discussion.

A survey of management accountants in US companies illustrates the point that many environmental costs are not adequately considered in internal decision-making *(White & Savage, 1995)*. When given a list of costs and asked which costs their firm "normally considered" when doing financial analysis for a capital investment project, the answers for different cost items ranged from 25% to 79% of respondents. Environmental costs on the low end of the response range included off-site wastewater or hazardous waste treatment;

environmental staff labour time, environmental penalties/fines, and reporting to government agencies.

Which conventional management accounting practices might contribute to the inadequate consideration of environmental costs in internal decision-making? Several practices that can contribute are: the unintentional "hiding" of many environmental costs in overhead accounts; inaccurate allocation of environmental costs from overhead accounts back to processes, products, and process lines; inaccurate characterisation of environmental costs as "fixed" when they may actually be variable (or vice-versa); inaccurate accounting for volumes (and thus costs) of wasted raw materials; and the actual absence of relevant and significant environmental costs in the accounting record. We will discuss several of these practices further below.

First of all, conventional management accounting usually assigns the more direct costs to the product, process, or activity that generated the cost. The indirect costs at the facility, which are more difficult to attribute to a specific product, process, or activity, typically are assigned to broad overhead accounts. As an example, imagine a manufacturing facility with two major production lines. The costs of purchased raw materials at this facility would like be assigned directly to the production lines that generated those costs. In contrast, the cost of electricity, which comes in the form of a single, facility-wide bill from the electric utility, would likely be assigned to an overhead account.

Conventional management accounting tends to assign many environmental costs to overhead accounts rather than assigning them directly to the processes, products, or activities that generated the cost. The US management accountant survey mentioned previously gives numerous examples of environmental costs commonly assigned to overhead accounts, including on-site and off-site waste treatment and disposal costs, environmental staff labour time, environmental fines and penalties, and various regulatory compliance costs *(White & Savage, 1995).* The same survey indicated that energy and water costs, two other cost items with environmental relevance, also are assigned to overhead accounts quite often. The combination of environmental costs plus many indirect non-environmental costs in overhead accounts makes it difficult to "find" them (or even know to look for them) for subsequent decision-making.

The indirect costs initially assigned to overhead accounts are later allocated back to products, processes, and activities using some reasonable allocation basis, e.g., the number of hours that each equipment line was in operation. The accuracy of this allocation process may differ for different types of costs. As an example, imagine the same manufacturing facility with two production lines. The electricity cost in the overhead account is allocated back to the production lines using production volume as an allocation basis. While this allocation procedure might be satisfactory for electricity costs, it might be less accurate for other types of costs, such as hazardous waste disposal costs. For example, if only one of the two production lines actually produces hazardous waste, then using production volume as the allocation basis for hazardous waste disposal costs would be completely inaccurate. This distorts the estimated operating costs for the two lines, and thus distorts other management activities and decisions, such as product pricing and identification of cost reduction opportunities.

In addition to hidden and misallocated environmental costs, some environmental costs often are not included in conventional management accounting records at all. Two types of environmental costs that fall into this category are less tangible costs (i.e., costs that are difficult to predict and estimate) and future costs. An example of a less tangible cost is the cost to a company of poor environmental image in the eye of consumers, as expressed by lower market share. An example of a future cost is the cost of a future wastewater treatment plant upgrade due to a new environmental regulation. Potential future environmental liability is an example of an future environmental cost that is also less-tangible.

Some of these management accounting practices, or the way in which they are implemented, have been criticised as insufficient for management decision-making in general, not just in the realm of environmental costs *(Bennett, 1999)*. In any case, these practices, which might have been acceptable for the lower (or non-existent) environmental costs of the past will no longer suffice for the continually increasing environmental costs and opportunities of the present and the future.

Failure to Adequately Inform Environmental Management Activities

One might think that if conventional management accounting systems could be improved to better track environmental costs, then this information should be sufficient for most environmental management activities and decisions. However, this is not the case.

Conventional management accounting focuses primarily on cost information for decision-making, while tracking cost drivers such as materials use, labour time, asset purchase and depreciation, etc. as necessary to inform costing. However, in order to make sound environmental management decisions, materials and energy flow information such as data on resource use (e.g., energy and water use) and waste generation (e.g., volume and type of air emissions or wastewater) is particularly important. Physical flow data thus serve not only as a key driver of environmental costs related to resource inefficiency and waste management , but also serve as a basis for helping to characterise the environmental consequences or impacts of business decisions.

Many conventional management accounting systems do not explicitly track physical flow information in a way that enables and encourages the "environmental management" part of EMA. Many companies do not adequately track materials and energy flows at all. Others may track subsets of materials and energy flow information separately from the general management accounting system, for very specific purposes. For example, in companies subject to strict environmental regulations, waste types, volumes, and fates may instead be tracked in a separate system geared solely towards regulatory compliance and reporting. Some companies may track raw materials inventories for inventory control and purchasing purposes, but not use the information for environmental management purposes.

Benefits and Uses of EMA

An organisation's decision-makers can use the physical flow information and monetary information provided by EMA to make decisions that impact both the environmental and financial performance of the organisation. It is important to note that, while EMA supports internal decision-making, the implementation of EMA does not guarantee any particular level of financial or environmental performance. However, for organisations that do have the goals of minimising costs in general, environmental costs in particular, or environmental impacts, EMA clearly provides a critical set of information for meeting those goals.

One key benefit of good EMA data is the opportunity to identify and reduce environmental costs. Reductions in environment-related capital investments or annual environmental operating costs can increase profit margins or allow lower product/service prices, which can help retain or increase market share. Reductions in potential environmental liability can reduce legal liability costs, and improve access to financing and customer contracts.

For example, an industrial firm that is able to recognise the true magnitude and monetary value of the wasted raw materials exiting the facility in the form of pollution and waste may be motivated to identify options for reducing the waste, recovering the raw material, and saving money. The reduced volume or changed content of the wastewater stream may allow lower-cost wastewater treatment plant upgrades in the future. A local government agency responsible for delivering municipal solid waste management services to the local community can use EMA information determine the combination of services, e.g., recycling, landfilling, incineration, that is the most cost-effective and has a minimal environmental impact.

The range of decisions affected by "environmental" costs will depend on the exact definition of environmental costs. For example, if a company considers the cost of wasted raw materials to be an environmental cost, then most production processes would have some environmental costs attached. The range of decisions affected by environmental costs also will depend on the environmental regulatory regime to which a facility is subject. For example, if the regulatory regime does not mandate or enforce proper disposal of hazardous waste, then hazardous waste disposal costs are not likely to be of concern.

Nevertheless, despite differing definitions of environmental costs, differing regulatory regimes, and differences in other factors, it is fair to say that the range of decisions affected by environmental costs of one type or another is generally on the rise. Thus, even conventional management decisions, previously considered to be non-environmental, will find themselves impacted by environmental costs in the future. From this perspective, EMA is and will become increasingly valuable for all types of routine management decisions, such as product pricing and capital budgeting.

However, EMA data is certainly the most valuable for management activities with a specific environmental component, or management decisions with the potential for significant environmental impacts or consequences. Examples include: the development, implementation and maintenance of environmental management systems; the analysis of cleaner production opportunities; assessment of the environmental performance of operations, product, and services; regulatory compliance decision-making; and many others. EMA provides not only the cost data necessary for assessing these management activities, but also the physical flow information (e.g., raw materials use and waste generate rates) that help characterise environmental impacts.

Even beyond the internal management and decision-making focus of conventional management accounting, EMA is also recognised as being of great value for external reporting purposes. Companies can use EMA to collect data for external stakeholders for a variety of reasons, such as to prove compliance with environmental regulations or to illustrate environmental commitment and improve company image. Many external stakeholders such as government environmental regulators, environmental NGOs, and local communities, are

primarily interested in the physical flow component of EMA. Other stakeholders, such as investors, are more interested in environmental cost data.

In summary, EMA is a broadly applicable management tool for implementing almost any of these efforts. And, as more organisations come to recognise that many management decisions have potential environmental impacts and costs of various kinds, recognition of the value of EMA will grow. In the end, the distinction between conventional management accounting and EMA may blur, as the two approaches merge into a single broad management accounting approach that can better inform all decisions, environmental and otherwise.

Why Should Government Promote EMA?

The implementation of EMA by private sector businesses can benefit government in a variety of ways. First of all, the more that industry is able to recognise and justify conservation and environmental protection programs and expenditures on the basis of financial self-interest, the lower the financial, political, and other burdens of environmental protection, regulation, and enforcement on government.

Secondly, implementation of EMA should strengthen the effectiveness of existing government policies/regulations by revealing to companies the true environmental costs that those policies/regulations impose *(Bouma, 2000)*. For example, natural resource taxes or higher prices for energy and water will not encourage improved environmental performance within a company if those costs are not recognised in management decision-making. Conversely, better EMA will make those policies more effective.

In addition, business-related EMA data can be directly used by government for policy design and decision-making. For example, data on the true costs and benefits of various industrial environmental management strategies (e.g., waste recycling vs. waste disposal) can help government to assess the potential financial impacts of alternative environmental regulations/policies on firms. Data on the industrial use of raw materials and energy and data on pollution and waste volumes and flows can help government measure the success of industry-focused conservation and environmental protection policies. Industry-specific data can also be used for regional or national-level accounting purposes; for example, EMA information from firms in a particular spatial region such as a watershed or airshed could be used to help manage the environmental quality of that region.

Government organisations can also use EMA for environmental and other decision-making within their own operations. Government agencies, offices, and facilities can use EMA to inform purchasing, capital budgeting, and other internal decisions as well as external reporting on economic and environmental performance. Several excellent examples of government use of EMA for internal management and external reporting are included among the case studies described later in this paper.

CHAPTER II - GOVERNMENT-SUPPORTED POLICIES AND PROGRAMS THAT PROMOTE EMA CONCEPTS

One of the goals of this paper was to select and collect information for a set of case studies of current government policies/programs that promote EMA concepts. There are numerous interesting and informative examples of government-supported EMA around the world; unfortunately, we did not have the time or resources to develop case studies on all of them. Thus, we selected an illustrative set of case studies, to show the richness and diversity of government efforts in this area, and to inform policy design for future activities.

Introduction to Case Studies

We selected the case studies to provide a mix of examples that illustrate the promotion of EMA:

- *By* different levels of government (local, regional, national, supranational)
- *For* different target audiences, i.e., EMA users (industry in general, specific industry sectors, small & medium sized enterprises, local government, state/national government)
- In different countries – both technologically developed and developing
- Via other environmental initiatives (e.g., cleaner production, environmental management systems, external reporting) and accounting systems (e.g., financial accounting & reporting, national resource accounting)
- Via a range of policy instruments (government regulation, promotion of voluntary adoption; research & concept/tools development, information dissemination, technical assistance, other incentives)

For the most part, we tried to select case studies of efforts that explicitly promote EMA concepts, even if the effort does not use the term EMA. The judgement as to whether a government initiative actually promotes EMA, in contrast to simply having the potential to promote EMA, was a difficult one in some cases. We used our best judgement in selecting the cases and expect that some readers may have different opinions.

It is important to note that there are many examples of EMA promotion that do *not* involve government to any significant extent. For example, the Canadian Institute of Chartered Accountants has developed a number of EMA-related guidelines and publications, without government support.

Similarly, numerous industrial firms such as Ontario Hydro, Polaroid, SCA, and Sony have implemented their own EMA-related programs. Understanding the goals and scope of those programs would be of great value to government policy makers, but they fall beyond the scope of this paper, due to time and resource constraints. Thus, we focused our efforts only on case studies of *government-supported* policies/programs that promote EMA concepts.

The 18 case studies we developed are listed in Table I, identified principally by the name of the government organisation, in alphabetical order. The full cases can be found in Appendix B.

TABLE I *CASE STUDIES OF GOVERNMENT POLICIES/PROGRAMS THAT PROMOTE EMA CONCEPTS
Australia National Office of Local Government (NOLG) **Projects on Applying Environmental Accounting Frameworks in Local Government**
Austrian Fed. Ministry for Agriculture & Forestry, Environment, & Water Management (AFEW) **An Approach Linking Corporate Waste Minimisation Efforts and Environmental Costs**
Danish Environmental Protection Agency **The Green Accounts Act**
Environment Agency (UK) **The Environmental Accounting Initiative**
Environment Canada, Quebec Regional Office **Private Sector Pollution Prevention Initiatives**
European Commission's Environment and Climate Programme **ECOMAC/EMAN Project: Promoting Eco-Management as a Tool for Environmental Management**
European Commission DG XV **Draft Commission Recommendation on the Recognition, Measurement, & Disclosure of Environmental Issues in the Annual Reports of Companies**
Finland Ministry of Environment **Guidelines for Environmental Reporting**
German Federal Environmental Agency of the Ministry for Environment, Nature Conservation, & Nuclear Safety **Guidelines on Environmental Cost Management**
Graz (Austria) Department of Environmental Protection (DEP) **ECOPROFIT – Ecological Project for Integrated Environmental Technologies**
Japan Environment Agency **Promoting Corporate Environmental Accounting and Reporting Systems**
Netherlands National Ministries **Research Program on Management Accounting and Environmental Management**
New Jersey (USA) Department of Environmental Protection (NJ DEP) Office of Pollution Prevention **The New Jersey Pollution Prevention Act**
United Nations Development Program (UNDP) Philippines Office & The Philippines' Department of Trade and Industry, Board of Investments **Project on Private Sector Participation in Managing the Environment (PRIME)**
United Nations Environment Programme Div. of Technology, Industry, & Economics (UNEP DTIE) & The Governments of Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua **Project on Financing Cleaner Production Investments**
US Environmental Protection Agency Office of Pollution Prevention & Toxics (US EPA OPPT) **The Environmental Accounting Project**
US Environmental Protection Agency Office of Solid Waste (US EPA OSW) **The Full Cost Accounting Project**
US Office of the President & The US EPA Federal Facilities Enforcement Office (FFEO) **Executive Order 13148: Greening the Government through Leadership in Environmental Management**

In the next sections, we will discuss the case study findings. It is important to keep in mind that the cases are meant to be an illustrative rather than representative or comprehensive set of examples of government policies/programs that promote EMA. Thus, although we focus primarily on the findings of the case studies in the following discussions, we will also mention other initiatives that were not the subject of a case study. We hope that these observations will be of value to policy makers considering changes to existing EMA promotion programs or designing new ones.

Who is Promoting EMA?

What Level of Government is Promoting EMA?
As shown in Table II, most of the case studies describe the efforts of national-level government organisations. The breakdown is as follows:

- local government – 1 case
- state/provincial government – 2 cases
- national government – 11 cases
- supranational government – 4 cases (5 if this UNDSD effort is included)

We can give two likely reasons for the predominance of national government in promoting EMA. First, many (although not all) of the case studies were identified via the UNDSD initiative that commissioned this paper, and mostly national government representatives have been involved in the initiative *(UNDSD, 2000)*. Secondly, EMA is still in a somewhat early stage of conceptual development, and national governments typically have more resources to investigate topics at this stage than do regional or local governments.

It is interesting to note that in the US, which has one of the oldest national-level EMA programs, many US state governments also promote EMA concepts. Only the efforts of the state of New Jersey were written up as a case study, but other states with past or current EMA-related efforts include Massachusetts, Washington State, Pennsylvania, Illinois, and a number of others. Within any given country, the number of regional-level initiatives likely will depend not only on the total number of regions (e.g., states, provinces), but also the involvement of that level of government in environmental issues within the national government structure.

As Table II illustrates, much of the national-level work is taking place in North America and Western Europe, with significant work also in Australia and Japan. There was no information readily available on national-level efforts in developing countries/regions, except within the context of the several supranational case studies shown.

The significant and increasing amount of national-level government work on EMA concepts makes it natural that supranational government organisations (defined here as government organisations with the participation of more than one national government) should become increasingly involved in investigating or promoting EMA concepts. Supranational projects provide national governments the opportunity to learn from each other's experiences and to consider the potential harmonisation or standardisation of EMA practices. With the creation of the UNDSD international working group, it is expected that supranational collaborations will continue to increase in the future.

