

Eco-Management Initiative
for New Growth and Development of
Companies

– Toward the Integration of Ecology and Economy –

March, 1999

Japan Management Association



The JMA Report

Since 1987, Japan Management Association has been conducting annual research project and compiling the output as "JMA Report." JMA picks up an issue in the field of management that is both timely and will continue as a focal point into the future. The aim of the Report is to probe into the background of the issue and outline our possible choices.

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I. Degradation of global environment

The global environment has been deteriorating steadily to the point that the existence of humankind itself is at risk. We can no longer afford to delay addressing these serious issues. Here are some examples of how the worsening global environment has begun to pose real threats to our lifestyles.

(1) Global warming

- The average temperature of Japan in 1998 reached record levels, 1.3 degree Celsius higher than the average.
- In the past 100 years, the temperature in the Antarctic region has increased by more than 2.5 degrees and massive melting and fracturing of ice has occurred on the Antarctic Continent. This is considered to be one reason for the abnormal weather worldwide.

(2) Depletion of ozone layer

- The ozone hole over the Antarctic Circle has expanded to double the size of Antarctica. In addition, another ozone hole has been discovered over the Arctic Circle. Destruction of the ozone layer increases the amount of ultraviolet rays that reach the ground and, consequently, increases the risk of skin cancers and cataracts.

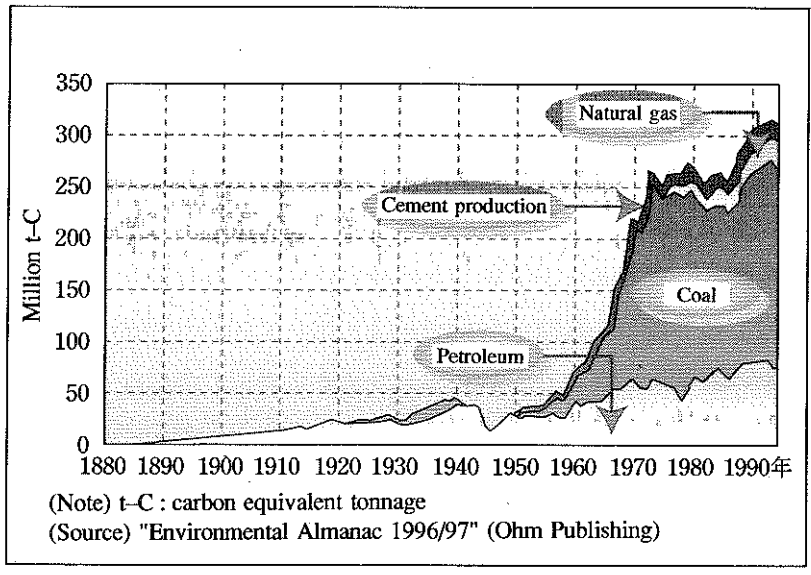
(3) Acid rain and destruction of forests

- In Japan, a growing number of trees have died because of acid rain.
- Every year, forests covering an area one third to one half the area of Japan disappear globally. This loss occurs at 10 times the rate of forest regrowth.
- Progressive desertification has not been checked. Global food production has been decreasing and the number of "environmental refugees" has been on a rise.

(4) Extinction of species

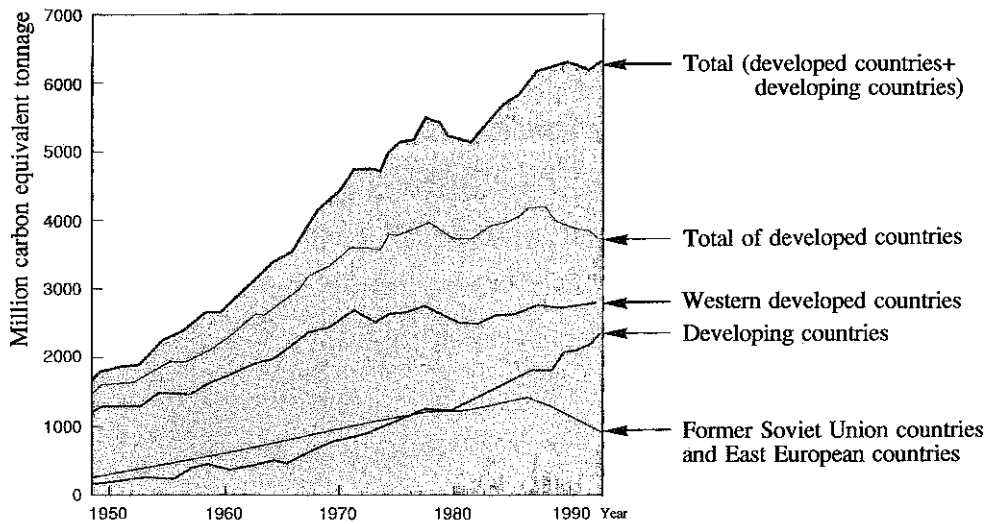
- 40,000 kinds of wild animals and plants are extinct every year, undermining the biodiversity that supports ecology. In Japan, more than 20% of wild plants are on the verge of extinction.

