

**Developing an Environmental Accounting System
(2000 Report)**

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**Study Group for Developing a System
for Environmental Accounting**

Environment Agency

Japan

Contents

Introduction	1
I. Basic Attitude of Compiling this Guideline	5
II. Guideline for Introducing an Environmental Accounting system (2000 Version)	6
1. Significance of Environmental Accounting and Recommendation of Installation	6
2. Basic Policies for Measuring Environmental Cost	11
2-1 Definition of environmental cost	11
2-2 Concept of Classification of Environmental Cost	15
2-3 Basic Concept for Measuring Environmental Cost	16
2-4 Concrete Categories of Environmental Cost	18
3. Basic Concept of Effects Relating to Environmental Measures	25
3-1 Effects Relating to Environmental Measures Measured by an Environmental Accounting System	25
3-2 Measuring Environmental Effects	25
3-3 How to Measure Economical Effects Associated with Environmental Measures	27
4. From Measuring to Announcing Environmental Accounting Information	30
Appendix I For Correct Understanding of Environmental Accounting Information ...	36
Appendix II Internal Aggregation Formats for Environmental Costs	38

Introduction

Environmental problems that have recently become more serious on a global scale are providing us a warning that this society as we know it cannot last forever. Japan, as one of the advanced countries that perform economical activities on a large scale while having a significant influence on the global environment, must take the initiative in developing a sustainable economic society with low environmental impacts.

Enterprises, which are important subjects of economical activities, play major roles in economical activities. Therefore, clear incorporation of the objective called environmental conservation in each business activity becomes a powerful motive force for the structural transformation of this economic society. It is important for people, regions, and administrations involved in enterprises to correctly evaluate such attempts by the enterprises and be able to prepare the system that can support the attempts for the entire society.

Environmental accounting is one of the frameworks for quantitatively evaluating the attempts for environmental conservation by enterprises. For enterprises, environmental accounting is a management analysis method designed to increase the efficiency and effects of tackling environmental conservation within the enterprises. For the nation, environmental accounting is an effective information method for understanding how enterprises approach environmental conservation through a standardized framework.

However, there were problems in environmental accounting due to the absence of a common framework. To overcome the problems a guideline for developing a common framework became necessary for both the provider and receiver of the information relating to environmental accounting. A specialized neutral organization was considered to be appropriate for compiling the guideline since environmental conservation has an important social significance.

Considering that establishment and circulation of an environmental accounting system in many enterprises in Japan will be significant in the environmental policies, the Japan Environmental Agency has promoted strategies for supporting the movement. As a part of the promotion, the Japan Environment Agency announced in March 1999 "Guideline for Measuring and Announcing Environmental Cost (Interim Summary)." By announcing this guideline proposal, the Agency expected promotion of installation of environmental accounting in enterprises. A wide range of opinions were given from concerned parties regarding this proposal and the Agency decided to review and revise the guideline proposal within 1999 by reflecting these opinions.

Triggered by the announcement of the guideline proposal, many Japanese enterprises have started to install environmental accounting. The trend covered all the business activities without being restricted to any specific business types and categories, and also the frame of private enterprises. Currently, the number of enterprises introducing environmental accounting has reached several tens and the year of 1999 can be called the "first year of environmental accounting" in Japan.

In June 1999, the Japan Environment Agency established a "Study Group on Practical Matters about Introducing Environmental Accounting" as the opportunities for exchanging information with practicing members such as enterprises in order to directly obtain opinions on the guideline proposal that was announced from those who are actually practicing environmental accounting. Up to now, eight meetings have been held with the involvement of more than 50 member enterprises. The Agency also established a joint study group with the specialist group of the Japanese Institute of Certified Public Accountants. So far, seven meetings have been held for exchange of opinions. In Japan, as examples of continuous practical research activities regarding environmental accounting, there are the Environmental Accounting Study Group by the Japan Management Association, the Environmental Accounting Committee by the Industrial Environment Management Association, and research by the Post and Telecommunication Research Center.

Regarding the movements overseas, in North America, the U.S. Environmental Protection Agency and the Canadian Institute of Chartered Accountants are currently studying the ways of measuring and announcing environmental cost and financial information relating to the environment. In Europe, the Ministry of Environment in Germany has produced "Environment Cost Calculation Handbook." This subject was also approached internationally through the UN's sustainable development committee and United Nations Trade Development Conference. In August 1999, the first international environmental accounting conference was held in Washington. Fifteen countries participated in the conference and as one of the advanced cases, the Japan Environment Agency reported the situation of tackling environmental accounting by the Japanese Government based on the guideline proposal. In October of the same year, the Environment Agency and the United Nations University Advanced Research Center jointly held an International Symposium in Tokyo and exchanged opinions by inviting authorities from Europe and America.

Through the local and overseas trends in environmental accounting as these, the "Study Group for Developing a System for Environmental Accounting" was established in the Japan Environment in November 1999. This Study Group was established by developing the "Study Group for Measuring Environmental Cost Accounting", which compiled the guideline proposal previously. The Study Group consists of the members listed below. Five meetings were held since the Group was established and rigorous discussions were held based on the setting of the guideline for introduction of an environmental accounting system as the main subject. This report was prepared to announce the results.

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This report is named as "Year 2000 Report". Considering the current situation where research of environmental accounting and installation conditions are progressing steadily, we considered necessary the future reinforcement of the contents of the report as required as the report provides appropriate and effective indications to the concerned parties. We also believe that implementation of environmental accounting by a wider range of enterprises while introducing their own ideas by using the concept indicated by the guideline described in II as the reference supports development of the environmental accounting system itself. At the same time, it is important for the information organized through environmental accounting to be announced for development of the society that is oriented to environmental conservation. Thus, continuous support is provided to enterprises for tackling their voluntary environmental conservation, including appropriate follow-up of the guideline and promotion of the spread of environmental accounting. Another major subject for the future is to ensure objectiveness and transparency of environmental information that is announced through environmental accounting.

Without being restricting by the conventional financial accounting frameworks of enterprises, yet while respecting them, this report suggests a new framework by combining information on monetary units and information in physical quantity units as later described in Section 1 of II, as the entire image of the environmental accounting system. However, some items have not yet been thoroughly organized. Among the contents included in II, the details of measuring the environmental cost described in Section 2 has almost been decided by reflecting the opinions that have been given from the concerned parties. For the effects described in Section 3, since the concept has never been clarified before and no opinions have been collected in a wide range, the concrete measuring technique is still in a trial stage. Therefore, further improvements are necessary for the entire guideline of implementation of the environmental accounting

system by collecting opinions from concerned parties over a wide range in various occasions. Considering the development stage of environmental accounting through practical activities by enterprises, the concept of the concrete relationship with environmental management such as financial accounting and enterprises must be organized and deepened.