TABLE II

CASE STUDIES OF GOVERNMENT-POLICIES/PROGRAMS THAT PROMOTE EMA CONCEPTS ORGANIZED BY PRIMARY TARGET AUDIENCE

Primary Target Audience (i.e., EMA User)	**Government Organisation Supporting the Policy/Program**			
	Local	*Regional*	*National*	*Supranational*
Business in General		New Jersey DEP (US)	Danish Env. Protection Agency Environment Agency (UK) Finland Ministry of Environment German Federal Environment Agency Japan Environment Agency Netherlands National Ministries US EPA Office of P2 & Toxics	EC Env. & Climate Programme EC DG XV UNDP (with the Philippines) (UNDSD DESA) UNEP DTIE (with Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua)
Specific Business Sectors			Austrian Federal Ministry for AFEW Japan Environment Agency US EPA Office of P2 & Toxics	EC Env. & Climate Programme
Small and Medium Sized Enterprises	Graz DEP (Austria)	Environment Canada Québec Regional Office	US EPA Office of P2 & Toxics	
Local Government			Australia National Office of Local Gov't US EPA Office of Solid Waste	
Regional or National Gov't			Environment Agency (UK) US Office of the President	

Austrian Federal Ministry for AFEW = Austria Federal Ministry for Agriculture & Forestry, Environment, and Water Management
EC = European Commission
Graz DEP (Austria) = Department of Environmental Protection
Netherlands National Ministries = Five different national ministries in the Netherlands (see case study for details)
New Jersey DEP (US) = Department of Environmental Protection
UNDP = United Nations Development Programme
(UNDSD DESA) = United Nations Division for Sustainable Development Division of Economic and Social Affairs.
UNEP DTIE = United Nations Environment Programme Division of Technology, Industry, and Economics
US EPA = United States Environmental Protection Agency
USEPA Office of P2 & Toxics = Office of Pollution Prevention & Toxics

Only one case study of local government promotion of EMA was found – an initiative in the city of Graz, Austria, which promotes the use of EMA by private firms. The lack of a "trickle down" to local governments of EMA programs is not too surprising in this somewhat early stage of EMA development. However, in this era of ever-increasing focus on "acting locally" to achieve sustainable development goals, it is likely that local government will be willing and able to take a more active role in promoting EMA in the future. To date, however, local government has been more of a target audience for EMA policy, i.e., an EMA user, than a promoter of EMA to other stakeholders.

What Types of Government Organisations are Promoting EMA?
Out of the 18 EMA efforts described in the case studies, 13 were initiated by government agencies with a specific environmental protection mandate of some kind, ranging from "environmental protection" to "water management" to "nature conservation". This is not surprising, since EMA is of greatest interest and value to environmental management and protection initiatives.

However, it is interesting to note that three of the case study policies/programs were initiated by government entities with a different primary mandate than that of environmental protection: the Australian National Office of Local Government; the United Nations Development Programme; and the US Office of the President. In addition, the Netherlands project was initiated with equal support from five national ministries, only two of which have specific environmental mandates. Another example not found in the case studies is the active involvement of the US Department of Energy in promoting EMA concepts and tools for environmental management within the agency. The involvement of "non-environmental" government organisations in promoting and implementing EMA is critical if environmental decision-making is to be integrated into overall decision-making.

Who are Government's Primary Partners in Promoting EMA?
One not-surprising fact is clear from the case studies – government is promoting EMA with assistance from many non-government partners. The many partner organisations mentioned in the case studies include individual industrial firms, industry associations, financial institutions, accounting associations, universities, research & consulting firms, and NGOs.

Accounting and related associations should be of particular interest as government EMA partners. Five of the policies/programs described in the case studies mentioned accounting organisations as formal partners.

In almost all of the cases, academic or other consultants provided much of the technical expertise for policy/program implementation. It is interesting to note that the range of technical expertise ranged quite widely – from chemical engineering to general economics to accounting. This illustrates the inter-disciplinary nature of EMA, which incorporates both traditional monetary accounting concepts as well as more technical materials balance concepts typically used by engineers.

Primary Target Audiences of Current Policies/Programs

Industry as the EMA User
As shown in Table II, most of the case studies describe efforts to promote the use of EMA by private business – either within business in general, within specific business sectors, or within

small and medium-sized enterprises. Although the broad term "business" is used to make the point that EMA is useful for many different business sectors, it should be noted that most efforts to date have focused on manufacturing industries rather than resource extraction or service industries. This focus is typical of many policy approaches formulated in technologically developed countries, where manufacturing industries are important contributors to both raw materials use and pollutant emissions.

Some of the government efforts go beyond promoting EMA for business/industry in general to focus on specific industry sectors of particular interest. For example, the program supported by the Austrian Federal Ministry for Agriculture and Forestry, Environment, and Water Management (AFEW) has developed EMA *implementation* case studies for the food, pharmaceutical, and machinery sectors. The US Environmental Protection Agency's Office of Pollution Prevention and Toxics has published reports on EMA in the oil/gas sector and the metal finishing sector. A sector focus can be an important part of EMA design, promotion, and implementation because different industry sectors have different types of materials and energy flows and may be subject to different types and magnitudes of environmental costs.

One audience of particular interest to environmental policy makers is small and medium-sized enterprises (SMEs). SMEs are typically difficult to identify and reach because of the large number of firms and, in some countries, because they are not part of the formal, documented economy. In addition, SMEs often do not have the time, capacity, or other resources to implement environmental protection schemes. Thus, SMEs might particularly benefit from EMA information that can help them identify lower cost environmental management measures. However, EMA itself is a management system that SMEs might not have the resources to implement effectively. Thus, the development and promotion of EMA approaches suitable for SMEs is particularly important.

Three of the case studies described efforts to promote EMA concepts specifically for SMEs. Not surprisingly, two of these were by local and regional-level government organisations: the Department of Environmental Protection (DEP) of the city of Graz, Austria; and the Québec Regional Office of Environment Canada.

Government as the EMA User

Interest in government organisations as users of EMA information for internal management purposes is also strong, and growing. Table II shows the four case studies that describe efforts to promote EMA within government itself. Two efforts focus on promoting EMA concepts within local government; the other two focus more on regional or national government EMA users. In one unique case, the UK Environment Agency is promoting the use of EMA within itself, i.e., the same agency is the EMA promoter and the EMA user.

The use of EMA within government's own operations is particularly important for several reasons. First of all, government, which is supposed to act for the public good, has a particular responsibility to approach environmental management in the most effective and proactive fashion possible. This is particularly true for government organisations whose operations have significant environmental impacts themselves (e.g., a military manufacturing facility) or responsibility for significant environmental expenditures (e.g., a local government department responsible for municipal wastewater treatment). And secondly, governments around the world are beginning to realise that they may not be able to convince industry to adopt an environmental management practice that government has not adopted itself.

EMA Links of Current Policies/Programs

What are EMA Links?
Often, rather than promoting EMA directly, government will promote EMA via an intermediate element of some kind, that links the government policy maker to the EMA user. One type of intermediate element is any environmental initiative, program, or approach that needs EMA information in order to be successful. These intermediate elements can also be viewed as EMA applications. Another type of intermediate element that can link policy makers and EMA users is any accounting or management system that has potential overlaps with EMA data.

There may, of course, be overlap between these two types of intermediate elements. For example, is an environmental management system (EMS) an EMA application or a related management system? The exact answer is not important. The recognition of the potential connection between EMS and EMA, and recognition of the potential for EMS to link policy makers to EMA users are what matters. The Workbook on EMA Links discusses the analysis of intermediate elements in more detail, but we will continue with a brief description below.

Examples of EMA applications that can link the policy maker and the EMA user are environmental initiatives and programs such as:

- Design for Environment
- Eco-efficiency
- Environmental Life Cycle Costing
- Environmental Performance Evaluation & Benchmarking
- Environmental Supply Chain Management
- Environmentally Preferable Purchasing
- Extended Producer/Product Responsibility
- External Reporting (Regulatory or Voluntary)
- Cleaner Production & Pollution Prevention
- Waste Management
- Waste Minimisation

A concrete example is given by the Japan Environmental Agency (JEA) program to "promote corporate environmental accounting and reporting systems". JEA has developed "environmental accounting" guidelines with the goal of promoting EMA concepts for internal environmental management and decision-making. However, JEA also has a very specific and explicit interest in promoting EMA as a tool for supporting the external reporting of EMA information. To that end, JEA also has developed external reporting guidelines consistent with its environmental accounting guidelines.

These EMA applications may be one-time, short-term initiatives or longer-term ongoing programs at an organisation. Thus, the potential for these EMA applications to truly integrate EMA approaches into ongoing management decision-making may vary widely from firm to firm. In contrast, accounting and management systems are by nature systems with a long time-horizon. Thus, accounting and management systems, the second type of intermediate element for linking policy makers and EMA users, will be quite important for ensuring integration of EMA into day-to-day operations. Examples of accounting and management systems that can link policy makers and EMA users include:

- ↓# Corporate accounting systems for conventional management accounting, conventional financial accounting & reporting, conventional regulatory accounting & reporting, external ecological accounting & reporting, regulatory ecological accounting & reporting
- ↓# Management systems for financial management, environmental management, health & safety management, quality management, and human relations
- ↓# National accounting systems for national ecological accounting and national economic accounting

An example is provided by the case study for Australia, where the National Office of Local Government (NOLG) has initiated a series of projects promoting the application of environmental accounting frameworks in local government. A key goal is to integrate various "environmental accounting" approaches being developed across a wide range of disciplines. As such, the project focuses on integrating the framework and classification of the United Nation's System of Integrated Environmental and Economic Accounting (SEEA) with other EMA practices.

The Most Common Intermediate Elements

Table III illustrates the most common intermediate elements that link policy makers and EMA users in the policy case. Six of the policies/programs focused primarily on one type of intermediate element, while the remainder identified multiple intermediate elements.

One of the most common types of intermediate element was the group of EMA applications including: pollution prevention; cleaner production; eco-efficiency; waste minimisation; and waste management. For example, the New Jersey Department of Environmental Protection (NJ DEP), a state-level government agency in the US, promotes EMA concepts specifically for the purposes of Pollution Prevention (P2) Planning at industrial facilities.

Going beyond internal management initiatives, external reporting was another intermediate element identified in many of the case studies. Denmark, Finland, and Japan all promote EMA concepts in the context of corporate environmental reporting, and the UK promotes EMA concepts in the context of government performance reporting.

Environmental Management Systems (EMS) were also a common intermediate element in the case studies. In Germany, the Federal Environment Agency's project on environmental cost management is working with ISO and EMAS to study the potential for incorporating EMA guidelines or requirements into EMS.

Only three of the case studies significantly promote EMA concepts in connection with other types of accounting systems, but these three efforts will probably provide some of the most interesting and far-reaching lessons of how EMA can be integrated into core decision-support systems that will support long-term sustainable development goals. The Australia effort has already been described. The effort of the Environment Agency (UK) is similar, with a key goal of integrating EMA concepts into the agency's business management, management accounting, and financial reporting processes. A draft recommendation from the European Commission links EMA and financial accounting by addressing the inclusion of environmental costs and other issues in the annual accounts and reports of companies.

TABLE III

CASE STUDIES OF GOVERNMENT-POLICIES AND PROGRAMS THAT PROMOTE EMA CONCEPTS ORGANIZED TO ILLUSTRATE EMA LINKS

Intermediate Elements Linking the Policy Maker and the EMA User	Government Organisation Supporting the Policy/Program			
	Local	*Regional*	*National*	*Supranational*
Multiple			Australia National Office of Local Gov't Environment Agency (UK) German Federal Environment Agency Japan Environment Agency Netherlands National Ministries US EPA Office of P2 & Toxics US Office of the President	EC Env. & Climate Programme UNDSD DESA
Pollution Prevention; Cleaner Production; Eco-efficiency; Waste Minimisation; Waste Management	Graz DEP (Austria)	Environment Canada Québec Regional Office New Jersey DEP (US)	Austrian Federal Ministry for AFEW Environment Agency (UK) US EPA Office of P2 & Toxics US EPA Office of Solid Waste US Office of the President	UNDP (with the Philippines) UNEP DTIE (with Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua)
External Reporting		New Jersey DEP (US)	Danish Env. Protection Agency Environment Agency (UK) Finland Ministry of Environment Japan Environment Agency Netherlands National Ministries	
Environmental Management System(s)		Environment Canada Québec Regional Office	Austrian Federal Ministry for AFEW Environment Agency (UK) German Federal Environment Agency US EPA Office of P2 & Toxics US Office of the President	
Other Accounting & Management Systems			Australia National Office of Local Gov't Environment Agency (UK)	EC Env. & Climate Programme EC DG XV

The Core Policy Focus
Table III illustrates the fact that all of the policies/programs described in the case studies have one or more intermediate elements that link the policy maker and the EMA user. In other words, EMA typically is not promoted in a vacuum, but in reference to potential applications and related accounting and management systems. However, although EMA is promoted in connection to various intermediate elements, the relative prominence of EMA vs. the intermediate element can vary widely among different policies/programs.

For example, the US Environmental Protection Agency's Office of Pollution Prevention and Toxics (OPPT) manages a long running Environmental Accounting Project. The explicit goal of this project is to promote EMA concepts for business decision-making. The project illustrates the use of EMA for many applications such as pollution prevention, environmental supply chain management, and environmental management systems, but the focus of the project activities is EMA – what it is, how to do it, etc.

In contrast, the United Nations Environment Programme (UNEP), working with the governments of Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, and Nicaragua, is promoting EMA concepts only as part of a larger project, the primary goal of which is to increase levels of investment in Cleaner Production (CP) projects in developing countries. EMA concepts will be promoted explicitly, but only along with a number of other tools for achieving the core goal of CP financing.

The inevitable parallel promotion of EMA along with various intermediate elements, and the wide variation in the prominence of EMA concepts in these policies/programs prompts the question: what is actually being promoted? EMA or CP? Is the intermediate element being used to help promote EMA, or vice-versa? In the end, we are almost always interested in promoting EMA as a tool for achieving some other goal, but in practice we may need to use policies/programs focused primarily on intermediate elements to get users interested in EMA in the first place.

In other words, the point of entry for promoting EMA concepts may be:

- A policy with the core goal of promoting EMA, that uses an intermediate element to help achieve that goal
- A policy with some other element as the core goal, with EMA to help achieve that goal
- A policy that promotes EMA and an intermediate element somewhat equally

EMA Methodologies and Language

The government policies/programs described in the case studies use a variety of different terms to describe their EMA-related efforts: Environmental Accounting (EA); Environmental Management Accounting (EMA); Eco-management Accounting; Environmental Cost Accounting (ECA); Full Cost Accounting (FCA), Environmental Cost Management (ECM); and others. This range of terminology is not surprising, considering the range of organisations developing EMA-related concepts and tools, and the wide range of applications for which EMA data are used. Similarly, the range of costs considered to be “environmental” costs varied among programs.

Recall that the formal definition of EMA proposed at the beginning of this paper encompasses both physical flow and monetary information. Most of the case study policies/programs included both physical flow and monetary information, with different levels of relative emphasis. A few focused equally on monetary and physical flow information as environmental tools, e.g., the efforts of the Australia National Office of Local Government (NOLG) and the Japan Environment Agency. However, most focused primarily on costs, with physical flow information as a secondary consideration, usually viewed only as a cost driver rather than as an independently valuable set of environmental management information.

Most definitions of management accounting and EMA focus on the collection of information for internal management and decision-making purposes rather than for reporting to external audiences/stakeholders. About seven of the policies/programs reviewed retained this internal management focus, but the majority went further and promoted the use of EMA-related information for external reporting as well as for internal decision-making.

EMA Policy Instruments/Activities

Broad Categories of EMA Policy Instruments/Activities

There are a number of different ways in which government environmental policy instruments can be categorised *(IISD, 1997; UNDSD, 2000; Bouma, 2000).* Perhaps the most commonly used broad categories of instruments are regulatory instruments, economic instruments, information instruments, and social instruments. Each policy approach has strengths and weaknesses *(UNDSD, 2000)*. Typically, government will choose a mix of instruments that collectively raises awareness of the policy goal or issue, motivates the target audience to behave in such a way as to contribute to the policy goal, and improves the capacity or skills of the target audience to do so.

For the purposes of discussing EMA policy/program options in this paper, a framework was chosen that reflects current EMA policy/program activities around the world with a little more clarity and detail. Table IV gives the broad categories of EMA policy instruments/activities chosen. Appendix A of this paper gives a more detailed list of policy instruments/activities that would fall under each of the broader categories shown above.

In considering these categories, it is important to distinguish between the overall policy/program and the EMA components of that policy/program. For example, it would be possible to have a government regulation that requires firms to do CP Planning, while offering follow-up EMA technical assistance on a voluntary basis. The policy instrument promoting CP Planning is Government Regulation – the policy instrument promoting EMA is primarily voluntary in nature. For most of the case studies, this distinction was not too important – the overall policy instruments and the EMA component instruments were usually the same.

TABLE IV BROAD CATEGORIES OF EMA POLICY INSTRUMENTS/ACTIVITIES
Government Regulation *Direct requirement of EMA via government regulation*
Promotion of Voluntary Adoption, Standards, or Self-regulation *Promotion of the development of voluntary EMA standards, voluntary adoption of EMA standards and practices, and self-regulation of EMA practices and performance by individual organisations, professional and trade associations, and other EMA stakeholders*
Research & Concept/Tools Development *Development of EMA concepts, definitions, methodologies & tools such as EMA guidelines, case studies, software, curricula & training materials, etc.*
Information Dissemination *Dissemination of EMA information and tools via written materials, web sites, conferences, networks, etc.*
Technical Assistance *Provision of free or subsidised technical assistance such as EMA training, implementation assistance, etc.*
Other Incentives *Financial incentives such as tax breaks, low-cost financing, etc.* *Regulatory Relief incentives such as reduced regulatory inspections, etc.* *Award programs* *Others....*

Policy Instruments Identified in the Case Studies

Tables V-A and V-B illustrate the use of these different categories of policy instruments/activities by the government programs described in the case studies. Table V-A shows the first two categories:

↓# Government Regulation
↓# Promotion of Voluntary Adoption, Standards, or Self-regulation

Most of the case study programs clearly fell into one of these two key categories – the program either required EMA by regulation, or encouraged voluntary participation by members of the target audience. An example of government regulation is the case of the US Office of the President. Executive Order 13148 requires executive federal agencies in the US to adopt "environmental cost accounting" to the maximum extent feasible to foster the broad goal of the executive order, which is to green government operations. The case study for the five Netherlands National Ministries gives a good example of a purely voluntary program – a research program on management accounting and environmental management in which industry firms are voluntary participants. The Danish EPA's efforts under the Green Accounts Act illustrate a program that has both regulatory and voluntary components with regards to external reporting of EMA physical flow information.

