



The IFAC guidance document on Environmental Management Accounting (EMA) Experiences from case studies

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Reasons for Environmental Management Accounting

Current developments

- ▶ Increasing pressure from stakeholders interested in environmental issues
- ▶ Increasing importance of environment-related costs
- ▶ Increasing recognition of problematic accounting practices
- ▶ Growing demand for integrated consideration of financial and physical aspects of environmental management
- ▶ The concepts of sustainable development and corporate social responsibility require a combined consideration of financial, environmental and social aspects.
- ▶ Regulatory bodies, statistical agencies, environmental protection agencies and rating agencies put a strong focus on disclosure of environmental and financial aspects in financial and non-financial reports (e.g. **EU Modernization Directive**).

Conclusion

- ▶ Need for an integrated concept, in order to be able respond to the current developments and make environment-related costs available for external reporting in auditable data quality

Prominent examples of environmental pressure

supply chain pressures, such as large companies requiring their suppliers to comply with the Environmental Management System (EMS) standard of the International Standardization Organization;

disclosure pressures from various stakeholders for companies to publicly report their environmental performance in annual financial accounts and reports or in voluntary corporate environmental performance reports, for example, via the guidelines of the Global Reporting Initiative;

financing pressures via the worldwide growth of socially responsible investment (SRI) funds, investment rating systems such as the Dow Jones Sustainability Index and investment policy disclosure requirements;

regulatory control pressures, for example, the RoHS Directive, a European Union (EU) regulation that restricts the use of certain hazardous substances in electrical and electronic equipment sold in the EU;

environmental tax pressures, for example, various government-imposed environment-related taxes such as carbon taxes, energy use taxes, landfill fees and other emissions fees;

cap and trade pressures, such as the emissions cap and trading aspects of the Kyoto Protocol.

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EU Modernisation Directive

Requests from 2005 onwards:

„To the extent necessary for an understanding of the company's development, performance or position, the analysis shall include both financial and where appropriate, non-financial key performance indicators relevant to the particular business, including information relating to environmental and employee matters.“

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Tradable emission permits

EU Greenhouse Gas Emissions Trading scheme

Decision between CO² reduction or trading of emission permits based on risk management and investment appraisal decisions

In Austria, verification of CO² emissions includes accountants for verification of materials input, warehouse/stock management and quality of information system!

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Reporting standards and requirements

Global Reporting Initiative (GRI) –

ØEN30: Total environmental protection expenditures and investments by type.

EU

ØEuropean System for the Collection of Economic Information on the Environment (SERIEE) - designed to form a series of satellite accounts of the national accounts; details: air/climate, waste water, waste, soil/groundwater, noise/vibration, biodiversity/landscape, others.

Austria (Statistik Austria)

ØAnnual (Leistungs- und Strukturhebung): env. expenditures (excl. depreciation), investments (air/climate, waste water, waste, others), R&D costs.

ØEvery two years (Umweltschutzaufwendungen im produzierenden Bereich): required details in line with IFAC EMA method, investments and expenditures (excl. depreciation).

Germany (Destatis)

ØAnnual: expenditures (incl. depreciation and calc. interests); required details in line with IFAC EMA method.

Stakeholders in general

ØEU Modernization Directive

ØEU Emissions Trading Directive

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Drivers for sustainability reporting and corporate responsibility

International KPMG survey 2005 quotes:

- to have a good brand and reputation
- to be an employer of choice
- to have and maintain a strong market position
- to have the trust of the financial markets and increase shareholder value
- to be innovative in developing new products and services and creating new markets

= purely economic, not an ethical argument!

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Reasons for doing EMA

In companies with existing EMS and CP (Cleaner Production) projects, EMA is used to improve the consistency of information systems to provide consistent and verifiable data quality for internal budgeting, cost calculation, investment appraisal, target setting, benchmarking and external reporting.

For newcomers to environmental management (EM) EMA can be used as a screening tool: how much money do we lose by NOT doing EM and CP?

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The UN DSD EMA Workinggroup

The Expert Working Group on "Improving the Role of Government in the Promotion of Environmental Management Accounting (EMA)" was set up in 1999 by the United Nations Division for Sustainable Development (UN DSD) in cooperation with a number of government agencies and non-governmental experts to promote Environmental Management Accounting (EMA) through publications, pilot projects and by establishing an international forum for discussion on the role of governments in the promotion of EMA.