The "Guideline for Introduction of an Environmental Accounting System", which is the main part of this report, is the world's first attempt at the practical guideline for introducing environmental accounting. The Japan Environment Agency will continuously produce the contents that can be effective worldwide through further improvements and at the same time actively provide information to and exchange opinions with other countries. Examining overseas development of enterprises, it is assumed that the contents of environmental measures and the ways of emerging the effects vary reflecting the differences of the environmental laws and regulations of the country. To establish an environmental accounting system that can be effective in such cases, collection of appropriate information on overseas laws and regulations is also included as the future subjects.

I Basic Attitude in compiling this Guideline

The main points of this report are to integrate standard concepts regarding environmental accounting in Japan and to develop environmental accounting as one of the social systems that enable people to correctly understand, evaluate, and support the tackling of environmental conservation by enterprises.

The "Guideline for Introducing an Environmental Accounting System", which is the main body of the report, suggests the basic guideline regarding environmental accounting. For the basic section of environmental accounting, the guideline emphasizes the coherence of the concept that indicates the policies that can be commonly applied. For the actual operation of the basic guideline in various business types and categories, the guideline maintains the basic attitude of interim summary considering the need for flexibility. As the extension of this attitude, the Japan Environment Agency considers important to actively link with practical research that will be carried out in various areas in the future, for the operation guideline regarding environmental accounting implemented by fully utilizing the features of the business types and categories. The Japan Environment Agency intends to proceed with this task based on this policy.

The concept used in environmental accounting must be consistent regardless of whether the information is used within the enterprise only or is disclosed externally. It is expected that the concept that is clarified by this guideline is the basic concept for the basis of the information. More concretely, it is expected that the concept will be used as the guideline for the method of arranging the summarizing information or actual classification for internal summary of information by environmental accounting and at the same time as the guideline for how to announce the information appropriately considering the receiving side of the information at disclosure of the information.

This report is intended to enable comparison of information by environmental accounting as much as possible since the report summarizes the coherent concept regarding environmental accounting. Currently, only the framework of environmental accounting is incomplete and some limitation cannot be avoided due to the characteristics of the guideline that respect the independence of enterprises and diversity of individual business categories. However, in the future, we hope to develop a system that enables comparison of basic sections not only sequentially but also among enterprises.

Accumulation of practical activities by enterprises is important for the development of an environmental accounting system. This report gives consideration to enable enterprises to achieve smooth installation of business practices since more time is required to establish the actual technique of environmental accounting. Based on these intentions, we include measures in stages and expect environmental accounting to be spread widely regardless of the sizes and categories of enterprises.

II. Guideline for Introducing an Environmental Accounting System (2000 Version)

1. Significance of Environmental Accounting and Recommendation of Installation

To build a sustainable economic society with low environmental impacts, the main activity groups such as nation, enterprises, and administration must implement the subject actively and voluntarily. Particularly, active tackling by enterprises is expected since they play an extremely influential part in economic activities.

(1) Significance of environmental accounting

The "environmental accounting system" that is targeted in this report indicates the following mechanism: "Mechanism that enable enterprises to measure, analyze, and announce the cost for environmental conservation in business activities and the effects quantitatively (monetary units or physical quantity units) as much as possible - effects that were achieved by the activities - for promoting the tackling of environmental conservation efficiently and effectively while maintaining the friendly relationship with the society in order for sustainable development)."

Some effects corresponding to the "environmental conservation" associated with the environmental measures by enterprises may be difficult to measure quantitatively. However, effects targeted by environmental accounting are classified into the following major categories.

- (1) "Environmental conservation effect" that controls or avoids the environmental impacts caused by business activities
- (2) "Economical effect due to environmental measures" that contributes to business revenues

The effect (1) is the social effect intended by the environmental measure itself and (2) can be the internal effect that is generated associated with the effect (1).

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In addition to the "environmental cost" that is presented as the major element in environmental accounting in the interim summary, this guideline enables correlation of each item with "environmental effects" as much as possible and includes the elements of the "economical effects associated with environmental measures" in an appropriate form. The aim of this guideline is to develop a system that can display environmental costs and associated effects in a well-balanced manner as a whole.

In other words, the environmental accounting system can be understood as a mechanism that systematically organizes environmental conservation effect data, which is a part of a company's environmental performance index, in addition to the environmental cost, where company's environmental measures are related to its financial performance, and economical effects (cost saving and business revenue, etc.) associated with the environmental measures.

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This guideline recommends companies to actively announce the results that are achieved by installing the environmental accounting system. When an environmental report is announced in terms of comprehensiveness of environmental information, it is preferable to announce the results as a part of the report. In this case, the contents relating to the environmental performance that is included in the environmental report must be appropriately linked.

While the internal use of environmental accounting is assumed, the system must be able to correctly measure, analyze, and announce how companies actually implement environmental conservation since the Japan Environment Agency opens a path for announcement by the environmental accounting support system (*) that will be started from year 2000. The aim of this report is to establish the environmental accounting system as an integrated systematic mechanism in the future.

* *Environmental accounting support system that is scheduled to be implemented by the Japan Environment Agency*

The Japan Environment Agency requests companies nationwide to implement environmental accounting by using the implementation support software provided through the Internet and to forward the results. The Environment Agency accumulates and summarizes the environmental accounting information and discloses the information to the public.

(2) Recommendation of installation of the environmental accounting system

Functions expected from environmental accounting are classified into "internal functions" and "external functions" as described below.

1) Internal functions

As an internal management information system of a company, environmental accounting enables management of environmental costs that are increasing each year, and analysis of effects associates with costs of environmental measures, and promotes efficient and effective environment investments through appropriate management judgement.

2) External functions

As a system that announces quantitatively a status of tackling environmental conservation by a company, the system influences decision-making of the concerned parties.

Since the information can be used as the element for environmental ranking of companies and as revenue related information, merits such as stock stabilization and smooth fund procurement can be expected.

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In terms of a company, the use of the environmental accounting system as an administration and management tool can be assumed by the administrators and related departments and demonstration as internal functions is expected. When proceeding with announcement of environmental accounting information, a company must be aware of communication with the society and for external users such as consumers, investors, and local residents, the external functions are also important. To support companies that actively promote environmental management across the entire society, the two types of functions must be demonstrated in a well-balanced manner.

The database of environmental accounting that is developed by a company is assumed to be common regardless of whether it is used internally or externally. For the internal use, items important for the company are selected and used as required. For distribution of information externally, coherence and commonality are required for the information through utilization of the guideline for providing accurate information to users.

The background and necessity for companies to implement installation of an environmental accounting system are summarized below.

Firstly, the necessary and essential elements for healthy business administration are measurement of environmental costs and effects of environmental measures and appropriate management of the costs and effects.