TABLE V-A

CASE STUDIES OF GOVERNMENT-POLICIES/PROGRAMS THAT PROMOTE EMA CONCEPTS

ORGANIZED BY POLICY/PROGRAM CATEGORY

EMA Policy or Program Category	Government Organisation Supporting the Policy/Program			
	Local	*Regional*	*National*	*Supranational*
Promotion of Voluntary Adoption, Standards, or Self-regulation	Graz DEP (Austria)	Environment Canada Québec Regional Office	Australia National Office of Local Gov't Austrian Federal Ministry for AFEW Danish Env. Protection Agency Environment Agency (UK) Finland Ministry of Environment German Federal Env Agency Japan Environment Agency Netherlands National Ministries US EPA Office of P2 & Toxics US EPA Office of Solid Waste	EC Env. & Climate Programme EC DG XV UNDP (with the Philippines) (UNDSD DESA) UNEP DTIE (with Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua)
Government Regulation		New Jersey DEP (US)	Australia National Office of Local Gov't Danish Env. Protection Agency Environment Agency (UK) US Office of the President	

TABLE V-B

CASE STUDIES OF GOVERNMENT-POLICIES/PROGRAMS THAT PROMOTE EMA CONCEPTS

ORGANIZED BY POLICY/PROGRAM CATEGORY

EMA Policy or Program Category	Government Organisation Supporting the Policy/Program			
	Local	*Regional*	*National*	*Supranational*
Research & Concept/Tools Development	Graz DEP (Austria)	Environment Canada Québec Regional Office New Jersey DEP (US)	Australia National Office of Local Gov't Austrian Federal Ministry for AFEW Danish Env. Protection Agency Environment Agency (UK) Finland Ministry of Environment German Federal Env Agency Japan Environment Agency Netherlands National Ministries US EPA Office of P2 & Toxics US EPA Office of Solid Waste US Office of the President	EC Env. & Climate Programme (UNDSD DESA)
Information Dissemination	Graz DEP (Austria)	Environment Canada Québec Regional Office New Jersey DEP (US)	Australia National Office of Local Gov't Austrian Federal Ministry for AFEW Danish Env. Protection Agency Environment Agency (UK) Finland Ministry of Environment German Federal Env Agency Japan Environment Agency Netherlands National Ministries US EPA Office of P2 & Toxics US EPA Office of Solid Waste US Office of the President	EC Env. & Climate Programme EC DG XV UNDP (with the Philippines) (UNDSD DESA) UNEP DTIE (with Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua)
Technical Assistance	Graz DEP (Austria)	Environment Canada Québec Regional Office New Jersey DEP (US)	Australia National Office of Local Gov't Austrian Federal Ministry for AFEW US EPA Office of P2 & Toxics US Office of the President	UNDP (with the Philippines) UNEP DTIE (with Norway, Zimbabwe, Tanzania, Vietnam, Guatemala, Nicaragua)
Other Incentives	Graz DEP (Austria)		Finland Ministry of Environment	

Regardless of the core approach – regulatory or voluntary – most of the programs reviewed included additional program elements from the next three categories of activities:

- ↓# Research & Concept/Tools Development
- ↓# Information Dissemination
- ↓# Technical Assistance

This "trickle down" effect is common in government policy – the key policy mechanism is then followed by supplementary activities to increase the effectiveness of the overall policy/program. As EMA is in the relatively early stages of conceptual development, it is not surprising that many of the government efforts fall into the category of Research & Concept/Tools Development. The German Federal Environmental Agency, for example, is sponsoring a basic research program on EMA practices, the potential need for EMA standards, and the connections between EMA and EMS.

Naturally enough, all of the programs with a component on Research & Concept/Tools Development also have activities under the category of Information Dissemination. In addition, government agencies and programs that have not developed concepts/tools on their own are beginning to learn from and disseminate experiences of other countries. This is particularly evident in two of the programs sponsored by supranational government organisations or groups. The United Nations Development Programme's Philippines Office, in collaboration with the Philippines Department of Trade and Industry, has not developed any new EMA concepts or tools, but is disseminating materials and experiences from the US and other countries as part of its Project on Private Sector Participation in Managing the Environment (PRIME).

Activities that fall under the category of Technical Assistance are not as common as activities in Research & Concept/Tools Development and Information Dissemination. Although one might reasonably consider Information Dissemination to be form of Technical Assistance, we separated the two categories for more clarity – under Technical Assistance we include the more active forms of assistance, such as training and on-site assistance. Environmental Canada's Québec Regional Office, for example, not only widely distributes copies of its "environmental accounting" guidelines (i.e., Information Dissemination), but also provides on-site technical assistance to SMEs via its EnviroClub initiative (i.e., Technical Assistance).

The last category of policy instruments/activities is a very broad category entitled "Other Incentives". Several sub-categories of incentives were combined into to this category for the simple reason that we found very few examples of these instruments/activities in the case studies, or in other policy examples that we reviewed informally. The one exception was the sub-category of Award Programs. For example, the Finland Ministry of Environment sponsors an annual awards competition for the best voluntary corporate environmental report – and one of the report components should be EMA-related monetary information. Considering the large and growing number of environmental reporting award schemes around the world, the use of awards to promote EMA will likely increase as the connection between EMA and corporate reporting is strengthened.

The only policy/program activities identified that could possibly be categorised as Financial Incentives might be the provision of free or low cost information or technical assistance. No examples were found of the use of Regulatory Relief Incentives to promote EMA.

Policy/Program Challenges and Successes

Only a few of the policy/program contacts mentioned formal review efforts designed to assess program success. Examples include the formal review efforts of the New Jersey (USA) Department of Environmental Protection (NJ DEP) and the Danish Environmental Protection Agency. However, many of the other case studies mention program challenges and successes.

The primary success noted in a number of cases was the high level of interest in the policy/program on the part of the target audience. The challenges mentioned were more varied, including:

- ↓# Lack of clear consistent definitions & terminology
- ↓# Difficulty in bringing together environmental and financial experts
- ↓# Lack of EMA implementation capacity/skills

Summary

In conclusion, there are a wide variety of government-supported policies/programs that promote EMA concepts. In most cases, government agencies with a clear environmental mandate are the primary actors, but other agencies are beginning to get involved. National-level governments have taken the lead in many of these activities, but the level of experience and activity by lower levels of government (regional and local) is increasing. Similarly, supranational government organisations and groups are becoming more active in promoting the sharing of experiences and tools from the national level.

Government organisations are promoting EMA concepts in collaboration with many non-government organisations, including individual industrial firms, industry associations, financial institutions, accounting associations, universities, research & consulting firms, and NGOs. The one type of partner that most programs seem to have in common is that of consultants with technical expertise.

Policy target audiences, i.e., EMA users, have included both industry and government, and EMA has proven valuable to each for internal management and decision-making. The target audiences have generally show great interest in the policies/program reviewed in the case studies.

Efforts targeted towards EMA for industry to date seem to be mostly focused on manufacturing, rather than the resource extraction or service sectors. Small and medium-sized enterprises (SMEs) are also an audience of specific interest.

Most of the case studies illustrated the promotion of EMA via an intermediate element of some kind that links the government policy maker to the EMA user. One type of intermediate element is an EMA application, i.e., any environmental initiative, program, or approach that needs EMA information in order to be successful. Another type of intermediate element is any kind of accounting or management system that has potential overlaps with EMA data.

Six of the policies/programs focused primarily on one type of intermediate element, while the remainder identified multiple intermediate elements that linked the policy makers and the EMA users. One of the most common types of intermediate element was the group of EMA applications, including: pollution prevention; cleaner production; eco-efficiency; waste minimisation; and waste management. External reporting was another EMA application identified as a useful intermediate element in many of the case studies. A number of the case studies identified Environmental Management Systems (EMS) as an intermediate element, but only two of the case studies significantly promote EMA concepts in connection with other types of accounting systems.

A wide range of methodologies and terminology are used by the various policies/programs in describing their EMA-related efforts. Most of the programs do include monetary data and physical flow data in their definitions/activities, but the primary focus is usually on monetary data. Most of the programs retain the internal management and decision-making focus of management accounting and EMA, but many also go further, to encompass external reporting activities as well.

Partly because the conceptual development of EMA is at a relatively early stage, much of the activity focuses on voluntary programs with a significant amount of Research & Concept/Tools development, and general information dissemination. However, there are also several good examples of programs that require EMA via government regulation. This may an indication that the critical value of EMA approaches to environmental management and decision-making is starting to be widely recognised, and that EMA approaches are starting to emerge from the developmental stage into a more robust stage of dissemination and implementation. One significant gap in EMA-related policy activities was in the realm of financial incentives.

There has been little formal evaluation of the challenges and successes of these EMA policies/programs to date, probably partly because of the early stage of some of the projects, and partly because formal evaluation itself can be difficult. Thus, the extent and effectiveness of many current policies/programs is unclear. However, some common challenges seem to be challenges of definition, cultural change, and technical capacity.

CHAPTER III - LESSONS LEARNED

Promising Policy Pathways

In comparison to the decades-long (if not longer) process of development of financial accounting and conventional management accounting, EMA is a relatively new field. Thus, government policy efforts to promote EMA are also in the early, experimental phase for the most part. It is too early to draw hard and fast conclusions about what works and what does not.

In addition, the best policy approach for promoting EMA concepts will likely differ for different levels of government, for different target audiences, and in different countries. For example, a broad range of environmental costs would be relevant to companies in countries with strict environmental regulation and enforcement that internalises environmental costs for companies. Companies in countries with less regulation or less effective enforcement might only be willing to recognise and account for a narrower range of environmental costs. Similarly, the effectiveness and political acceptability of direct regulation in a country would impact the policy instruments chosen to promote EMA.

Nonetheless, the existing policies/programs reviewed in the case studies in this paper do provide some preliminary lessons and suggestions about broadly promising policy pathways for the promotion of EMA concepts by government.

EMA Links

The US Environmental Protection Agency's Office of Pollution Prevention and Toxics (US EPA OPPT) has observed that EMA is very difficult to promote as a "stand-alone" voluntary concept. In other words, EMA needs to be promoted in connection with programs that actually require EMA data to succeed. This makes perfect sense. Who would devote the time and resources to adopting EMA unless they knew exactly why they needed EMA information, and how they could use it?

A number of EMA applications that can link policy makers to EMA users were identified in the case studies, the most common ones being Pollution Prevention/Cleaner Production/Eco-efficiency (P2/CP/E2); and External Reporting. These intermediate elements clearly hold great promise for promotion of EMA concepts. In particular, External Reporting, of growing popularity in many parts of the world, promises to enhance EMA promotion efforts, even though external reporting is formally beyond the scope of EMA as defined in this paper. It is clear from the case studies that EMA information is increasingly used for external reporting purposes, so perhaps we should start using the collective term Environmental Management Accounting & Reporting (EMAR) to reflect this trend.

In addition to the EMA applications most commonly found in the case studies, a number of other EMA applications bear investigating; examples include Environmental Supply Chain Management; Extended Producer/Product Responsibility; Environmentally Preferable Purchasing (EPP); and Design for Environment (DfE). A few of these EMA applications were mentioned in one or two case studies. We are also aware of examples of the use of EMA for these applications, which we did not review in this paper, partly because some of them were not government-supported, partly because of a lack of time and resources.

The most common intermediate element that falls into the category of "other accounting and management systems" is Environmental Management Systems (EMS). If this trend continues, one could envision a standardisation and certification process for EMA similar to that used for EMS.

There are compelling reasons to promote EMA concepts via other accounting and information management systems. First of all, while some of the environmental initiatives that qualify as EMA applications may or may not be institutionalised, ongoing initiatives, as opposed to one-time projects, accounting and information systems are by nature systems with a long time-horizon. Incorporation of EMA concepts into these systems holds great promise for ensuring that EMA is incorporated into the routine, ongoing operations of the organisation. In addition, the better that EMA and related accounting/information systems are integrated, the more likely that EMA data will be used for all internal management and decision-making, not just environmental decision-making.

Some intermediate elements may be more effective in some countries than others. For example, considering the widespread adoption of EMS in Asia, promotion of EMA concepts via this intermediate element might be particularly effective there. In contrast, adoption of EMS in the US has been slower, and other intermediate elements may be more practical there.

Some intermediate elements may also be more effective with some target audiences than others. Supply chain management, for example, holds great promise for disseminating and motivating better environmental management practices, including EMA to small and medium-sized firms.

Policy Instruments

All of the policy instruments activities illustrated in the case studies are probably valuable for promoting EMA concepts. Again, the choice of policy mix will depend on the particular government organisation, target audience, EMA link, country, etc. However, we do have some general recommendations regarding activities in several of the policy categories.

First of all, while the general trend in environmental policy is towards the supplementing of direct regulation with alternative policy instruments such as economic instruments and information instruments, we should not neglect the potential role of government regulation in promoting EMA concepts. Five of the case studies illustrate the use of regulation to promote EMA. In addition, financial accounting and reporting by publicly held firms is regulated, either by government or by government-authorised industry bodies. The potential for promoting EMA concepts via accounting or other regulations needs further discussion and investigation.

Under the policy categories of Research & Concept/Tools Development and Information Dissemination, we generally recommend better co-ordination of the various efforts of local, regional, and national government bodies. Indeed, the UNDSD international working group was formed specifically for this purpose, with a focus on co-ordinating and sharing national-level efforts.

We also recommend that efforts should focus on organising the various individual approaches to EMA into a single coherent framework. As such, EMA might be best defined

as a family of tools that share a common set of basic principles. Enough independent activities in the realm of Research & Concept/Tools Development have taken place to make this feasible and advisable. Otherwise, we run the risk of simply confusing stakeholders with the variety of terminology and tools that currently exist; this problem was pointed out by several of our case study contacts and was also evident at the second working group meeting in Vienna.

Activities that fall under the policy category of Information Dissemination should be expanded as well as co-ordinated. To date, policies/programs seem to have focused their Information Dissemination activities primarily towards their most direct constituents and stakeholders. However, a much wider potential audience of EMA stakeholders could benefit from the work to date and could assist in promoting the basic concepts and tools developed.

And finally, we would like to note that the policy category of Financial Incentives has not really been discussed or tested as a pathway for promoting EMA concepts. The relationship between Financial Incentives and EMA is curious one. EMA would enable firms to more accurately characterise the impacts of other economic incentive policies related to environment. However, EMA-specific financial incentives might be needed to lower the cost barriers to developing an EMA system. Since the potentially high cost of implementing EMA has been a challenge or barrier to some firms, this policy instrument category bears further consideration and investigation.

Important Partners

The primary government sponsor of an EMA program will often have other government organisations as partners. In Australia, for example, national government is working with local government. In the Netherlands, five national ministries are working together. Whenever possible, the primary government sponsor of EMA efforts try to involve at least one or two government agencies that do not have environmental protection as a primary mandate. Examples would include government organisations that focus primarily on economic development, finance, and energy. This will help speed the integration of EMA principles into mainstream, non-environmental activities and help strengthen the sustainable development connection between economics and environment.

Another critical partner for government is, or should be, the accounting community. Accounting and related finance associations can put the industry seal of approval on EMA practices and approaches. When government itself is the EMA user, government finance and accounting associations can also play a critical role in promoting EMA. An excellent example is the formal endorsement by the US Government Finance Officers Association of Full Cost Accounting (FCA) as a best practice for municipal solid waste management. FCA has been developed and promoted by the US Environmental Protection Agency's Office of Solid Waste, as described in that case study.

Accounting academics and organisations can promote the integration of EMA concepts into academic accounting curricula and the continuing professional education courses that most practising accountants are required to take for periodic certification. An example is given by the activities of the Philippines Institute of Certified Public Accountants (PICPA), which has integrated EMA concepts into the academic accounting curriculum in the Philippines *(Reyes, 2000)*, and which also offers training courses on environmental accounting and environmental cost assessment for its membership.

The most opportune and cost-effective time to integrate EMA into a company's accounting system may be when the company is changing the accounting system for some other reason anyway. Thus, other good EMA promotion partners might be the accounting firms that assist business with such transitions, and the firms that develop popular accounting software packages in various parts of the world.

And finally, engineering academics and professional associations might be another valuable partner. Engineers and other technically trained professionals are in a particularly good position to apply EMA-related concepts in the early research and design stages of projects. Chemical engineers, for example, routinely learn how to assess the potential profitability of industrial projects as part of senior design courses. Accordingly, a new textbook on "Green Engineering" being published by the US Environmental Protection Agency devotes an entire chapter to Environmental Cost Accounting.

A Broad Framework for EMA Policy Design

As mentioned previously, the best policy or combination of policies for promoting EMA concepts will likely vary from place to place. Thus, we thought it might be useful to propose a very broad framework for EMA policy design to assist policy makers. An initial version of this framework was designed to assist our case study identification, development, and assessment efforts, and evolved as the case studies were actually written.

