Environmental Performance Indicators for Businesses

－Fiscal Year 2000 Version－

February 2001
Ministry of the Environment
Government of Japan

Contents

Preface Purpose of the Guideline

Today's environmental problems including global warming, mass generation of waste, and release of a vast volume of harmful chemical substances are the consequence of the accumulation of environmental burdens caused by normal business activities and daily consumption activities. In other words, the problems stem from the socio-economic system itself, which pursues mass production, mass consumption, and mass disposal. Therefore, we need to make a drastic shift to a sustainable socio-economic system with fewer burdens on the environment.

Only limited results can be produced by the conventional 'end-of-pipe' regulations to achieve this shift. Businesses are expected to have an environmental conservation concept as a background of their economic activities, and to promote environmental conservation activities voluntarily.

It is essential for business to accurately understand and assess the scope of environmental burdens they are generating and the effects of the measures they are taking (environmental performance) associated with the burdens in order to promote their voluntary environmental activities effectively. "Environmental performance indicators" provide information on how to understand and assess the environmental performance. Businesses would implement meaningful activities on environmental conservation if they could select appropriate environmental performance indicators. Environmental performance indicators would facilitate environmental communication with stakeholders if they were included in environmental reporting.

ISO (The International Organization for Standardization) issues a guideline of the environmental performance evaluation process as ISO14031 (Environmental Performance Evaluation – Guidelines: Specifies the purposes of environmental performance evaluation, preparation of an evaluation plan, data collection, review of results – this was regulated as JIS Q 14031 on October 20, 2000). Although the guideline defines the concept and procedure of selection of environmental performance indicators, it does not cover development of actual indicators.

In the meantime, environmental performance indicators are being developed by overseas research organizations including WBCSD (World Business Council for Sustainable Development) and GRI (Global Reporting Initiative).

In Japan also, many businesses have developed and are using their specific environmental performance indicators and such efforts are highly appreciated in terms of development of environmental performance evaluation. However, since the indicators that are used vary according to the business, the items and calculation methods tend to become inconsistent so that businesses and their stakeholders have difficulties in comparison and evaluation of the overall environmental performance of the businesses.

Under these circumstances, Ministry of the Environment has established the "Committee on Environmental Performance Indicators for Businesses". Through six meetings, the setting of a guideline of the environmental performance indicator was discussed as the main subject. As a

result of the discussions held in fiscal year 2000, the "Environmental Performance Indicators for Businesses (Fiscal Year 2000 Version)" was prepared.

This guideline indicates a desirable concept of environmental performance indicators and the common framework and, at the same time, presents the indicators that are considered to be practical for businesses. The ministry of the Environment hopes that this guideline will facilitate businesses to assess the environmental burdens associated with their business activities and the measures that are taken, and to make improvements. It is also hoped that this guideline will help stakeholders including consumers and investors to understand environmental conservation activities of businesses.

Ministry of the Environment is planning to take the following measures using this guideline.

(1) The "Guideline for Preparation of Environmental Reporting" that was set out in 1998 by the Environment Agency, which became Ministry of the Environment in 2001, indicates "Activities for Reduction of Environmental Burden" as an important article, however, only some examples were presented as the actual details. Therefore, the "Environmental Reporting Guidelines" is set out to incorporate the environmental performance indicators that are presented in this guideline. The purpose is, by presenting actual items to be described in environmental reporting, to promote further efforts and improve quality of environmental reporting by businesses.

(2) The "Guideline for Introduction of an Environmental Accounting System" that was set out by Ministry of Environment indicates that "physical unit" is a superior way for checking (measuring) the degrees of environmental burdens and the fluctuation as the method of checking the effects of environment conservation measures. However, only some examples are presented as the actual contents. The integrity between the checking of environmental performance and the cost checking in environmental accounting is attempted in this guideline. This is done by reflecting the environmental performance indicators that are provided in the "Guideline for Introducing an Environmental Accounting System" and using the indicators as the "physical units" for checking environmental conservation effects in environmental accounting.

(3) Ministry of the Environment will participate in international discussions regarding environmental reporting and environmental performance evaluation, thereby contributing to the development of environmental performance indicators that conform to the Japanese conditions and also have integrity internationally.

Committee for Environmental Performance Indicators
for Businesses, Ministry of the Environment

(Chairman)

Ryoichi Yamamoto: Professor, Center for Collaborative Research, University of Tokyo
Koji Amano: Associate Professor, Environmental Systems Engineering, RITSUMEIKAN UNIVERSITY
Mariko Kawaguchi: Senior Analyst, Public Sector Consulting Dept., Daiwa Institute of Research Ltd.
Hidefumi Kurasaka: Associate Professor, Faculty of Law & Economics, Chiba University/ Visiting Research Fellow, Institute for Global Environmental Strategies

Toshihiko Goto: Chair, Environmental Auditing Research Group/GRI GRI Steering Committee member

Mitsuru Takado: Manager, Environment and Energy Control Section, Production Control and Strategy Planning Department, Manufacturing and Industrial Engineering Division, NISSAN MOTOR CO., LTD.
Hiroyuki Tada: Manager, Planning Office, Corporate Environmental Affairs, Sony Corporation
Yuji Noritake: Manager, Environment Safety Group, Corporate Environment Office, RICOH COMPANY, LTD.
Tetsuro Fukushima: Representative Director & Managing Director, Japan Audit and Certification Organization for Environment and Quality
Yuichi Moriguchi: Head, Resources Management Section, Social and Environmental Systems Division, National Institute for Environmental Studies
Ken Morishita: Representative, Eco-Management Institute
Yoshio Yamanaka: Professor, Faculty of Administrative Sciences, Osaka-gakuin University
Hiroshi Yokoyama: Chairman, Japanese National Committee for ISO/TC-207/SC4/General Manager, Center for Communication to the Society Corporate Environmental Policy Office, Hitachi, Ltd.

(Secretariat)
Environment and Economy Division, Comprehensive Environmental Policy Bureau, Ministry of the Environment
(Cooperation)
Eco-Management Institute

I. Objectives of Environmental Performance Indicators

(1) Environmental performance indicators provide information for internal decision-making on environmental conservation activities within the businesses (identification of significant environmental aspects, ascertaining environmental performance trends, and using environmental aspects in performance evaluation of employees, etc.) .
By integrating environmental burden related indicators and management related indicators, the guideline provides useful tools for reducing environmental intensity of environmental burden and improving eco-efficiency . In other words, this guideline provides the opportunity to improve economic efficiency and to reduce environmental burden at the same time.

(2) Environmental performance indicators provide information for external stakeholders including consumers, local residents, and financial organizations, to evaluate environmental conservation activities undertaken by businesses.

(3) Micro-level indicators called environmental performance indicators and macro-level and medium-level indicators that are used by national and local governments were prepared in an integrated manner, including comprehensive environmental indicators that are based on the national environmental basic plan. Using these indicators, a common information platform is formed to enable an appropriate decision-making process in each subject from business activities by individual businesses to policy establishment of national and local institutes.

* The “businesses” that are referred to in this guideline indicate mainly companies involved in profit-seeking activities (including company group units, individual factory/business site units, and project units as well as cooperate unit). However, this guideline would be applied to non-profit seeking sectors including governmental organizations, schools, hospitals, and other NPOs according to the characteristics of each business mode.

II. Relationship with Other Existing Guidelines

(1) Relationship with ISO14031

ISO14031 (JIS Q 14031) (Environmental Performance Evaluation International Standard) is a “Guideline for Designing and Using Environmental Performance Evaluation within Organizations”.

Environmental performance evaluation is an internal management process that uses the indicators (environmental performance indicators) for providing information on comparison between the past environmental performance and the present environmental performance of the organization based on the environmental performance standard of the organization. The process follows the management model of “Plan – Do – Check – Act.”

The actual contents of environmental performance indicators are not discussed (however, examples are provided in Attachment A) and the guideline simply recommends organizations to

give consideration to integrity with the indicators developed by governmental organizations, non-governmental organizations, and science research organizations at selection of performance evaluation indicators.

These indicators were set out using the national macro-level indicators ("comprehensive environmental indicators" based on the environment basic plan (report of the Comprehensive Environmental Indicator Examination Meeting, Environment Agency in November 1999)) and indicators developed by WBCSD and GRI as the reference. Environmental performance should be assessed according to the process specified in ISO14031 by using this index as the reference.

ISO14031 requests consideration to environmental conditional indicators (ECI). See the "Annual Report For Environmental Conditions (Environmental White Paper)" prepared by Ministry of the Environment and each local government and "comprehensive environmental indicators" that are described above.

(2) Relationship with ISO14001

ISO14001 (JIS Q 14001) (international standard relating to the environmental management system) specifies "enhancement of the environmental management system for achieving overall environmental performance improvement according to the environmental policies of the organization."

This guideline defines environmental performance as "measurable results of the environmental management system relating to the management of the environmental aspects performed by the organization based on its environmental policies and objectives." As described in Attachment A, the objective of implementation of the environmental management system is to improve the environmental performance as a result.

However, ISO14001 does not discuss the actual contents of the environmental aspects to be managed and the standard of environmental performance and leaves the decision to the judgment of each organization.

Therefore, the environmental performance indicators that are presented in this guideline are considered to assist decision-making processes regarding significant environmental aspects and viewpoints to be managed and the examination of environmental performance items to be improved.

These indicators do not change the requirements of the environmental management system and the deliberation registration standard.

(3) Relationship with results of the research implemented by international research organizations and foreign countries

As summarized in the data section, the following materials are available as the existing main results of the research carried out by international research organizations and organizations in overseas countries regarding environmental performance indicators.

- "Eco-efficiency Indicators and Reporting" (World Business Council for Sustainable Development (WBCSD))

· ”Sustainability Reporting Guidelines” (Global Reporting Initiative (GRI))
· ”Measuring Up - Toward a Common Framework for Tracking Corporate Environmental Performance” (World Resource Institute (WRI))
· ”Measuring Eco-efficiency in Business: Feasibility of a Core Set of Indicators” (National Round Table on the Environment and Economy (NRTEE))

These existing research results were used as the reference for examination of environmental performance indicators.

(4) Relationship with Environmental Activity Evaluation program (Eco-Action 21)

Since 1996, Ministry of Environment has been promoting the introduction of the Environmental Activity Evaluation Program (Eco-Action 21) to small and medium businesses to provide a simple method for environmental management. This program enables even small to medium businesses to develop implementation of environmental conservation measures and to summarize and announce the results as an “environmental activity plan”. This program is compatible with ISO14031 and complies with the management model of “Plan – Do – Check – Action.”

Since the environmental performance indicators that are presented in this guideline target mainly large businesses such as listed enterprises, small and medium businesses are advised to initially select environmental performance indicators using the evaluation items and selection sheets for “self-checking environmental burdens” and “self-checking of implementation of environmental conservation” that are described in the Environmental Activity Evaluation Program. After implementing environmental conservation for several years, those businesses should select and assess the environmental performance indicators that are presented here.

III. Requirements of Environmental Performance Indicators

Environmental performance indicators need to satisfy the following requirements.

(1) Relevance

Environmental performance indicators need to accurately reflect the important environmental burdens and implementation status of the organization based on the conditions of the environmental problems, the trend of environmental policies, requirements of stakeholders, business characteristics, and regional characteristics.

The items to be examined are not only the environmental burdens on which regulations or liabilities are imposed by the Act, but also the items for preventing environmental pollution and items that enable evaluation of implementation such as improvement of resource productivity for transposition to sustainable economic activities.

It is also important that environmental performance indicators can be used for evaluation of measures relating to downstream activities (distribution of products) and measures for upstream activities (purchasing raw materials and services) in addition to measures for reducing environmental burdens occurring as a result of the activities within the business area (area where

the business can directly manage environmental burdens).

(2) Comparability

Environmental performance indicators needs to be comparable in various forms such as secular variation comparison, comparison with other companies or business types of the same industry in Japan and overseas countries, and comparison with items required by laws and regulations.

Otherwise, it is difficult for businesses to improve their measures and for external stakeholders to compare with other businesses and industries. For this reason, indicators should have common factors for many businesses. To realize those factors, standardization of the concepts and terminologies is necessary. In addition, the measuring scopes, the measuring methods, calculation methods, and presentation methods should also be standardized.

(3) Verifiability

The information associated with the indicators should be able to be verified objectively to use the indicators as reliable ones.

This means that methods for third parties to verify the reliability of the information are available such as; there is evidence data of the information associated with the indicators, the calculation method is established, the data aggregation system is available, and the information is checked through appropriate procedures. It is important to be able to provide clear explanation on the calculation ground of the indicators according to the request from external parties.

(4) Clarity

The meanings of the indicators should be clear and unambiguous within the organization and for stakeholders.