Companies must implement aggregation and analysis by correctly measuring the investment amount and expense amount (environmental cost) regarding their own environmental conservation and know the investment effects and effects against the cost. These factors are extremely important for companies to improve the implementation efficiency and make rational decisions.

Accurate measurement of their own environmental costs and effects of environmental measures is useful

and necessary for development and operation of an accurate environmental management system. That is, environmental accounting can be used as one of the indexes for evaluating the effects of environmental measures by measuring and managing their own environmental performance.

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For healthy business administration, the necessary and essential elements are to measure the effect against the cost such as how much effect was achieved for how much cost. In particular, for companies to produce products of higher performance with less energy, resources, and wastes, that is to improve the environmental efficiency, it is extremely important to measure and manage environmental costs in addition to management of the physical quantities.

By analyzing the environmental conservation costs and effects of environmental measures that are measured through this guideline, the information can be used as an internal management tool (measuring the cost reduction by tackling environmental conservation such as conservation of energy and resources and reduction of wastes) relating to an environmental management system.

Secondly, announcement of environmental conservation costs by environmental accounting is becoming one of the measures for evaluating the company's attitude for tackling environmental management.

This days, announcement of various information items relating to tackling of environmental conservation by companies is requested from each area through environmental reports and the contents of the information and announcement status are becoming the measures for evaluating the companies. As one of the important information items that are announced by companies, environmental cost by environmental accounting is desired.

Through continuous announcement of the contents of environmental costs and its proportion in business activities, receivers of information can be informed of how companies approach environmental conservation and their actual handling. Many companies have already prepared and announced environmental reports. In these circumstances, the number of companies that announce their environmental costs using environmental accounting is increasing and many companies are recognizing its necessity.

An implementation image of environmental accounting suitable for each company is developed basically through many trials and improvements by the company using this guideline. Therefore, for installation of an environmental accounting system, a more realistic approach is to proceed in a step by step fashion rather than trying to achieve a complete system all at once. The procedure is to initially recognize and measure the environmental impacts that resulted in business activities and measure the environmental conservation while measuring environmental effects and economic effects associated with environmental measures, and announce the effects after organizing the information to some extent. Partial information (site units, division units, management item units, etc.) by expanding the range of items to be measured or aggregation or the announcement range seems to be effective if the utilization purposes are clear.

2. Basic Policies for Measuring Environmental Cost

2-1 Definition of Environmental Cost

In this guideline, "environmental cost" refers to the "investment amount and expense amount for environmental conservation" that are defined later. Briefly, the cost can be expressed as the cost for minimizing the environmental impacts caused by business activities of companies and the associated cost.

In principle, decision as to whether cost is applicable to environmental cost is made based on the purpose of the expenditure and is supplemented by the effect associated with environmental conservation.

We intend to provide explanations as detailed as possible at this stage in this guideline, however, a summary of some detailed concepts and actual measuring techniques have not yet been established. In such cases, general concept of financial accounting can be applied.

(1) Investment amount and expense amount

The "investment amount" as environmental cost is referred to as an expenditure for environmental conservation, whose effects continue for several terms, and which is spent during the period. The investment amount is referred to as the current acquisition value of the depreciable property* on financial accounting. This is to obtain information regarding input of a fund to large environmental measures where effects of the environmental measures cover a long period of time.

The "expense amount" as the environmental cost is incurred by the sending of the finance and services acquired by the expenditure for environmental conservation. This expense amount includes a personnel cost, a material cost, depreciation, transferred allowance, etc. This information is used to obtain the information on the cost incurred during the current term, corresponding to the effects associated with the environmental measures of the current term.

* *Depreciable property*

In general, property that depreciates partially in progress of time or use and is calculated to the cost gradually through the depreciation procedure (for instance, fixed properties such as facilities and machines)

The aim of this guideline is to measure both the current "investment amount" and "expense amount" in the sense described above, considering the importance of understanding the effects associated with environmental measures. However, a procedure in stages can be considered to achieve the objective, assuming the practical procedure for establishing a concrete image of environmental accounting of a company. For instance, facility investment depreciation may be excluded from measurement since depreciation to be included in the environmental cost for various facilities cannot be calculated easily at this stage. For a company that does not invest frequently, the environmental cost in the immediate future can be measured by the expense amount only. We summarize some notes below, considering the current conditions of tackling environmental accounting by the companies.

- 1) Both the investment amount and expense amount that are defined here as the environmental cost include the depreciation cost and cannot be simply added together.
- 2) In this guideline, the environmental cost is classified into six categories according to the business activities as described in Section 2-2. The investment amount and expense amount can be measured for each category.
- 3) To correlate with the investment amount for environmental conservation, the investment amount of the term including the investment amount for the purposes other than environmental conservation of the term should be indicated separately. The investment amounts of the past several years are important information since they are related to the effects associated with the environmental measures. When announcing the information, report the investment amount of each term and also the outline if possible, avoiding simply reporting of the total amount.
- 4) Separate from the concept applied in this guideline, environmental cost can be managed in terms of cash flow. In this concept, environmental cost can be classified into the cost of an investment nature and a cost with a current-account nature as the cost that can be aggregated. When the cash flow aspect is focussed in terms of cost management, the concept becomes different from this guideline such as consideration of depreciation cost is not required. In the future, the discussions of environmental accounting will be deepened, the structure will become more sophisticated, and the concept will be more organized.
- 5) Shares, shares of related companies, and the amount invested as environmental business investments are not included in the investment amount as the environmental cost and the amounts and outlines may be indicated separately since they are not depreciable properties.

(2) Research and development

Company activities regarding research and development for environmental conservation, which is a typical advance investment, are important information for judging the attitude of the company to approach environmental administration.

As described in Section 2-2, in this guideline, the environmental cost in research and development activities is referred to as a research and development cost, which includes an investment amount and an expense amount.

This guideline uses the concept of financial accounting and handles the expenditure associated with research and development activities as the expense amount in the research and development cost. The acquisition value of the depreciable property to be used for research and development dedicated to environmental conservation purposes is handled as the investment amount.

For announcement of a research and development cost, the total amount of the research and development cost including the cost other than research and development purposes should be indicated separately. This is to check the correspondence between the research and development cost and total cost for the expense amount as the research and development cost.

(3) Social costs

The social costs are borne by the society as external economic loss, as opposed to the costs normally borne by companies. They include health damages of third parties and damages on agricultural products and the fishery industry caused by environmental contaminants discharged as a result of economic activities by companies, etc.

Among the social costs, the cost that has already been included in the business cost as a result of active tackling of environmental conservation by companies is naturally included in the environmental cost defined in this guideline. However, the social costs that are still borne by third parties are not included for the time being. Since development of rigorous tackling on environmental conservation by company's results in reduction of social costs, such tackling should be encouraged. However, it is necessary to examine how social costs are to be associated with private expenses. Such points are considered as future subjects.