Policy designers may choose different starting points for program design. For example, one government organisation may start out with a particular EMA link in mind, e.g., EMS, and design the remainder of the program around that initial decision. Another government organisation might have a particular partner in mind, e.g., an accounting association, and work with that partner to determine the policy/program details. Thus, this framework is not meant to be rigid or prescriptive – it is meant to be a general taxonomy of the principle decisions and steps we see as valuable in EMA policy design, arranged in tiers that indicate a suggested logical order.

TABLE VI

A BROAD FRAMEWORK FOR EMA POLICY DESIGN

Tier I – Scoping	Clarify the core policy goal and the primary target audience	If the core policy goal is to promote EMA itself – identify the most promising intermediate element(s) to link the policy maker and the EMA user	
		If the core policy goal is some other element, clarify the prominence of EMA within the policy or program	
Tier II – Partners & Content	Recruit the most important partners	Determine the most appropriate EMA methodology & language	Select specific EMA policy instruments & program activities
Tier III – Details	Design an implementation plan	Design an assessment plan	Design an institutionalisation plan

Tier I – Scoping

↓# Clarify the core policy goal and the primary target audience

What is the core policy goal?
To promote EMA itself?
To promote an EMA application such as Cleaner Production or External Reporting?
To promote a related accounting/management system such as conventional management accounting, conventional financial accounting, environmental management systems, or national economic accounting?
To promote some other element?
To promote more than one of these simultaneously?

Who is the primary target audience?
Industry or government?
If industry – Any specific industry sectors? Large firms or SMEs?
If government - which level of government?

↓# If the policy core goal is to promote EMA itself – identify the most promising intermediate elements to link the policy maker and the EMA user, e.g.,

An EMA application such as Design for Environment; Eco-efficiency; Environmental Life Cycle Costing; Environmental Performance Evaluation & Benchmarking; Environmental Supply Chain Management; Environmentally Preferable Purchasing; Extended Producer/Product Responsibility; External Reporting (Regulatory or Voluntary); Cleaner Production; Pollution Prevention; Waste Management; Waste Minimisation, etc.

A corporate accounting system for conventional management accounting, conventional financial accounting & reporting, conventional regulatory accounting & reporting, external ecological accounting & reporting, regulatory ecological accounting & reporting, etc.

A management system for financial management, environmental management, health & safety management, quality management, and human relations

A national accounting system for national ecological accounting, national economic accounting, etc.

Some other intermediate element

↓# If the core policy goal is some other element, clarify the prominence of EMA within the policy or program

How prominent a role should/will EMA play in the policy/program?
Do EMA activities make up a large part of the overall program activities?
Or is EMA only one of many components of the program?

Tier II – Partners &Content

↓# Recruit the most important partners

Who should be the government partners in the program?
Who are the leaders or most willing participants from the target audience?
Who would be the best EMA messenger for the target audience?
Who could provide the technical expertise?
Who could manage and/or fund the program?
Who could best encourage integration of the activities into routine management?

↓# Determine the most appropriate EMA methodology & language

What is the best EMA methodology/tool to use?
What is the primary focus – physical flows, monetary information, or both?
Is the primary focus internal management/decision-making, or does it go beyond this?
What terminology would be the most effective with the target audience?

↓# Select specific EMA policy instruments & program activities

What policy instruments would be the most effective?
What program activities are affordable?
Which program activities would be short-term, medium-term, long-term?
Can we use materials from other EMA policy efforts/activities to support this program?

Tier III - Details

↓# Design an Implementation Plan

What will be the overall timeline of the policy/program?
What are the major project milestones?
What are the program budget and budget guidelines?
Which partners will be responsible for which tasks?

↓# Design an Assessment Plan

How can we identify mid-program problems and challenges and react?
How will we measure program success?

↓# Design an Institutionalisation Plan

How can we make the program self-sustaining?
How will we disseminate the results of the program?

CHAPTER IV - IN CONCLUSION

In this chapter, we make some suggestions for next steps for the UNDSD working group and for individual governments. These suggestions are a combination of our own ideas and the ideas of other participants of the working group. Indeed, some of these recommendations are already being explored or implemented by members of the group, as indicated below.

Suggested Next Steps for the UNDSD International Working Group

Formalise and Expand the Group

- ↓# Continue to plan regular meetings *(ongoing activity)*
- ↓# Fund participation in future meetings by additional developing countries *(under consideration)*
- ↓# Establish sub-groups to address topics and partners of interest *(ongoing activity)*
- ↓# Establish some long-term policy goals with timeframes

Co-ordinate Information Dissemination Efforts

- ↓# Create an EMA list server that would facilitate Q&A on EMA *(under development)*
- ↓# Co-fund and develop an international website on EMA issues *(under consideration)*
- ↓# Sponsor an international conference on EMA, with participation from non-government stakeholders *(under consideration)*
- ↓# Develop an international, co-ordinated EMA marketing plan

Develop Internationally Accepted EMA Definition/Framework/Taxonomy

- ↓# Agree upon a core definition or set of principles *(under development)*
- ↓# Develop a framework to organise and present the wide variety of EMA-related tools
- ↓# Explore the possibility of more formal standardisation

Commission Related Studies/Case Studies

- ↓# Additional government policy cases focusing on other critical intermediate elements that link policy makers and EMA users *(website space for these under consideration)*
- ↓# Case studies of non-government efforts to promote EMA, e.g., by accounting associations, foundations, etc.
- ↓# Case studies of industry/government experiences in actually implementing EMA
- ↓# Case studies of how government can use EMA data reported by industry
- ↓# An evaluation of existing management accounting software systems for EMA potential

Commission Other Materials for (Free) Distribution

- ↓# An introductory guidance document on EMA definitions, value, links, etc.
- ↓# A more technical guidance document on various levels of EMA implementation
- ↓# A core set of training materials

Suggested Next Steps for Individual Governments

Evaluate Existing Program Challenges & Successes to Inform Future Program Design

Co-ordinate Internal EMA Efforts

- ↓# Efforts of different national agencies
- ↓# Efforts of national government organisations with regional and local organisations
- ↓# Efforts of government with those of non-governmental organisations

Target Industry Sectors/Sizes and Geographic Regions of the Most Interest

- ↓# Sectors with high environmental impact
- ↓# Sectors with high environmental costs
- ↓# Small & medium-sized enterprises
- ↓# Geographic regions with significant industry presence/impacts
- ↓# Geographic regions of particular environmental interest

Identify and Explore the Most Promising EMA Links and Partners

- ↓# EMA applications particularly popular in a country, e.g., EMS, CER
- ↓# Accounting & management systems that facilitate long-term integration of EMA
- ↓# Key partners, e.g., non-environmental government agencies, accounting community, engineering community, industry leaders

Some Final Words

EMA is a tool – implementation of EMA does not guarantee any particular level of environmental or financial performance by an organisation. However, EMA is a critical tool, and it is fair to say that most environmental and other management efforts will greatly benefit from EMA information. From our perspective, EMA is not merely one environmental management tool among many – rather, EMA is a broad set of principles and approaches that inform many other environmental management activities and programs.

As environmental costs rise and as environmental considerations become more integrated into routine management and decision-making, the value of EMA will increase. Indeed, the implementation of EMA can promote the integration of environmental and economic concerns into a single management system.

UNDSD is following the example of other organisations such as the Global Reporting Initiative (GRI) and the United Nations Conference on Trade and Development (UNCTAD) in bringing together an international group of EMA stakeholders to bring coherence and consensus to a previously disconnected efforts in an area of critical import to environmental management. We hope that this initiative will not only successfully catalyse the international clarification and adoption of EMA principles for environmental management, but also make a significant contribution in helping us all to progress towards sustainable development.

REFERENCES

Much of the information in this paper on specific examples of government policies/programs that promote EMA concepts was obtained via direct communication with or documents obtained from the individuals listed as contacts in the case studies in Appendix B. Please contact those individuals for more details.

In addition, preliminary information on many of the cases was obtained from one of the references listed below – *(UNDSD, 2000)*.

(Bennett, 1999) Bennett, Martin. "Bridging the Gap: Current Developments in Managerial Accounting and Environmental Managerial Accounting", presentation at the First Expert Working Group Meeting on Improving Government's Role in Environmental Managerial Accounting. Washington, DC. August, 1999.

(Bouma, 2000) Bouma, Jan Jaap. "Environmental Management Systems and Audits as Alternative Policy Instruments", *Implementing EU Environmental Policy*, eds. C. Knill and A. Lenschow, Manchester University Press, Manchester, UK. 2000.

(IISD, 1997) The website of the "Instruments for Change" project – a collaborative project of the International Institute for Sustainable Development (IISD) and the United Nations Division for Sustainable Development. http://www.iisd.ca/susprod/compendium.htm

(Reyes, 2000) Reyes, Maria Fatima. Letter from the Chair of the Environmental Accounting Committee of the Philippines Institute of Certified Public Accountants (PICPA). September 2000.

(UNDSD, 2000) *Improving Governments' Role in the Promotion of Environmental Managerial Accounting*, Report and Document of the First Expert Working Group Meeting in Washington DC (August, 1999). United Nations publication 00.II.A.2, New York, 2000.

(White & Savage, 1995) White, Allen L. and Savage, Deborah E. "Budgeting for Environmental Projects: A Survey", *Management Accounting*, Institute of Management Accountants, New York. October 1995.

APPENDIX A

LIST OF POTENTIAL POLICY INSTRUMENTS/ACTIVITIES

TO PROMOTE EMA CONCEPTS

APPENDIX A: LIST OF POTENTIAL POLICY INSTRUMENTS/ACTIVITIES TO PROMOTE EMA CONCEPTS

Government Regulation

Require EMA by government regulations:

↓# Require EMA directly via regulation

↓# Explore potential for encouraging or requiring EMA via the revision or creation of related regulations, e.g.,

- Financial reporting regulations
- National statistics reporting regulations
- CER, PRTR, or environmental compliance reporting regulations
- P2 Planning regulations
- EMS regulations
- Business Licensing Requirements

Promotion of Voluntary Standards, Adoption, and Self-regulation

Promote the development of voluntary EMA standards, voluntary adoption of EMA standards and practices, and self-regulation of EMA practices and performance by individual organisations, professional and trade associations, and other EMA stakeholders:

↓# Work with various EMA users/stakeholders to promote voluntary adoption and implementation of EMA.

↓# Work with accounting associations to set EMA guidelines or standards

↓# Work with accounting associations to study the potential for setting financial accounting/reporting standards that would require or promote EMA

↓# Work with ISO & EMAS to study the potential for incorporating EMA guidelines or requirements into EMS

↓# Work with GRI, etc. to study the potential for incorporating EMA guidelines or requirements into CER

↓# Work with bankers, insurance firms and other members of the financial services community to study the links between EMA & their environmental activities and the potential for incorporating EMA guidelines or requirements into those activities

Research & Concept/Tools Development

Development of EMA concepts, definitions, methodologies and tools such as:

↓# Basic theory, concepts, definitions, guidelines, and standards

↓# Methodological and empirical studies

↓# Software

↓# Curricula & training materials

Information Dissemination

Dissemination of EMA documents, tools, and information such as:

↓# Guidance documents, journal articles, empirical studies

↓# Case studies of EMA application successes, failures, best practices

↓# Software

↓# Curricula & training materials

↓# Information on the various potential end-uses of EMA data, e.g., cleaner production planning, life-cycle assessment of products, setting up environmental management systems, reporting of environmental performance, etc.

↓# Information on how EMA is related to other accounting systems such as financial accounting and natural resource accounting

↓# Information on EMA initiatives sponsored by government, industry, the accounting community, and other stakeholders

↓# Sponsorship of and information on EMA and related conferences, meetings, and other networking opportunities

Technical Assistance

Provide direct technical assistance to EMA users in industry and government and to other interested stakeholders in the form of:

↓# Training

↓# Implementation assistance

Other Incentives

Provide other incentives for organisations to implement approved EMA projects of systems

↓# Financial incentives, e.g.,

Tax incentives such as accelerated depreciation, remediation spending tax breaks, income & property tax credits, sales tax waivers, and interest deduction

Financing incentives such as low interest loans and loan guarantees

Preference on government procurement contracts

Funding for EMA pilot or demonstration projects

↓# Regulatory Relief Incentives such as quicker and simpler permit applications and review, reduced inspections, and plant-wide emission limits.

↓# Award programs for companies with approved EMA systems

APPENDIX B

CASE STUDIES

OF GOVERNMENT POLICIES/PROGRAMS THAT SUPPORT

ENVIRONMENTAL MANAGEMENT ACCOUNTING (EMA)

AUSTRALIA NATIONAL OFFICE OF LOCAL GOVERNMENT (NOLG)

Projects on
Applying Environmental Accounting (EA) Frameworks in Local Government

Government Agency

Australia's National Office of Local Government (NOLG) is responsible for building capacity in the nation's local governing bodies to contribute to implementing national priorities. It does so through providing administrative support for the Commonwealth's distribution of general-purpose grants, by funding and disseminating research, and by contributing to more effective relations between the country's three levels of government.

Partners & Stakeholders

NOLG collaborates with the Environment and Energy Statistics Section of the Australian Bureau of Statistics (ABS), with Environment Australia, and with other federal and state government agencies in managing the Environmental Accounting (EA) projects. The projects also draw on extensive interest and support from Australia's 670 local governments. The consulting firm "Green Measures" has played a research, co-ordinating and brokerage role in this work since 1995.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

NOLG exercises responsibility in building the capacity of local governments to contribute to environmental and natural resource management initiatives agreed to by Commonwealth, State and Territory Governments. As part of this broad effort, NOLG funded a project called 'Applying Environmental Accounting Frameworks in Local Government' between 1995-96 and 1998-99. Extensions to that work are being funded in 1999-2000. EMA concepts are promoted as part of these Environmental Accounting (EA) projects in Australia.

The functions and responsibilities of Australia's local government lead to some 670 general-purpose councils being responsible for over one quarter of the nation's expenditure on environment protection. These councils generally determine land use through zoning powers, and their processing of building and development applications. Trends towards privatisation have not diminished the significant responsibility within Australia's local governments for the construction and maintenance of water supply, waste disposal and other infrastructure assets. In addition, local governments have a general duty of care for the sustainable development of their jurisdictions. Therefore, the EA projects enhance the prospects of greater transparency and accountability within an industry of strategic significance in raising the nation's environmental performance.

Australia's EA projects are also seen as supporting and clarifying a variety of initiatives that separately promote adoption by Australia's local government industry of State-of-Environment-Reporting, of ISO 14000 series, of Eco-Efficiency and Design for Environment approaches, of Ecological Footprint, of application of the United Nations System for integrated Environmental and Economic Accounting (SEEA), and many other EA practices.

Since local and other levels of Australian government, are expected to run their organisations under 'New Public Management' or 'Reinventing Government' initiatives, results from the

projects can also be relevant to private businesses. Local government remains however as the primary target for disseminating results.

Methodology & Language

The NOLG projects focus on a broad set of tools that are collectively called Environmental Accounting (EA). A working definition developed in the projects is that "Environmental accounting is the use of tools to transform physical and financial measures of environmental data into information for decision-making to judge either environmental performance or change in ecosystem condition." Thus, similarly to Environmental Management Accounting (EMA), NOLG's definition of EA includes both physical flow and monetary measures.

However, the NOLG EA projects go beyond EMA to include related accounting efforts such as environmental financial accounting. A key goal of the NOLG projects is to work to integrate various EA approaches being developed across a range of disciplines in order to encompass and classify environmental accounting practices from differing points of evolution.

A sub-classification of EA tools for judging environmental performance is also used in the projects. Tools such as Balanced Scorecard, which integrate environmental with other aspects of organisational performance, are differentiated from those such as the EcoBudget⊗ tool designed by the International Council for Local Environmental Initiatives (ICLEI) to run parallel to but separate from other budgetary and other decision-making processes used by local governments.

EMA-related Components of the Policy/Program

↓# *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* Participation by local governments in SEEA data compilation pilot projects was voluntary for fiscal years 1997-99. In addition, a code of environmental accounting practice that is in concordance with the Classification of Environmental Protection Activities contained within SEEA has been proposed by accounting professionals within the local government industry.

↓# *Government Regulation.* For fiscal year 2000, the ABS made reporting of SEEA estimates mandatory for 50% (335) of local governments.

↓# *Research & Concept/Tools Development.* Activities have included: Development of case studies with individual local authorities to explore and report on creating linkages between the financial transaction classifications included within the System for integrated Environmental and Economic Accounting (SEEA) with the predominately physical measures employed in other environmental accounting project appraisal and planning practices; Collection of evidence on how SEEA-based financial estimates may be used for internal decision-making as well as external reporting; and Exploration of the integration of environmental information for decision-making both horizontally and vertically - horizontally by seeking to compare and combine performance measures across private and public organisations operating within a regional space, and vertically by linking SEEA-based with other EA practices within organisations.

- *Information Dissemination.* Progress on the projects is reported nationally to the Local Government Ministers' Conference, and internationally to ICLEI's series of Expert Seminars on Environmental Management Instruments, to the London Working Group on SEEA, and to the UN Working Group on Government Roles in Promoting Environmental Management Accounting. In 1999-2000 a number of local governments are documenting experiences in using their SEEA-based estimates for internal decision-making. NOLG and its partners in these projects are working towards a whole-of-government approach to better identify and consider disseminating results of the projects, and options for building skills in EA.