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Jasch Ch., EMA, Procedures and Principles, United Nations, New York, 2001

The book was prepared for the UN DSD, EMA WG. It was commissioned by the Austrian Ministry for Transport, Innovation and Technology, the Austrian Ministry for Agriculture, Forestry, Environmental Protection and Water Management and the Austrian Chamber of Commerce.

Translations available into German, Spanish, Portuguese, Japanese, Korean, Chinese, Czech, Lithuanian, etc

You can also find the excel tool and case studies under www.ioew.at

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INTERNATIONAL GUIDANCE DOCUMENT
ON
ENVIRONMENTAL
MANAGEMENT
ACCOUNTING
(EMA)

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EMA Definition from UN DSD EMA WG

EMA is broadly defined to be the identification, collection, analysis, and use of two types of information for internal decision-making:

- physical information on the use, flows, and fates of energy, water, and materials (including wastes) *and*
- monetary information on environment-related costs, earnings, and savings.

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System boundaries for mass balances

INPUT		System boundaries		OUTPUT
		Nations		
Materials	⇒	Regions	⇒	Products
Energy	⇒	Corporations	⇒	Waste
Water	⇒	Processes	⇒	Emissions
		Products		

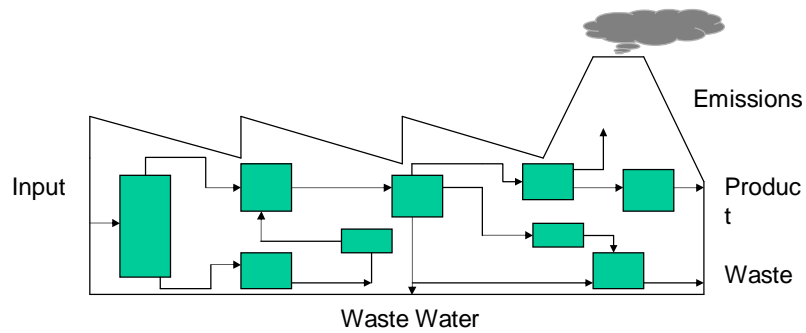
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Physical Mass Balance: Input and Output Types

Materials Inputs	Product Outputs
Raw and Auxiliary Materials	Products (including Packaging)
Packaging Materials	By-products (including Packaging)
Merchandise	Non-Product Outputs (Waste and Emissions)
Operating Materials	Solid Waste
Water	Hazardous Waste
Energy	Wastewater
	Air Emissions

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Process flow charts: Opening of the black box



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Cost categories in the IFAC Document:

- **Materials Costs of Product Outputs**
- **Materials Costs of Non-Product Outputs**
- **Waste and Emission Control Costs**
- **Prevention and other Environmental Management Costs**
- **Research and Development Costs**
- **Less Tangible Costs**

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Waste is a sign of inefficient production

All purchased materials must by physical necessity leave the company either as product or waste and emission.

Waste is a material which has been purchased and paid for but which has not turned into a marketable product.

Waste has been purchased, processed and for disposal is being paid for a 3rd time. Waste comprises all **non-product output of input materials** including water and energy.

Therefore when calculating environmental costs, not only disposal fees are calculated, but in addition the wasted material purchase value and the production costs of waste and emissions.

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Environment related cost categories

1. Materials Costs of Product Outputs : Includes the *purchase costs* of natural resources such as water and other materials that are converted into products, by-products and packaging.

2. Materials Costs of Non-Product Outputs: Includes the *purchase (and sometimes processing) costs* of energy, water and other materials that become Non-Product Output (i.e., Waste and Emissions).

3. Waste and Emission Control Costs : Includes costs for: *handling, treatment and disposal* of waste and emissions; *remediation and compensation* costs related to environmental damage; and any control-related *regulatory compliance* costs.

4. Prevention and Other Environmental Management Costs : Includes the costs of *preventive environmental management activities* such as cleaner production projects. Also includes costs for *other environmental management activities* such as environmental planning and systems, environmental measurement, environmental communication and any other relevant activities.

5. Research and Development Costs: Includes the costs for *Research and Development* projects related to environmental issues.