Trends of energy consumption in Japan



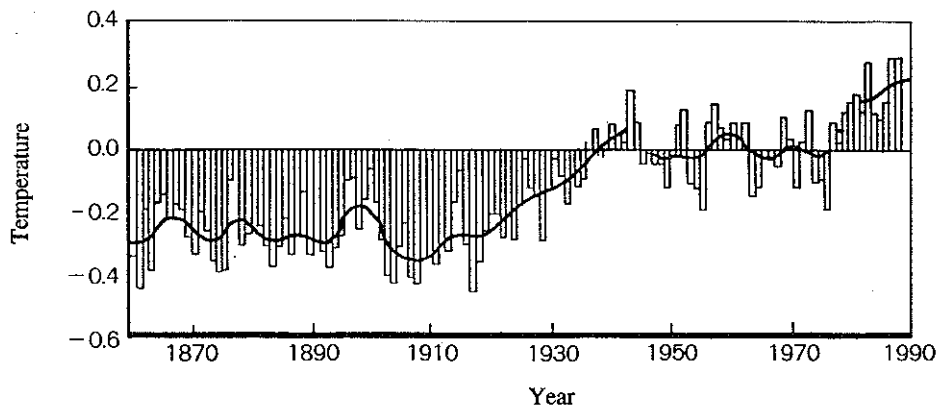
(Source) "Introduction to Environmental Theory for Students of Arts" (Yuhikaku-Malco)

Trends of CO² emission of the world



(Source) Estimated by Oak Ridge National Laboratory's Climate Data Information Analysis Center (Imidas 99)

Trends of global warming



* : Deviation from the average temperature between 1951 and 1980
 (Source) Environmental White Paper 1997, the Second report from IPCC

(5) Chemical contamination

– In Japan, the dioxin problem has been getting serious and incineration of wastes, the principal form of waste disposal, has been questioned. Soil contamination has also become an issue.

– Concerns over reproductive abnormality or deformation of living creatures in relation to environmental hormone (endocrine disrupter) have been growing. Their potential impacts on human beings have attracted increasing attention.

(6) Waste treatment

– In Tokyo Metropolitan area, industrial waste treatment sites will become full in less than 1 year.

– Increasing cost of industrial waste treatment causes illegal dumping of wastes and associated troubles around Japan.

Furthermore, consumption of resources and energy has been increasing year after year. Given the threat this fact poses, we can no longer take a "wait and see" attitude.

II. The Y2K (Year 2000) environmental problem for companies

The year 2000 as a big turning point for environmental problems

– Environmental problems have become an important strategic issue for companies. "Separate collection of container packaging and promotion of product re-use and container packaging recycling law" and a law for recycling of household electric appliances will be implemented fully in the year 2000 and 2001, respectively, requiring manufacturers to take responsibility for their products even after products are sold. And certainly, this trend will spread across many other industries.

Also, the "top-runner method" was adopted in the revised law for saving energy in 1998. It means that a product with highest energy-saving performance should be targeted as standard in a given product sector. This marks a revolution from the traditional "convoy" system in which standards were set at the average level for manufacturers concerned. Now, the principle of competition is introduced in the field of environment. Environmental administration has been changing drastically.

– The media features environmental issues day after day, enhancing awareness and concerns for environment in societies. "Earth Day", a global environmental NGO, is initiating an "Earth Day 2000 Campaign" to encourage individuals to take action on behalf of the environment in their daily lives. The year 2000 should be an important transition period for companies to deal with environmental issues. For companies, just establishing systems is not sufficient enough. They are required to move ahead toward realization of Eco-Management.

Increasing consciousness for environment on the side of stakeholders of companies

– Companies cannot ignore the following trends among stakeholders.

- * The number of green consumers who are highly conscious of environment has been on the rise.
- * An increasing number of companies require green procurement and ISO certification as a condition of doing business.
- * Consumers and communities have demanded strong measures to conserve the environment.
- * Employees have become more concerned about how their companies' respond to environmental problems.

* How to deal with environmental issues has become an important factor in determining a company's image.

– An increasing number of companies and/or management have been requested to pay compensation or have been sued for their responsibility in polluting the environment. And the amount of compensation has grown to the point of threatening the survival of many companies.

Environmental issues as a condition to compete in the global markets

– ISO certification is often said to be a passport to the global market. This is one example of how environmental issues have become an important competitive factor in the world. Not only does product quality in terms of energy saving and environmental impact influence a product's competitiveness, but a company's responsiveness to environmental issues determines, at least partially, whether or not the company can obtain financing.

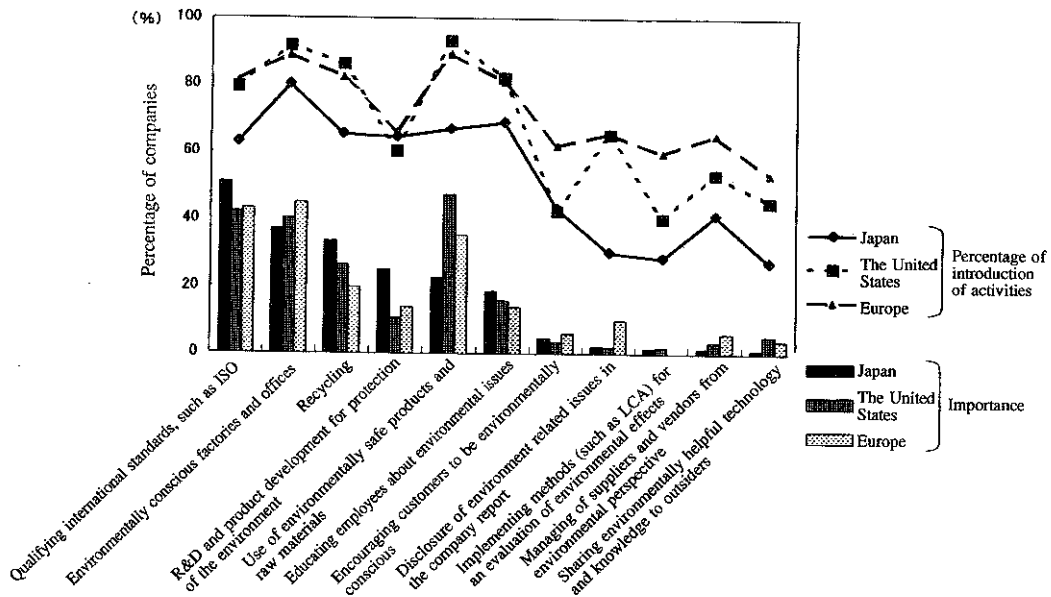
Furthermore, as seen in the automobile industry, environmental issues might lead to global reorganizations of companies. There is no doubt that emissions trading, the result of strengthened environmental regulations, should have significant impacts on the international competitiveness of companies.