(4) Concept of environmental conservation

In this guideline, "environmental conservation" is defined as follows: "Tackling for prevention or control of the occurrence of the environmental impacts, that is, the influence applied to the environment on a considerably wide range, which is caused by business activities and other human activities and is considered to be harmful (referred to as "environmental impacts") for maintaining the favorable environmental condition, removal of the influence, and recovery from the damages that occurred". Basically, environmental conservation includes the following activities:

- 1) Conservation of the environment from the conditions that cause adverse effects on human health and the living environment through air pollution, water pollution, soil contamination, noise, vibration, ground subsidence, and offensive odors that are generated by business activities by companies, etc. (Pollution prevention)
- 2) Conservation of the environment from the conditions that cause adverse effects on the global environment overall or over a wide range through global warming, progressing ozone layer depletion, marine pollution, and biodiversity that are generated by business activities by companies, etc. (global environmental conservation)
- 3) Resources of business activities such as companies (including water). Conservation of the environment by reduction of the use of chemical materials that may pollute the environment, control of waste production, reuse of products, promotion of recycling at various levels, and other appropriate waste processing (resource circulation)
- 4) Other environmental conservation implemented by companies (other environmental conservation activities)

It is difficult to draw a line between the area of environmental conservation and the fields of safety and sanitation. In this guideline, the fields are excluded in principle if they can be measured as separate areas and if they are included, some notes should be inserted.

2-2 Concept of Classification of Environmental Costs

In this guideline, business activities are classified into four areas based on the environmental impacts; they are "production and service activity", "management activity", "research and development activity", and "social activity". Environmental costs are classified into major categories corresponding to these business activity areas.

The environmental costs are classified into the following five categories according to the expenditure purposes.

- (1) Environmental cost for controlling the environmental impacts that are caused within a business area by production and service activities (Abbreviated as business area cost)**
- (2) Environmental cost for controlling environmental impacts that are caused in the upper stream or lower stream as a result of production and service activities (Abbreviated as Upper/lower stream cost)**
- (3) Environmental cost in management activities (Abbreviated as management activity cost)**
- (4) Environmental cost in research and development activities (Abbreviated research and development cost)**
- (5) Environmental cost in social activities (Abbreviated as social activity cost)**

Another category is added as a result of the cause unrelated to these business activity areas.

- (6) Environmental costs corresponding to environmental damages (Abbreviated as environmental damage costs)**

This guideline recommends classification of environmental costs into these six categories. In relation to the environmental conservation fields, the category (1) can be further classified into three subcategories of (1) Pollution prevention cost, (2) Global environmental cost, and (3) Resource circulation cost.

2-3 Basic Concept for Measuring Environmental Cost

(1) Scope of aggregation

Aggregation of environmental costs should be comprehensive aggregation throughout the entire company or the entire group that is the target of consolidated settlement of accounts, however, initially the costs can be aggregated in smaller units such as site units, including factories or subsidiaries.

For the scope of consolidation in a consolidated financial statement, practically, a real management standard is applied. However, the importance in terms of environment does not necessarily coincide with the importance in a consolidated financial statement and sometimes it may not be appropriate to match the scope of an environmental report with a consolidated financial statement. Consequently, the scope of consolidated settlement accounting and the scope of environmental reporting do not always coincide. Therefore, for aggregation of environmental costs, it is necessary to set a target scope based on the importance in terms of environment, while giving consideration to the scope of consolidated settlement of accounts.

→ It is desirable to clearly indicate the scope and also to indicate whether the scope coincides with the consolidated financial statement.

There are many items that are yet to be resolved regarding the effects associated with environmental costs and environmental measures between companies within a group, such as compensation by internal transactions. In this guideline, these items will be examined as the future subjects through case studies to be accumulated in the future.

(2) Period

If possible, the time period for announcement of environmental cost should coincide with the time period of the environmental report or financial report.

(3) Practical method of measuring environmental costs

In principle, the purpose of expenditure is used to determine individual costs are applied to "environmental costs" and effects are used as supplementary information as required. The ground rule is to strictly restrict measurement to environmental costs only for aggregation.

Initially, when costs for environmental conservation can be directly measured, aggregate the costs. When this method is difficult, that is, when measuring environmental costs by separating them from "composite costs" that are combined with costs for purposes other than environmental conservation or normal costs, examine the costs in the order described below. The method actually used for aggregation and the reason should be indicated.

- 1) Aggregation of balances
→ Aggregate the balances produced by deducting the costs for other purposes or normal costs.
- 2) Apportionment aggregation
→ Apportion composite costs based on the reasonable concept according to the expenditure purposes and aggregate the related portions.
- 3) Aggregation by a simple method
→ Predetermine the portion ratio such as 25%, 50%, or 75%, apply the most appropriate ratio for each composite cost, and aggregate the results.
- 4) Appropriating a full amount with a special note
→ When important environment costs that are combined with other costs cannot be measured easily, aggregate the composite costs and indicate the effect.

Personnel costs and depreciation costs are the typical costs that cannot be directly measured or whose balances cannot be aggregated.

For aggregation of **personnel costs**, the relationship between the actual details of the duty and environmental conservation is taken into account. In the case of personnel that is engaged in both a business duty and an environmental duty, the costs can be aggregated based on the time distribution ratio. If distribution of personnel costs is practically possible, the costs should be distributed according to the actual categories as much as possible. This is because individual correlation of the effects associated with environmental measures and the costs is assumed.

To measure **depreciation costs**, specify the time when implementation of environmental conservation was started intentionally, calculate the differences with the depreciation costs associated with investments other than those of environmental conservation purposes, and aggregate the sections influenced by the effects in the term, by tracing back to that point of time. Even if costs cannot be easily aggregated by tracing back, an aggregate of the entire image of depreciation costs of the term can be produced after several years by aggregating depreciation costs of the facility investments for future environmental conservation.

There are still many difficult problems for measuring environmental costs as environmental business (manufacturing of pollution prevention devices, environmental consultant, waste processing, and recycling business). However, in principle, costs relating to the environmental business that is implemented are not included in the environmental costs. However, if a specific calculation method is used in a company, the costs can be measured and announced by clearly indicating the method. This item will be examined as a future subject.

2-4 Concrete Categories of Environmental Costs

The costs that belong to each major category of environmental costs are shown below. Some costs may be removed or added according to the actual business activities. Since costs of different characteristics in terms of cost management may belong to the same category, notes are necessary in cost management. This guideline shows typical examples of the notes in (1) and (6). It is also desirable to clarify the corresponding relationship with environmental impacts that are controlled.