6. Less Tangible Costs :Includes *both internal and external* costs related to less tangible issues. Examples include *liability, future regulations, productivity, company image,*¹⁷ *stakeholder relations and externalities*

What are environmentally relevant plants?

Type 1 - End of Pipe (EoP)

100 % for „environmental protection“

Plants, machines, buildings, etc. exclusively purchased for purposes of environmental protection and would be not necessary for production, e.g.:

- Ø waste water purification
- Ø desulphurization and denitrogenization
- Ø waste separation and disposal
- Ø incineration of waste sludge
- Ø

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What are environmentally relevant plants?

Type 2 - Integrated environmental prevention

Proportion of plants, machines, buildings etc. that were more complex and more expensive for reasons of environmental protection, than they would have been only for production, e.g.:

- Ø enamelling lines with afterburning
- Ø bottle washing plant with separate discharge of broken glass, paper and metal caps
- Ø totally capsuled plants, closed circuits
- Ø fluid catalytic cracking (5%)

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What are environmentally relevant plants?

Type 2 - Product oriented integrated environmental prevention

Investments aiming at reducing the environmental impact of products are a specific form of integrated prevention, e.g.:

- Ø desulphurization of gasoline and kerosene
- Ø catalytic upgrading of gasoline components (e.g. Auto-Oil 2 project)
- Ø production of hydrogen as a basis for desulphurization (100%)

The portion results from the percentage of environmental versus production or market oriented considerations.

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Percent distribution of environmental costs for 2000

Environmental media ¹⁾	Air and climate	Waste water	Waste	Soil and groundwater	Other	Total
Environmental costs categories						
1. Waste and emission treatment						
1.1. Depreciation for related equipment	0.2%	3.2%	0.5%			3.9%
1.2. Maintenance, operating materials and services		5.0%		0.1%		5.1%
1.3. Related personnel	0.8%	1.6%	0.7%			3.1%
1.4. Fees, taxes, charges	0.7%	1.3%	3.6%			5.6%
1.5. Fines and Penalties						
1.6. Insurance for environmental liabilities						
1.7. Provisions for clean up costs, remediation						
2. Prevention and environmental management						
2.1. External services for environmental management					0.1%	0.1%
2.2. Personnel for general environmental management activities	0.1%				0.9%	1.0%
2.3. Research and Development		1.5%				1.5%
2.4. Extra expenditure for cleaner technologies						
2.5. Other environmental management costs						
3. Material Purchase value of non product output						
3.1. Raw materials			23.0%			23.0%
3.2. Packaging			0.1%			0.1%
3.3. Auxiliary materials			2.1%			2.1%
3.4. Operating materials	0.1%	32.0%	0.5%			32.6%
3.5. Energy	22.6%					22.6%
3.6. Water		0.1%				0.1%
4. Processing costs of non product output		0.2%	0.9%			1.1%
Total environmental costs	24.8%	44.0%	31.4%	0.1%	1.0%	101.0%
5. Environmental earnings						
5.1. Subsidies, Awards		-0.8%				-0.8%
5.2. Other earnings		-0.2%	-0.9%			-1.1%
Total environmental earnings		-1.0%	-0.9%			-1.9%
Saldo costs/earnings	24.8%	43.0%	30.5%	0.1%	1.0%	100.0%

The Excel Tool

The Excel Tool consists of four working sheets:

- Ø Input-output (I-O) balance
- Ø Detail
- Ø Summary
- Ø Summary % (percent distribution of environmental costs)

For the cost assessment, you only work in ‚Detail‘. All cost categories (in lines) and environmental media (in columns) are already provided. The file ‚Detail‘ automatically aggregates to ‚Total‘ and ‚Percent Distribution‘. The Excel file can easily be used for the recording of the costs of each business year. It has auxiliary columns such as „source of information“, etc. It is advisable to use this Excel tool for the EMA cost assessment – do not try to immediately change the whole accounting system of a company.