- *Technical Assistance.* The process of collecting SEEA-based financial estimates from local governing bodies as used by the ABS provides participating organisations with access to a phone help-line.

- *Other Incentives.* Not applicable.

Challenges & Successes

Seeking to integrate EA practices within and between entities employing somewhere between less than 20 and more than 4,000 staff has been the main challenge, but more useful to the target audience than promoting one form of EA tool, or limiting adoption targets to large organisations. Working without being able to refer to substantive theoretical or empirical evidence as to the environmental information needs of decision-makers has been another challenge. A third challenge has been bringing the environmental conservation and environmental health officials together with the financial and management accountants of corporate services.

The interest and support from local governments in compiling SEEA-based estimates has been the main success of the projects to date. First 12, then 45, then 183 of Australia's 670 local governments participated in pilot studies for fiscal years 1997, 1998 and 1999.

Next Steps

Disseminating the evidence collected on how local governments are applying SEEA-based estimates to internal decision-making will occur in 1999-2000. An exposure draft of a Local Government Guide to Reviewing Regional Environmental Performance is being developed for 2001 field-testing in three Australian states and in New Zealand.

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AUSTRIAN FEDERAL MINISTRY FOR AGRICULTURE AND FORESTRY, ENVIRONMENT AND WATER MANAGEMENT (AFEW)

An Approach Linking Corporate Waste Minimisation Efforts and Environmental Costs

Government Agency
The Austrian Federal Ministry for Agriculture and Forestry, Environment and Water Management is responsible for environmental legislation and politics in Austria.

Partners & Stakeholders
The Institute for Environmental Management and Economics (IÖW) has worked in co-operation with the Graz University of Technology and ARGE Müllvermeidung on this project. The project follows a multidisciplinary approach. IÖW is responsible for financial accounting, ARGE Müllvermeidung is responsible for cost accounting, and the Graz University of Technology for environmental technologies.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
Environmental Management Accounting (EMA) concepts are promoted as the means by which private corporations can link and justify investment in waste minimisation and cleaner production technologies. EMA concepts are also promoted in combination with environmental management systems as certified by ISO 14001 and EMAS.

A series of case studies and research papers have been produced since 1990 on corporate strategies for minimising the costs and environmental impacts associated with production. The project aims at creating a competitive advantage for companies that use Cleaner Production as their main philosophy. About 300 companies have participated in Cleaner Production-programs in Austria since 1990.

While the main target audience of the program is industry, the information and data thus gained are viewed not only as important to the participating companies but equally important to public decision-makers, banks, insurance companies, interest groups, etc.

Methodology & Language
Ascertaining and allocating costs correctly makes it possible to determine which waste minimisation technologies influence those cost categories where the best results can be obtained. The project uses the following methodical approach to ascertaining, allocating and evaluating environmental costs/savings:

- *Environmental Cost Categories:* treatment and disposal costs; personnel costs; costs of outside services; environmental fines, penalties, charges, and taxes; material value of corporate wastes and emissions; depreciation of environmental investments; maintenance and utilities; financial costs of environmental investments; and calculated risks.
- *Media-related Categories:* The approach investigates the above types of environmental costs for the following areas: corporate waste; energy (heat, cold); air/noise; water; and other.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation*. Participation in the program is voluntary.

- *Regulatory Requirements or Incentives.* Not applicable

- *Research & Concept/Tools Development.* A systematic techno-economic approach has been developed that links waste minimisation technologies with the reduction of corporate environmental costs. The methodology includes both the technical and costing/accounting components of a waste minimisation assessment. It allows co-operation between technicians and economists within one program, striving towards the same goals, but each using their own language. A first series of case studies has been completed in order to test and improve the approach. Case studies have been developed in several industry sectors: food, pharmaceuticals, and machinery. A manual for a self-audit in companies, including cost checklists also has been developed.

- *Information Dissemination.* The manual and checklists are available in German.

- *Technical Assistance.* Technical assistance is provided through a "train-the trainers" workshop. This workshop should enable consultants to carry out techno-economical analysis in companies.

- *Other Incentives.* Not applicable.

Challenges & Successes

The case studies have shown that there is a substantial chance to reduce corporate environmental costs if a materials flow analysis is combined with an economic analysis. In many of the companies, the identified waste minimisation measures have been implemented successfully.

Next Steps

The next step is a plan to provide the approach to all EMAS and ISO 14001 certified companies in Austria, in collaboration with the Austrian Federal Ministry for Agriculture and Forestry, Environment and Water Management and the Austrian Federal Ministry of Transport, Innovation and Technology.

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DANISH ENVIRONMENTAL PROTECTION AGENCY

The Green Accounts Act

Government Agency
The Danish Environmental Protection Agency (EPA) is a national agency responsible for administering the nation's environmental protection programs and polices.

Partners & Stakeholders
A number of Danish enterprises that are particularly heavy polluters and are subject to other national environmental protection laws, are required to publish green accounts.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
In Denmark, EMA materials accounting concepts are promoted via the information disclosure requirements of the Green Accounts Act. The Danish Parliament passed the "Green Accounts Act" in 1995. The Act required certain polluting enterprises to produce annual reports on environmental performance, beginning in 1997. The Act was passed to:

1) Ensure that the general public had easy access to information on resource use and environmental performance of polluting enterprises;
2) Improve regulated enterprises knowledge of their own environmental performance through focus on resource consumption, choice of raw materials, and pollutant emissions.

Methodology & Language
This initiative focuses solely on the "physical flow accounting" components of Environmental Management Accounting (EMA), but does not include the financial and cost components of EMA. Green Account reports are comprised of a number of mandatory elements, including the following physical flow accounting elements:

- Data on consumption of water, energy, and raw materials;
- Significant types & volumes of pollutants emitted to air, water, and soil;
- Significant types & volumes of pollutants forming in production processes, waste, or products

The Green Accounts Act goes beyond the internal decision-making focus of EMA in its focus on external reporting. However, interviews with enterprises required to submit green accounts indicate that 41% achieved environmental improvements through their green accounting work, and 49% achieved financial benefits via better management of resources. Both results indicate the use of the green accounts information for internal decision-making purposes.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The Danish EPA is promoting the green accounts framework as a voluntary reporting standard.

- *Government Regulation.* This program is a mandatory requirement for a number of enterprises that are particularly heavy polluters.

- *Research & Concept/Tools Development.* The simple reporting framework that makes up the Green Accounts is designed to increase environmental awareness among the general public, and also motivate reporting enterprises to make continuous environmental improvements.

- *Information Dissemination.* Approximately 1,200 Danish enterprises that are particularly "heavy polluters" are required to publish Green Accounts. In addition, some 200 enterprises have voluntarily submitted Green Accounts reports.

- *Technical Assistance.* Information on technical assistance other than information dissemination was unavailable at the time that this case study was written.

- *Other Incentives.* Not applicable.

Challenges & Successes

In 1999, the Danish EPA conducted a comprehensive evaluation of the Act, including a review of 550 Green Account reports, interviews with persons responsible for completing Green Accounts, interviews with 1900 neighbours and consumers, and interviews with persons with special interest in Green Accounts. This evaluation revealed that:

- 41% of regulated enterprises believe that they have achieved environmental improvements through green accounting.
- Environmental improvements have generally been achieved through the introduction of monitoring and control systems, and/or the acquisition of energy and water conservation equipment
- 83% of accounts comply with the requirements of the act, and nearly 75% are considered easy to read.
- 70% of regulated enterprises have prepared Green Accounts without external assistance.
- Awareness of Green Accounts amongst professional stakeholders, such as journalist, environmental groups, investors, is high (i.e., over 80%).

Next Steps

The Danish EPA is drafting a revised law that it hopes to have introduced in Parliament in October 2000 The new legislation changes the administrative procedures of the law, relies on local environmental authorities to comment on the accounts, and requires comments to be publicised with account information. Additionally the information required in the Green Accounts would be expanded. While financial aspects of EMA may be included as part of a future initiative, it probably will not be included as part of the revised legislation in fall 2000.

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ENVIRONMENT AGENCY (UK)

The Environmental Accounting Initiative

Government Agency
In the United Kingdom, the Environment Agency (the "Agency") has wide-ranging authority and duties related to environmental protection and regulations across England and Wales. It is a national body with a regional structure.

Partners & Stakeholders
The primary stakeholders in this initiative are the approximately 10,000 employees that work for the Agency and large numbers of companies that it regulates, advises, and interacts with. Additionally, the Agency's external financial auditors audit all internal financial-related reports and information produced by the Agency prior to publication in its annual "Corporate Plan," "Annual Report and Accounts," and "Corporate Environmental Report" (each of which is described in more detail below).

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
EMA concepts are promoted through a 5-year initiative to "green" agency financial accounting systems that was initiated in 1997. This effort was a response to a broader "*Greening Government*" policy aimed at improving the environmental performance of all government departments and their agencies. The "Practice what we Preach" initiative seeks to incorporate environmental management and accounting systems in the Agency's business planning, management accounting, and annual financial reporting processes. This initiative has three objectives:

1) Develop and integrate an environmental accounting system (EAS) within the Agency's financial management processes.
2) Reduce agency resource consumption and realise and report cost savings.
3) Influence other public and private sector organisations to adopt, promote, and develop the same or similar practices.

While the "Practice what we preach" initiative focuses on implementing EMA concepts within the Agency itself, in other initiatives the Agency provides general EMA-related information and assistance and information to businesses and other government departments and their agencies.

Methodology & Language
The Agency's publications and information use the term "environmental accounting system" (EAS) to refer to a system that:

- ↓# Utilises and informs core organisational processes including planning (budgets), management accounting (monitoring), and financial accounting (disclosure);

- ↓# Tracks UK £60m expenditures on key environmental expenditures (i.e., energy, water, sewage, travel, construction, other support costs);

- Differentiates between operational costs, administrative support costs, and capital expenditures;

- Links financial data to other quantitative information such as material flow and/or utility data;

- Develops the financial infrastructure to support EA, for example, creating new codes, developing reporting mechanisms, and increasing environmental and financial awareness throughout the Agency.

As such, the Agency's EAS model essentially encompasses Environmental Management Accounting (EMA) for internal decision-making, both the physical flow and monetary components, but also goes beyond EMA in it focus on financial accounting and reporting.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The program is intended to encourage voluntary action on the part of other public bodies as well as the private sector.

- *Government Regulation.* Participation in the "Practice What We Preach" initiative is required for divisions/departments of the Environment Agency.

- *Research & Concept/Tools Development.* The project focuses primarily on the practical development and use of EMA and environmental management tools in government departments and their agencies. For example, the agency has developed a booklet linking procurement codes and expenditure codes in order to improve tracking of utility usage and expenditures.

- *Information Dissemination.* The Agency issues an *Annual Environmental Report* to document progress in reaching internal policies and initiatives, including the EA initiatives.

- *Technical Assistance.* Most assistance for this program is targeted at Agency staff responsible for implementing and/or using the environmental management and accounting systems.

- *Other Incentives*. Not applicable.

Challenges & Successes

Some of the issues that the Agency has encountered in implementing its EMA system are summarised below.

- Integrating EA into core financial systems requires widespread cultural change within an organisation, which is often a slow process. On the other hand, integrating EA into core financial functions has a profound effect on building “environmental thinking” into the day-to-day operation of an organisation.

- Gaining consensus between environmental and financial groups can be difficult, particularly when either group lacks training and/or awareness about environmental and/or financial issues. The agency has addressed this issue by using cross-functional teams with expertise in environmental and financial management, accounting, procurement, auditing, and operations to implement its EA systems.

- There is generally a lack of clear and unambiguous standards and terminology relating to EA that can hinder its advancement. Perhaps more importantly, there is often a lack of organisational incentives to advance EA because the benefits of EA are not necessarily readily apparent and may require a separate organisational commitment to sustainable development and/or enhanced environmental performance.

Next Steps

The Agency is now moving on to look at outsourced third party expenditures, and the value of its environmental assets and liabilities as part of its financial accounting, including covering the extent of any contamination and remediation required. This information will be used to develop an embryonic green balance sheet. The external audit of the environmental accounts is being increasingly integrated into the overall financial audit process. Work is now starting on developing promotional tools, e.g., a "How to do EA" guide, for other public bodies and for the private sector.

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ENVIRONMENT CANADA, QUEBEC REGIONAL OFFICE

Private Sector Pollution Prevention Initiatives

Government Agency
Environment Canada is a federal environmental protection agency that administers environmental protection regulations, policies, and assistance on behalf of the Canadian government. Environment Canada has regional offices at the provincial level throughout Canada. The projects described here were initiated by Environment Canada's Quebec Regional Office (referred to as "the Region").

Partners & Stakeholders
Partners and stakeholders have included the Québec Chartered Accountants Association as well as select small and medium-sized enterprises in Québec.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
In 1995 the Canadian government launched a federal pollution prevention strategy aimed at shifting the federal focus from cleaning up pollution to preventing pollution in the first place. In response to this national policy, Environment Canada's Quebec Regional Office launched an initiative to advance private sector pollution prevention in 1997. The region's efforts to date have focused on providing businesses with the information, tools, and resources that they need to recognise pollution prevention opportunities. As part of this broad effort, EMA is promoted as a way to encourage voluntary pollution prevention (P2) investments by small and medium sized private enterprises in the Quebec region. In addition, EMA is being promoted as a tool for the development of Environmental Management Systems (EMS).

Methodology & Languages
The Region's activities refer to a broad, and basic "Environmental Accounting (EA)" model that consists of three distinct, but inter-related conceptual elements: 1) Identifying measurable objectives and targets; 2) Gathering and analysing decision support data; 3) Accountability. Each of these elements is described briefly below.

Emphasis on identifying measurable objectives and targets is driven by the notion that an organisation will "manage what it measures." Thus, the Region's EA model recommends that organisations establish three categories of internal objectives and targets that relate to environmental effectiveness, compliance, and reliability of management reports. These targets provide a basis against which planned and existing projects or investments can be evaluated.

The model provides guidance on data development in all stages of the product/service lifecycle, including research and development, supply chain, operational, products and service, and client/consumption. The model relies on a combination of quantitative financial data, quantitative non-financial data (i.e., material or product flows), and qualitative information. While externalities are covered briefly, most of the data relates to information required to carry out internal management functions (i.e., decision-making, performance, assessment, accountability, etc).

Accountability issues addressed by the EA model include both internal functions, such as decision-support and performance assessment and external functions, such as addressing environmental performance in financial statements and environmental performance reports.

Thus, the Region's EA model encompasses both physical flow and monetary information for internal decision-making and reporting in the same fashion as EMA. However, the Region's model goes a bit beyond EMA in its discussion of EMA as a tool for external accountability and reporting.

EMA-related Components of the Policy/Program

- A second element is the Region's EnviroClub initiative, *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The Québec initiatives are voluntary.

- *Government Regulation.* Not applicable.

- *Research & Concept/Tools Development.* A central focus of this program was the development of a simple conceptual model of EA that could be adopted by a wide range of SMEs. The model was developed in close collaboration with the Québec Chartered Accountants Association.

- *Information Dissemination.* The conceptual model of EA is documented and disseminated in a guidebook called an "Introductory Guide to Environmental Accounting."

- *Technical Assistance.* The only technical assistance provided on EMA-related principles and concepts is part of a broader technical assistance effort – the Region's EnviroClub Initiative. This initiative has provided on-site technical assistance to 14 small and medium size enterprises (SMEs) in the development of pollution prevention projects and environmental management systems (EMS). Participating SMEs receive the technical assistance in exchange for a $5,000 participation fee, and mandatory participation of one administrator and one technical manager.

- *Other Incentives*. Not applicable.

Challenges & Successes

Work with EnviroClub members has allowed the Region to gain practical experience and feedback on its EA model while also demonstrating concrete results of its application. In pilot stages of the project, the model was used to evaluate 8 pollution prevention projects and support the development of environmental management systems in 6 organisations. For leading businesses, pollution prevention strategies undertaken as a result of participation in the EnviroClub produced savings of $90,000 annually from an initial investment of $100,000.

Next Steps

Although there are no known plans to extend or revise the Region's EA model and Guide, the Region is in the process of extending the EnviroClub initiative to other geographic regions in the province. Workshop and course materials for future EnviroClub initiatives are expected to be ready within the next few months.

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THE EUROPEAN COMMISSION'S ENVIRONMENT AND CLIMATE PROGRAMME

ECOMAC/EMAN Project: Promoting Eco-Management Accounting as a Tool for Environmental Management

Government Agency

The ECOMAC project was sponsored by the European Commission (EC) Environment and Climate Programme (DG XII)—which is part of the European Union's former Fourth Framework Programme. This Programme improved the structure of European environmental research by RTD projects and networks of excellence in the areas of "Research into the natural environment, environmental quality and global change", "Environmental technologies", "Space technology applied to Earth observation and environmental research" and "Human dimensions of environmental change".