– According to a recent survey of corporate management in Japan, the United States and Europe, the United States and Europe are ahead of Japan in implementation of environmental conservation activities at the company level.

Chronicle of environmental issues

Japan		World
1962		Publication of "Silent Spring"
1967	Basic Law for Anti-Pollution Measures	
1971	Establishment of Environmental Agency	
1972	Law for Conservation of Natural Environment	Rome Club announces "The limits to Growth"
1987		The 1 st United Nations Conference on Human and Environment WCED (World Commission on Environment and Development)
1989		Confirmation of the concept, "Sustainable Development"
1991	Keidanren (the Federation of Economic Organizations) "Global Environmental Charter"	Oil Spill in Alaska Establishment of CERES Principles (Valdez principles)
1992	Ministry of International Trade and Industry "Voluntary plan for environmental friendliness"	ICC Business Charter for Sustainable Development United Nations Conference on Environment and Development (Earth Summit) Rio Declaration, Adoption of Agenda 21 Framework Convention on Climate Change GEMI (Global Environmental Management Initiative) "Environmental Self-Assessment Program"
1993	Basic Environmental Law Environmental Agency "Guideline for Environmentally Friendly Business Activities"	
1994	Environmental Agency "Basic Environmental Plan"	Germany: Enactment of Recycling Economy and Wastes Law German Constitution stipulates environmental conservation for next generations as one of the national goals.
1996	Keidanren "Environmental Voluntary Action Plan"	Publication of "Our Stolen Future"
1997	Recycling Law for Packages and Containers	The Third Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in Kyoto
1998	Law for Environmental Impact Assessment Recycling Law for Household Electric Appliances Revision of Energy Conservation Law Promotion Law for Countermeasures against Global Warming	
1999	Law for PRTR : Pollutant Release and Transfer Register (expected)	
2000	Full Implementation of Recycling Law for Packages and Containers	Earth Day 2000 Campaign
2001	Full Implementation of Recycling Law for Household Electric Appliances	
2008~		Target year to reduce CO ² emission

Introduction of environment conservation activities and rating of importance, Japan, the United States and Europe (by JMA, 1998)



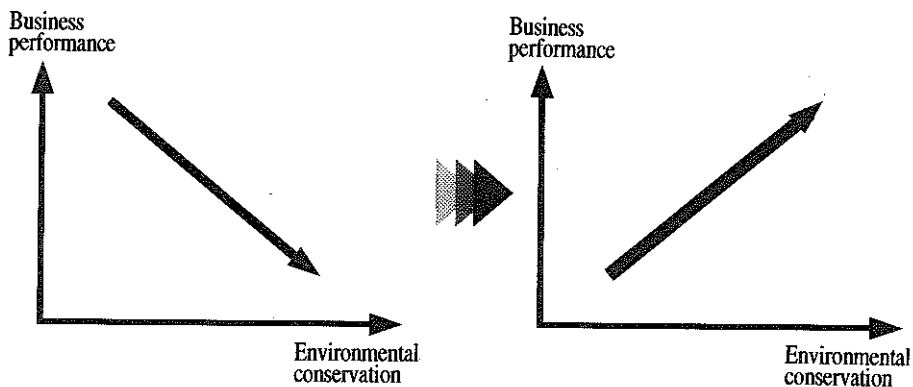
III. Departure from generally accepted ideas

Ecology and economy are not in "trade-off" but "synergy" relationship

– Up to now, ecology and economy were considered to have an antagonistic, "zero-sum" relationship, where gains for one necessarily meant losses for the other. However, saving energy and resources not only eases the burden on the environment but also reduces cost. And environmental issues can trigger innovations. Therefore, the combination of ecology and economy can bring about synergy effects.

Ecology and economy are not in "trade-off" but "synergy" relationship

Investment in environmental issues does not constrain but improve business performance.

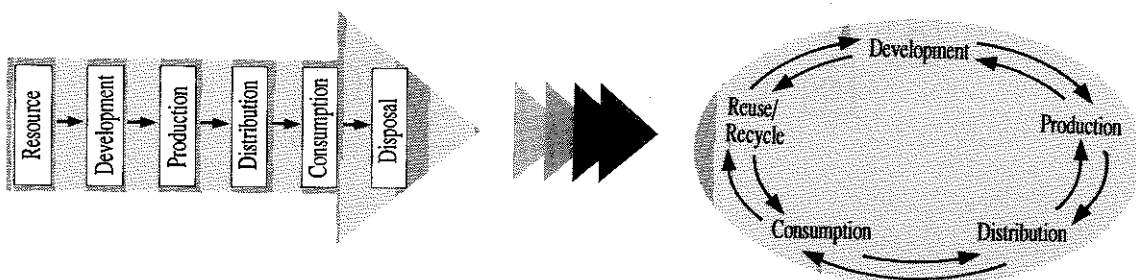


From "One-way and linear ideas" to "two-way and recycle-centered ideas"

– Traditional industrial processes have a one-way and linear structure in which resources are processed to make products, and products are disposed of after use. This one-way process of development, production, distribution and disposal should be converted into a two-way recycling process in which production processes and raw materials are determined from the viewpoint of reuse and recycling at the end of a product's life. In addition, products with the highest energy-saving performance should be developed from the perspective of running cost during the consumption stage.

From "One-way and linear ideas" to "two-way and recycle-centered ideas"

Two-way recycling-based ideas expand the range of options drastically.