EMA templates – „Detail“

ENVIRONMENTAL DOMAIN	Air and Climate	Water + Waste	Water	Waste	Soil, Surface, and Groundwater	Noise, Vibration and Odor and Fire	Biodiversity and Landscape	General Environments, MS	Product oriented prevention measures	Total	Data Source	Classification	Investment volume (only new investments or reporting year)	Mandatory or voluntary
ENVIRONMENT-RELATED COST CATEGORIES														

According to environmental cost categories

According to IFAC environmental domains

EoP / integrated prevention

Investment (EUR)
- total amount
- year of commissioning

Mandatory

Comparison of Case Studies in Austria and Costa Rica

Austria	Min	Average	Max
1. Waste and Emission treatment	13%	29%	52%
2. Prevention and environmental management	1%	6%	14%
3. Material purchase value of NPO	39%	64%	85%
4. Processing costs of NPO	0%	5%	17%
5. Environmental revenue	0%	-3%	-9%

Costa Rica	Min	Average	Max
1. Waste and Emission treatment	6%	18%	38%
2. Prevention and environmental management	1%	9%	17%
3. Material purchase value of NPO	46%	72%	92%
4. Processing costs of NPO	0%	5%	20%
5. Environmental revenue	0%	-4%	-13%

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Case Study Austrian Verbundgesellschaft

The Verbund group is Austria's largest electric utility, generating about 50% of the electricity consumed in the country. In 2001, Verbund participated in an EMA project with three different sites: a small hydro power station, a fossil fuel power plant and a substation of the transmission grid. Within the company's Enterprise Resource Planning accounting system SAP system, environment-related costs can be found in two different places:

- (1) data records associated with a specific company project or
- (2) cost centre data records.

The company had to determine which costs, taken from both data records, were environment related, per the company's definition. For costs with dual characteristics, for example, those considered to be both environment and efficiency related, an appropriate percentage of the cost was taken to be environment related.

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Case Study Austrian Verbundgesellschaft

It became evident that it was not possible to have the SAP software automatically extract and report the needed environment-related cost data. So, a formal data collection procedure was written for environmental managers from the about 150 sites of the three largest subsidiary companies. This procedure helps the managers to extract SAP data that must be reported to the corporate parent company each year. The extracted data are reported by cost category and by environmental domain. Environment-related earnings are also reported. Each subsidiary reports not only costs for the previous year, but also budgeted costs for the upcoming year.

In 2003, all of Verbund's power generation companies and its grid operating company adopted this EMA process developed during the pilot project. The data is used for internal management decision making and external reporting at both the corporate and site level, and allows performance comparisons between different sites.

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Case Study Brewery Murau

Murauer's EMS is supplemented by an extensive system of environmental performance indicators. The company uses physical and monetary accounting data to calculate these EPIs and to calculate the annual monetary savings achieved since the implementation of the EMS.

Absolute EPIs calculated include the total amounts of all significant Materials Inputs (for example, hectoliters of fresh water, kilograms of heating oil). Relative EPIs are also created by calculating the ratio of each Materials Input to hectoliters of Product Output, that is, beer. Similar absolute and relative EPIs are calculated for the brewery's Non-Product Outputs (for example, glass, paper, wastewater, carbon dioxide and other air emissions).

The following EPIs illustrate the success of some of Murauer's waste minimization efforts during a five-year time period:

- ◆ reduction in fresh water use per unit product (1995-2000) – 19%;
- ◆ reduction in fuel oil use per unit product (1995-2000) – 30%;
- ◆ reduction in wastewater generation rate per unit product (1995-2000) – 32%.

Monetary savings are calculated for each Materials Input by applying current year purchase prices to the physical reductions since 1995. These efforts **saved** the SME (about 110 employees) firm **approximately US \$186,000** in the year 2000.

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General observations on methodology

- It is possible to do the assessment of last years expenditure in one to two days
- The method is especially useful for companies with a certain level of environmental awareness in the production sector
- General management has a very limited idea of the environmental costs produced by the company. The tool is useful to create awareness amongst general management of the importance to have quantified information for decision making processes regarding environmental and material flow management

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General observations on methodology

- Method is very useful for ISO 14001 certified companies in order to connect environmental management issues at operational level with the financial system
- Method helps SME to identify operational potential facts to reduce environmental costs
- Method is useful for increased consistency between financial data and material flow information
- The interest of many companies often initially comes from environmental reporting and EMS but optimization actually focuses on traditional cost accounting, scrap percentages, material flow recording and material and energy efficiency improvements.