Partners and Stakeholders

The ECOMAC project is managed by EIM Small Business Research and Consultancy in the Netherlands in co-operation with Fondatione Eni Enrico Mattei of Italy, IBM Germany, the UK Sustainable Business Centre, and the Erasmus Centre for Environmental Studies of the University of Erasmus in Rotterdam, Netherlands. Other stakeholders included representatives of industries for which environment is an important issue, including chemicals, pharmaceuticals, energy and printing.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

The ECOMAC project, initiated in 1996, examined the extent to which "eco-management accounting" was occurring within the European Union (in particular, Germany, Italy, the Netherlands and the United Kingdom). The empirical relationship between environmental management and management accounting was analysed in a survey of 84 companies in the four countries, including both large and small companies. Both environmental and financial specialists were interviewed in each company, in an effort to gain comprehensive insight into company environment accounting strategies. Moreover, 15 detailed case studies were conducted in order to explore current practices and further opportunities for environmental management accounting. The case studies address various topics such as lifecycle costing, environmental costs based on Total Quality Management concepts, Activity-based Costing types of environmental costs measurements, accounting for recycling, and accounting to detect cost savings associated with more efficient process controls.

Methodology & Languages

Eco-management accounting is defined as the generation, analysis and use of financial and related non-financial information in order to integrate corporate environmental and economic policies and build sustainable business. As such, Eco-management accounting is very similar to Environmental Management Accounting (EMA), and includes both monetary information and physical flow information. However, as shown below, Eco-management accounting goes further than EMA in its consideration of external costs.

The project found that Eco-management accounting was used mostly for capital budgeting, bookkeeping, cost control, and product pricing. Some 26 percent of the enterprises surveyed were using activity-based costing, providing the data necessary for Eco-management accounting.

Environmental costs addressed include the following:

- Expenses that are wholly and exclusively required for purpose of environmental protection (capital costs of equipment and its operating costs);
- Expenses that are largely related to purposes of environmental protection, using, where necessary, some form of apportionment of actual expenditure;
- The costs of inefficiency, i.e., suboptimal utilisation of environmental resources such as energy, raw materials and water (the amount of environmental cost is the difference between actual consumption and a conceivable lower level);
- Intangible costs, such as damage to reputation, which are difficult to quantify;
- External costs, i.e., welfare losses to society caused by a company's activities, which are not reflected in the company's own transactions or accounts;
- Opportunity costs, i.e., welfare losses associated with forgone alternatives (in this case referring to declined environmental actions or overruled options for preventive investments).

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* This research initiative promotes voluntary adoption of EMA concepts.

- *Government Regulation.* Not applicable.

- *Research & Concept/Tools Development.* A key component of this effort was empirical survey research of effective and demonstrated EMA tool and techniques

- *Information Dissemination.* In addition to the publication of the main report (entitled Eco-Management Accounting, published by Kluwer Academic Publishers, 1999), a summary report for practitioners was developed. As a follow-up to the ECOMAC project, the Eco-Management Accounting Network (EMAN) was established to promote the dissemination and exchange of EMA information and techniques. EMAN is a network of researchers, consultants, business people and policy advisors interested in environmental management accounting as a tool for corporate environmental management. The purpose of the network is to promote the understanding and the use of EMA by business, to stimulate research in the field, to promote education in EMA, and to identify opportunities for government support of EMA.

- *Technical Assistance*. Other activities to promote the role of accountants in enhancing environmental management in SMEs are forthcoming.

- *Other Incentives.* Not applicable.

Challenges and Successes

The project has produced unique empirical materials that demonstrate how companies use management accounting to support environmental management. It produced important insights into how companies can apply the principles of environmental accounting. It revealed how existing accounting structures can support EMA and where new sources of information are needed to address the environmental issues companies have to face.

Finally, it produced a framework that allows integration of literature and project findings into one coherent body of knowledge that indicates areas for further research.

Next Steps

An ongoing dialogue on policy-relevant issues will take place within the framework of the Eco-Management Accounting Network (EMAN). Major means of interaction are an annual meeting and a newsletter.

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THE EUROPEAN COMMISSION – DG XV

Draft Commission Recommendation on the Recognition, Measurement and Disclosure of Environmental Issues in the Annual Accounts and Annual Reports of Companies

Government Agency
The Commission of European Communities (EC) is a multinational government body that develops and proposes policy initiatives on behalf of the European nations comprising the European Union (EU).

Partners & Stakeholders
Four groups of stakeholders are listed in the Recommendations, including: 1) Investors who need to know how companies deal with environmental liabilities and costs to accurately assess financial performance; 2) Financial analysts responsible for developing and/or evaluating companies annual reports and financial disclosures; 3) Regulatory authorities that have an interest in monitoring environmental regulations and costs; and; 4) the general public, which may consider environmental information voluntarily disclosed by companies to be either inadequate or unreliable.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
The Recommendation provides guidance, with respect to environmental issues, on the application of earlier more general accounting and financial guidelines and directives issued by the EC to foster a more consolidated and efficient Single European market amongst its members. The Recommendation also references several International Accounting Standards (IAS) published by the International Accounting Standards Committee, and the United Nations Working Group on International Standards of Accounting and Reporting.

In 1999, the Commission adopted a Communication intended to make environmental and single market policies mutually supportive and reinforcing ("Communication on the Single Market and the Environment" (COM(99)(263). The Communication identified a series of further measures for the EC to pursue including issuance of a "Recommendation on Environmental Issues in Financial Reporting." At the time of this writing, a Draft Recommendation, dated November 5, 2000, was available for review.

The Draft Recommendation identifies several issues and/or needs that it is intended to address, including:

- A need for authoritative guidelines with respect to environmental issues to foster comparability between and transparency in company financial and annual reports.
- A need for reliable information on enterprises' environmental performance amongst users of financial statements.
- A lack of guidance directly related to treatment of environmental issues in national and international accounting standards.
- The aim of making company environmental, accounting, and annual reports more consistent, cohesive, and closely associated.

The focus of the Recommendation is exclusively on financial and cost data as opposed to material flow data.

Language & Definitions

While there is definitely overlap with EMA concepts and techniques (which tend to be internally focused), this effort focuses on environmental financial accounting and reporting for external review. In particular, the Recommendation focuses on measurement and disclosure of environmental expenditures, liabilities and risks and related assets that arise from transactions or events that influence the financial position of the reporting entity. It also identifies the type of environmental information that should be disclosed in annual reports with respect to company's attitudes towards the environment and the enterprise's environmental performance (to the extent that these issues influence the financial position of the company).

The Recommendation is divided into three technical sections summarized below:

1. *Definitions*: Most significantly the term "environmental expenditure" is defined as costs incurred to prevent, reduce, or repair damage to the environment which results from a company's operating activities. These include, but are not limited to, the disposal or avoidance of waste, protection of surface and ground water, preserving air quality, or removal of contamination in buildings. The definition explicitly excludes costs that may favorably influence the environment but primarily to respond to other needs, such as increasing profitability, health and safety, production efficiency, or energy conservation.

2. *Recognition and Measurement:* This section contains several detailed and technical subsections pertaining to accounting for enterprise environmental liabilities, environmental expenditures, and measurement of environmental liabilities.

3. *Disclosures:* This section indicates that environmental issues should be disclosed to the extent that they are material to the financial position of the reporting entity, and provides technical details on the format and procedures for reporting such information.

EMA-related Components of the Policy/Program

- ↓# *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The Recommendation provides standards and guidelines for financial reporting of relevant environmental information.

- ↓# *Government Regulation.* Not applicable.

- ↓# *Concept/Tools Development.* The recommendation seeks to formally integrate environmental accounting and disclosures in the financial reporting process.

- ↓# *Information Dissemination.* Not applicable at this point.

- ↓# *Technical Assistance.* Not applicable at this point.

- ↓# *Other Incentives.* Not Applicable.

Challenges & Successes
As noted the Recommendation at the time of this writing was in draft form.

Next Steps
The Recommendation must be finalized and adopted by EC. The schedule and feasibility of formal adoption of the Recommendation is unknown.

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FINLAND MINISTRY OF ENVIRONMENT

Guidelines for Environmental Reporting

Government Agency
Finland's Ministry of Environment ("the Ministry") is a national agency responsible for administering the nation's environmental protection programs and polices.

Partners & Stakeholders
A number of organisations, including national ministries such as the Ministry of Transport and Communications, and Statistics Finland; non-governmental organisations, such as the Finnish Academy of Science; and private sector organisations and consulting firms have collaborated with the Ministry of Environment in advancing EMA concepts and techniques.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
EMA concepts are promoted as part of a broader initiative to promote development of standard, credible, and accessible organisational environmental performance reports by both businesses that voluntarily create such reports and organisations required to submit mandatory environmental reports to environmental permitting authorities. The Ministry published its *Guidelines for Environmental Reporting* in April of 1999 and has various ongoing research and promotional initiatives to support the use of the guidelines.

In recent years, the Ministry also has promoted EMA efforts by funding several research and development (R&D) projects that examine topics such as techniques for determining the environmental costs of products over their lifecycle, and developing "green" national accounts using standard EMA data and other information reported by the firms. However, these efforts are not described in this case study.

Methodology & Languages
While the *Guidelines for Environmental Reports* cover a wide range of topics related to environmental performance, such as organisational environmental policies, systems, they also specifically encourage organisations to report "economic data" related to environmental performance, including: environmental investments; annual costs; costs of research and development; administrative and environmental costs; and environmental taxes. Organisations also are encouraged to highlight the economic benefits and new business opportunities resulting from environmental management.

The *Guidelines* refer specifically to organisational "environmental accounting" techniques that capture primarily internal organisational costs. As such, even though the guidelines use the broad term "environmental accounting", the focus is clearly on environmental management accounting (EMA).

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The program promotes voluntary implementation of EMA via voluntary environmental reporting.

- *Government Regulation*. Not applicable.

- *Research & Concept/Tools Development.* The Ministries' *Guidelines for Environmental Reporting* provides information on EMA concepts and cost categories.

- *Information Dissemination.* The Guidelines have been distributed to all ISO 14001 certified organisations and other relevant organisations.

- *Technical Assistance.* Not applicable.

- *Other Incentives*. Since 1996, the Finnish Ministry of the Environment has sponsored a Finnish Environmental Award Competition to encourage voluntary submission of environmental reports. In 1999, the competition was organised by the Finnish Organisation for Chartered Accountants, Helsinki School of Economics and the Confederation of Finnish Industry and Employers. In 2000, the criteria for good reporting in the Finnish competition were developed by taking into account the Guidelines for Environmental Reporting published by the Ministry of the Environment and the Sustainability Reporting Guidelines published by the Global Reporting Initiative.

Challenges & Successes

The Ministry reports that the main challenge has been insufficient data, especially related to the economic value of environmental impacts. Additionally, the Ministry acknowledges difficulties associated with quantifying benefits of good environmental performance in monetary terms and is currently sponsoring research to address this issue.

Next Steps

The Ministry reports that an evaluation study of environmental management systems and reporting initiatives is planned.

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GERMAN FEDERAL ENVIRONMENTAL AGENCY OF THE MINISTRY FOR ENVIRONMENT, NATURE CONSERVATION, & NUCLEAR SAFETY

Guidelines on Environmental Cost Management

Government Agency
The Federal Environmental Agency is a scientific federal authority that advises the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety on environment-related issues. The Agency has a special section on Environmental Economics that manages this project.

Partners & Stakeholders
The Institute for Ecological Economy Research (IÖW) of Berlin is the scientific project leader and is responsible for the research results. The Institute for Management and the Environment (IMU) in Augsburg provides additional research capacities, especially in the field of material and energy flow accounting. Industry associations such as Association of Chemical Industries of Germany (VCI), business-representatives, and independent scientists are supporting the project as members of an advisory-board.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
This one-year project was initiated in 2000 with the following goals:

1) to provide some guidelines on Environmental Management Accounting (EMA) practices for business, focusing on how to identify the most suitable EMA approach(es)
2) to identify the possible need for EMA standards
3) to work with ISO & EMAS to study the potential for incorporating EMA guidelines or requirements into EMS

Methodology & Languages
A number of different Environmental Cost Management approaches related to EMA are being assessed under the project. These approaches can be broadly organised as follows:

- Traditional Environmental Cost Accounting approaches, which focus mainly on investment (depreciation) costs and other expenditures (e.g. personnel costs) for corporate environmental protection.

- Materials and energy flow-based cost accounting approaches, which mainly are focused on production based flow costs: material costs, investment (depreciation) and current expenditures; personnel costs; cost of external disposal, etc. These approaches are aimed at determining the "real" corporate cost of resource consumption.

- Approaches to calculating environment-related investment costs and benefits by integrating all relevant environmental cost into the assessment

- Approaches that take external costs/social costs of corporate activities into consideration.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The project promotes voluntary adoption of EMA concepts and techniques.

- *Regulatory Requirements.* Not applicable.

- *Research & Concept/Tools Development*. Basic EMA theories, concepts, definitions, and guidelines are being developed as part of this project. As a first step, a scientific pre-study is being prepared to identify EMA approaches of practical importance in Germany. This pre-study is also intended to serve as a discussion basis in the relevant German standardisation committee (DIN NAGUS), which is considering EMA as standardisation issue*.*

- *Information Dissemination.* The project is providing guidance documents and best practice information to promote EMA.

- *Technical Assistance*. Not applicable.

- *Other Incentives*. Not applicable.

Challenges & Successes

Information on challenges and successes was unavailable at the time this case study was written.

Next Steps

The above mentioned pre-study will be published at the end of 2000 in German. A summary of the main findings will also be available in English.

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GRAZ (AUSTRIA) DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)

ECOPROFIT – Ecological Project for Integrated Environmental Technologies

Government Agency
The Department of Environmental Protection of the City of Graz, Austria is responsible for the strategic planing, implementation and evaluation of environmental programs for the City of Graz

Partners & Stakeholders
The ECOPROFIT-program was developed by the Institute of Chemical Engineering of the Graz University of Technology in co-operation with the STENUM GesmbH research and consulting firm, and is directed towards small and medium sized private companies.

Background & Scope of Policy/Program within which EMA Concepts are Promoted
The ECOPROFIT project was established in 1991 and has been implemented in more than 200 small and medium sized private companies to date. The dual objectives of the ECOPROFIT initiative are to improve the environment of Graz while also strengthening the competitive advantage of participating companies. The broad approach taken is to promote corporate resource efficiency.

There are approximately three to four ECOPROFIT programs each year. In the "beginners-program" new companies go through a series of ten training workshops on topics such as environmental management, regulatory compliance, pollution prevention, energy management, waste management, and transportation. Two workshops promote EMA concepts – one workshop on environmental cost accounting and one workshop on materials flow analysis.

Methodology & Languages
ECOPROFIT promotes both the physical flow and monetary components of EMA via its workshops on those two topics.

The program defines "environmental cost accounting" as a tool for reducing a company's expenditures on raw materials, energy and waste management. The checklist "Corporate Environmental Costs" used in this program contains the following categories of costs: treatment and disposal costs; personnel costs; cost of outside services; environmental contribution; material value of corporate wastes and emissions; depreciation of environmental investments; maintenance and utilities; financial costs of environmental investments; estimated risks.

EMA-related Components of the Policy/Program

- ↓# *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The program is voluntary.

- ↓# *Regulatory Requirements.* Not applicable.

↓# *Research & Concept/Tools Development.* A key part of the program has been the development of training workshops and manuals, including workshops/manuals on the topics of environmental cost accounting and materials flow analysis.

↓# *Information Dissemination.* Manuals and workshops are provided to participating organisations on a cost sharing basis**.** The manuals are available in German. Some of the materials are also available in Portuguese and Spanish. The program expects the workshop participants to further disseminate ECOPROFIT concepts within their own organisations in parallel with workshop attendance. In addition, the "ECOPROFIT Network" was created to promote sharing of new knowledge, deepening of existing knowledge, and strengthening of co-operation between ECOPROFIT companies after the basic training workshops have been completed. To that end, the ECOPROFIT Network supports exchanges of workshop experiences, insights (mutual company inspection tours), and social events

↓# *Technical Assistance.* Technical assistance is provided by STENUM GmbH. on a number of different topics, including materials flow analysis and total cost analysis.

↓# *Other Incentives.* The program provides awards and/or commendations to participating businesses.

Challenges & Successes

About 200 companies have taken part in the “beginners-program” to date. Thirty companies are members of the ECOPROFIT Network and about 20 companies are participating in the ECOPROFIT Tourism Program, which focuses on bringing ECOPROFIT concepts to tourism-related businesses in Graz. The tourism program is managed under the supervision of the Graz DEP and the Department of Economic and Tourist Development in co-operation with the Federal Ministry of Environment, Youth and Family Affairs.

Next Steps

The ECOPROFIT program is aiming to involve as many SMEs as possible in the City of Graz. In order to spread the program, the ECOPROFIT Academy was founded. The ECOPROFIT Academy is an expert centre in which certified ECOPROFIT consultants and representatives of communities are educated.

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JAPAN ENVIRONMENT AGENCY

Promoting Corporate Environmental Accounting and Reporting Systems

Government Agency
The Japan Environment Agency (JEA) is a national agency responsible for administering the nation's environmental protection programs and polices.