Indicators are used by a wide range of businesses and stakeholders. New indicators that have just been studied, extremely technical indicators, or indicators of ambiguous contents are difficult to be applied. Therefore, the indicators should be defined clearly by defining the items or scope through laws and regulations or government policies so that the contents and the significance are readily available and are easily understood.

IV. Framework of Environmental Performance Indicators

1. Organization and classification of indicators

The relationship between business activities and the environment was summarized as shown in the attached diagram based on the “relevance (reflect accurately the important environmental burdens and implementation status of the organization based on the conditions of the environmental problems and the trend of environmental policies)” among the requirements of environmental performance indicators. The details are summarized as follows.

(1) Indicators related to management (management measure)

Introduction of an environmental management system, development of environmental technology, and implementation of environmental accounting result in development and efficiency improvement of environmental conservation of businesses. Communication regarding environment between businesses and the society through preparation and announcement of environmental reporting results in improvement of environmental conservation activities of businesses. By implementing these environmental management activities, environmental burdens can be reduced indirectly.

(2) Indicators related to business operation

◎ Input

[1] Exploitation of resources from environments and input into business activities

Fossil fuels, minerals, water, forests, and others are exploited from environments, and substances (raw materials), energy, and water are poured into business activities. These activities result in direct environmental burdens such as depletion of natural resources and degradation of land. Besides, these substances will be eventually released to the environment, possibly causing environmental burdens in such forms as greenhouse gases, soot, polluted water, and waste.

[2] Preferential purchase of products and services based on reduction of environmental burdens (green purchasing)

Purchase of products and services of high environmental burdens directly increases environmental burdens.

Therefore, to assess business activities comprehensively, indirect environmental burdens associated with purchased items need to be assessed considering the environmental burdens at the purchasing points, which are the upstream sections, as well as environmental burdens within the business area.

◎ Output

[1] Output of polluted substances and waste from business activities to the environment

Greenhouse gases, soot, polluted water, and waste directly cause environmental burdens.

[2] Provision of products and services

Products and services generate environmental burdens such as greenhouse gases in the course of production, distribution, and the usage, and in addition, products are eventually disposed, causing environmental burdens as waste. In particular, to form a recycling society, businesses engaged in manufacturing and sales of products are obliged to control waste generated from the

products and promote reuse or recycling of the products. To achieve this objective, businesses are required to design and develop products of minimal environmental burden and recover the products for reuse or recycling.

Therefore, in order to assess business activities comprehensively, it is necessary to assess indirect environmental burdens caused by production, distribution, utilization, and disposal of the products in the downstream areas as well as environmental burdens within the business area.

◎ Transportation

Transportation imposes serious environmental burdens through traffic pollution such as air pollution, noise, and generation of greenhouse gas.

Therefore, comprehensive evaluation of business activities requires evaluation of environmental burdens associated with transportation for delivering raw materials from suppliers to the business sites and transportation for dispatching products, services, and waste from the business area.

◎ Stock pollution

Negligence of stock pollution caused by inappropriate handling of harmful substances such as accumulation of pollution in soils and underground water that were generated in the past passes environmental burdens on to the next generation, which may cause health hazard to the local residents in the future. This also may prevent the use of the surrounding land in the future.

◎ Land utilization

Alteration of natural areas associated with business activities causes direct environmental burdens in such forms as destruction of ecosystems and loss of wild animal and plant species.

(3) In view of the fact that the key to solving current environmental problems is to plan economic development while minimizing environmental burdens and to build a sustainable socioeconomic system with sound material cycles, it is desirable to integrate environmental performance indicators and management related indicators (economic profits, functions of products and services provided, and others), and to monitor intensity of environmental burdens and eco-efficiency. (See Chapter VI.)

In summary, the following tasks are required in addition to enhancement of the environmental performance related to management and maintenance and enhancement of economic efficiency related to the environmental performance associated with business operation.

[1] Reduce the total amount of input to business activities. Increase the proportion of recycled resources while reducing the volume of harmful substances.

[2] Promote preferential purchase of products and services based on reduction of environmental burdens (green purchasing) as the measure in the upstream areas of the

business area.

[3] Reduce the total amount of output from business activities. Increase the proportion of reutilization and recycling while reducing the amount of hazardous substances.

[4] As the measures downstream from the business area, design, develop, and provide products and services of low environmental burdens by controlling generation of waste material. In addition, promote recovery of used products and reutilization and recycling of products.

[5] Reduce environmental burdens associated with transportation.

[6] Prevent and clean stock pollution.

[7] Maintain an ecosystem suitable for land utilization.

Based on the above, indicators are organized and classified as shown in the following table.

<table>
<tr><td colspan="3"></td><td>Environmental burdens within business areas (Area where businesses can manage direct influences on the environment)</td><td>Environmental burdens downstream and upstream (Area where businesses can manage indirect influences on the environment)</td></tr>
<tr><td rowspan="8">Indicators related to environmental burdens (Operational Performance Indicator (OPI))</td><td rowspan="3">Input</td><td>Materials</td><td>Total input of materials</td><td>Indicators for Green Purchasing etc, according to the characteristics of products and services purchased</td></tr>
<tr><td>Energy</td><td>Total energy consumption</td><td></td></tr>
<tr><td>Water</td><td>Amount of water used</td><td></td></tr>
<tr><td rowspan="4">Output</td><td>Air</td><td>Amount of greenhouse gases and ozone depleting substances released</td><td></td></tr>
<tr><td>Water/soil</td><td>Total amount of drainage</td><td></td></tr>
<tr><td>Wastes</td><td>Total amount of disposal,
Amount reused and recycled,
Amount of final disposal, etc</td><td></td></tr>
<tr><td>Products/services</td><td></td><td>Indicators for environmental burdens according to the characteristics of products/services e.g., Energy consumption rate of each product group, Amount of product used, containers and packaging collected.</td></tr>
<tr><td colspan="2">Transportation</td><td colspan="2">Total volume of transportation, CO_2 emissions resulting from transportation</td></tr>
<tr><td colspan="4">Cumulative soil contamination (Stock pollution)</td></tr>
<tr><td colspan="4">Land utilization</td></tr>
<tr><td colspan="4">Other environmental risks</td></tr>
<tr><td colspan="3">Indicators related to environmental management (Management Performance Indicators (MPI))</td><td colspan="2">Environmental Management Systems, Design for the Environment, Environmental Accounting, Disclosure of information, communication, Compliance with regulations, social contributions</td></tr>
<tr><td colspan="3">Management-related indicators</td><td colspan="2">Sales, Output (total price and amount), Total amount of floor space, Number of employees, etc.</td></tr>
</table>

* Environmental burdens in upstream and downstream areas

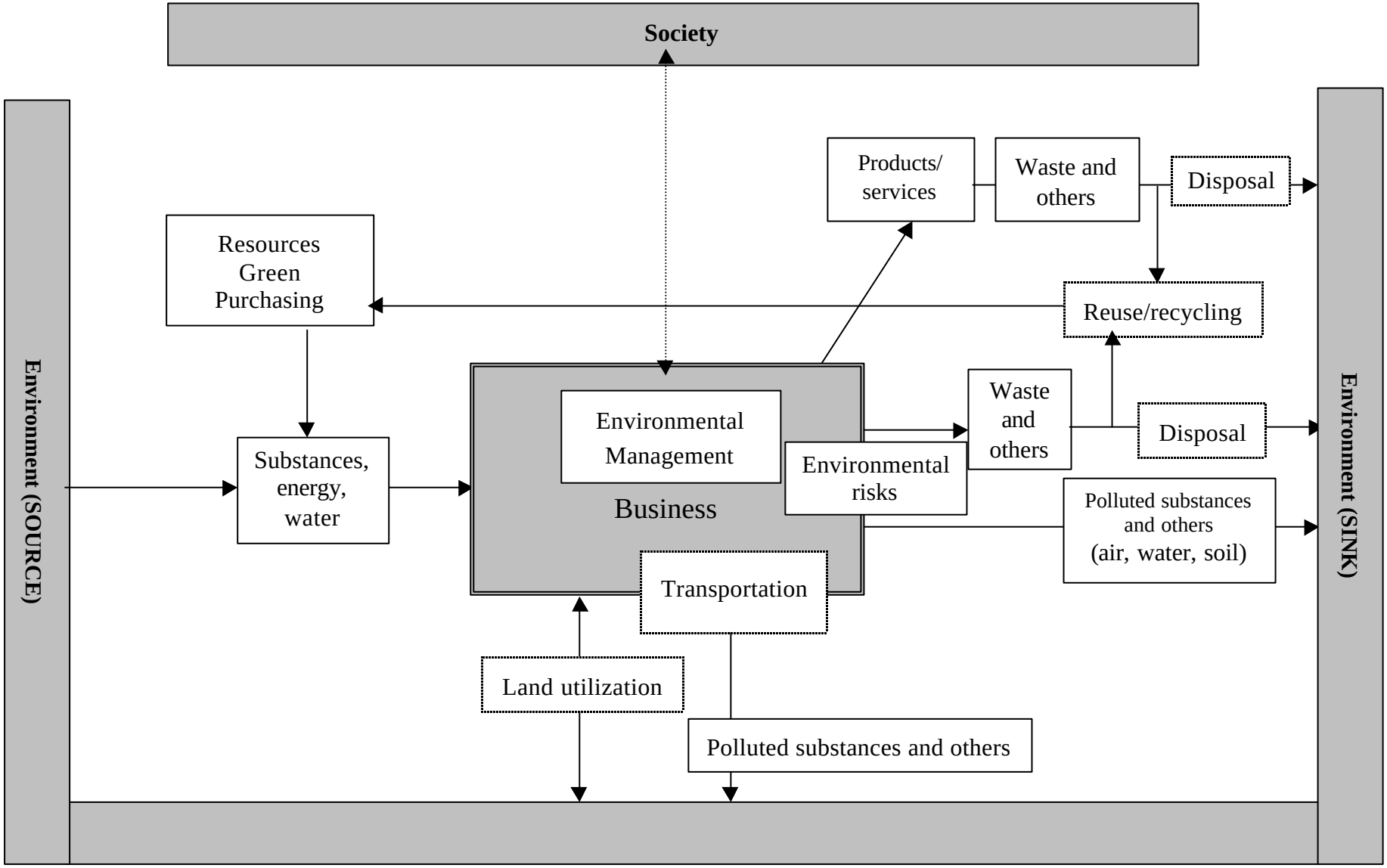
In the future, it is desirable to aggregate environmental burdens in all the important upstream and

downstream activities. However, since environmental burden data on the supplier side such as products and services is necessary, at this point, data is aggregated as much as possible.

（See the reference material “Evaluation sheet for the selection of indicators” for details.）

Attachment

Relationships between business activities and the environment (Concept model)



2. Selection of indicators

According to Item 1, "Organization and classification", individual indicators shall be grouped into the following three types for selection.

- **Common core indicators**

Those that meet the following requirements:

- Important from the point of view of environmental issues and environmental policy trends.
- Applicable to a great majority of businesses regardless of the characteristics of organizations, such as industry types, regions and stakeholders.
- Methods of measurement and estimations are available at this stage.

Basically, it is desirable that the common core indicators be assessed by every business. However, it is acceptable to leave them out if they are obviously unrelated from the point of view of business characteristics.

- **Industry-specific core indicators**

Those that meet the following requirements for each industry:

- Important from the point of view of environmental issues and environmental policy trends.
- Applicable to a great majority of businesses classified into the relevant industry.
- Methods of measurement and estimations are available at this stage.

It is desirable that businesses classified into the relevant industry examine appropriate indicator items that suit their characteristics based on these industry-specific core indicators.

At this stage, the scope of this guideline is still experimental, taking up a small number of industries in rough classification, and it does not fully cover various business characteristics. Therefore, it is necessary to omit or add indicators according to the characteristics of each business.

- **Indicators selected by businesses**

Those that are selected according to the characteristics of businesses, such as industry types, regions and stakeholders.

※ **Notes**

(1) For businesses that have just started environmental conservation activities and the businesses with sizes too small to check all the indicators easily, the indicators may be checked in stages according to the degree of importance, keeping in mind the characteristics of the businesses (for instance, indicators may be selected in the order of common core indicators -> industry-specific core indicators -> indicators selected by businesses).

(2) To cope with rapidly changing environmental problems and to assess various businesses appropriately, it is necessary to continuously develop environmental performance indicators with originality. This guideline does not prescribe a limited list of indicators, but it is a summary of research results so far. Therefore, although it is not yet scientifically clear whether or not obstacles in terms of environmental conservation will be generated, it is

important to voluntarily promote the development and the use of indicators for those areas in which people take a deep interest, based on managerial judgment regarding how they are related to the markets of the businesses concerned.