(1) Environmental costs for controlling environmental impacts that occur within a business area as a result of production and service activities (abbreviated as business area cost)

The "environmental costs for controlling environmental impacts that occur within a business area as a result of production and service activities" are the cost for implementing control of environmental impacts that directly occur within a business area (area where companies including material distribution and sales activities can manage directly influences on the environment). (The announcement of the cost should include the actual details of the implementation and related environmental impact data.)

The business area costs are further classified into the following items.

1) Pollution costs

This "pollution costs" are applied to implementation of control of environmental impacts that occur in the facilities and equipment that are attached to the end of production facilities (end of pipe) or terminal points of production facilities in order to prevent pollution (including prevention of environmental contamination by poisonous chemicals).

- a. Costs to prevent air pollution (including acid rain prevention)
- b. Costs to prevent water pollution
- c. Costs to prevent land contamination
- d. Costs to prevent noise
- e. Costs to prevent vibration
- f. Costs to prevent odor
- g. Costs to prevent ground subsidence
- h. Other costs to prevent pollution

→ In principle, apply the principle indicated in 2-3(3) for total costs. The full amount is allocated for the pollution prevention costs, however, when the production facility incorporates an environmental impact control device, the cost is estimated by measuring the cost associated with device or totaling the differences or apportioning.

- Expenses include facility lease costs, depreciation costs, and maintenance operation costs.
- Maintenance operation costs may include personnel costs, power costs, water and heating costs, sewerage costs, costs for processing wastes produced from facilities and equipment, measurement costs, raw material costs, repair costs, and rental costs.

2) Global environmental conservation costs

The "global environmental conservation costs" are the costs for the facilities and equipment or implementation relating to environmental conservation other than 1) pollution prevention costs and 3) resource circulation costs, in addition to global warming prevention, ozone layer protection, and other environmental conservation activities.

- a. Climate change prevention costs
- b. Ozone layer depletion prevention costs
- c. Other environmental conservation costs

- The expenses include facility lease costs, depreciation costs, and maintenance operation costs. The concept of the maintenance operation costs are the same as for 1) pollution prevention costs.
- The costs for processing wastes generated from facilities and equipment are allocated to the same item.
- Climate change prevention costs include costs for controlling discharge of greenhouse gas and energy conservation costs.
- Implementation of energy conservation results in control of environmental impacts. For instance, the costs for purchasing co-generation, fuel batteries, illumination sensors, passive solar, solar systems, and energy conservation devices are measured by calculating a total of the differences from the case in which these devices are not purchased.
- Precisely speaking, reduction of power consumption within a business area is implemented to control environmental impacts that are caused in power plants. Therefore, the costs may belong to category (2) that is described later, however, in this guideline, the costs are included in a.
- As other environmental costs, costs for conservation of biodiversity and ecosystem are assumed. When the weight of these costs is high, a new category, 4), may be added to categories 1) to 3).

3) Resource circulation costs

The "resource circulation costs" are the costs for implementation of sustainable resource circulation. The costs include the costs for efficient use of resources, costs for efficient use of irrigation water and healthy water circulation, and costs for reduction, processing, disposal, and recycling of wastes that are generated.

- a. Costs for efficient use of resources
- b. Costs for conservation of water and use of rain water
- c. Costs for reduction, cutdown, and recycling of industrial wastes
- d. Costs for reduction, cutdown, and recycling general business wastes
- e. Costs for processing and disposal (including landfill) of industrial wastes (including landfill)
- f. Costs for processing and disposal (including landfill) of general business wastes
- g. Costs for sustainable resource circulation

- The expenses include the facility lease costs, depreciation costs, and maintenance operation costs. The concept of the maintenance operation costs is the same as for 1) Pollution prevention costs.
- Costs for controlling generation of wastes in the production stage and reduction of wastes (for instance, increase of yield such as raw materials) are included in category a or g. Costs for processing wastes discharged from pollution prevention facilities are handled within 1) Maintenance operation costs and the costs indicated here target the wastes directly discharged from production processes.
- When an approach achieving both productivity improvement and environmental conservation (efficient use of resources) is taken with production facility costs, in principle, the costs are calculated by apportionment aggregation based on the degree of the effect and purpose (for instance, 60% for productivity improvement and 40% for environmental conservation). (The approach is called "clean technology", which is in a process that is built into the production facility system - for instance, implementation of an approach for increasing coating yield of automobiles or household electrical goods resulted in the effects such as reduction of the amount of paints used and reduction of the amount of paint sludge.) The details of the approach, the ground of apportionment, and calculation method should be clearly indicated.
- The costs for the use of rain water and middle water are the differences with the costs for the use of clean water.
- For instance, an approach for reduction of sludge and dewatering applies to c, its incineration or landfill applies to e, and recycling by spending costs applies to c. Recovery of heat and electricity by incineration (so called thermal recycle) applies to e and category c only targets material recycling.
- Since categories e and f have different characteristics from other costs in terms of circulation and efficient use of resources, considerable care is necessary in management of environmental costs.
- When valued materials obtained by prudence or intermediate processing are sold, the effect is applicable to the "economic effect resulted in environmental measures". The amount must be indicated separately.

(2) Environmental cost for controlling environmental impacts that are caused in the upper stream or lower stream as a result of production and service activities (Abbreviated as Upper/lower stream cost)

The "Environmental cost for controlling environmental impacts that are caused in the upper stream or lower stream as a result of production and service activities" are, like green purchase, the costs for controlling environmental impacts that occur in the upper stream of the business area and environmental impacts that occur in the lower stream in the business area cause by consumption and discarding of

products, containers, and packages that were produced and sold by companies and related costs. (The announcement should include the actual details of the approach.)

- 1) Costs estimated by calculating the difference with the normal purchasing activities that occurred as a result of purchase (so called green purchase) of products, goods, fuels, and raw materials of low environmental impacts (including those for which consideration was given in reduction of the use of hazardous or chemical materials).
- 2) Costs for recycling, recovering, re-producing, and modifying the products that were produced or sold
- 3) Costs for recycling, recovering, re-producing, and modifying containers and packages
- 4) Additional costs for providing products and services for implementing environmental conservation
 - The costs are defined to be additional costs to enable measuring additional amounts of investments and expenses and correlate them with the effects associated with environmental measures. The costs should be estimated according to the actual situation based on this view.
 - Costs of environmental business as the main business are not applicable to additional costs that are defined here. Allocation of such costs in full amount is meaningless. However, allocation of costs of environmental business may be meaningful when additional costs involved in design modification of the products to control environmental impacts further can be measured and at the same time additional effects associated with environmental conservation can be measured.
 - Costs that are determined to the (4) research and development costs are excluded.
- 5) Additional costs for reduction of environmental impacts such as containers and packages
- 6) Costs related to 1) and 5) indicated above (including burden charges to industry associations)
 - The burden charges to industry associations that are applicable to (5) are excluded.
 - The expenses include facility lease costs, depreciation costs, maintenance operation costs. The concept of maintenance operation is the same as for (1)-1) Pollution prevention costs.
 - When valued materials that were acquired by prudence or intermediate processing such as recovered products, containers, and packages are sold, the effect is applicable to the "economic effect resulted in environmental conservation" that is described later. The amount should be indicated separately.