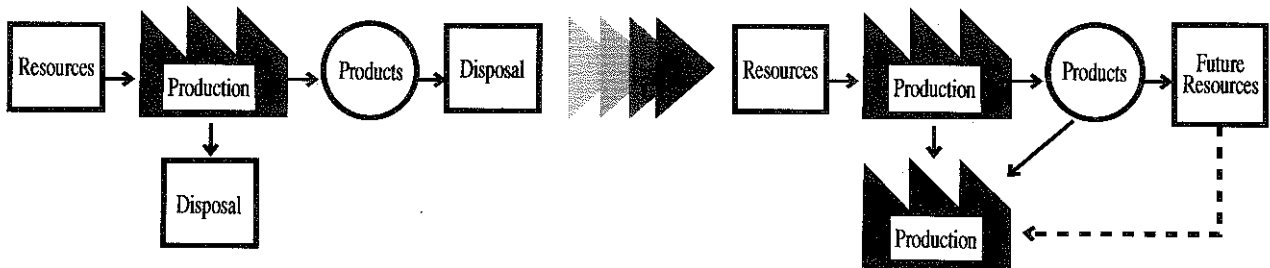
Emissions are not "waste" but "valuable on-the-ground resources"

– Just as waste from a living creature becomes sustenance for other living creatures, emitted materials and waste energy can be viewed as valuable resources. When discards are regarded as "waste", they are treated as useless, without any option but disposal, and no thought is given to how they might be used. Emissions should be regarded as useful "on-the-earth" resources generated by industrial processes, and effective utilization of them should be considered.

Wastes are not "waste" but "valuable on-the-ground resources"

From different perspectives,wastes can be regarded as valuable.

It is important to try to find values in wastes.

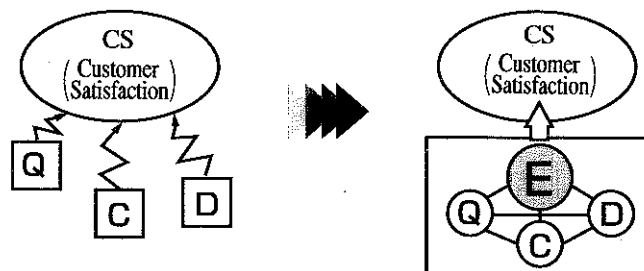


From "QCD" for customer satisfaction to "E+QCD" centering on environment

– QCD : quality, cost and delivery are three major factors for customer satisfaction. And in each of them, the environmental aspect has become important. Therefore, "QCD" should be transformed into "E+QCD" which includes an environmental factor throughout QCD. In doing so, environmental loads can be reduced and at the same time all factors of QCD can be enhanced.

From "QCD" for customer satisfaction to "E+QCD" centering on environment

An aspect of E (Environment) enhances QCD to a higher level.

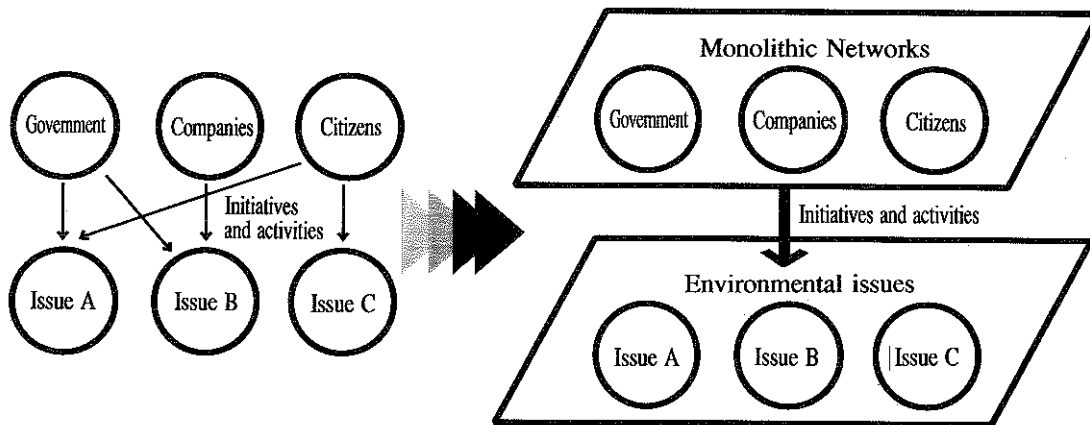


From closed system to open network

– Environmental issues are complicated problems in which various factors are intricately intertwined. Therefore, broad approaches, rather than closed systems in which each issue is addressed separately, are necessary to tackle environmental problems. Efforts should be made not only by staff but by all employees including line workers. Likewise, multiple companies should work together, rather than having companies work in isolation. In order to tackle environmental issues, open networks should be established which include customers, Non Profit Organizations (NPOs) and government in an international context.

From closed system to open network

Not point-to-point responses but comprehensive and organized responses are needed.



IV. Development of Eco-Management Initiative

1. Step-by-step transformation of companies toward Eco-Management

Certification of ISO : starting point toward Eco-Management

– It is difficult for companies, which rely on a complex organizational structures to carry out their activities, to change their general frame of thinking on the environment all at once. The realistic path to change is to strengthen attitudes and activities for environment in a step-by-step manner while aiming at visionary goals. And a starting point is to acquire ISO 14001 certification. With this certification, systems to promote Eco-Management are established, enabling the company to move Eco-Management forward.

Five stages in Eco-Management

– There are many ways to define steps to promote Eco-Management. The following is one model example of five stages in Eco-Management for the manufacturing sector.

[1] Initial stage

Environmental laws and regulations are observed. Energy saving and other easy-to-implement measures are taken but they are still partial and sporadic responses.

[2] Stage of efforts at a plant or site level

How to deal with environmental issues becomes a policy priority for management. The Eco-Management system is introduced at the plant and business unit level. At the same time, environmental education for employees is started.

[3] Stage of efforts at a corporate level

Activities of each function in a company are integrated from the viewpoint of how to reduce environmental burdens. Products and services are also reviewed to ease environmental loads.