(3) When ambiguous indicators are used without clear definitions, it is necessary to clearly state definitions of these indicators as interpreted by the businesses concerned, as well as reasons for using such indicators.

(4) When businesses themselves select industry-specific core indicators and other indicators selected by businesses, the indicator selection procedure of ISO14031 will help.

3. Boundary

First of all, at presentation of an indicator value, it is important to clearly establish a boundary of business activities for adding up the value.

Environmental performance indicators are divided broadly into two groups; indicators that cover the entire organization, and indicators that cover individual sites such as factories and business sites.

Some enterprises do not simply implement their businesses activities within the organizations only, but subcontract production transfer or transportation to domestic or overseas subsidiaries. Therefore, the entire group of each enterprise should be examined according to the aggregation scope of consolidated financial accounting. However, considering the load required for aggregating the data and comparison of evaluation with other companies, the boundary shall be defined based on the actual situation (it is necessary to clearly indicate the boundary and the reason for defining the boundary). For instance, when one enterprise group includes entirely different industries, the details shall be clearly indicated to avoid any confusion.

For typical products and services, the entire image of the environmental burdens should be checked beyond the boundary that is mentioned above, by implementing life cycle evaluation (LCA) including suppliers of raw materials and OEM subcontractors.

Indicators of individual factories and business sites are important in terms of handling regional environmental issues such as pollution regarding which regional residents are the main stakeholders.

When indicators of the entire organization and indicators in site units are to be presented concurrently, some items need to be included in either one of the indicators only. Therefore, this examination indicates which one of the entire organization or site unit is to be emphasized for each indicator item, regarding industry-specific indicators.

4. Flow and stock

As financial accounting involves a profit and loss statement (flow) and a balance sheet (stock),

environmental performance indicators also conceptually involve flow indicators (example: amount of material input and amount of waste produced) and stock indicators (example: amount of chemical substances accumulated in soils within the premises).

However, since this is still an indicator development stage and in particular, stock indicators can only be used as extremely restricted indicators, the indicators shall be organized and classified based on flow for the time being and the important fields such as pollution of soils and underground water shall be handled by adding indicators relating to stock pollution.

V. Evaluation by Environmental Performance Indicators

1. Time-series comparative evaluation

Environmental performance of a business needs to be assessed not by temporary situations, but by yearly changes such as improvements over an extended period of time. For this purpose, environmental performance indicators need to show not single-year values but time series values from the past. In this case, it is appropriate to indicate changes of the absolute values and also indicate changes of values associated with the management indicators to avoid the influence from economic fluctuations and increase and decrease of businesses that are subcontracted externally. Any changes of boundaries and notations need to be stipulated also.

To predict future environmental performance of a business, the presence of programs for future efforts and the contents will be useful information. For this reason, it is important to indicate the plan and outlook and provide comparative evaluation between the future targets and the current conditions for environmental performance indicators.

It is also important to present indicators (including qualitative description) regarding environmental management conditions as well as indicators directly connected to environmental burdens in order to achieve the targets.

The environment improvement effects that are clarified by time series comparative evaluation and the way the indicators should be assessed to indicate the relationship with the amount invested and cost will be examined in the future environmental accounting studies.

2. Comparative evaluation with the baseline

Separate from the time series evaluation, an environmental burden reduction measure may be assessed by calculating the difference between the environmental burdens indicated as a result of applying the environmental burden reduction measure and the environmental burdens (baseline) that are assumed without application of the measure. This method is useful for evaluation of results of individual measures such as development or introduction of specific products and services based on environmental conservation and implementation of specific businesses or projects.

However, the comparative evaluation based on the baseline is greatly affected by the baseline setting method and may fall into subjective evaluation. Therefore, the baseline setting method

needs to be clarified to enable third parties to participate in verification.

The environment improvement effects that are clarified by comparative evaluation based on the baseline and the way the indicators should be set to indicate the relationship with the amount invested and cost will be examined in the future environmental accounting studies.

VI. Indicators Associated with Management Indicators

Since problems of environmental burdens will not be alleviated unless the total burdens are reduced, basically, environmental burden related indicators needs to be examined and assessed based on the absolute values. For instance, for the amount of greenhouse gases emitted, the target reduction rate is established based on the amount in 1990.

However, since industrial activities are basically profit-seeking activities, and pursuit of profitability (pursuit of economic efficiency) is important in the development of business, any efforts that compromise the development will be rejected by the company.

Therefore, environmental performance of profit-seeking enterprises should be assessed through environmental burden indicators and also through the indicators produced by associating management related indicators such as turnover and turnout and environmental burden related indicators, as supplementary information.

Especially, in view of the fact that the key to solving current environmental problems is to plan economic development while minimizing environmental burdens and to build a sustainable socioeconomic system with sound material cycles, it is necessary to make efforts to control the total amount of environmental burdens generated from the economy as a whole, while maintaining sound competitions between individual corporations. For this purpose, it is desirable that corporate performance be compared by indicators that integrate economic efficiency and environmental conservation, and that corporate competitions be promoted based on these indicators.

For example, these indicators include:

(1) Environmental burdens per unit product/service value (environmental burden intensity degree)

The indicator of an environmental burden concentration degree is effective for assessing business's efforts to environmental conservation only without being influenced by economic fluctuations and increase/decrease of businesses that are subcontracted externally. Therefore, the indicator is used by many businesses. For instance, if the production of energy conservation equipment increases, the volume of CO_2 generated from the production process of the business may be increased; however, this does not mean that the environmental conservation activities of the business are inferior. If a factory is closed as a result of restructure, the environmental burdens of that year decrease, however, this does not mean that the environmental conservation activities of the business are superior. To solve these problems, an indicator of an environmental burden concentration degree is effective.

No matter how much the environmental burden concentration degree is reduced, a dramatic

increase of the total environmental burdens is not acceptable and it is necessary to indicate the performance in conjunction with the absolute value.

[Notes on calculation]

a. As the unit for expressing the "product/service value" here, the economic added value should be used by subtracting the raw material cost from the turnover at evaluation of environmental burdens within the business area in terms of matching the aggregate scope of the numerator and the denominator. However, when such calculation is not easy, the following unit requirements are also acceptable according to the characteristics of the environmental burden related indicators.
   [1] Turnover
   [2] Turnout (delivery amount), production, production quantity: (for manufacturing industry)
   [3] Total floor area, business hours, number of employees, and number of customers :(for non-manufacturing industry)
   (However, for the products of high raw material costs, the environmental burden concentration degrees of the turnover and turnout are low.)
   In addition, various unit requirements are considered according to the characteristics of each business such as the size of the construction area.

b. The indicator may be used according to the boundary such as using the turnover for the entire enterprise group and production for factory units.

c. To assess efforts on environmental conservation related to individual products, it is desirable to apply unit requirements for "production function"(example: cooling capacity of air conditioner). (However, functions of many products cannot yet be expressed quantitatively except for some products whose functions are indicated according to "regulations relating to rationalization of energy utilization) and this issue is to be examined as one of the future objectives.)

* Example of environmental burden concentration indicators
  · Amount of greenhouse gases emitted per unit turnover (t/yen)
  · Amount of energy consumed per unit production (J/t)

(2) Product/service value per unit environmental burden (eco-efficiency)

The eco-efficiency indicator is expected to become more important in the future along with construction of the economic system with sustainable development and internalized environmental consideration. No matter how much the economic value is increased, the economic value in the broad sense including the environmental factor will be cancelled out if large economic burdens are imposed. Since this indicator shows enhancement of the economic value in proportion to the progress of environmental improvements, this indicator gives a big incentive for the companies with their emphasis on management indicators.

However, no matter how the eco-efficiency is improved, a dramatic increase in the total environmental burdens is not desirable and it is essential to present the indicators together with the absolute values.

[Notes on calculation]

a. For the “unit environmental burden” discussed here, application of all the environmental burdens related indicators makes evaluation more difficult in proportion to the load required. Therefore, application of common core indicators such as total amount of materials input, total energy consumption, amount of greenhouse gases emitted, total volume of water drained, and waste is considered to be sufficient.
b. The contents are the same as for those of the environment burden concentration indicators, except for those indicated above.

※ Example of eco-efficiency indicators

· Turnover per unit energy consumption (yen/J)
· Product function (fuel cost, etc.) per unit energy consumption (km/ l)
· Production of products/service per material input amount (t/t)

Based on the above, businesses and stakeholders are required to select indicators by associating with management indicators in various forms and make evaluation to begin with.

VII. Environmental Performance Indicators

1. Common core indicators

The following indicators are highly important from the point of view of the actual situations regarding the environmental problems and environmental policies as stated below. In addition, since the subjects are common to almost all industries, regions, and stakeholders and may be estimated, these indicators are defined as common core indicators.

◎ Environment management related indicators (management performance indicators(MPI))

1. Indicators for environmental management system

[1] Environmental problems

In order for businesses to improve their environmental performance, they must establish and use a proper environmental management system (EMS), which will be a basis for their activities.

In selection of environmental performance indicators, how environmental management systems are built and used will be an important indicator.

Since the situation of how environmental management systems are established and used is likely to differ largely depending on the type and the size of the corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how properly they are promoting it.

[2] Considerations for estimation

A. Progress in the establishment and utilization of environmental management systems shall be monitored and assessed according to the actual situation of each industry type, corporate size, and so on.
B. It is desirable to establish quantitative indicators for evaluation as best as possible. If that is not possible, qualitative evaluation is also acceptable.
C. Evaluation shall be made by monitoring the overall progress in the establishment and utilization of EMS; the number and percentage of business sites establishing and using EMS; the number and percentage of business sites that have acquired ISO14001 certification; the number and percentage of business sites working out environmental action plans for Environmental Activity Evaluation Program; the presence of policies, objectives and others, and their details; preparedness of organizations and systems; the number, percentage and persons/time of employees who have received environmental education and training; preparedness of emergency systems; progress in the implementation of monitoring and measurement; progress in the implementation of EMS audit, and so on.

2. Indicator for research and development of technologies for environmental conservation, environment-conscious products/services, etc. (Design for the Environment (DfE))

[1] Environmental problems

Businesses should make environmental efforts by actively promoting research and development of technologies for environmental preservation, environment-conscious products/services and

others. Their research and development activities will lead to the improvement of environmental performance in the future.

Important factors in selection of environmental performance indicators are how they are promoting research and development of technologies for environmental conservation, environment-conscious products/services and others, and what outcomes they are producing.

Since the situation regarding research and development of technologies for environmental preservation, environment-conscious products/services and others is likely to differ largely depending on the type and the size of the corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how properly they are promoting it.

[2] Considerations for estimation

A. Progress in research and development of technologies for environmental conservation, environment-conscious products/services and others shall be monitored and assessed according to the actual situation of each industry type, corporate size, and so on.
B. It is desirable to establish quantitative indicators for evaluation as best as possible. If that is not possible, qualitative evaluation is also acceptable.

3. Indicators for progress in environmental accounting

[1] Environmental problems

In order for businesses to make proper environmental efforts, it is essential to monitor and assess the costs and effects of their own environmental efforts. Triggered by the announcement of the "Guidelines for the Implementation of Environmental Accounting System (2000 Edition)" by Ministry of the Environment, environmental accounting is rapidly spreading among businesses.

Progress in environmental accounting can be an important indicator for selecting environmental performance indicators.

Since progress in environmental accounting is likely to differ largely depending on the type and the size of a corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how effectively they are promoting it.

[2] Considerations for estimation

A. Based on the concept stated in the "Guidelines for the Implementation of Environmental Accounting System (2000 Edition)" by Ministry of the Environment, the progress in environmental accounting shall be assessed regarding whether costs of environmental preservation, effects of environmental conservation measures, and others are being monitored.
B. At announcement of environmental accounting information, it is necessary to clearly state the scope of data collection, methods used for data collection, and others.

4. Indicators for the disclosure of environmental information and environmental communication

[1] Environmental problems

In order for businesses to make environmental efforts and to win the confidence of the society, they need to disclose their environmental information and willingly try to develop better environmental communication. Especially, the number of environmental reporting written and announced by businesses is increasing rapidly, and they are making great progress with respect to quality. Also, the efforts to provide environmental information to consumers and others through eco-labels, advertisements related to the environment, and other means are increasing.

Furthermore, the need for environmental communication is rising from the point of view of businesses' "accountability regarding the environment."

In selection of environmental performance indicators, progress in the disclosure of environmental information through environmental reporting, eco-labels and others, as well as environmental communication with stakeholders can be an important indicator.

Since progress in the disclosure of environmental information through environmental reporting, eco-labels, and others, as well as environmental communication with stakeholders is likely to differ largely depending on the type and the size of a corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how properly they are promoting it.