Partners & Stakeholders
JEA has established several study groups consisting of external stakeholders including the Japanese Institution of Certified Public Accountants (JICPA), members of the business community, and other organisations interested in promoting Environmental Accounting concepts for both internal decision-making and external reporting.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
JEA launched a dedicated Environmental Accounting (EA) research initiative in 1996 in response to general interest expressed by the Japanese business community. This interest was born in part from the creation of environmental management system (EMS) standards embodied in ISO 14001. Additionally in July of 1999, Japan's Prime Minister Obuchi proposed ongoing investigation of EA as part of broad reform proposal for employment creation and enhancement of Japanese industrial competitiveness.

JEA's initial research led to the development of draft guidelines for EA, which were released in March of 1999. After a one-year comment and demonstration period, JEA released final guidelines in its report entitled "Developing an Environmental Accounting System" (referred to as the "2000 Report" -- additional details provided below).

According to the 2000 Report the primary objectives of Japan's EA efforts to date entail "integrating standard concepts regarding environmental accounting in Japan and developing environmental accounting as one of the social systems that enable people to correctly understand, evaluate, and support environmental conservation by business enterprises." The focus of the program is on business enterprises as users and beneficiaries of EA, however, as noted above, consistent reporting of environmental information to external stakeholders is another important focus of JEA's efforts. To this end, JEA requests that companies voluntarily implement EA support software (provided by JEA) and forward results to JEA for disclosure to the public.

Methodology & Languages
JEA uses the term "Environmental Accounting (EA)" to refer to a scope of activities that is essentially the same as Environmental Management Accounting (EMA). In particular, JEA emphasises the fact that EA incorporates both physical flow and monetary accounting, using the following language: 1) "physical quantity units" suitable for evaluating environmental impacts associated with a given activity and 2) "monetary units" suitable for evaluating economic impacts associated with a given environmental investment. This inclusion of both physical flow and monetary accounting data is a key feature of EMA. However, JEA does go beyond the internal decision-making scope of EMA in its emphasis on external reporting of EMA information.

JEA identifies six general categories of environmental costs that should be accounted for in EA systems, including:

- *Cost of controlling environmental impacts within a business area*: such as costs associated with air and water pollution control equipment, global environmental conservation costs (i.e., climate change prevention, ozone layer depletion prevention, and other environmental conservation activities) and resource circulation/reuse technologies

- *Cost of controlling environmental impacts in the upper or lower stream of a business chain*: such as costs associated with environmental impacts resulting from purchasing, recycling, recovery or disposal of products or packaging produced or sold.

- *Management costs*: such as costs associated with environmental education of employees, monitoring and measuring environmental impacts, and other related personnel and overhead expenses

- *Research and development costs*: such as costs associated with planning and design of environmental control or conservation technologies.

- *Non-business, social activity costs*: such as costs for beautification, citizens' seminars and environmental activities, support for environmental groups, and other related expenses.

- *Environmental damage costs*: such as costs associated with remediating environmental damage that is a direct result of a company's business activities

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation*. The JEA initiative promotes voluntary implementation of EA and voluntary reporting of EA information.

- *Government Regulation.* Not applicable.

- *Research & Concept/Tools Development*. The thrust of the initiative to date has been on developing standard framework(s) that companies can use to inform internal decision making and external reporting related to environmental investments and performance. In addition to the EA cost framework described above, JEA has developed three standard frameworks that companies can use to report or disclose EA information related to environmental investments and/or performance. In addition, JEA is developing a variety of case studies and software tools.

- *Information Dissemination*. Information dissemination has been carried out through diverse, high profile stakeholder "study groups", and through publication of reports, case studies, and other information that is available on a dedicated EA project Web page.

- *Technical Assistance.* Not applicable.

↓# *Other Incentives*. Not applicable.

Challenges & Successes

JEA reports that interest in EA is at an all time high since the 2000 report was released. JEA has distributed over 7000 copies of the "Guidebook for the introduction of EA". Over 4000 have accessed to download the "implementation software", which was developed by JEA in co-operation with a private company.

According to a survey conducted by JEA, over 100 companies have introduced EA, of which over 70 companies officially reported their EA information. Most public EA information is made available based on JEA's Guidelines from the 2000 report. Sectors that have introduced EA include construction, electrical manufacturing, machine manufacturing, chemical engineering, paper and pulp, automobile, textile, food, electricity, gas, ceramic engineering, wholesale, to financing. In addition, several local governments have introduced EA.

In addition to these efforts, voluntary working groups have been recently formed in business circles such as the gas industry and construction industry, discussing industry or sector specific EA information and techniques. JEA supports these movements through the exchange of views and ideas.

Next Steps

JEA intends to revise the 2000 Report, based on the feedback from companies actually using the guidelines. JEA expects to publish a revised version of the 2000 Report in 2002. For this purpose, JEA has established the “Study Group for Environment Performance Indication.” This group is also examining techniques for quantifying effects related to environmental measures.

JEA has established three working groups to address per the following industry sectors: the electric industry, the food industry , and the distributive industry. JEA aims to discuss the appropriate method of EA, taking characteristics particular to their industry into consideration.

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NETHERLANDS NATIONAL MINISTRIES

Research Program on Management Accounting and Environmental Management

Government Agency
Five national ministries in the Netherlands financially support this research program: the Ministry of Foreign Affairs; the Ministry of Economic Affairs; the Ministry of Agriculture, Nature Management and Fisheries; the Ministry of Education, Culture, and Science; and the Ministry of Transport, Public Works, and Water Management.

Partners & Stakeholders
The research program is a joint effort of the government ministries and the Dutch scientific research organisation NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek). Other research partners involved in the program are Erasmus University in Rotterdam, the University of Amsterdam; Wuppertal Institute, and the University of Njimegen. Other stakeholders include the industry firms participating in case studies.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
The Research Program on Management Accounting and Environmental Management is one of nine research programs initiated in 1996 to promote environmental economics and inform related policy decision in the Netherlands. The programs are executed by consortia of universities and research institutes.

The Research Program on Management Accounting and Environmental Management ("the Program), which will run until 2002, is designed to answer the following research question: What are the implications of environmental management for management accounting and external reporting?

Methodology & Languages
Although the program title does not use the exact term "Environmental Management Accounting (EMA), the program focus is understood to be EMA. EMA is understood here as environmental accounting (including monetary information, physical flow information, or other information) for the specific purpose of supporting the information needs of the organisation's own management. EMA is based on the premise that, as environmental issues become more important, so will good environmental management by business and other organisations; and that accounting and financial management techniques can help to support this, to the mutual benefit of both the organisation's environmental management function and its accounting and finance function.

Despite the formal definition's description of EMA as an accounting approach that specifically address an organisation's internal information needs, the project also goes beyond internal decision-making to study external reporting needs and the relationship between the two.

EMA-related Components of the Policy/Program

Promotion of Voluntary Adoption, Standards, or Self-Regulation. Participation by industry firms in the research program is voluntary.

Government Regulation. Not applicable.

Research & Concept/Tools Development. Three research projects are being implemented, each one encompassing a different combination of conceptual development work, case study development, literature review, and surveys. Project 1 addresses the development and application of EMA. Project 2 focuses on environmental information in external reporting based on generally accepted principles. Project 3 deals with mapping the interrelationships between internal and external environmental reporting and its implication for the integration of environmental accounting in enterprises.

- *Information Dissemination.* The research results are being published in a number of academic and policy journals.

- *Technical Assistance.* Not applicable.

- *Other Incentives*. Not applicable.

Challenges & Successes

It seems that expanding the scope of traditional management accounting makes the concepts of EMA also useful for other business opportunities where different organisations have to exchange financial and non-financial information. Traditional management accounting often focuses only on the information needs of the management of one entity. However, supply chain management and industrial ecology seem to evoke a new type of information need for which management accounting techniques and systems have to be developed. A case study on supply chain management within the coffee supply chain identifies these information needs. Current work includes development of new accounting systems and techniques to satisfy this information need.

Also, the research program shows the interrelations between EMA and the effectiveness of financial policy instruments that aim at internalising external costs. For example, emission taxes become more effective as EMA identifies the internal financial effects of this policy instrument.

Next Steps

No next steps will be planned until the project is completed.

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NEW JERSEY (USA) DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJ DEP) OFFICE OF POLLUTION PREVENTION

The New Jersey Pollution Prevention Act

Government Agency

The New Jersey Department of Environmental Protection (NJ DEP) is a state-level government regulatory agency in the US. The New Jersey Pollution Prevention Act established the Office of Pollution Prevention within the DEP, which is responsible for providing assistance and ensuring enforcement related to the Act.

Partners & Stakeholders

Industrial facilities that use threshold quantities of certain toxic chemicals are affected by the New Jersey Pollution Prevention Act.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

In 1991 the US state of New Jersey passed the New Jersey Pollution Prevention Act ("The Act"). The Act requires industrial facilities using threshold quantities of certain toxic chemical to develop pollution prevention (P2) plan and submit plan summaries and annual progress reports. The plans are revised every five years. According to the rules adopted by NJ DEP to implement the Act, facilities are not required to implement the P2 options they identify, but must include a comprehensive analysis of the options in their P2 plans. The rationale behind this policy is the conviction that facilities will voluntarily implement P2 activities once they analyse the options and realise that many are profitable.

The Act requires the use of EMA-related approaches for P2 planning activities under the Act.

Methodology & Languages

While the Act and supporting assistance documents do not make specific reference to EMA, the types of information and analyses required in the plan are very consistent with EMA concepts and techniques. Regulated facilities must compile both physical flow accounting and monetary accounting information at the process level. The Act requires facilities to analyse the cost of using, generating, and releasing hazardous substances and to conduct a "comprehensive financial analysis" of the costs or savings realised by investments in pollution prevention alternatives. The Act uses the term "full cost accounting" to describe this financial analysis, while the supporting information developed by the agency uses the terms "comprehensive financial analysis" and "total cost assessment" interchangeably to describe procedures for analysing process costs and pollution prevention alternatives. Regulated facilities are encouraged to address the following general types of costs in their analyses:

- Direct costs, such as capital expenditures and/or operation and maintenance expenses associated with both planned and current practices.

- Liability costs, including penalties and fines, personal injuries, private property damages, and damages to natural resources.

- Revenues and less tangible benefits such as enhancements to product quality, company image, and employee relations.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* Not applicable.

- *Government Regulation.* P2 Planning under the Act, including the EMA component, is a mandatory requirement for the regulated industrial facilities.

- *Research & Concept/Tools Development.* The Office of Pollution Prevention has developed a guidebook with P2 Planning and EMA-related instructions, standard EMA forms, and software that regulated facilities can use to support pollution prevention planning.

- *Information Dissemination.* The Office of Pollution Prevention disseminates a wide variety of information, including information related to EMA through its web site located at http://www.state.nj.us/dep/opppc.

- *Technical Assistance.* A separate non-regulatory Technical Assistance Program, which is financed by funds generated by the Act, provides free, confidential, on-site pollution prevention assessments to New Jersey businesses that can include EMA assistance.

- *Other Incentives.* Not applicable.

Challenges & Successes

In 1996, the Office of Pollution Prevention conducted an extensive survey of regulated facilities to evaluate the effectiveness of the Act. The survey addressed many aspects of the program and revealed that nearly half of the regulated facilities did not sufficiently address the "comprehensive financial analysis" requirements of the Act, and that many considered this to be the most difficult part of the plans.

Next Steps

Department review of facility progress reports and updated plan summaries occurs on a regular, ongoing basis. Based on review of the plans and progress reports, the Department is working to improve and integrate facility regulations and related permitting processes.

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UNITED NATIONS DEVELOPMENT PROGRAM (UNDP) PHILIPPINES OFFICE & PHILIPPINES' DEPARTMENT OF TRADE AND INDUSTRY, BOARD OF INVESTMENTS

Project on Private Sector Participation in Managing the Environment (PRIME)

Government Agencies
The United Nations Development Programme (UNDP) Philippines office seeks to provide knowledge-based services, such as technical assistance and policy advice to government, civil society and the private sector within the sustainable development agenda of the Philippines. The Philippines Department of Trade and Industry (DTI) is a national agency that promotes private sector development and best management practices.

Partners & Stakeholders
EMA partners and stakeholders include the Philippine Institute of Certified Public Accountants (PICPA) as well as industrial firms who work with the two agencies.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted
EMA is being promoted as a part of a broader initiative called the Project on Private Sector Participation in Managing the Environment (PRIME). The PRIME project, a joint project of UNDP and DTI, started in 1998 and will be funded through 2001. The project has four modules with the following general goals:

1) To help industry associations develop “Business Agenda 21” action plans for environmental management.
2) To support pollution prevention by encouraging “industrial ecology” such that the waste materials and waste energy of companies are used as inputs by other companies.
3) To promote a quality culture, competitiveness and industry self-regulation through environmental management systems.
4) To encourage entrepreneurs to invest in the growing environmental services and technology industry.

EMA is being introduced mid-way in the PRIME Project after initial work with companies showed that the perception of cost was a barrier to cleaner production.

Methodology & Languages
The PRIME project is using two different terms and frameworks to promote EMA concepts: "Environmental Cost Accounting" and "Environmental Cost Assessment". The Environmental Cost Accounting framework promoted by PRIME is the framework developed by the US Environmental Protection Agency's Environmental Accounting Project. The Environmental Cost Assessment framework being promoted is that used by PICPA.

The principles of Environmental Cost Accounting and Environmental Cost Assessment are very similar to those of EMA, but are more limited in scope, as they focus primarily on costs, with physical flow information primarily important only as a cost driver. The categories of costs considered under Environmental Cost Assessment are:

- ↓# Lost direct and indirect material, energy, labour inputs resulting from wasteful practices

- Waste handling, recycling, treatment, disposal, and compliance costs

- Less tangible costs, such as costs of reduced productivity, negative company image, liability, insurance, and future regulation.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* Industry participation in the PRIME project and its EMA components is voluntary.

- *Government Regulation.* Not Applicable.

- *Research & Concept/Tools Development.* Not applicable.

- *Information Dissemination.* The PRIME project has developed a short brochure entitled "Environmental Cost Accounting: Your Tool for Eco-efficiency" (based on the work of the US Environmental Protection Agency's Environmental Accounting Project and other organisations), which has been distributed widely.

- *Technical Assistance.* The project has commissioned PICPA to deliver a course entitled "Environmental Cost Assessment: Profiting from Cleaner Production" to representatives of industrial firms who are taking part in the project.

- *Other Incentives.* Not Applicable.

Challenges & Successes

EMA is a new concept in the Philippines. There is a need for local experts in this field, local companies to demonstrate its applicability, and training material based on Philippine examples.

Next Steps

PRIME, with the help of PICPA, initially will focus on introductory training programs. The response of the companies trained will determine subsequent strategies, particularly getting partner companies to implement EMA and putting in place policies to encourage EMA.

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UNITED NATIONS ENVIRONMENT PROGRAMME DIVISION OF TECHNOLOGY, INDUSTRY, AND ECONOMICS (UNEP DTIE) & THE GOVERNMENTS OF NORWAY, ZIMBABWE, TANZANIA, VIETNAM, GUATEMALA, NICARAGUA

Project on Financing Cleaner Production Investments

Government Agencies

This project was launched by the United Nations Environment Programme (UNEP) Division of Technology, Industry, and Economics (DTIE). UNEP DTIE works with government, local authorities, and industry in many countries on issues such as cleaner production, safe chemicals management, and trade and environment. The Government of Norway is funding the project through a trust fund. Government agencies in Zimbabwe, Tanzania, Vietnam, Nicaragua, and Guatemala are project partners. For example, the government partner in Zimbabwe is the Ministry of Environment and Tourism; in Tanzania the Vice-President's Office; and in Vietnam the Ministry of Planning and Investment

Partners & Stakeholders

In addition to various government agencies in the demonstration countries, project participants include representatives from academia, industry, banks, and other financial institutions in each country. International experts on specific topics relevant to the project also serve as project advisors and consultants.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

EMA concepts are being promoted as part of a program called the Project on Financing Cleaner Production Investments (the "CP Financing Project"). UNEP initiated this project in 1998, and it will run through the end of 2002. The project is part of UNEP's ongoing Cleaner Production Programme, which was launched in 1989 in response to a mandate from the UNEP Governing Council.

The goal of the project is to increase levels of investment in CP in developing countries, first by promoting CP investments and related capacity-building in the five demonstration countries, and then by disseminating the project experiences and materials to other developing countries. The key audiences in each country are the industry representatives with potentially profitable CP projects that need funding and representatives of banks and other financial institutions that could fund those projects.

The project partners view EMA as a key tool for illustrating the true profitability of industrial CP projects to private sectors finance providers such as bankers. Accordingly, EMA is being promoted as part of the project.

Methodology & Languages

With finance providers as a key audience of the CP Financing Project, the focus of the project's EMA-related activities will be on generating cost data, with physical flows viewed simply as a key driver of costs. Internal company costs will be the focus, but a more detailed categorisation of those costs to be included is still under development. Also, it has not yet been determined whether the project will use the term EMA or some other, related term to promote basic EMA concepts.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The project promotes voluntary adoption of EMA concepts.

- *Government Regulation.* Not applicable.

- *Research & Concept/Tools Development.* The project is in the process of developing a series of training modules on the use of EMA for CP profitability assessment.