[4] Stage of social activities

How to cope with environmental issues becomes part of the corporate mission. Environmental loads of raw materials, equipment, products and services are grasped from a societal perspective. Environmental problems are tackled in partnership with other companies, Non Governmental Organizations (NGOs) as well as local communities. Informa-

tion on environment is actively disclosed to the public through the use of environmental reports, environmental labeling and EPI (Environmental Performance Indicators). Environmental audits by an outside agency are also conducted.

[5] Stage of integration of ecology and economy

Environmental burdens are minimized by shifting corporate activities to a recycle-based structure. With the introduction of environmental accounting systems, a company's overall activities are viewed from an ecological and economic perspective. Also, a corporate culture is established that encourages everyone, from management to front line workers, to act based on environmental consciousness.

Development of Eco-Management in manufacturing sector (model)

Eco-Management Initiative (EMI)	Environmental Conscious Activities (ECA)	Compulsory responses	Voluntary responses	
		Responses to comply environmental regulations	Responses in company	Responses in a society
[1] Initial Stage	Environmental activities related to law and regulations	Observation of environmental laws and regulations	Activities to improve energy and resources saving	Voluntary activities to improve environment
[2] Stage of efforts at a plant and site level	Introduction of EMS Introduction of environmental slogans (e.g. E+QCD)	Voluntary objectives beyond standards set by regulations	Certification of ISO 14001 at plant Initiation of environmental education	Initiation of activities for improvement of environment in partnership with a society
	Setting ZE goals Setting numerical objectives	ditto	Improvement of environment at plant Shifting to Zero Emission Internal environmental audit	Green procurement at a plant and office level
[3] Stage of efforts at a corporate level	Introduction of the idea of Life Cycle Assessment (LCA)	ditto	Certification of ISO 14001 for entire company (including development and sales divisions) Eco-Design (e.g. Life Cycle Value Engineering: LCVE) Reduction of inventory and disposal of products	Green procurement at a corporate level
	Start of information disclosure	ditto	Publication of environmental report Certification of Eco Mark	Recovery and recycling of all used products
[4] Stage of social activities	Introduction of Corporate Governance System (CGS) Introduction of Life Cycle Costing (LCC) Identification of new corporate missions integrating Eco-Management Initiatives Introduction of assessment criteria (e.g. Environmental Performance Indicator : EPI)	ditto	Introduction of external audit Eco Marketing (e.g. Life Cycle Value : LCV)	Upgradable service (improvement of environmental loads for an entire scope of products, both in stock and in use)
[5] Stage of integration of ecology and economy	Introduction of environmental accounting system	ditto	Publication of annual report integrating environmental report Entry to green business field	Certification of ISO 14001 of life cycle related companies Strategic improvement activities for environmental loads (including trade of emission rights, sales of "functions", systematically scheduled recycling)

[Note] EMI : Eco-Management Initiative

ECA : Environmental Conscious Activity

EMS : Environmental Management System

EQCD : Ecology, Quality, Cost&Delivery

ZE : Zero Emission

LCA : Life Cycle Assessment

LCVE : Life Cycle Value Engineering

CGS : Corporate Governance System

EPI : Environmental Performance Indicator

LCV : Life Cycle Value

LCC : Life Cycle Costing

IV. Development of Eco-Management Initiative

2. "Eco-Management" as a new management paradigm

"Definition of Eco-Management" toward a recycling society

– Companies cannot neglect environmental issues if they are to develop and grow further. How to deal with environmental issues could be a matter of life or death. At the same time, however, it is necessary to recognize that active involvement in environmental issues can actually strengthen a company. How to tackle environmental issues has become an important competitive factor. Fundamental changes in management paradigm toward establishment of "Eco-Management" will become new strategies for growth and development. Here, "Eco-Management" means the final stage of "Five stages in Eco-Management" described previously.

The definition for "Eco-Management" is as follows.

Eco-Management Initiative: Management in which integration of ecology and economy is pursued and environmental burdens are minimized by structuring corporate activities based on recycling.

At issue: integration of economy and ecology

– Up to now, the environment (ecology: organic composition including organisms and surrounding non-organic substances) has been regarded as separate from the economy, which was seen as the exclusive realm of companies. However, ecology is the foundation of corporate existence. And at the same time, companies themselves are important constituents of ecology. Companies should abide by rules of ecology if they hope to realize sustainable development.

– Conversely, if companies establish recycling-based structures for corporate activities and successfully bridge ecology and economy, they are able to reduce their environmental impact. In the face of worsening environmental problems, integration of economy and ecology offers a new strategy for growth and development.

– There are many issues to be overcome in order to realize Eco-Management. Here are our recommendations on seven items of great importance. We sincerely hope that at-

tempts to realize Eco-Management aiming at synergy between ecology and economy will become Japan-originated global standards and promote further development of companies. And we also hope that environmental problems will be solved essentially by corporate initiatives.

Guidelines for utilization of resources and energy for Eco-Management (model)