[2] Considerations for estimation

A. Progress on the disclosure of environmental information through environmental reporting, eco-labels and others, as well as environmental communication with stakeholders shall be monitored and assessed according to the actual situation of each industry type, corporation size, and so on.
B. It is desirable to establish quantitative indicators for evaluation that are as good as possible. If that is not possible, qualitative evaluation is also acceptable.

5. Indicators for compliance with environmental regulations

[1] Environmental problems

In order for businesses to make environmental efforts and to win the confidence of the society, they need to actively promote environmental communication. At the same time, they also need to adhere to various environmental regulations, and others, and to disclose information. Especially, how they are adhering to environmental regulations is a matter of great concern for local residents living near the businesses.

In selection of environmental performance indicators, adherence to environmental regulations can be an important indicator.

Since adherence to environmental regulations is likely to differ largely depending on the type and the size of a corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how properly they are promoting it.

[2] Considerations for estimation

A. Adherence to environmental regulations shall be monitored and assessed according to the actual situation of each industry type, corporation size, and so on.
B. It is desirable to establish quantitative indicators for evaluation that are as good as possible including the number of violations, the number of accidents, the amount of fines and so on. If that is not possible, qualitative evaluation is also acceptable.

6. Indicators for social contribution related to environments

[1] Environmental problems

It is desirable that businesses make environmental efforts, and at the same time, make efforts to build an environment-conserving society in cooperation with various other sectors. One of the specific means of cooperation is social contribution related to environments - voluntary social contribution activities to environments by employees and businesses, support to organizations promoting environmental preservation, and efforts of industrial groups. It is necessary to promote

these positive social activities voluntarily.

In selection of environmental performance indicators, social contribution related to environments can be an important indicator.

Since social contribution related to environments is likely to differ largely depending on the type and the size of a corporation, it is difficult to establish uniform evaluation indicators. However, since it meets the requirements of a common core indicator, environmental performance of businesses shall be assessed according to how properly they are promoting it.

[2] Considerations for estimation

A. Social contribution related to environments shall be monitored and assessed according to the actual situation of each industry type, corporation size, and so on.

B. It is desirable to establish quantitative indicators for evaluation that are as good as possible including voluntary social contribution activities to environments by employees and businesses, support to organizations promoting environmental conservation, efforts of industrial groups, and so on. If that is not possible, qualitative evaluation is also acceptable.

◎ Environmental burden related indicators (operational performance indicators (OPI))

1) Indicators relating to input

a. Relationship of environmental burdens within the business area

(1) Indicators of “substance” input

1. Total input of materials (unit: t)

2. Amount of sustainable use of materials within the business (unit: t)

[1] Environmental problems

Today's economic society, which exploits a large quantity of resources from the environment and releases a large quantity of discarded articles into the environment, surpasses the restorative ability of the environment, causing various environmental problems. To find drastic solutions to these environmental problems, and to build an economic society that allows sustainable development, businesses need to make efforts to design resource-conserving production processes and develop resource-conserving products and services, as well as to promote cyclical use of resources (reutilization, recycling, and thermal recycle) to reduce the total input of substances as much as possible.

The basis of selecting environmental performance indicators shall be to know the material flow regarding how much resources corporations, factories and business sites are using (input), and how much discarded material they are releasing (output).

Therefore, the total input of substances shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it (also, how the amount of the substances that are used cyclically within the business is increased).

[2] Considerations for estimation

A. The total input of substances related to the flow includes:
   a. Raw materials
   b. Products, parts, and components
      The following considerations shall also be included:
   c. Substances that are regarded as production and capital assets such as facilities, equipment and others of factories and business sites.

B. Regarding raw materials, it is desirable to announce the breakdown including metal (iron, aluminum, copper, lead and others), plastic, wood, paper, farm produce and others. (Different units (volume, etc.) are acceptable for the substances that cannot be checked by weight (t) such as timbers.)

C. Regarding products, parts and components, only the total weight is necessary for the time being and there is no need to monitor the breakdown of the substances since it is difficult to check the breakdown of each substance. However, the breakdown is expected to be monitored in the future.

D. Regarding production and capital assets, there are many fluctuation factors such as a dramatic increase of input in the year when facilities are rebuilt and equipment is replaced. Therefore, it is acceptable to make estimations without including production and capital assets. When they are included, the reason for the fluctuation and the fluctuation amount needs to be clearly indicated.

E. The total substances input shall not include the substances that are used cyclically (reutilization,

recycling, and thermal recycle) within the business and such substances shall be checked separately as described in "2. Amount of sustainable use of materials within the business."

(2) Indicators of "energy" input

3. Total energy consumption (unit: J)

4. Renewable energy consumption (unit: J)

[1] Environmental problems

Exploiting and burning a large quantity of fossil resources, such as petroleum, coal and natural gas from the environment, and releasing a large quantity of carbon dioxide (CO_2) into the environment is a major cause of global warming. In order to build an economic society that allows sustainable development, it is necessary to minimize the energy consumption from fossil resources, to use the renewable energies such as solar energy and solar heat, as well as to improve energy consumption efficiency.

The basis of selection of environmental performance indicators shall be to know the energy flow regarding how much energy corporations, factories and business sites are using (input), and how much carbon dioxide and other matter they are releasing (output), in addition to monitoring the total input of resources.

Therefore, the total energy consumption shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it (also, how changeover to consumption of renewable energies is implemented).

[2] Considerations for estimation

A. The total energy consumption shall be estimated by monitoring separately the amount of electricity, fuels and others used, and adding the figures.
B. The electricity consumption shall be monitored at the receiving end.
C. The value, 10,250 (kJ/kWh), shall be used as the coefficient for converting the electricity consumption kWh to J (joule) based on the " Enforcement Regulations for the Law Concerning Rational Use of Energy."
D. It is desirable to check the breakdown of the electricity consumption and consumption of each fuel.
E. The energy consumption for own transportation and others shall be included in the total energy consumption. The energy consumption for transportation of products and others contracted out to outside operators shall be monitored separately and not included.
F. "Renewable energies" refer to those that are generated from or supplied by sunlight, solar heat, wind, geothermal energy, and/or small-scale hydroelectric power.

(3) Indicators of "water" input

5. Amount of water used (unit: m^3)
6. Amount of sustainable use of water within the business (unit: m^3)

[1] Environmental problems

Water is essential for survival of the human race, and it is also a basic resource essential for agriculture, manufacturing industry and others. Furthermore, excessive pumping-up of water, especially groundwater, may cause such public problems as land subsidence. Therefore, it is

necessary to reduce the amount of water resources used as much as possible, as well as to promote efficient recycling of water resources.

The basis of selecting environmental performance indicators shall be to control how much water resources corporations, factories and business sites are using (input).

Therefore, the amount of water used shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it (in addition, how the amount of cycled water is increased within the business).

[2] Considerations for estimation

A. The amount of water used shall be estimated by adding the amount by kind, including tap water, industrial water, and groundwater.
B. The amount of water recycled and reused within the business site shall not be included and shall be checked separately as "6. Amount of sustainable use of water within the business ."

b. Environmental burden relationship in upstream sectors of the business area

Indicators related to "green purchasing (preferential purchase of environment-conscious products and services)"

7. Green purchasing indicator according to the characteristics such as products and services purchased

8. Quantity or proportion of products purchased that could contribute to the mitigation of environmental burdens such as Eco Mark products, which are certified by eco-labels (unit: t, yen, or %)

[1] Environmental problems

To minimize environmental burdens and promote cyclical use of resources and energies, businesses need to actively make efforts regarding the purchasers of products, raw materials, parts, and services (referred to as "products, services, and others" henceforth), which are in the upstream sectors of the business area, as well as efforts within their own business areas. As one of the important techniques, preferential purchase of environment-conscious products and services (green purchasing) is available.

In selection of environmental performance indicators, it is necessary to check how actively corporations, factories, and business sites are promoting green purchasing.

Since the products and services that are purchased vary greatly according to the industry and scale of the corporation, it is difficult to set uniformly standard and quantitative evaluation indicators for green purchasing. Therefore, it is important to examine the environmental factors according to the characteristics of each product or service and set out a green purchasing program for each business. Environmental performance of each business shall be assessed according to how green purchasing is implemented based on this program.

[2] Considerations for estimation

A. "Environment-conscious products and services" refer to the "environmental articles" that are defined in Clause 1 of Article 2 of the "Law regarding promotion of procurement of environmental articles by country, etc.(Law on Promoting Green Purchasing)" The actual products, services, and others refer to the following:

· Environment-conscious raw materials or components (recycled resources, recycled components,

etc.)

· Environment-conscious products (products produced using recycled resources or recycled components, products produced by reducing the use of environment pollutants, products of low energy consumption, products that can be reused or recycled, etc.)

· Environment-conscious services (transportation service using vehicles of low exhaust gas, etc.)

B. The status of green purchasing shall be monitored and assessed based on the green purchasing program established by the business according to actual condition of the industry or the scale of the corporation. In this case, it is necessary to clarify the actual definition of the "environment-conscious products, services, and others" and the concept and reason for using the indicator by the business.

C. It is appropriate to monitor the environmental considerations associated with the supplier's business activities as well as the products and services. For instance, the environmental considerations associated with business activities in the supplier shall be monitored through acquisition of ISO14001 certification and implementation status of the Environmental Activity Evaluation Programme.

D. "Eco-labels" refer to the environmental labels that match ISO14024 (JIS Q 14024: third party certified environmental label) and ISO14021 (JIS Q 14021 self-declaration type environmental level) such as eco-mark.

E. In selection of "environment-conscious products", the specific procurement items shall be used based on No.2, Clause 2, Article 6 of the law regarding green purchasing and the bases of the judgment in addition to eco-label certified products such as eco-mark.

F. Since eco-label approved products and specific procurement items based on the law regarding green purchasing are mainly standard items (cataloged products), it is appropriate to use the "total quantity of the standard items that were purchased" as the denominator in calculation of the ratio.

2) Output indicators

a. Environmental burden relationship within the business area

(1) Indicators of emissions to the "air"

9. Greenhouse gas emissions (unit: t-CO_2)

[1] Environmental problems

The earth is warmed by solar radiation that reaches the earth's surface, and the earth's surface releases infrared radiation to outer space for cooling. Since the air has greenhouse gases that absorb infrared radiation, the air absorbs infrared radiation released from the earth's surface and stays warm. This exquisite balance of the earth maintains atmospheric temperature appropriate for organisms to live.

Recently, however, a large quantity of greenhouse gases, such as carbon dioxide, has been released into the atmosphere from aggressive economic activities of human beings. As the atmospheric density of greenhouse gases rises, the amount of heat kept in the air increases, and global warming is progressing at a rapid pace. If it continues to progress at the current pace, it is expected that the average atmospheric temperature of the earth will rise about two degrees by the end of the 21st century, and the sea level will rise about 50 centimeters throughout the earth. Furthermore, due to climatic changes caused by global warming, it is feared that rainfall patterns will change and there will be more serious floods and droughts. (Source: IPPC 2nd Assessment Report, 1995)

In particular, the amount of CO_2 emitted as a greenhouse gas accounts for 88.9% of the total amount of greenhouse gases emitted in Japan. This gas contributes to global warming as the largest proportion, and a large amount of CO_2 is discharged as a result of fossil fuels such as coals and oil. The total amount of CO_2 discharged in 1998 in Japan is 1188 million tons, which account for 9.39 tons per capita. This is an increase of 5.6% in the total amount discharged and an increase of 3.2% per capita in comparison to that of 1990.

The basis of selecting environmental performance indicators shall be to monitor greenhouse gas emissions from corporations, factories and business sites.

Therefore, the amount of greenhouse gas emissions shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. The amount of greenhouse gas emissions shall be estimated by initially monitoring separately the amount of six kinds of gases stipulated in the Climate Change Policy Law; carbon dioxide (CO_2), methane (CH_4), dinitrogen monoxide (N_2O), hydrofluoro-carbons (HFC), perfluoro-carbons (PFC), and 6-sulfur fluoride (SF_6). Then, each monitored value shall be multiplied by the global warming coefficient (coefficient to make it a CO_2 equivalent) and the total amount shall be produced by adding these values to gather.

B. The amount of greenhouse gases emitted shall be estimated by checking the amount of fuels, electricity, and heat used within the scope specified in the Enforcement Act for the Government Ordinance for the Implementation of the Climate Change Policy Law, and applying the emission coefficient.

C. In principle, the value specified in the Enforcement Act for the Government Ordinance for the Implementation of the Climate Change Policy Law shall be used as the emission coefficient for the estimation. However, detailed evaluation of the effects of individual measures for reduction of greenhouse gas emission (introduction of a co-generation system that supplies electricity and heat simultaneously, introduction of generation of natural energy, etc.) is essential and rational emission coefficients suitable for individual measures may be applied if available.