- *Information Dissemination.* The project plans to make the training materials widely available to other parties interested in promoting CP Financing in developing countries. These will be published in the form of primers, loose-leaf manuals, distance-learning packages, web-based products, etc.

- *Technical Assistance.* The project has already provided on-site technical assistance on basic concepts of CP project assessment to industry partners in several of the project countries. Once the new CP-EMA curricula are developed, the project will provide actual training courses in the project demonstration countries, including train-the-trainer courses for local consultants, to promote long-term capacity building.

- *Other Incentives.* Not applicable.

Challenges & Successes

The project's early technical assistance activities have gone well, and a number of promising CP projects have been identified and assessed. Some projects have already been financed and financing negotiations are under way for others. However, both the technical assistance activities and subsequent training needs assessments have revealed a general lack of knowledge on the basic concepts of CP and EMA. The curricula under development are being designed to meet those needs.

In addition to testing and demonstrating tools and instruments in five pilot countries, the project will contribute significantly to the global dialogue on integrating/mainstreaming preventative strategies in company policies and in the due diligence process. The project team already has been invited to present the concept and interim results to very diverse audiences, ranging from the MFI Environment Group to legislators in Eastern Europe and NICs, industrialists in selected countries and regional Roundtables on Cleaner Production. Also the 6th International High-Level Seminar on Cleaner Production in Montreal 16-17 October 2000 includes a parallel session on the issue.

Next Steps

A new website on this subject will be launched in October 2000 and a major study on past investment practices will be published in November 2000. The implementation of four different training programs will start in January 2001 in the pilot countries.

Additional Information

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICE OF POLLUTION PREVENTION AND TOXICS (US EPA OPPT)

The Environmental Accounting Project

Government Agency

The United States Environmental Protection Agency's Office of Pollution Prevention and Toxics (OPPT) is a federal agency office with primary responsibilities related to regulating production and distribution of commercial and industrial chemicals in order to minimise or avoid adverse risks to human health or to the environment.

Partners & Stakeholders

External stakeholders have played a key role in helping to shape the emphasis and scope of activities of the Environmental Accounting Project (the "EA Project"). Initially, accounting organisations such as the Institute for Management Accountants and the American Institute for Certified Public Accountants played an important role in helping to establish EA applications, definitions and conventions. As the program has evolved, the EA Project has increasingly sought alliances with organisations that are able to use or apply EA to achieve specific pollution prevention outcomes, such as government technical assistance programs for manufacturers.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

OPPT launched the EA Project in 1992 in response to the US Pollution Prevention Act of 1990. The Act established pollution prevention as a national priority for controlling industrial pollution and emphasised implementation of voluntary, market-based EPA-sponsored programs to achieve national pollution prevention goals. The premise of the EA Project was that in order for pollution prevention to be successful, it had to be financially justifiable, which was not possible within traditional accounting frameworks and/or conventions.

The EA Project's original mission was "to encourage and motivate business to understand the full spectrum of their environmental costs, and integrate these costs into decision making". While the primary focus of the program is on business as a user and beneficiary of EA concepts, the EA Project has also provided limited assistance to government departments and agencies.

Methodology & Languages

The EA Project uses the term "Environmental Accounting (EA)" rather then Environmental Management Accounting (EMA). While OPPT recognises that EA is a broad term that can encompass environmental aspects of organisational financial accounting, organisational management accounting, and national income accounting, EA Project activities primarily focus on EMA for internal decision-making by business.

OPPT recognises that EMA information includes data on costs, physical flows, labour activities, and other cost drivers, but most of the project activities and documents focus on costs. OPPT encourages organisations to uncover and consider several types of internal "environmental costs" (See EPA's *Introduction to Environmental Accounting as a Business Management Tool* for additional details):

- Conventional costs, such as the costs of equipment, labour, and materials
- Potentially hidden costs, such as regulatory compliance costs and voluntary program costs
- Contingent costs, such as remediation and legal costs
- Image and relationship costs that relate to perceptions of and interactions with customers, investors, other business partners, workers, regulators, and other stakeholders

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The project promotes voluntary adoption of flexible EA/EMA systems as a best-management practice for informing business decision making.

- *Government Regulation.* Not applicable.

- *Research & Concept/Tools Development.* OPPT has developed promoted several conceptual models and tools to help organisations implement EA/EMA. Activities include, for example: 1) creation of a guidance booklet that defines concepts, terms, and stakeholder roles in promoting and using EA/EMA; 2) development of EA/EMA software tools; 3) development of EA/EMA case studies; and 4) research support.

- *Information Dissemination.* The EA Project has a dedicated project website (http://www.epa.gov.opptintr/acctg) with a wide range of downloadable resources including case studies, other reference documents, a software compendium, and a directory of EA/EMA contacts.

- *Technical Assistance.* The EA Project provides direct technical assistance through activities such as: 1) training on EA/EMA concepts to government staff; and 2) EA/EMA train-the-trainer workshops and presentations for the staff of state, local, and non-governmental technical assistance initiatives.

- *Other Incentives.* Not applicable.

Challenges & Successes

As a longstanding program, the EA Project has encountered many opportunities for enhancing its focus and emphasis. Some of these are described briefly below.

- The EA Project's overall impacts have proven difficult to evaluate because measurability was not addressed in the early design stages of the project. This issue is being addressed as described in the "Next Steps" section below.

- Achieving industry-wide behavioural change has proven difficult given the EA Project's limited resources. However, the program has been successful in elevating EA/EMA topics to the national level by leveraging resources with other organisations and associations, producing a wide range of information related to EA, and sponsoring free dissemination of EA/EMA information and resources.

- As the program has evolved, the EA Project increasingly has sought to reach out to operations, as well as accounting and finance staff in industry. Additionally, the program has been successful in using EA/EMA to create internal dialogue between Environment, Health and Safety (EH&S) staff, accounting and finance staff, operational staff, and management staff.

- In many cases, confusing and poorly defined terminology prevents organisations from recognising either existing or planned internal uses and applications for EA/EMA. In addition, information and accounting systems are simply not set up to deal with the kind of information required for EA/EMA. This issue has been addressed to a certain extent by the EA Project through the development of tools, techniques, and software.

- EA/EMA is very difficult to promote as a "stand-alone" concept. The EA Project therefore is working to incorporate EA/EMA techniques into other environmental and/or business initiatives such as environmental supply chain management, environmental management systems, etc.

Next Steps

Based on the challenges, successes, and lessons learned in the early years of the EA Project, OPPT is considering the following enhancements to the program as it looks to the future:

- Integrating project activities with additional voluntary initiatives, including, but not limited to design for environment, environmentally preferable purchasing, etc.

- Focusing on practical application of EA/EMA through strategic alliances with organisations, such as government programs that provide direct assistance to business and industry.

- Establishing metrics to evaluate and enhance the EA Project's activities.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICE OF SOLID WASTE (US EPA OSW)

The Full Cost Accounting (FCA) Project

Government Agency

The United States Environmental Protection Agency's Office of Solid Waste (OSW) is a national agency office with primary responsibilities related to safe management of non-hazardous household, industrial, and mining wastes. OSW promotes and encourages the use of combined methods to manage solid waste, including: source reduction or waste prevention, recycling, composting, waste combustion and landfilling.

Partners & Stakeholders

External stakeholders have played a key role in helping to shape the initiatives of OSW's Full Cost Accounting (FCA) Project. For example, the International City/County Management Association convened roundtables in the initial stages of the program in order to solicit and co-ordinate input from local governments, recycling and solid waste industry associations, and other key stakeholders. This input was used to create OSW's multi-year FCA program agenda.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

In the United States, local governments assume primary financial responsibility for waste management, disposal, and recycling. Most local governments have adopted OSW's Integrated Waste Management Hierarchy, which supports an integrated approach to municipal solid waste management emphasising prevention and recovery of municipal solid waste. Thus, many localities now offer a wide range of integrated waste services, such as curbside collection of garbage, recyclables, yard trimmings, and white goods. The increased complexity of local waste management services has made it more difficult for localities to track and evaluate costs associated with planned or existing services.

OSW's FCA Project was launched in 1995 and was designed to help local governments improve planning, pricing, and performance of cost-effective and environmentally sound waste management options or alternatives. Between 1996 and 1998, the program focused on development of technical assistance manuals, case studies, and information dissemination. Current activities focus primarily on dissemination of free information through OSW's FCA web site and/or government publication services. EMA concepts are promoted as part of the FCA Project activities.

Methodology & Languages

FCA is very similar to Environmental Management Accounting (EMA). One main difference is that FCA focuses primarily on costs, with physical flow information as a driver of costs, rather than focusing on the two types of data equally. Another difference is that EMA is a broadly applicable tool while FCA has been developed for the very specific purpose of assessing the costs of municipal solid waste management alternatives. Otherwise, the principles of FCA and EMA are quite similar.

OSW defines FCA as "a systematic approach for identifying, summing, and reporting the actual costs of solid waste management. It takes into account past and future outlays,

overhead (oversight and support services) costs, and operating costs." FCA does not account for "externalities" (i.e., social or environmental costs) associated with solid waste management.

FCA embodies several key concepts that distinguish it from standard government budget or "cash flow" accounting and make it a more useful management tool for public officials focusing on long term integrated waste management investments and capital expenditures. The following list highlights the five basic principles of FCA as defined by OSW.

↓# *Accounting for costs rather than outlays*. Many government agencies inadvertently use "cash outlays" instead of costs to evaluate the cost-effectiveness of proposed or existing operations. An outlay is an expenditure of cash to acquire or use a resource. A cost is the dollar value of the resource as it is used.

↓# *Accounting for hidden costs*. With FCA, the value of goods and services is reflected as a cost even if no cash outlay is involved. For example, many communities receive public grants to purchase solid waste equipment. This equipment has value even if though the agency may not make any cash outlay for it. FCA seeks to account for such costs in order to ensure that adequate funds are available to replace seemingly "free" resources.

↓# *Accounting for overhead and indirect costs to individual solid waste services*. FCA accounts for all overhead and indirect costs, including those that are shared with other public agencies. Overhead and indirect costs might include legal services, administrative support, data processing, billing, and purchasing.

↓# *Accounting for past and future outlays*. Past and future cash outlays often do not appear on annual budgets in cash accounting systems. Past (or "up front") costs are initial investments necessary to implement services such as the acquisition of vehicles, equipment, or facilities. Future (or back-end) outlays are costs incurred to complete operations such as landfill closure and post closure care and post-employment health and retirement benefits.

↓# *Accounting for costs according to activities or paths*. Integrated solid waste management systems consist of a variety of activities and paths. Activities are the building blocks of the system, which may include waste collection, operation of transfer stations, transport to waste management facilities, waste processing and disposal, and sale of by-products. Paths are the directions that material follows in the course of integrated solid waste management (i.e., the point of generation through processing and ultimate disposition) and include recycling, composting, waste-to-energy, and land disposal. Understanding the costs of each solid waste activity often will be necessary for compiling the costs of the entire system and helps one evaluate whether to provide a service yourself or contract out for it. However, in considering changes that affect how much solid waste ends up being recycled, composted, converted to energy, or landfilled - a focus on the costs of the different paths may be necessary. Understanding the full costs of each path is an essential first step in discussing whether to shift the flows of solid waste one way of the other.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* The program is voluntary and promotes flexible adoption of FCA by local governments.

- *Government Regulation.* None.

- *Research & Concept/Tools Development.* Activities in early years of the program focused on development of FCA concepts in the form of written primers.

- *Information Dissemination.* The FCA project has a dedicated a web site with a wide range of downloadable resources, including case studies, a workbook that contains guidance and spreadsheets for converting existing accounting data to full cost information, an FCA "Resource Guide" that list various other reference documents, and a directory of FCA contacts. Free hard copy reports are also available through a separate EPA hotline.

- *Technical Assistance.* No direct technical assistance beyond that included in the free information and resources is provided as part of this initiative.

- *Other Incentives.* Not Applicable.

Challenges & Successes

Some of the benefits noted by OSW officials researching and promoting FCA at the local level include:

- FCA helps officials identify the actual costs of municipal solid waste (MSW) management. When local governments handle MSW services through general tax funds, the costs of MSW management can get lost among other expenditures. By using FCA, managers know what drives MSW costs and can make more informed decisions about how to manage their services.

- FCA allows communities to see through the peaks and valleys in MSW cash expenditures. Using accounting techniques such as depreciation and amortisation, FCA provides a more accurate picture of the total costs of services, without the distortions that can result from focusing solely on cash flow.

- FCA helps officials more clearly explain MSW costs to citizens. FCA can result in "bottom line" numbers that speak directly to residents. In addition, public officials can use FCA results to respond to specific public concerns.

- FCA fosters more cost-efficient MSW management. FCA allows local governments to take a more businesslike approach to MSW management. It allows decision-makers to consider the balance between the cost of providing a service and its utility. FCA also helps local government evaluate whether an alternative method could provide a service for less money or greater value. Most importantly, FCA can help identify

opportunities for streamlining services, eliminating inefficiencies, and facilitating cost-saving efforts through informed planning and decision-making.

↓# FCA helps communities fine tune MSW programs. As more communities use FCA and report the results, managers can "benchmark" their operations to similar communities or norms. This comparison can suggest options for "re-engineering" current operations.

Next Steps

Two recent events add momentum to help propel implementation of FCA throughout local government operations. First, the Government Finance Officers Association (GFOA) endorsed the application of FCA in local solid waste management activities and recommended it as a best practice to their membership. The second event was issuance of the Government Accounting Standards Board Statement No. 34 - Basic Financial Statements and Management's Discussion and Analysis - for State and Local Governments. As a result of this statement, for the first time, the annual reports of state and local governments will include financial statements using full accrual accounting for all government activities. This is the method used in the FCA approach.

The FCA program's primary emphasis at this point is on dissemination of existing information and resources. Development of new materials and information is not expected in the near term.

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UNITED STATES OFFICE OF THE PRESIDENT & THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) FEDERAL FACILITIES ENFORCEMENT OFFICE (FFEO)

Government Agency

The Office of the President of the United States represents the executive branch of federal government in the US. The United States Environmental Protection Agency's Federal Facilities Enforcement Office (FFEO) has responsibility for ensuring that Federal facilities take actions necessary to prevent, control, and abate environmental pollution. FFEO's functions include policy and guidance development, regional program, enforcement, information support, interagency agreement negotiation support, technical assistance, and capacity building.

Partners & Stakeholders

This EO is enforced by US EPA FFEO. The EO directs FFEO to provide technical and administrative assistance to agencies by convening and chairing a Interagency Environmental Leadership Workgroup consisting of senior-level representatives from all executive agencies and other interested government agencies affected by the order.

Background & Scope of the Policy/Program within which EMA Concepts are Promoted

An executive order (EO) is a standard type of requirement that is issued by decree of the President of the United States. A series of “Greening the Government” EOs have been promulgated since 1993.

EO 13148 was signed in April 2000. It requires federal executive agency facilities to “integrate environmental accountability into agency day-to-day decision-making and long term planning processes, across all agency missions, activities and functions.” To this end the EO lists several specific agency goals related to implementation of environmental management systems, compliance with environmental regulations, pollution prevention, release and use reduction of toxic chemicals, reductions in ozone depleting substances, and environmentally and economically beneficial landscaping.

EO 13148 explicitly requires executive agencies to adopt environmental cost accounting to the maximum extent feasible to foster achievement of the broad goals of the EO.

Methodology & Languages

The EO defines "Environmental Cost Accounting" (ECA) as “the modification of cost attribution systems and financial analysis practices specifically to directly track environmental costs that are traditionally hidden in overhead accounts to the responsible products, processes, facilities or activities.” [1] Thus, ECA as used in this context is very similar to Environmental Management Accounting (EMA), but with a stronger focus on monetary rather than on physical flow information.

The EO also requires agencies to develop pilot programs to apply “life cycle” assessment for determining return on investment of pollution prevention investments. These systems must compare the life cycle costs of treatment and/or disposal of waste and pollutant streams to

[1] See Executive Order 13148, Part 10, April 21, 2000.

the life cycle costs of alternatives that eliminate or reduce toxic chemicals or pollutants at the source. Agencies are required to implement projects that are "life-cycle" cost-effective.

EMA-related Components of the Policy/Program

- *Promotion of Voluntary Adoption, Standards, or Self-Regulation.* Not applicable

- *Government Regulation.* This is a requirement for executive federal agencies.

- *Research & Concept/Tools Development.* The FFEO has developed several conceptual tools to help agencies implement EMA, including a primer entitled "*Federal Facility Pollution prevention Project Analyses: A Primer for Applying Lifecycle and Total Cost Assessment*."

- *Information Dissemination.* FFEO disseminates a wide variety of information, resources, case studies, and demonstration project through its "FedSite" web site located at http://es.epa.gov/oeca/fedfac/cfa.

- *Technical Assistance.* FFEO provides technical assistance and information to federal agencies affected by the EO.

- *Other Incentives.* Not Applicable.

Challenges & Successes

Although EO 13148 was only recently promulgated, program contacts and demonstration projects provided on the FFEO web page (see "Additional Information" below), suggest that billions of dollars have been saved by federal agencies through implementation of life cycle oriented EMA systems at federal facilities.

Next Steps

According to the timeline set forth in the EO, affected agencies are required to prepare a written plan to achieve the requirements of this EO by April 2001.

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