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General Observations on Methodology

- Applying the methodology also works in a less developed country and actually has much more direct results on cleaner production and environmental management as some of these companies have not already spent 10-30 years on material efficiency and cost savings.
- In Costa Rica, there are hardly costs related to legal compliance and municipal costs (disposal fees, waste water treatment fees), so the main argument for environmental management is cost savings and the potential therefore can easily be shown by the one-day workshop.
- In Austrian companies the motivation and results stay on the level of improving the accounting system, cost recording and the (environmental) management system, partly using the results for external disclosure, but there is no such direct effect on cleaner production as in companies who are just starting their environmental management.

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Should we report high or low environm. costs?

From a **financial point of view**, lower costs are always better!

From an **environmental point of view**, not the costs, but the environmental impact is important.

It is therefore preferable to invest in technologies and management systems, that prevent the creation of waste and emissions at source. But the „environmental share“ of these integrated measures is difficult to assess.

From a **communications point of view**, not the total of environmental costs, but the distribution between and shift from EoP to integrated and material flow related measures is desirable.

Financial manager: "Since the take over we do a lot for environmental protection but at the moment we record and communicate at the maximum 30% of our efforts. Within this project we aim to increase this percentage to at least 70%."

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What EMA is good for ...

Bring environmental impacts down is at least as important as to bring costs down.

EMA makes environment-related costs, investments and benefits visible.

Provides basic data in order to formulate targets and programs for integrated environmental prevention. Support line managers and project managers in decision making with an additional point of view – the environmental impact and benefits.

EMA helps to rise environmental awareness in the “normal” business.

Provides data and information for the annual report (e.g. non-financial information in the Director's report).

EMA tells the environmental story of costs.

Gives the possibility to communicate the progressive shift:

emission control à integrated prevention plants à integrated prevention products

provides arguments why cleaner production pays

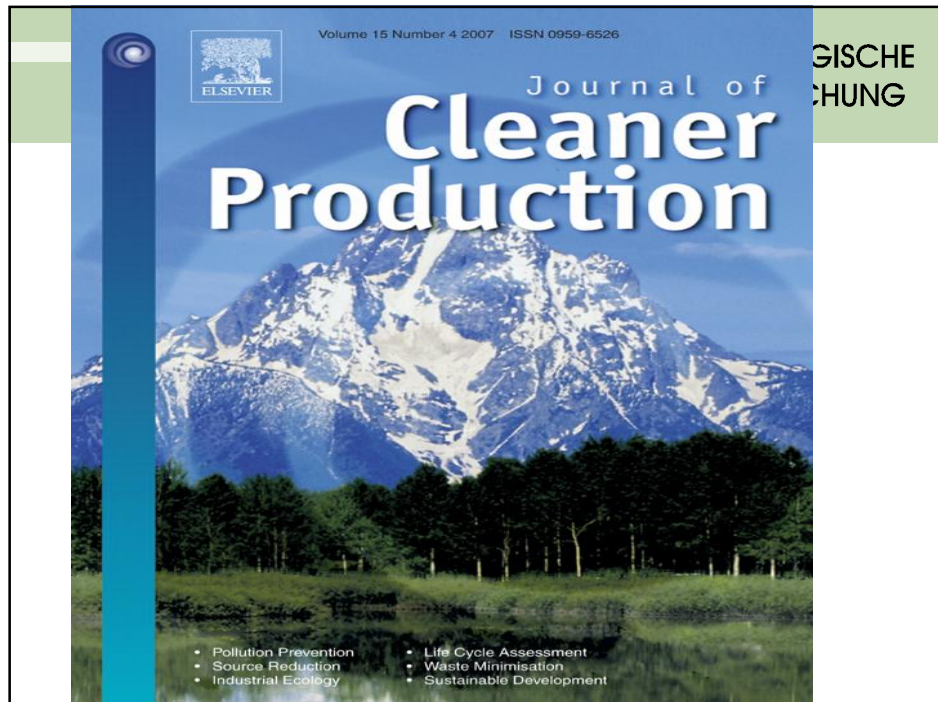
Provides arguments why cleaner production pays

EMA provides the information needed to convince the financial department to invest in integrated prevention technologies and human resources for environmental management

May help to identify environmental risks and to adopt countermeasures where insurance is not possible and/or save insurance costs with the right measures.

EMA is a tool for proactive risk management.

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