For instance, use 0.357 ($kgCO_2/kWh$), which is the average emission coefficient of the total power supply, for estimation of the amount of CO_2 emitted per year as a result of the use of electricity supplied from general electricity business. However, when the consumption of the electricity supplied from the general electricity operator is reduced due to the measures taken by the business, making a large difference in the CO_2 emission coefficient corresponding to the reduced consumption from the original value of 0.357, the effects may be estimated by using the emission coefficient corresponding to the actual condition. For the electricity supplied from a business other than general electricity utility, the emission coefficient corresponding to the actual condition shall be used as much as possible (for instance, when the supplier generates electricity from natural energy, the CO_2 emission coefficient is 0) and when such coefficient is not available, the value 0.602 (kg CO_2/kWh) shall be used.

D. For the amount of CO_2 emitted as a result of incineration of waste, waste that are consigned to subcontractors for incineration shall be included.

E. For the amount of greenhouse gases emitted, include the amount of gas emission caused by the fuel consumption associated with the business's own transportation, but do not include the amount of gas emission caused by the fuel consumption associated with transportation of products that are consigned to subcontractors.

F. For the amount emitted in overseas countries, the emission coefficient for estimation shall be

used if such information is available in the country.

G. For other estimation methods, refer to the report of “the Study Group on the Calculation Methodology of the Emissions of Green house Gases” (Ministry of the Environment) for 2000. (Scheduled to be announced after March, 2001) shall be used as the reference.

10. Amount of ozone depleting substances released (unit: ODP t)

[1] Environmental problems

The ozone layer exists in the stratosphere at an altitude of over 10,000 meters. It absorbs almost all hazardous ultraviolet lights contained in solar radiation, protecting human beings, animals and plants from harmful influences. This important ozone layer is rapidly deflected by artificial chemical substances such as chloro-fluoro-carbon.

If the ozone layer is deflected, the amount of hazardous ultraviolet radiation that reaches the earth's surface increases, which causes harm to the environment such as increase of skin cancer and harmful influences to ecosystems.

To prevent ozone layer depletion by chloro-fluoro-carbon and other substances, "Vienna Convention for the Protection of the Ozone" and "Montreal Protocol on Substances that Deplete the Ozone Layer" have been signed and adopted in the international arena. In Japan, the "Ozone Layer Protection Law through Regulations of Specified Substances" has been enacted.

Therefore, the amount of ozone depleting substances released shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. The total amount of ozone depleting substances released shall be estimated by monitoring the amount of each substance stipulated in the table in Article 1 of the Enforcement Act of the Law Concerning the Protection of the Ozone Layer , including CFC, halon, HCFC and 1,1,1-tricholoroethan, multiplying each value by the ozone layer depleting coefficient (coefficient to make it a CFC-11 equivalent) that is specified in the table, and adding the results.

B. The amount of each substance released includes both the amount used in a business site and released to the environment, and the amount released to the environment from discarded air conditioners, car air conditioners, refrigerators and others.

C. It is desirable to also monitor the amount of ozone depleting substances released by kind and how they are released.

D. For halon that is contained in fire extinguisher agent, the amount used for extinguishing a fire, the amount released at repair or checking, and the amount released at disposal of the fire extinguishing facilities shall be the amount released.

(2) Indicators of emission to “water and soil”

11. Total amount of drainage （unit: m^3）

[1] Environmental problems

Increase in the amount of drainage without recycling water resources leads to a shortage of water resources, and causes water pollution by COD, phosphorus, nitrogen, heavy metals, toxic chemicals, and others in waste water, as well as eutrophication of lakes, marshes and sea areas.

In the future, it is desirable to reduce not only hazardous substances included in waste water, but also the amount of drainage itself.

Therefore, the total amount of drainage shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. The total amount of drainage shall be estimated by adding up the amounts of drainage to public waters and sewerage.
B. The amount of rainwater not recycled/reused shall not be included in the amount of drainage.

(3) Indicators of the amount of "waste" generated

12. Total amount of waste generated (unit: t)

[1] Environmental problems

To reconsider economic and social systems centered on mass production, mass consumption and mass disposal, it is most important for businesses to control generation of waste by reducing the use of resources and using resources efficiently. It is also important for businesses to promote reutilization and recycling of resources in their activities and to minimize generation of waste. To assess quantitatively how they are coping with these tasks, it is appropriate to focus on the total amount of waste and others generated.

The basis of selecting environmental performance indicators shall be to know the material flow regarding how much resources corporations, factories and business sites are using (input), and how much discarded articles they are releasing (output).

Therefore, the total amount of waste and others generated, which is the total amount of output, shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. The total amount of waste generated shall be estimated by adding everything a business generated/carried out to the outside of its site (outside the control), except for the waste shipped along with products, services and others provided. In this guideline, the amount of waste that are cyclically used within the premises of the business shall not be included and shall be assessed separately as “2. Amount of substances cyclically used within the business operation.” (Waste discharged to the environment for reclamation shall be included even if they are discharged within the premises.)
B. "Waste" refer to waste, used or unused articles collected or discarded, and secondary articles generated from business activities (articles stipulated in Clause 2, Article 2 of the Basic Law for Establishing the Recycling-based Society).
C. “Waste” include construction waste that are generated as a result of re-building or disposal of facilities and equipment of factories and business sites. Facilities and equipment are treated as production assets and capital assets and waste generated from these fluctuate greatly such as a sudden increase in such waste in the year of rebuilding or disposal. Therefore, waste generated from facilities and equipment shall be monitored and assessed separately from other waste.
D. It is desirable to monitor the breakdown of waste and the processing method, and locations of processing for each type of waste and others.

13. Amount of recyclable resources reused (unit: t)

14. Amount of recyclable resources recycled (unit: t)

[1] Environmental problems

No matter how aggressively the generation of waste and others is restrained, there are waste and others that are inevitably generated, and there are waste and others that are generated for economic and technological reasons. The Basic Law for Establishing the Recycling-based Society regards them as "recyclable resources" and promotes their utilization in cycles (reuse, recycling and thermal recycle). Therefore, it is necessary to promote reuse, and if reuse is difficult, promote recycling. If the amount of recyclable resources reused/recycled is larger than before when compared to the amount of waste that were processed for final disposal, it is likely that this society is departing from mass production, mass consumption and mass disposal, and heading toward a recycling-based society.

Therefore, the amount of waste and others reused/recycled as recyclable resources shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are increasing it in comparison with the amount of final disposal and the amount of thermal recycle.

[2] Considerations for estimation

A. "Recyclable resources" refer to useful resources among "waste".
B. The amount of recyclable resources reused and the amount of recyclable resources recycled shall be estimated by monitoring each resource a business reused and recycled among the waste the business generated/carried out to the outside of its site (outside its control).
C. However, residue after reuse and recycling shall be excluded from the amount reused/recycled. Even if the amount cannot be estimated and, consequently was not excluded, the effect shall be clearly indicated.
D. Conversion of waste plastics into oil resources shall be included in recycling.
E. It is desirable to also assess situations of reuse and recycling.
F. Besides monitoring the absolute amount of recyclable resources reused/recycled, it is also effective to monitor it in terms of the percentage in the total amount of waste and others generated.

15. Amount of recyclable resources that are thermally recycled (unit: t)

[1] Environmental problems

No matter how aggressively the generation of waste and others are restrained, and no matter how completely reuse and recycling are promoted, there are unavoidable waste and others that are to be processed or discarded, and there are waste and others that are difficult to reuse/recycle for economic and technological reasons.

It is also important to regard these waste and others as "recyclable resources" and use them effectively. Measures for effective use of such waste include thermal recycle by incineration, methane utilization by anaerobic fermentation, and utilization in coke and blast furnaces. It is necessary to promote these measures within the scope needed.

Therefore, the amount of waste and others from which heat is recovered as recyclable resources shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are increasing it in comparison with the amount of final disposal such as reclamation.

[2] Considerations for estimation

A. The amount of recyclable resources from which heat is recovered shall be estimated by monitoring the amount of resources a business recovered heat from, among the waste and others the business generated/carried out to the outside of its site (outside its control).
B. It is desirable to also assess situations of thermal recycle.

16. Amount of waste incinerated (unit: t)

17. Amount of final disposal of waste (unit: t)

[1] Environmental problems

It is necessary to minimize the amount of waste to be processed for final disposal (landfill, etc.), first by controlling the generation of waste and others, then by reusing and recycling them, and if that is difficult, by thermal recycle.

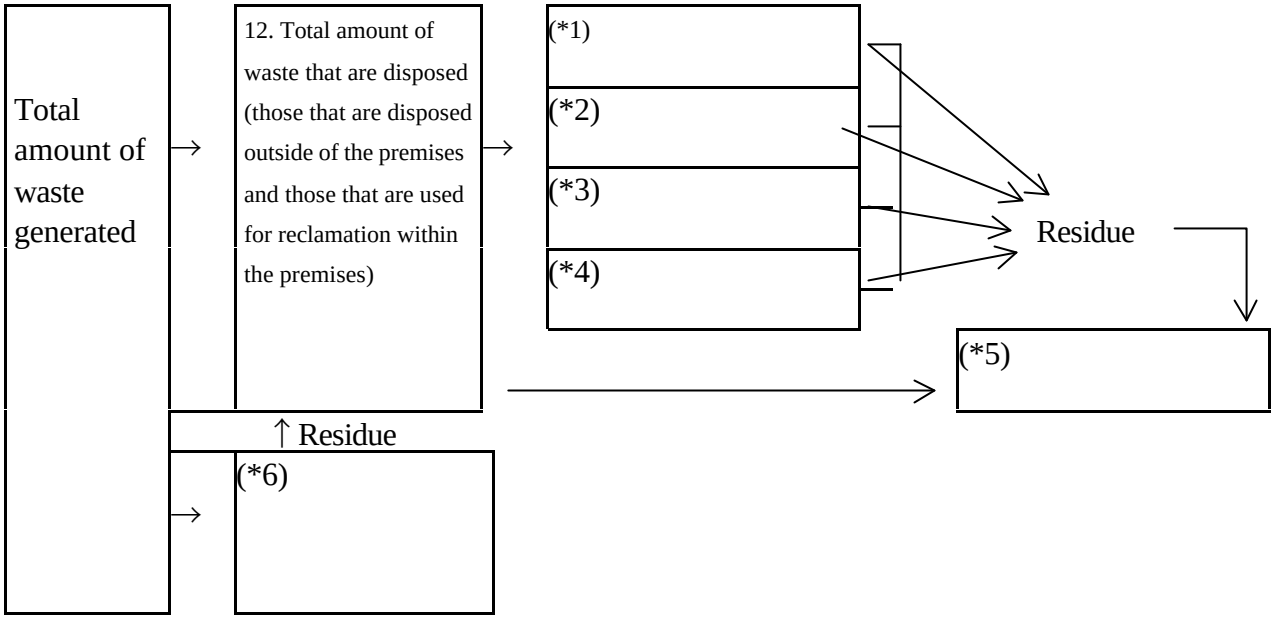
The basis of selecting environmental performance indicators shall be to know the material flow regarding how much resources corporations, factories and business sites are using (input), and how much discarded articles they are sending to final disposal.

Therefore, the total amount of waste and others that are processed for final disposal, which is the total amount of final output, shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. Regardless of inside and outside of the premises of the business, the amount of waste to be processed for incineration and final disposal (landfill, etc.) shall be estimated.
B. "Incineration processing" is to simply burn the waste without thermal recycle.
C. The amount of waste and others to be processed for final disposal includes the amount of residue after reusing, recycling, thermal recycle, and incineration processing. The amount shall be monitored separately from the amount of waste and others that are directly processed for final disposal. Even if the amount of residue cannot be included in the amount to be processed due to inability to monitor, the effect shall be clearly indicated.
D. It is desirable to also assess situations of final disposal.
E. Regarding waste and others for which burying and other means of disposal are difficult and which are kept or stored (including radioactive waste and hazardous waste), it is desirable to separately monitor and assess the amount and situations by type.

The relationship of the indicators associated with disposal of "waste and others" are shown below. This information enables the monitoring of the entire material flow associated with waste and others.



(*1) 13. Amount of recyclable resources reused
(*2) 14. Amount of recyclable resources recycled
(*3) 15. Amount of recyclable resources that are thermally recycled
(*4) 16. Amount of waste incinerated
(*5) 17. Amount of waste processed for final disposal
(*6) 2. Amount of recyclable resources that are reused, recycled, or thermally recycled within the business operation

b. Relationship of environmental burdens in the downstream sectors of the business area

Indicators for "provision of products and services"

18. Indicator of environmental burdens (or contributions to environmental preservation) according to the characteristics of products and services

19. Quantity or proportion of production/sales of products/services that could contribute to the mitigation of environmental burdens (unit: quantity, %)

[1] Environmental problems

It is one of the most important missions for businesses to reduce environmental burdens generated from products and services they produce and sell. This is a task essential for building an environment-conserving and recycling-based sustainable society.