<p>Principles</p> <p>(1) All materials and energy should be regarded as "valuables". Wastes, residues after corporate activities to extract values, should be recognized not as "valueless things" but as "valuable resources" by taking a different perspective.</p> <p>(2) It is important to recognize that all materials and energy are originally owned by all people in societies and companies utilize them for their management activities. Even if some materials have no value for the company, they shouldn't dispose of them based on their judgment. Long time possession of materials without utilizing them or lingering possession of residues after utilization without returning them properly to ecology should be avoided.</p>
<p>Guidelines for utilization of resources</p> <p>(1) Principles of sustainability for utilization of renewable resources When renewable resources are used, the pace of utilization should not exceed that of renewal of resources.</p> <p>(2) Principle of minimization of utilization of non-renewable resources When non-renewable resources are planned to be used, first, alternatives of renewable resources should be investigated. If renewable resources cannot be used, usage amount of non-renewable resources should be minimized by recycling and improving the utilization ratio.</p> <p>(3) Principle of responsibility for man-made changes in material composition Changes in material composition in natural environment caused by utilization of resources should be monitored and the information should be disclosed. And efforts to recover according to set rules should be made.</p> <p>(4) Principle of Zero Emission for maximization of resource productivity For utilization of resources, first of all, value of in-house resources should be exploited to maximum in order to get maximum effects with minimum input. And for used resources, Zero Emission should be pursued as much as possible by establishing networks with other industries in order to use them as resources.</p> <p>(5) Principles of Life Cycle Assessment in evaluation of resources When values of resources are evaluated, the entire life cycle of the resources should be reviewed.</p>
<p>Guidelines for energy utilization</p> <p>(1) Principle of maximization for utilization of flow-type energy Flow-type energy should be utilized to the maximum within the limit not to destabilize the balance of ecology. At the same time, systems and mechanisms to enhance utilization should be positively established.</p> <p>(2) Principle of minimization for utilization of stock-type energy When stock-type energy is used, first of all, alternatives to use flow-type energy should be pursued. When it does not work, amount of usage should be minimized by making efficient use of it.</p> <p>(3) Principle of responsibility for man-made effects on ecology Impacts on natural environment caused by energy utilization should be continuously monitored and the information should be disclosed. And efforts to recover according to set rules should be made.</p> <p>(4) Principle of Zero Emission for maximization of energy productivity For utilization of energy, scattered and lost energy which is not used for the intended activities should be reduced to zero in order to get maximum effects with minimum input. And energy which cannot be used in-house should not be discharged for nothing, but Zero Emission should be pursued as much as possible by establishing networks with outside.</p> <p>(5) Principles of Life Cycle Assessment in evaluation of energy When values of energy are evaluated, various activities to obtain the energy should be included in such evaluation.</p>

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 1 :

Management should take leadership in promoting Eco-Management Initiative

Principles of Eco-Management should be embodied in business plans and personnel evaluations

– Promotion of Eco-Management should contribute to corporate performance in the mid-to-long term but it is not necessarily reflected in short-term profits. Therefore, a "philosophy of Eco-Management" should be written clearly in the corporate mission statement as a basis for operations. In such documentation, "environmentally friendly", "actively tackle environmental issues" or other abstract wording should not be used. Rather, specific description is necessary based on its industrial sector and business organization.

– Principles related to Eco-Management should be embodied in criteria for specific business plans, business evaluation and personnel evaluations. Without such embodiment, principles remain empty and cannot become corporate values. It is effective to make principles for Eco-Management public at shareholder's meetings and on other occasions, and to make other societal commitments if principles are to take root in a company.

Management should take every opportunity to talk about "the importance of environment concervation" and should demonstrate their commitment to preserving the environment.

– Only when management internalizes principles of Eco-Management will such principles really become viable. Remarks by management such as "yes, environment is important but business performance is more important", even in casual conversation, influence everyone in the company. Conversely, environmentally conscious behavior by management in everyday situations stimulates employees. It is crucial for management to show leadership in the development of environmentally sensitive products and processes if Eco-Management is to take root.

– "Understanding of environmental issues" and "eco-consciousness" are "must have" attributes of management today. Management shouldn't think that environment and business performance are in conflict. Rather, they should consider "synergy" between envi-

ronment and businesses so that they can determine how to leverage environmental issues for better business performance. It is necessary for management to actively talk about these points at management meetings.

Aiming for establishment of an advanced model of Eco-Management

– Each company is limited in its capacity to implement Eco-Management. Therefore, industry-wide level of Eco-Management should also be adopted. Just as dissemination of ZD (zero defects) or TQC (total quality control) activities has increased the competitiveness of Japanese companies, dissemination of Eco-Management should lead to a higher level of management quality for Japanese companies. It is expected that Eco-Management would spread across industries as a new management paradigm and become the worldwide de facto standard. Each company is expected to try to create an advanced model of Eco-management that could be used as a benchmark by other companies and to actively disclose the results of such efforts.

Differences between Eco-Management and traditional management

Traditional management

- Think environmental conservation as a market
- Ecology exploiting type
- Linear structure of business with one way flow
- Productivity measured by labor and capital
- Partnership with other companies based on capital relationship
- Corporate performance evaluated by economic indicators
- Organization focusing on stable management
- Trying to manage with the use of information gap
- Trying to solve problems in a self-concluded manner
- Emphasis on motivation of employees



Eco-Management

- Think environmental conservation as a basis for existence
- Ecology fostering type
- Recycle-based business structure
- Productivity also measured by resource/energy efficiency
- Partnership with other companies based on utilization of resources
- Corporate performance evaluated by environmental indicators and economic indicators
- Dynamic and self-organizing organization
- Trying to create jointly by sharing information
- Trying to solve problems in open networks
- Emphasis on amenity for employees

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 2 :

EMS (Environmental Management System) should be established as a basis for Eco-Management

Institutionalization of environmental management system

– The management cycle of "PLAN – DO – CHECK – ACT" is the foundation for Eco-Management. Unless this management cycle is adopted, principles of Eco-Management will not be easily integrated. In ISO 14001, EMS (environmental management system) is designed in a framework of planning based on environmental policies, checking its implementation and results, taking corrective actions if necessary and leading to continuous improvement by management review of the system. Establishment and implementation of such a management cycle is fundamental to eco-management.

– The environmental management system should be incorporated into specific business activities. Individual business improvement viewed from an integrated viewpoint of environment will lead to cost reductions, quality improvement, increased customer satisfaction and new technology development.

Corporate-wide understanding of environmental impact and real situations of environmental activities of the company

– In order to establish an effective environmental management system, the environmental impacts of corporate activities, measurement of environmental problems (both real and anticipated) should be understood quantitatively from a corporate-wide viewpoint.