(3) Environmental costs in management activities (Abbreviated as management activity costs)

The "environmental costs in management activities" are the costs involved in management activities for conserving the environment by companies by indirectly contributing in control of environmental impacts that occur as a result of business activities. (The announcement should include actual details of the implementation.)

- 1) Costs for environmental education for employees
- 2) Costs for developing and implementing (operating) an environmental management system, as well as the cost for acquiring a certificate
- 3) Cost for monitoring and measuring environmental impacts
→ The costs include the costs for monitoring and measuring individual environmental impacts as well the costs involved in implementation of PRTR such as measurement of the amount of chemicals discharged to the environment.
- 4) Personnel costs for organizations engaged in environmental measures and personnel costs involved in 1) to 3) indicated above
→ The expenses include the facility release costs, depreciation costs, and maintenance operation costs.

(4) Environmental costs in research and development activities (Abbreviated as research and development costs)

The "environmental costs in research and development activities" are the costs involved in environmental conservation among the costs for research and development activities including personnel costs, which are measured by companies as research and development costs. (The announcement should include the actual details of the research and development.)

- 1) Costs for research and development of products for environmental conservation
→ A major portion of research and development costs in environmental business as the main business may be included in the costs since the business also is involved in research and development for control of environmental impacts.
- 2) Costs for research and development or costs for planning and design for controlling environmental impacts at a product manufacturing stage
- 3) Other costs for research and development for controlling environmental impacts at a product distribution stage or a production sales stage
→ The expenses include facility lease costs, depreciation costs, and maintenance operation costs. The concept of maintenance and operation is the same as for (1)-1) Pollution prevention costs.
→ Indicate separately the total amount of research and development costs including the research and development costs other than costs of environmental conservation purposes also.

(5) Environmental costs in social activities (Abbreviated as social activity costs)

The "environmental costs in social activities" indicate the following costs for environmental conservation through social activities implemented by companies without direct relation to their business activities or costs for companies to communicate with the society such as information disclosure. (The announcement should include the actual details of the implementation.)

- 1) Costs for nature protection, afforestation, beautification, environmentally sound landscaping, and environment improvements
- 2) Costs for support of local residents' environmental activities such as providing funds and costs for other various social activities such as seminars and distribution of information
- 3) Costs for providing contribution and supports to environmental groups
- 4) Costs for announcement of environmental information and environmental announcement (excluding the costs for product advertising and sales promotion)
→ The expenses include facility lease costs, depreciation costs, and maintenance operation costs.

(6) Environmental costs corresponding to environmental damages (Abbreviated as environmental damage costs)

The "environmental costs corresponding to environmental damages" are the costs for damages caused on the environment by company's business activities, which include the following environmental costs as a result.

- 1) Costs for remediating soil contamination and damages to the environment
- 2) Allowance transfer amount and insurance premium associated with environmental damages
→ For the allocated amount, only the amount that is appropriated in the financial statement can be included.
- 3) Costs related to environmental settlement, compensation, penalties, and lawsuit
→ Unlike the costs in 1), the expenditure results costs 2) and 3) do not necessarily relate to environmental conservation. Therefore, this item should be handled carefully such as indicating the amount.

(7) Other costs related to environmental conservation (Abbreviated as other costs)

There may be costs that do not belong to any of the items indicated above, yet are related to environmental conservation. When such costs are included, the details and reasons should be disclosed in order to maintain the clear scope.

Reference: **Tackling environmental costs in stages**

As a practical method of introducing environmental accounting, the scope of aggregation of environmental costs can be expanded in stages. Practically, all the environmental costs are measured in stages as indicated below using a manufacturing business as the example.

Stage 1

- (1) Following costs of the environmental costs for controlling environmental impacts occurring within a business area as a result of production and service activities (abbreviated as business area costs)
 - 1) Pollution prevention costs
 - 3) Resource circulation costs
- (5) Environmental costs in social activities (abbreviated as social activity costs)

Stage 2

- (2) Environmental costs for controlling environmental impacts occurring in the upper stream or lower stream as a result of production and service activities (abbreviated as upper/lower stream costs)
- (3) Environmental costs in management activities (abbreviated as management activity costs)
- (4) Environmental costs in research and development activities (abbreviated as research and development costs)

Stage 3

- (1) Following costs of the environmental costs for controlling environmental impacts occurring within a business area as a result of production and service activities (abbreviated as business area costs)
 - 2) Global environmental costs
- (6) Costs corresponding to environmental damages (abbreviated as environmental damage costs)

3. Basic Concept of Effects Relating to Environmental Measures

3-1 Effects Relating to Environmental Measures Measured by an Environmental Accounting System

In Chapter 1 of this guideline, the significance of environmental accounting and the image assumed are discussed in some extent. This section summarizes the concept again.

Two methods are available to measure effects relating to environmental measures. They are 1) "physical quantity units" suitable for measuring the amount of environmental impacts and the quantitative change and 2) "monetary units" suitable for measuring the business revenues achieved by companies and cost reduction or avoidance due to environmental measures.

This guideline suggests the method in physical quantity units for "environmental effects" and the method in monetary units for "economical effects associated with environmental measures" to measure the most correct effects. In the meantime, introduction of 3) new common unit or conversion of physical quantity units to monetary units is attempted. This will be examined as the future subject.

With the involvement of other unrelated elements such as changes in business scales, the efficiency of environmental conservation by companies sometimes cannot be compared seasonally. Therefore this guideline shows examples of some comparative indexes such as the method of expressing environmental efficiency.

Some effects associated with environmental measures may not be measured quantitatively; for instance, the effect such as prevention of environmental pollution by preventative environmental measures. For such effects, facts can be described qualitatively.

For aggregation of effects associated with environmental measures, basically follow the concept regarding the scope or target period for aggregating the environmental costs that are described in Chapter 2.

3-2 Measuring Environmental Effects

Companies must measure first "Environmental effects" to examine cost effects for implementing environmental measures by investing a certain environment cost.

Based on the actual conditions that are announced through environmental reports by measurement of environmental impacts by business activities, this guideline shows typical examples of physical quantity indexes that clarify environmental effects (control or avoidance of environmental impacts and maintenance and improvements of environment) by environmental measures. The examples are shown in (1) to (3). Companies must individually measure the effects by associating with the environmental costs as much as possible such as selecting physical quantity indexes according to the actual condition and checking the changes.