In selection of environmental performance indicators, it is necessary to monitor how enthusiastically businesses are promoting production and sales of environment-conscious products and services.

Since businesses produce and sell a wide variety of environment-conscious products and services, and the actual situation is likely to differ largely depending on the type and the size of a corporation, it is difficult to establish quantitative and uniform evaluation indicators. Therefore, environmental performance of each business shall be assessed based on how the business provides environment-conscious products and services by examining the environmental aspects according to

the characteristics of the products and services.

[2] Considerations for estimation

A. “Products/services that could contribute to the mitigation of environmental burdens” refer to “environment items, etc.” defined in Article 2 of Clause 1 of Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities. (Including fund investments for environmental conservation by financial organizations.) Judgment standards of specific procurement items based on the eco-label certification standard such as eco-mark and items based on the Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities may be used as the reference.

B. Progress in reduction of environmental burdens or progress in environmental care shall be monitored and assessed according to the actual situation of each industry type, corporate size, kind of products/services, and so on.

It is desirable to establish quantitative indicators for evaluation that are as good as possible. If that is not possible, qualitative evaluation is also acceptable. However, it is necessary to clearly define " products/services that could contribute to the mitigation of environmental burdens" as well as to state the concept and reasons for using the relevant indicators.

C. To monitor environmental burdens related to products, it is desirable to being comprehensive consideration to the entire life cycle including the burdens generated during the production process as well as the burden generated during the use of the products and by disposal of the products (implementation of LCA) and various environmental burdens such as global warming, air pollution, water pollution, and increase of waste.

(2) Indicators for "transportation"

20. Total volume of transportation (unit: ton kilo (t x km) or person kilo (persons x km))

[1] Environmental problems

Among CO_2 emissions in Japan, the amount from transportation is increasing year after year. In fiscal 1998, it represented an increase of 21.1% compared to fiscal 1990, and accounted for 21.7% of the total amount of emissions.

In addition, as automobile transportation increases and concentrates in urban areas, air pollution in city areas is becoming more and more serious.

In order to reduce CO_2 emissions and air pollutants from transportation, it is necessary not only to promote more efficient transportation, but also to reduce the volume of transportation itself as much as possible.

The basis of selecting environmental performance indicators shall be to know how much transportation corporations, factories and business sites carrying out.

Therefore, the total volume of transportation shall be used as a common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. Estimation shall be made by monitoring and adding the volume of own transportation and transportation of products and services by outside operators (consignment and others) by transportation means (automobile, ship, railroad, air and others).

B. Although it is difficult to accurately monitor and estimate transportation of products and services by outside operators (consignment), it is desirable to monitor it as accurately as possible. If accurate monitoring is difficult, it is acceptable to make estimations for major

products only, use a certain simulation model to make estimations, and so on.

C. As for transportation of raw materials, fuels and others purchased, it is desirable to separately monitor it if they are not mixed with other general cargoes and delivered by exclusive, chartered and other transportation means.

D. It is desirable to monitor percentages of own transportation and transportation by outside operators, a breakdown of transportation means, and others.

E. Improvement of transportation efficiency (unit: % {[transportation ton kilo(t×km)] / [capacity ton kilo (t×km)] or [transportation person kilo (persons x km)] / [capacity person kilo (persons x km)]}) through joint transportation/delivery and return cargo arrangements also contributes to reducing carbon dioxide emissions and air pollutants. Therefore, it is appropriate to use it as an indicator too.

21. CO_2 emissions resulting from transportation (unit: t- CO_2)

[1] Environmental problems

CO_2 emissions from transportation account for about 20% of the total amount of emissions in Japan, and it requires intensive efforts in the same fashion as those made at factories and business sites. For this reason, the amount of CO_2 emissions from transportation as an indicator shall be used. To reduce CO_2 emissions, it is necessary to reduce the volume of transportation itself, and at the same time, it is necessary to promote a modal shift to rail and marine transportation as well as to improve transportation efficiency through joint transportation/delivery and return cargo arrangements.

Therefore, the amount of CO_2 emissions resulting from transportation shall be used as the common core indicator, and environmental performance of businesses shall be assessed according to how they are reducing it.

[2] Considerations for estimation

A. The amount of CO_2 emissions shall be estimated by monitoring the amount of fuel used within the scope specified in the Government Ordinance for the Implementation of the Climate Change Policy Law and calculating the emission coefficient. For instance, the emission coefficient of gasoline is 2.31 (kg CO_2/1), and the emission coefficient of diesel oil is 2.64 (kg CO_2/1.)

B. Estimation shall be made by monitoring and adding the amount of carbon dioxide emissions from own transportation and transportation of raw materials and products/services by outside operators (consignment and others) by transportation means (automobile, ship, railroad, air and others). (The amount of carbon dioxide emissions from own transportation is duplicated in the above "9. Amount of greenhouse gas emitted")

C. If it is difficult to accurately monitor the amount of carbon dioxide emissions from transportation by outside operators (consignment), it is acceptable to make estimations for major products only, a certain simulation model shall be used to make estimations, and so on.

D. As for transportation of raw materials, fuels and others purchased, it is desirable to separately monitor it if they are not mixed with other general cargoes and delivered by exclusive, chartered and other transportation means.

E. It is desirable to monitor percentages of own transportation and transportation by outside operators (consignment), the breakdown of transportation means, and others.

2. Industry-Specific Core Indicators

1) Indicators relating to input

a. Environmental burdens within the business area

Indicator	Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
Input of recycled resources and recycled parts	It is necessary to reduce environmental burdens resulting from mass exploitation of natural resources, and to use more recycled resources and recycled components for promoting waste recycling and reducing waste generation.	t	Monitor "recyclable resources" and “recycled parts” stipulated in the "Law for Promotion of Effective Utilization of Resources."	Material, Processing & Assembly, Construction, etc.	Entire organization
Input of hazardous materials	Hazardous materials, which have harmful influences on human health as well as animals and plants, do not produce environmental burdens immediately after they are used. However, they are destined to become waste themselves or become waste generated from products, and they will be released into the environment eventually. Therefore, it is necessary to use less hazardous materials.	t	Basically monitor chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management."	Material, Processing & Assembly, etc.	Entire organization Individual factory Business site
Input of tropical timber, genetically modified organisms、and others	For monitoring environmental burdens due to exploitation of resources, it is appropriate to include wild animals, plants and others that are important components of nature.	t	Monitor the areas that have issues from the point of view of environmental conservation, such as timber produced from tropical rain forests that are found to be decreasing, and genetically modified organisms that are found to have influences on ecosystems.	Construction, Foods, etc.	Entire organization

2) Indicators relating to output

a. Environmental burdens within the business area

Indicator		Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
Air	SOx emissions	May damage the respiratory organs, and causes acid deposition that has harmful influences on forests, lakes and ponds.	t		Material, Processing & Assembly, etc.	Entire organization Individual factory Business site
	NOx emissions	May damage the respiratory organs, and causes acid deposition and photochemical oxidants.	t		Material, Processing & Assembly, etc.	Entire organization Individual factory Business site
	VOCs emission	Generates photochemical oxidants, stimulates eyes and throats, and may give damage to the respiratory organs.	t		Material, Processing & Assembly, etc.	Individual factory Business site
	Emissions of substances subject to the PRTR Law	May have harmful influences on human health and obstruct the development and growth of animals and plants.	t	Make estimations for each of the chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management (the PRTR Law)." (Make separate estimations for hazardous air pollutants listed in the Air Pollution Control Law (substances subject to voluntary control.))	Material, Processing & Assembly, etc.	Entire organization Individual factory Business site
	Density of the emissions of items under emission control (SOx, NOx, soot and dust , dioxins, etc.)	May have harmful influences on human health and living environments.	Maximum density (ppm, etc.)	Make estimations for each item.	Material, Processing & Assembly, Construction, etc.	Individual factory Business site (facility)

	Density of the emissions of materials under emission restraint (benzene, trichloro-ethylene, tetrachloro-ethylene)	Among the air pollutants that may damage human health if inhaled continuously, those that need immediate control on release and dispersal are in this category.	Maximum density (mg/m^3N)	Make estimations for each item.	Material, Processing & Assembly, Construction, etc.	Individual factory Business site (facility)
	Noises and vibrations	Have psychological and mental influences on people.	dB		Material, Processing & Assembly, Construction, Distribution etc.	Individual factory Business site
	Odor	Have psychological and mental influences on people.	Maximum value (m^3N/ minute)		Material, Processing & Assembly, etc.	Individual factory Business site
Water and soil	Emissions of substances subject to the PRTR Law	May have harmful influences on human health and obstruct the development and growth of animals and plants.	t	Make estimations for each of the chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management."	Material, Processing & Assembly, etc.	Entire organization Individual factory Business site
	The level of COD and emissions of nitrogen, phosphorus	Cause eutrophication of enclosed water.	t		Material, Processing & Assembly, Distribution, Construction, etc.	Individual factory Business site
	Density of emission of items under drainage control	May have harmful influences on human health and living environments.	Maximum density (mg/l)		Material, Processing & Assembly, Construction, etc.	Individual factory Business site
Waste	Amount of hazardous waste generated	May have harmful influences on human health and living environments.	t	Make estimations for general waste under special control and industrial waste under special control stipulated in the "Waste Management and Public Cleansing Law." Also monitor the types and the treatment methods.	Material, Processing & Assembly, etc.	Entire organization Individual factory Business site

	Amount of waste transferred subject to the PRTR Law	May have harmful influences on human health and obstruct the development and growth of animals and plants.	t	Make estimations for each of the chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management."	Material, Processing & Assembly, etc.	Entire organization Individual factory Business site

b. Environmental burdens in downstream areas
Indicators for “products, services, and others”

Indicator		Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
Environmental burdens at the use phase	Energy efficiency of each product group	Improvement of energy efficiency contributes to reducing CO_2 emissions.	Units stipulated in the Energy Preservation Law		Processing & Assembly, Construction, etc.	Entire organization
	Percentage of products conforming to the criteria stipulated in the Energy Preservation Law	Contributes to reducing CO_2 emissions.	%		Processing & Assembly, Construction, etc.	Entire organization
	Production quantity/percentage of low-emission vehicles and fuel efficient vehicles	Contributes to reducing hazardous substances such as CO_2 and NOx.	Number, %	Monitor the number of vehicles with law exhaust emissions (the Low-emission vehicles, etc, Technical guidelines for exhaust gas (Ministry of the Environment)) and fuel-efficient vehicles (vehicles complying with the energy preservation law judgment standard).	Automobile	Entire organization
Environmental burdens at the time of disposal	Total quantity of production	Mass production of products is doomed not only to mass exploitation of resources but also to mass release of them as waste eventually. Therefore, it is required to produce products with as little material as possible (a shift to compactness and flexibility) while maintaining and improving functional aspects of products.	t		Material, Processing & Assembly, Construction, etc.	Entire organization
	Content of hazardous materials	Hazardous substances contained in products are destined to be released to the environment as waste eventually.	t	Monitor chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management”	Material, Processing & Assembly, Construction, etc.	Entire organization

	Amount of containers and packaging used	Law strongly requires businesses to reduce containers and packaging, which account for the greater part of general waste and which are relatively easy to recycle.	t	Make estimations for containers and packaging subject to the "Law for Promotion of Sorted Collection and Recycling of Containers and Packaging."	Processing & Assembly, Distribution, etc.	Entire organization
	Average life of each product group	In order to reduce waste generation fundamentally, it is necessary to improve product durability and to establish a better systems for repair.	Years		Processing & Assembly, Construction, etc.	Entire organization
	Percentage of reusable/ recyclable portions of each product group	In order to promote reuse/recycling of waste, it is necessary to use reusable/recyclable materials at the design stage of a product.	%	- On condition that there is a system to collect and reuse/recycle products. - Estimate separately the waste that can be thermally recycled.	Processing & Assembly, Construction, etc.	Entire organization
	Dismantling time for each product group	In order to promote reuse/recycling of waste, it is required to design products in such a way to make it easier to take products apart.	Time		Processing & Assembly, etc.	Entire organization
	Amount of used products, containers and packaging collected	Businesses who manufacture and sell products are required to collect and recycle the said products.	t		Processing & Assembly, Distribution, etc.	Entire organization
	Amount reused, recycled, and thermally recycled, and percentage of each regarding used products, containers and packaging collected	Businesses who manufacture and sell products are required to collect and recycle the said products.	t, %		Processing & Assembly, Distribution, etc.	Entire organization