– A starting point is to investigate the flow of energy and materials – measuring the inputs from outside, the consumption of energy and materials, and the emission of non-product materials at each stage of the production process. The next step is to review and summarize expenditures and activities for environmental issues at each stage of production in order to get a clear picture of current environmental problems in each section of the company. Based on this assessment of a company's situation, an environmental management system can be established by first setting "environmental policies" and "plans".

Implementation of environmental audits and continuous improvement

- Environmental auditing is very important. The structure and methods used in the environmental audit determine the effectiveness of the environmental management system. Needless to say, audit results should be reported to top management and firmly reflected in business evaluations.

- Internal audits are particularly effective as an independent checking function and to determine a company's real and potential environmental risks. By taking corrective and preventive measures based on the results of an internal audit, a company can increase its capacity for self-innovation. Furthermore, a third party audit can be used as a double-checking mechanism to further increase effectiveness.

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 3 :

Environmental activities should be made objective and understandable in a quantified manner

Environmental performance should be expressed numerically

– It is difficult to grasp environmental impact quantitatively. But in order to manage environmental activities scientifically, it is necessary to show current performance objectively by using numerical indicators. In doing so, the objectives of environmental activities will be clarified and progress in improvement can be monitored over time.

– Furthermore, if numerical indicators become part of a company's evaluation criteria for environmental performance, each company activity can be judged for its environmental impact, and a common foundation for effective decision-making can be established. It also promotes monitoring of corporate-wide environmental performance.

EPI (Environmental Performance Indicators) should be developed as an indicator of commitment to Eco-Management

– An objective evaluation of corporate commitment to Eco-Management requires EPI (Environmental Performance Indicators) that facilitate comparison among companies. It is possible to develop indicators for three dimensions of activity: management, operations, and product. It is difficult to create a common standard across industries. But once a common EPI is created, the Eco-Management performance of companies can be positioned relatively, showing clearly the areas in which each company can improve. This helps management to concentrate resources where they are needed and shows stakeholders why particular investments were taken.

– Once EPI is adopted as a common standard, it can become a Japanese-origin quality standard for Eco-Management, giving a new competitive edge in the global market to Japanese companies. To meet this goal, active disclosure of information on the environment, along with establishment of a proper evaluation system, are crucial.

Environmental perspectives should be integrated into the corporate accounting system

– In the past, accounting systems have targeted only economic transactions. But Eco-

Management requires an environmental accounting system that calculates economically the impacts of corporate activities on ecology and incorporates the results into traditional accounting systems.

– The first step for an environmental accounting system is to create a balance sheet of the costs and benefits of environmental investments. Such a balance sheet can clarify the feasibility of an investment. In Europe and the United States, there are various attempts to create and enhance environmental accounting because of increasing demand for environmental accountability. Also ecological bookkeeping has been introduced that calculates trends in the total environmental impact of corporate activities. There are many issues to be solved before introducing an environmental accounting system, but only such a system can concretize environmental management based on the integration of ecology and economy. It is necessary to study and review cases from Europe and the United States, then to develop a formula for environmental accounting.

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 4 :

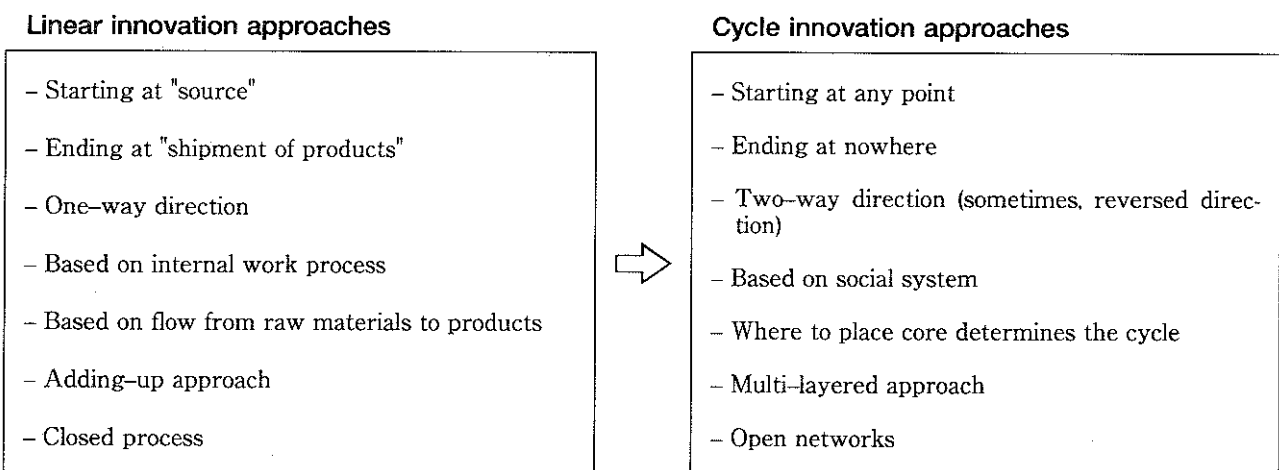
Cycling-based innovation approaches should open up new technological frontiers

Technological development should be transformed to emphasize cycling-based innovation approaches

– From the viewpoint of Eco-Management, it is important to use ecologically friendly technologies and to produce goods that can be easily returned to the environment. Of course, "environmental technologies" for solving environmental problems are very important. But more important is the shift to technologies that promote co-existence with the environment. To meet this goal, a traditional "linear approach", in which virgin resources are used to produce products that are disposed of at the end of their useful life, should be changed into "cycling-based innovation approaches" whose goals are the utilization of wastes and development of new materials and new energy.

– Attempts at inverse manufacturing focusing on the recovery and reuse/recycling of resources have already begun. However, such attempts should not simply look at how to deal with wastes generated by the current system of production. Rather they should lead to an overall review of production system. Technologies, including raw materials to be used, should be transformed using a cycle-based approach. This will lead to green production and to expansion of frontiers for new technologies.