This guideline summarizes physical quantity indexes corresponding to cost items other than (1) and (2) as (3) "other effects" at the stage.

Regarding this subject, the Environmental Agency will start examination of environmental performance evaluation on companies such as index items for evaluation and calculation method of each item. We will revise and develop this guideline further by using the examination results.

(1) Environmental effects occurring in a business area (business area effects)

The effects are control of environmental impacts occurring in a business area due to production and service activities and are typical environmental effects that can be directly measured by companies. The effects correspond to (1) costs within a business area among all the environmental cost categories. The following index examples by physical quantity units can be assumed based on actual conditions of measuring the amount of environmental impacts by companies.

- | | |
|--------------------------------------|--|
| (1) Pollution prevention: | Amount of environment contaminants (NO _x , COD, etc.) discharged
Amount of hazardous chemicals discharged or shifted |
| (2) Global environment conservation: | Amount greenhouse effect gas discharged and amount of energy used |
| (3) Resource circulation: | Amount of wastes discharged, final amount of wastes disposed, and volume of water used |

The indexes or presentation methods that enable seasonal comparison include basic unit comparison of production activities (production quantity unit, sales unit, construction amount unit, time unit, etc.), comparison of cost unit of individual measures (amount of environmental impact reduced/applicable expenses out of the environmental costs), and setting a standard year for target of comparison.

(2) Environmental effects occurring in the upper/lower stream (upper/lower stream effects)

Of the environmental cost categories, the effects correspond to (2) upper/lower stream costs. Based on the actual conditions examined such as the amount of environmental impacts caused by companies, examples of indexes that can be used as guidelines include 1) Green purchase amount, 2) amount of hazardous chemicals used, 3) indexes relating to products (recovery quantity, disassembly time for recycling, etc.), and 4) Re-production amount or final disposal amount.

For products, further examinations are necessary for the method of presenting environmental effects while considering the product life cycle including the use stage and waste stage as well as the manufacturing stage. The presentation method involves how differences by the use methods should be considered and how various products are represented.

(3) Other effects

This section discusses physical quantity indexes that represent environmental effects corresponding to the cost items other than (1) and (2) among the categories of environmental costs. The indexes include 1) afforestation result value of the area surrounding the office (can be expressed in the area ratio or CO₂ conversion) and 2) river/shore region cleaning result corresponding to social activity costs in category (5).

Reference:	Examples of comparative indexes
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In announcement of environmental effects, actual statuses of efforts made by companies may not be correctly presented only by seasonal changes represented by physical quantity indexes. The following examples are assumed as supplementary comparative indexes to assist understanding of simple physical quantity indexes.

1) Amount of environmental impacts reduced/applicable expenses out of the environmental costs

→ The index indicates the efficiency (the higher the plus value, the higher the efficiency) of the environmental measure, where the numerator is the physical quantity unit and the denominator is the monetary unit. When using this index, associate each index with environmental index value.

2) Added value or profit gained by business activities/total amount of environmental impacts generated

→ The index indicates the environmental efficiency (the higher the plus value, the higher the efficiency), where the numerator is the monetary unit and the denominator is the physical quantity unit. When using this index, the concept of added values or profits must be organized.

3-3 How to Measure Economical Effects Associated with Environmental Measures

Economical effects on the company by environmental measures should be calculated on the credible basis. If it is difficult to do so, the effects may be described qualitatively. Mainly internal use is assumed for economical effects based on hypothetical calculation. When the effects are to be announced, the effects must be distinguished from the economical effects in (1), indicating the calculation basis.

(1) Economical effects calculated based on credible basis

Sometimes economical effects that positively function on administration of companies occur as the reverse side of environmental effects, depending on the environmental measures. The "effects that are calculated based on the credible basis" refer to economical effects of this type. The effects include increase of business revenues and reduction and avoidance of costs. Since these items are economical effects that can be clearly measured, they can be included in environmental accounting.

1) Business revenue by recycling in production processes or recycling of used products

- Economical effects corresponding to resource circulating costs or upper/lower stream costs. The sale amount of valued materials obtained by recycling can be appropriated.
- When effects achieved by an investment for recycling are to be measured continuously, the appropriation period of the difference with the amount before introduction should be matched with the depreciation period of the investment.

2) Cost saving by energy conservation in production and service activities

- Economical effects corresponding to global environmental costs. For instance, the amount of energy costs such as power, oil, and gas that were reduced from that of the previous year associated with production and service activities can be appropriated.
- When effects achieved by an investment for energy conservation are to be measured continuously, the appropriation period of the difference with the amount before introduction should be matched in the depreciation period of the investment.

3) Cost saving associated with resource conservation in production processes or recycling activities

- Economical effects corresponding to resource circulation costs. The amount of waste processing costs that were reduced from those of the previous year by cost saving by reduction of the amount of resources used or reduction of the amount of wastes associated with recycling activities can be appropriated.
- When effects by an investment for resource conservation or recycling are to be measured continuously, the appropriation period of the difference with the amount before introduction should be matched with the depreciation period of the investment.

(2) Economical effects based on hypothetical calculation

Economical effects associated with environmental measures include the following economical effects based on a hypothetical calculation. When a calculation method for economical results based on the data under the actual condition is established, the economical effects described in (1) may be achieved.

1) Accidental economical effects (economical effects by avoiding risks)

Accidental environmental damage costs that are likely to be incurred may be avoided by preventative environmental measures. These effects exist latently associated with environmental measures and can be measured as the economical effects that function positively in terms of business administration. "Accidental economical results" are the effects that are produced by calculating the economical effects of such characteristics as these through a reasonable assumption method. These effects are considered to be one of the economical effects associated with environmental measures that are mainly involved in production activities. The effects include cost saving and avoidance that are described below.

Accidental economical effects are considered to be important information for administration management. However, since intervention by assumption calculation cannot be avoided, the item is mainly used internally. Because of these intentions, the announcement is not requested at the current stage. When the effects are to be announced, they must be distinguished from the economical effects that are calculated based on the credible bases that are described in (1) and the calculation basis used for assumption must be indicated.

Avoidance of environmental damage costs by controlling environmental risks through environmental investments

- The amount saved for environmental recovery and the assumed amount avoided for the costs incurred by operation loss due to the occurrence of environmental contamination accidents, indemnity and compensation to residents may be appropriated.
- The costs for avoiding environmental damages must be estimated assuming the occurrence of environmental costs due to neglect of environmental investments. If the data for the costs that may incur is insufficient, the calculation basis becomes weak. Therefore, special caution is necessary when the effects are announced.