Comprehensive evaluation	Quantity or percentage of products produced or sold when the products are certified by eco-labels such as Eco Mark	It is required to promote products certified by eco-labels certifying that the products have minimal environmental burdens.	Quantity, %		Processing & Assembly, Distribution, etc.	Entire organization

3) Indicators for transportation

Indicator	Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
NOx emissions resulting from transportation	Air pollution by NOx mainly from exhaust gas of vehicles causes damage to the health of people living in large cities.	t	Monitor the breakdown of own transportation and transportation by outside operators and the breakdown of transportation means (automobiles, ships, trains, etc.).	All industries including transportation and distribution.	Entire organization Individual factory and business site
Number/percentage of low-emission vehicles and fuel-efficient vehicles	Contributes to reducing hazardous substances such as CO_2 and NOx.	Number, %	Monitor the number of vehicles of high gas emission performance (Guideline for gas emission technology such as low-pollution vehicles (Ministry of Environment)) and vehicles of high fuel consumption performance (vehicles complying with the energy preservation law judgment standard).	All industries including transportation and distribution	Entire organization Individual factory and business site

4) Indicators for stock pollution

Indicator	Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
State of soil contamination and groundwater pollution	May have harmful influences on human health and living environments due to spillage to the outside of a factory site, or when the site is diverted to a residential area, a school, a park and others.	State, spot, density (mg/kg, mg/l)		Material, Processing & Assembly, etc.	Entire organization Individual factory and business site

5) Indicators for land utilization

Indicator	Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
Area of natural ecosystems affected	Alteration of natural ecosystems aggravates the landscape and living environments, and causes decrease and extinction of wild animal and plant species.	ha, details	Make estimations for altered areas in forests, grasslands, swamps, tideland, coral reefs, natural seas (lakes and rivers), shores and protected areas including natural parks and others.	Businesses placing orders to construction companies such as real estate industry	Entire organization Individual factory and business site

Area of afforestation and nature restoration	Planting of trees and restoration of natural habitats contribute to the improvement of landscape and living environments, and to the protection of wild animal and plant species.	ha		All industries	Entire organization Individual factory and business site

6) Indicators for other environmental risks

Indicator	Problems from the point of view of environmental conservation	Unit	Considerations for estimation	Applicable industries	Boundary
Number of accidents and their details (name of substance leaked/spilled , situation, amount, etc.)	Have harmful influences on human health and living conditions.	Number of cases Substance t		Material, Processing & Assembly, etc.	Entire organization Individual factory and business site
Amount of hazardous materials held in stock	Hazardous substances held in stock do not immediately cause problems. However, since they are in danger of being released to the environment due to accidents, leakage, volatilization and others, it is necessary to reduce hazardous substances held in stock.	t	Monitor chemical substances subject to the "Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management."	Material, Processing & Assembly, etc.	Entire organization Individual factory and business site

VIII. Future Issues for Establishment of Environmental Performance

1. Issues remaining for individual indicators

- Development of calculation method

Calculation methods of some indicators have not yet been established such as: although the indicator is important in terms of environmental conservation, the terminology or the scope has not been defined or is confusing, or the measurement method has not been established. It is necessary to examine these indicators and establish the calculation methods.

Above all, development of indicators and the calculation methods that enable evaluation of environmental burdens related to products covering the entire life cycle including production, distribution, utilization, and disposal is requested, taking the idea of Extended Producer Responsibility (EPR) into account.

- Examination of more detailed industry-specific indicators

At the current point, industry-specific indicators are simply classified into major categories. In the future, major indicators need to be examined for more detailed industries.

2. Studies for the Establishment of Indicators for Comprehensive Evaluation

In order to reflect environmental performance indicators in the decision-making process of an extensive range of stakeholders, it is important to study methods that allow comprehensive evaluation with simple indicators. Especially, the following points need further study based on the examination of the "basic concept of comprehensive examination":

- Establishment of indicators that are in conformity with management-related indicators.
- To pick up a few highly representative indicators from common core indicators or industry-specific indicators.
- Examination of the method for fair evaluation of environmental performance between industries of different discharge unit requirements such as manufacturing industry and non-manufacturing industry.
- An approach to add weight in integration of common core indicators or industry-specific core indicators.
- Establishment of indicators in an LCA approach including burdens not only from within the business area but also from upstream areas such as raw materials and downstream areas such as products and services.

Regarding the above points, Ministry of the Environment will continue to make further studies while soliciting opinions and comments from an extensive range of interested parties and knowledgeable people.

Businesses are requested to select actual environmental performance indicators based on this

guideline, and to check and assess the environmental performance. Stakeholders are also requested to assess the environmental performance of the businesses that are described in this environmental reporting. Comments on any problems or suggestions arising regarding this guideline as a result of the activities indicated above will be appreciated for further improvements of this guideline.

(Reference material) Evaluation sheet for the selection of indicators

[Concept of assessment]

- This guideline lists extensive range of indicator items that are regarded as important from the point of view of environmental problems, following the indicator classification of III 1 and based on how they are handled in overseas investigations. In addition, the characteristics of these indicator items were organized from the following points of view:

  > Are they important when seen from the background of environmental policies?
  > What industries, regions and interested parties are they applicable to? Are they applicable to various organizations equally?
  > Are there estimation methods available at this moment in time?

- Based on these characteristics, their appropriateness as common core indicators and as industry-specific core indicators was evaluated. Industry-specific core indicators were assessed according to the following broad categories for the present:

  > Material, Processing & Assembly, Distribution, Construction

- Characteristics were organized and listed based on the following concept:

  > Background: Environmental policy backgrounds including the legal system.
  Legends Comprehensive indicator: Those listed as comprehensive environmental indicators for the Basic Environment Plan (Environment Agency, 1999).
  (Those that have (issue) added are positioned as future subjects that need further examination.)
  Action guideline: Those listed in the Environment-Friendly Corporate Action Guidelines (Environment Agency, 1993).

  > Applicability to various organizations: Examines differences in the degree of importance for various organizations from three points of view - industries, regions and interested parties, and assesses applicability based on the examination.
  Legends ○: Generally applicable. △: Applicable to some.
  All: Applicable to all (= important). Material and others.: Applicable to material and other industries.

  > State of estimation methods: Describes the bases of estimation for those that have established methods.
  Legends ○: Established. △: Not established.

  > Other studies: Describes how they are handled in WBCSD and GRI results.
  Legends W: Items listed in the Generally Applicable Indicators of WBCSD.
  G: Items listed in the Generally Applicable Indicators of GRI.
  g: Items listed in the Organization-Specific Indicators of GRI.
  imilar to the indicator listed but the from is different.

  > Common core indicators and industry-specific core indicators
  Legends ○: Items that should be core indicators. △: Desirable to make them core indicators.

  > Boundary
  Legends W: Indicators for which numerical values of a business operator as a whole are important.
  S: Indicators for which numerical values as an individual factory/business site are important.

Indicators related to environmental burdens

			Indicator items	Unit	Background	Applicability to various organizations				State of estimation methods	Consideration for estimation	Other studies	Common core indicators	Industry-specific indicators				Boundary
							Industries	Regions	Interested Parties	Base and others of estimation method				Material	Processing & assembly	Distribution	Construction	
Environmental burdens within business areas	**Input**	**Material**	Total input of materials	t	Comprehensive indicator	○	All	All	All	○		Only raw materials and components acceptable.	G,W	○					W
			Sustainable use of waste within the business	t		○	All	All	All	○				○					W,S
			Input of recycled resources and recycled parts	t	Recycling Law, Law for Promotion of Utilization of Recyclable resources, etc.	△	Material, processing, assembly, construction, etc.	All	All	○		Make estimations for "recyclable resources" and "recyclable components" stipulated in the Law for Promotion of Effective Utilization of Resources.	g		○	○		○	W
			Input amount of hazardous materials	t		△	Material, processing, assembly, etc.	All	All	○		Make estimations for substances subject to PRTR and others	g		○	○			W,S
			Input amount of tropical timber, genetically modified organisms, and others	t		△	Construction, food, etc.	All	NGO, etc.	△		Monitor wild animals, plants and others that need protection from the point of view of environmental conservation.	g			△		△	W
		Energy	Total energy consumption	J	Comprehensive indicator	○	All	All	All	○		Also monitor the breakdown of electricity, fuels, etc.	G,W	○					W
			Renewable energy consumption	J	Comprehensive indicator	○	All	All	All	○		Make estimations of solar light, wind power, biomass, etc.	(g)	○					W
		Water	Amount of water used	m^3	Comprehensive indicator (water cycles)	○	All	All	All	○		Also monitor the breakdown of tap water, industrial water, etc.	G,W	○					W,S
			Amount of sustainable use of water within a business internally	m^3	Comprehensive indicator (water cycles)	○	All	All	All	○				○					W,S
	Output	**Air**	Total displacement	m^3		△	All	All	all	○		Emissions by leakage, volatilization and others do not need estimations.		△					W,S
			Greenhouse gas emissions	t-CO_2	Comprehensive indicator Climate Change Policy Law	○	All	All	All	○	Enforcement order of the Global Warming Prevention Law, Guidelines for Estimation of Total Greenhouse Gas Emissions (Environment Agency)		G,W	○					W

			Amount of ozone depleting substances released	ODP t (CFC-11 equal)	Comprehensive indicator Ozone Layer Protection Law	○	All	All	All	○	Enforcement regulations of the PRTR Law (*3), Manual for Estimation of PRTR Emissions (scheduled to be published from the Environment Agency)		G,W	○					W
			SOx	**t**	Comprehensive indicator (acid deposition) Air Pollution Control Law	△	Material, Processing & Assembly, etc.	All	All	○	Manual for Controlling the Total Amount of Sulfur Oxides (Environment Agency)		g		○	○			W,S
			NOx	**t**	Comprehensive indicator (acid deposition) Air Pollution Control Law	△	Material, Processing & Assembly, etc.	All	All	○	Manual for Controlling the Total Amount of Nitrogen Oxides (Pollution Research Action Center)		g		○	○			W,S
			VOCs	**t**	Comprehensive indicator (non-methane hydrocarbon)	△	Material, Processing & Assembly, etc.	Large city areas, etc.	Residents, self-government bodies, etc.	○			g		○	○			S
			Substances subject to the PRTR Law (*3)	t	Comprehensive indicator The PRTR Law (*3) Air Pollution Control Law	△	Material, Processing & Assembly, etc.	All	Residents, self-governing bodies, etc.	○	Enforcement regulations of the PRTR Law (*3), Manual for Estimation of PRTR Emissions	Make estimations for each substance. (Make separate estimations for hazardous air pollutants listed in the Air Pollution Control Law (substances subject to voluntary control).)	(g)		○	○			W,S
			Items under emission control (SOx, NOx, soot and dust, dioxins, etc.)	Maximum density (ppm, etc.)	Air Pollution Control Law Dioxin Special Action Law	△	Material, Processing & Assembly, Construction, etc.	All	Residents, self-governing bodies, etc.	○	Enforcement regulations of the Air Pollution Control Law Enforcement regulation of Dioxin Special Action Law	Make estimations for each item.	(g)		○	○		○	S
			Substances under emission restraint (benzene, trichloro-ethylene, tetrachloro-ethylene)	Maximum density (mg/m^3N)	Air Pollution Control Law	△	Material, Processing & Assembly, Construction, etc.	All	Residents, self-governing bodies, etc.	○	Specified substances control standards based on Additional Clause 9 of the Air Pollution Control Law.	Make estimations for each item.			○	○		○	S
			Noises and vibrations	dB	Comprehensive indicator Noise Regulation Law Vibration Regulation Law	△	Material, Processing & Assembly, Construction, distribution etc.	All	Residents, self-governing bodies, etc.	○	Standards and others regarding regulation of noises generated from specified factories and others.				○	○		○	S
			Odor	Maximum value (m^3N/minute)	Comprehensive indicator Offensive Odor Control Law	△	Material, Processing & Assembly, etc.	All	Residents, self-governing bodies, etc.	○	Enforcement regulations of the Offensive Odor Control Law.				○	○			S
			Total amount of drainage	m^3	Comprehensive indicator (water cycles)	○	All	All	All	○				○					W,S
		Water and soil	COD, nitrogen, phosphorus	t	Comprehensive indicator Water Pollution Control Law	△	All	Around closed waters, etc.	Residents, self-governing bodies, etc.	○	Enforcement regulations of the Water Pollution Control Law		g		○	○	○	○	S

			Substances subject to the PRTR Law (*3)	t	Comprehensive indicator the PRTR Law (*3)	△		All	Residents, etc.	○	Enforcement regulations of the PRTR Law (*3), Manual for Estimation of PRTR Emissions		(g)		○	○			W,S
			Items under drainage control (health related items, living environment related items, dioxins, trihalomethane generation capacity)	Maximum density (mg/l)	Water Pollution Control Law Dioxin Law Law Concerning Special Measures for the Water Quality Preservation at Water Resources Area in Order to Prevent the Specified Difficulties in Water Utilization	△	Material, Processing & Assembly, Construction, etc.	All	Residents, self-governing bodies, etc.	○	Examination method described in the Prime Minister's Office order stipulating the drainage standards. Enforcement regulations of the Dioxin Law. Examination method described in the specified drainage standards.		(g)		○	○		○	S
		Waste	Total amount of waste generated	t	Comprehensive indicator Basic Recycling Law, etc.	○	All	All	All	○		"Waste" include valuables and by-products. Also monitor the breakdown of metal, plastic, paper, etc. (Same for the following.)	W	○					W,S
			Amount of recyclable resources reused	t	Comprehensive indicator Basic Recycling Law, etc.	○	All	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.	.	g	○					W,S
			Amount of recyclable resource recycled	t	Comprehensive indicator Basic Recycling Law, etc.	○	All	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.		g	○					W,S
			Amount of recyclable resources that are thermally recycled	t	Basic Recycling Law	○	All	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.			○					W,S
			Amount of waste that are incinerated	t	Comprehensive indicator Basic Recycling Law, etc.	○	All	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.		(g)	◯					W,S
			Amount of final disposal of waste	t	Comprehensive indicator Basic Recycling Law, etc.	○	All	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.		(g)	◯					W,S
			Amount of hazardous waste generated	t	Comprehensive indicator (issue) Waste Management and Public Cleansing Law	△	Material, Processing & Assembly, etc.	All	All	○	Manifest based on the Waste Management and Public Cleansing Law, etc.	Make estimations for special control waste included in the Waste Management and Public Cleansing Law. Also monitor types and treatment methods.	(g)		○	○			W,S
			Substances subject to the PRTR Law (*3) (amount of waste transferred)	t	Comprehensive indicator The PRTR Law (*3)	△	Material, Processing & Assembly, etc.	All	Residents, etc.	○	Enforcement regulations of the PRTR Law (*3), Manual for Estimation of PRTR Emissions	Make estimations for each substance.			○	○			W,S
	Green Purchasing		Indicators of Green Purchasing according to the characteristics of the products and services purchased		Green Purchasing Law(*4)	○	All	All	All	△	Qualitative assessment		(G)	○					W

(*1)

		Quantity or proportion of environment-conscious products/services purchased such as Eco Mark products which are certified by eco-labels	t, yen, %	Green Purchasing Law(*4)	○	All	All	All	△	•Purchase program set out by the business operator • Environmental leve certification standarc such as Eco label			○					W
Products and services		Indicators of environmental burdens according to the characteristics of the products and services (or contribution to environmental conservation)			○	All	All	All	△	Qualitative assessment		(G)	○					W
	Environmental burdens at the use phase	Energy efficiency of each product group	Units stipulated in the Energy Preservatio n Law	Energy Preservation Law (§ 13, 17, etc.)	△	Processing & Assembly, Construction , etc.	All	All	○						○		○	W
		CO_2 emission efficiency of each product group	t/km (vehicle), etc.	Climate Change Policy Law	△	Processing & Assembly, Construction , etc.	All	All	△	Estimation methods for emission efficiency not established.					△		△	W
		Total energy consumption (Estimation for all products shipped this year)	J or kWh	Comprehensive indicator	△	Processing & Assembly, Construction , etc.	All	All	△	Estimation methods for situations of product use not established.					△		△	W
		Total CO_2 emissions (Estimation for all products shipped this year)	t	Comprehensive indicator	△	Processing & Assembly, Construction , etc.	All	All	△	Estimation methods for situations of product use not established.					△		△	W
		Percentage of products conforming to the criteria stipulated in the Energy Preservation Law	%	Energy Preservation Law (§ 14, 18, etc.)	△	Processing & Assembly, Construction , etc.	All	All	○						○		○	W
		Production quantity/percentage of low-emission vehicles and vehicles of low fuel consumption	Number, %	NOx Law Climate Change Policy Law Energy Preservation Law	△	Automobile	All	All	○	Technological Guidelines for Exhaust Gas of Low-Emission Vehicles and Others (Environment Agency)					○			W
(*2)	**Enviro nmenta l burden s at the time of disposa l**	Total quantity of production	t		△	Material, Processing & Assembly, Construction	All	All	○					○	○		○	W
		Content of hazardous materials	t	Basic Recycling Law, etc. (§ 20, etc.)	△	Material, Processing & Assembly, Construction	All	All	○		Make estimations for substances subject to PRTR and others.			○	○			W
		Amount of containers and packaging used	t	Container and Packaging Recycling Law, etc.	△	Processing & Assembly, Distribution, etc.	All	All	○		Make estimations for containers and packaging subject to the Container and Packaging Recycling Law.				○	○		W
		Average life of each product group	Years	Basic Recycling Law, etc. (§ 11(2))	△	Processing & Assembly, Construction , etc.	All	All	○						○		○	W
		Percentage of reusable/recyclable portions of each product group	%	Basic Recycling Law, etc. (§ 11(2))	△	Processing & Assembly, Construction , etc.	All	All	○		On condition that there is a collection/recycle system.				○		○	W

			Dismantling time for each product group (situations of shortening)	Time	Basic Recycling Law, etc. (§ 11(2))	△	Processing & Assembly, etc.	All	All	○						○			W
			Amount of used products, containers and packaging collected	t	Basic Recycling Law, etc. (§ 11(3))	△	Processing & Assembly, Distribution, etc.	All	All	○			g			○	○		W
			Amount reused recycled, and thermally recycled , and percentage of each regarding used products, containers and packaging collected	t, %	Basic Recycling Law, etc. (§ 11(3))	△	Processing & Assembly, Distribution, etc.	All	All	○			(g)			○	○		W
		Comprehensive assessment (LCA, eco-labels, etc.)	Quantity or proportion of production/sales of products/services that could contribute to the mitigation of environmental burdens	Quantity, %	Basic Recycling Law, etc. (§ 11(2))	○	All	All	All	△			(G)	○					W
			Quantity or proportion of production/sales of products certified by eco-labels such as Eco Mark	Quantity, %	Basic Recycling Law, etc. (§ 11(2))	△	Processing & Assembly, Distribution, etc.	All	All	○	Certification standards of eco-labels such as Eco Mark		(g)			○	○		W
			Results of analytical assessment of environmental burdens from entire life cycles of major products (LCA) Total quantity of production	t (CO_2, etc.) t	Basic Recycling Law, etc. (§ 20, etc.)	△ △	Processing & Assembly, etc.	All All	All All	△ ○	LCA methods under development					△			W
	Transportation		Total volume of transportation	t*km person*km	Global Warming Prevention Law NOx Law	○	All	All	All	○		Monitor the breakdown of own transportation and transportation by outside operators and the breakdown of transportation means (automobiles, ships, trains, etc.). Also appropriate are indicators of transportation efficiency that reflect joint transportation/delivery, return cargo arrangements, etc.	(g)	○						W,S
			CO_2 emissions resulting from transportation	T – CO_2	Global Warming Prevention Law	○	All	All	All	○	The Government Ordinance for the Implementation of the Climate Change Policy Law, Guidelines for Estimation of Total Greenhouse Gas Emissions (Environment Agency)	Monitor the breakdown of own transportation and transportation by outside operator and the breakdown of transportation means (automobiles, ships, trains, etc.).		○						W
			NOx emissions resulting from transportation	T	NOx Law	△	All	Large city areas	Residents , self-governing bodies, etc.	○	Manual for Controlling the Total Amount of Nitrogen Oxides (Pollution Control Action Center)				△	△	○	△	W,S

		Production quantity/percentage of low-emission vehicles and fuel efficient vehicles	Number, %	Climate Change Policy Law NOx Law Environmental Preservation Law	△	All	Large city areas	Residents, self-governing bodies	○	Technological Guidelines for Exhaust Gas of Low-Emission Vehicles and Others (Pollution Control Action Center)				△	△	○	△	W, S
	Stock pollution	State of soil contamination and groundwater pollution	State, spot, density (mg/kg, mg/l)	Comprehensive indicator Soil Environment Standards	△	Material, Processing & Assembly, etc.	All	Residents, self-governing bodies, investors, etc.	○	Standards for Application of Examination/Countermeasure Guidelines for Soil and Groundwater Pollution (Environment Agency)				○	○			W, S
	Land utilization	Area of natural ecosystem affected	ha, details	Comprehensive indicator	△	Business operator placing orders to construction company such as real estate industry.	Natural regions, etc.	Residents, NGO, etc.	△		Make estimations for altered areas in forests, grasslands and natural seas, and protected areas including nature parks and others.	(g)		△	△	△	○	W, S
		Area of afforestation and nature restoration	ha		○	All	All	All	○									W, S
	Other environmental risks	Number of accidents and their details (names of substance leaked/spilled, situation, amount, etc.)	Number of cases Substances *t		△	Material Processing & Assembly	All	Residents Self-Governing bodies Bodies, Etc.	○					○	○			W, S
		Amount of chemical substances held in stock	**t**		△	Material processing & Assembly	All	Residents Self-Governing bodies Bodies, Etc.	○		Make estimations for substances subject to PRTR and others			○	○			W, S

(*1) (*2) Environmental burdens in upstream/downstream
(*3) PRTR Law: Ministry order for Law Concerning Reporting, etc. of Release of the Environment of Specific Chemical Substances and Promoting Improvements in Their Management
(*4) Green Purchasing Law: Law Concerning the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities

Indicators related to environmental management

	Indicator items	Unit	Background	Applicability to various organizations				State of estimation methods		Considerations for estimation	Other studies	Common core indicators
					Industries	Regions	Interested parties		Bases and others of estimation methods			
Environmental Management System (EMS)	Situations of EMS establishment		Action guidelines	○	All	All	All	△	Qualitative assessment	Include self announcements.	G	○
	Number/percentage factories which established EMS, etc.	Number, %						△				
	Acquirement of ISO14001 certification	Number, details						○				
	Participation and registration in Environmental Activity Evaluation Program	Number, details						○				
Policy/objective	Yes/no, details							△	Qualitative assessment			
Organization/system	Preparedness							△	Qualitative assessment			
Employee education	Number of persons/percentage of those who received education	Persons, persons/time, %						○				
Preparedness for emergency	Preparedness of emergency systems							△	Qualitative assessment			
Monitoring and measurement	Progress in implementation							△	Qualitative assessment			
EMS audit	Progress in implementation							△	Qualitative assessment			
Environmental conservation technologies, design for the environment (DfE)	Progress in research and development of technologies for environmental conservation and environment-conscious products and services		Recycling Law (§ 11(2))	○	All	All	All	△	Research and development programs established by business operators			○
Environmental accounting	Monitoring of environmental conservation costs		Environmental Accounting Guidelines (Environment Agency, 2000)	○	All	All	All	△	Environmental Accounting Guidelines (Environment Agency, 2000)	Estimation methods for economic effects not established.	(G)	○
	Monitoring of the effects associated with environmental conservation measures											
	Disclosure of environmental accounting information											
Disclosure of information, communication	Disclosure of environmental reporting, eco-labels, etc.		• Action guidelines • Guidelines for Preparation of Reports on Environments (Environment Agency, 1997)	○	All	All	All	△	Environmental Reporting Guidelines (Ministry of the Environment , 2001)		G	○
	Progress in implementation of environmental communication with stakeholders							△				

Adherence to regulations	Number of violations/accidents, fines	Number, yen		○	All	All	All	○			g	○
Social contribution	Progress in social contribution activities related to environmental conservation	Persons, details		○	All	All	All	△	Qualitative assessment			○
	Donation made to NPOs promoting environmental conservation, industrial groups, etc.	Yen		○				○		Include not only financial support but also manpower support such as participation in groups.		

Indicators related to management

Indicator items	Unit	Background	Applicability to various organizations				State of estimation methods		Other studies	Common core indicators
				Industries	Regions	Interested parties		Bases and others of estimation methods		
Sales	Yen		○	All	All	All	○	Corporate accounting principles	W, G	◯
Production, turnout of products/services	t, quantity, Yen		○	All	All	All	○		W	◯
Functions of products/services	For each Product, service		○	All	All	All	△	Estimation method not established	W	△
Total floor space	m^2		△	Non-productive facility such as research center	All	All	○			
Number of employees (those registered)	Persons		○	All	All	All	○		G	◯