2) Profit contributed assumed effects

Environmental measures are incorporated further into normal business activities as environmental administration progresses. Calculation of "profit contribution assumed effects" is attempted assuming that the business profits include latent economical effects contributed by environmental measures other than the economical effects that practically occurred as indicated in (1)-1). This guideline is not able to mention the actual calculation method at this stage.

4. From Measuring to Announcing Environmental Accounting Information

For sustainable progress of a company, constructive information disclosure is required as the social responsibility of the company, particularly for the information that has important social meaning. At the same time, such an approach establishes the social evaluation of the company. High expectations are imposed on environmental accounting as one of the environmental information systems involved with companies and introduction of the system in as many companies as possible and accumulation of announcements are strongly requested.

This guideline clarifies the significance of environmental accounting in Chapter 1, indicates environmental costs, environmental effects, and economical effects associated with environmental measures in Chapters 2 and 3 as the elements that form the environmental accounting system. The guideline has discussed the concept of measuring each element. Companies try to install the environmental accounting system and use the systems for various cases using the information.

Enterprises using their databases, which are developed using an environmental accounting system, can use them for their internal environmental management or administration management and for announcing the implementation status of environmental conservation externally as a part of information disclosure. In the internal use, since the independence and uniqueness of the company can be demonstrated, this guideline simply indicates the basic concepts described in Chapters 1 to 3.

When disclosing information externally, companies must consider integrity and commonality that enable the system to be a social system for distribution of correct information to users. While recommending positive announcement of environmental accounting information, this guideline also discusses as required the concept for the framework of environmental accounting required for announcing information associated with summarized environmental accounting, concept regarding the framework of environmental accounting, the items to be measured and the concept. This guideline also assumes users of environmental reports, that is, consumers, investors, and local residents as the main receivers of environmental accounting information.

When an environmental accounting system is summarized based on the concept that has been described in this guideline, the formats shown below can be used for announcing environmental accounting information. Of course, the idea is to use the method that can most appropriately express individual information and the method is not restricted. This guideline suggests three announcement formats to enable selection of a format according to the policy for summarizing environmental accounting information and the degree of implementation progress. The contents announced by environmental accounting and the descriptions in environmental reports must be appropriately linked according to the framework of the environmental accounting applied by the company.

(1) Environmental cost oriented type: Announcement format A (Format A-1 and Format A-2)

This format was prepared for announcement of information based on environmental costs. It is desirable to describe the summary of the contents and effects of environmental measures as well as supplementing the information by entering applicable pages of the environmental report containing the details.

Announcement format A-2 is also attached as the format for announcing information in more concrete categories.

(2) Environmental effect correlation type: Announcement format B

This format was prepared for clarifying cost effects of environmental measures taken by companies by mainly correlating environmental effects with environmental costs. Certain quantification applies to the effects and the effects must also be linked with the description in the environmental report to actually back up the information.

(3) Comprehensive effect correlation type: Announcement format C

This format was prepared for clarifying cost effects of environmental measures by correlating environmental costs with economical effects that are associated with environmental effects and environmental measures and measuring the comprehensive effects. Although abundant information is made available, in terms of effects, appropriate measures are necessary for the presentation method since numeric values of different units are simply listed

This guideline provides examples of simple announcement formats as summarized above. Announcement of more detailed environment accounting is required according to the attitude of information disclosure by companies. Economical effects in a wide range may be correlated with environmental costs, without restricting to the economical results calculated based of the credible basis only. In this case, it is mandatory to consider cost effects of the environmental measures by linking with environmental performance indexes in the environmental report.

Appendix 1 For Correct Understanding of Environmental Accounting Information

The following points must be noted to correctly understand the information made available through environmental accounting that are measured or announced regarding individual companies

1. Evaluate comprehensively the statuses of environmental conservation implemented by companies based on the information made available through environmental accounting as well as other environmental information.

The environmental accounting system was developed for systematically measuring, analyzing, and announcing the following information within the scope where the information can be checked quantitatively although the system is still to be further developed; 1) environmental costs in company activities, 2) environmental effects achieved by environmental measures (so called environmental performance), and 3) economical effects returned to companies as a result of environmental measures. Through the information such as environmental reports that comprehensively summarize these contents, understand the actual conditions of company activities as the background of the information.

2. It is not appropriate to simply compare and evaluate the statuses of implementation by companies through the size or change (increase/decrease) of environmental costs that are clearly indicated by environmental accounting. The contents and characteristics of each environment cost must be examined thoroughly.

Practically, note the following.

- (1) The structure of the environment costs must vary according to the business type or business category.
- (2) For the detailed method of measuring environmental accounting, avoid simple comparison between companies using announced values only since differences in companies cannot be avoided under the current condition where environmental accounting is still in the process of propagation.
- (3) For instance, the cost of environmental conservation for measuring additions or extra portions must be increased or reduced according to the degree of progress of environmental measures.
- (4) Effective investments for environmental conservation can be achieved by applying appropriately as required since future environmental costs can be reduced by avoiding environmental risks.

3. Cost effects of environmental measures in social significance must be evaluated as a result of comparison between environmental effects and environmental costs by correct measuring the actual condition of environmental impacts occurring as a result of business activities.

- (1) Basically, measure the actual condition of environmental impacts occurring as a result of business activities of your own company.

- (2) Environmental effects must be able to be measured by using the data obtained as a result of environmental performance evaluation implemented by the company.

4. Cost effects of environmental measures by companies cannot be evaluated correctly simply by comparing only environmental costs and economical effects associated with environmental measures.

The environmental accounting system respects the framework of financial accounting of the company but is not restricted to it. It is not appropriate for the system to perform external evaluation on environmental measures of a company based on the only the difference of its revenues and expenditures (credit balance or deficit balance), by only focussing on the portions that can be compared in monetary units (economical effects).

- (1) In the sense of sustainability of a company, it is important to produce economical effects in environmental measures. However, since it is difficult to measure all the effects in monetary units and economical effects of environmental measures tended to be underestimated if they are measured on that basis only.
- (2) An attempt to measure economical effects as much as possible focussing on the difference of credit balance and deficit balance leads to inclusion of unclear calculation basis or many self-serving ideas, losing the meaning of announcement of environmental accounting information.
- (3) Measuring economic effects that are returned to companies widely as a result of environmental measures is a very significant factor as an administration management item in internal use, however, many that are not clearly associated with the expenditure purposes of environmental costs are also included. Considering the announcement of effects to the society as the precondition, a simple comparison between these cannot be considered as a balanced cost effect analysis.

Appendix 2 Internal Aggregation Formats for Environmental Costs

To enable aggregation of environmental costs within each company, internal aggregation formats for environmental costs are attached.

Account titles in the horizontal axis in the internal aggregation tables are examples only and select or add appropriate account titles according to your choice by examining implementation of aggregation in your company for each category.