From Linear Innovation to Cycle Innovation



Technologies should be reviewed from the viewpoint of resource/energy productivity

– The concept of productivity needs to shift. From the perspective of Eco-Management, resource and energy productivity are important considerations that should be added to the traditional focus on labor and capital productivity. The task for technology development now is to make full use of resources and energy so that environmental impact can be minimized while enhancing corporate performance.

– In order to improve resource and energy productivity, companies should think how wastes from inside the company can be used outside and waste from other companies can be utilized in their production process. The scope of technologies should be expanded beyond the boundary of companies. By expanding the scope of technologies, technologies in different fields can be linked together, creating totally new technologies.

Environmental technologies should be disclosed proactively

– Environmental technologies should be developed as soon as possible. It is crucial that patents for such technologies should be obtained and utilized in the development of products or systems as early as possible. However, dormant patents or technologies without potential commercialization for the time being should be disclosed in an active manner. Also, mutual technology transfers with other companies under non-disclosure agreements should be promoted.

– Developing nations should be included in a framework to address environmental problems. Technology transfer to developing countries should be promoted as much as possible.

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 5 :

Information on environment should be disclosed actively in order to involve society

All information related to environment should be disclosed in principle

– Communication on environment with the outside world is indispensable if Eco-Management is to be promoted. Active dissemination of environmental information creates relationships of mutual trust and co-creation between society and stakeholders. It also allows companies to develop solutions to environmental problems as a preventive strategy. Even when a company obtains disadvantageous information, early disclosure of this information is best for

the company as well as for society.

– When disclosing information, difficult-to-understand technical terminology should be avoided and internationally valid figures or indicators should be used. In particular, information on wastes should be made public in such a way that the contents and quantity can be easily understood.

The content of environmental reports should be improved with an eye to readers

– The core of a company's environmental communication activities is the environmental report. Recently, a growing number of companies have produced environmental reports. However, indicators and activities in such reports are unilaterally chosen based on each company's judgement and style. Therefore, it is difficult to make comparison among companies, and reports are not necessarily written to be easily understood by readers.

– In Europe and the United States, advanced companies are taking a lead to set the standard for environmental reports. In Japan, environmental NGOs are trying to facilitate benchmarking for environmental reports. But it is the task of industry to enhance the quality of environmental reports. In a variety of areas, improvements can be made for more effective environmental reports, including the content, strategic utilization, format for specific readers, utilization of

Internet and facilitation of dialogues based on the reports.

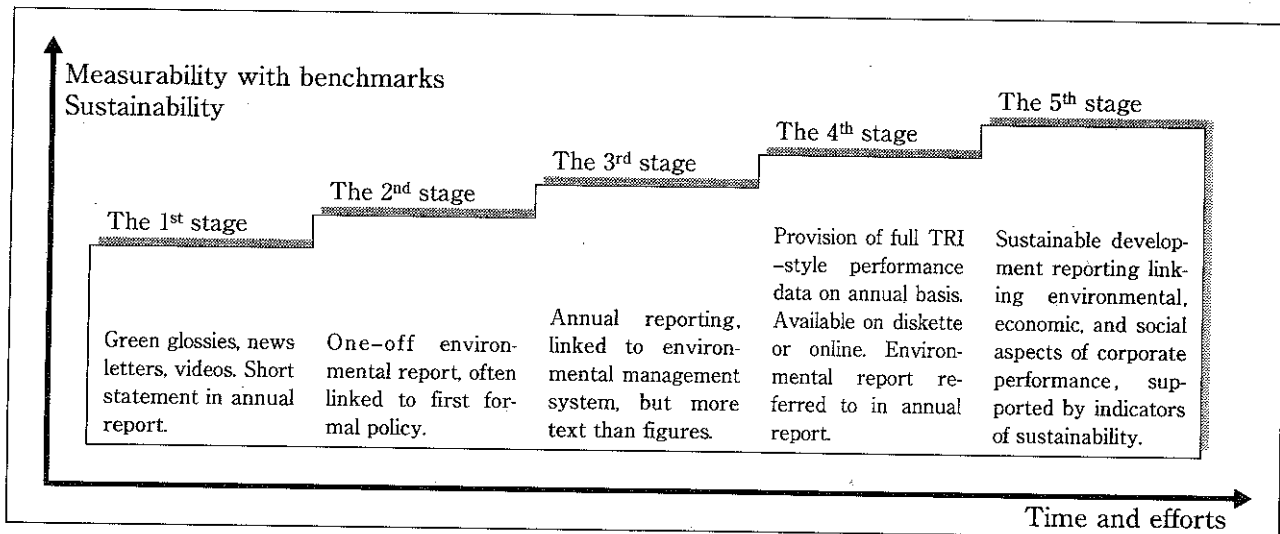
Standardization of eco-labeling should be promoted as a social marketing activity

– Dissemination of information on environment leads to environmental marketing.

Eco-Management will be enhanced only when a partnership and collaboration between consumers and societies are formed. Therefore, management should proactively incorporate the idea of social marketing that raises environmental issues for society and communicates with consumers and local communities. Eco-labeling is important for raising environmental consciousness among consumers. Eco-labeling and the inclusion of environmental indicators in product specifications should not be positioned simply as advertising tools but as a bridge between companies and consumers. Industries, together with government and civil society, should promote standardization of these initiatives.

Five Stages of Environmental Reports

IISD (International Institute for Sustainable Development) analyzes environmental reports from all over the world and sets a five-stage framework for the content of such reports.



(Source) "COMING CLEAN - Corporate Environmental Reporting" Sustainability Published by Deloitte Tohmatsu International (1993)

(Note TRI: Toxic Release Inventory)

New examples of environmental reports

Statement of green balance sheet (Takara Shuzo)

Takara Shuzo has financially calculated environmental loads and contribution to the environment of their business activities and reported "Green Index", each year's improvement against benchmark year.

Third party evaluation in report (Toyota Motor Corporation)

Toyota asks outside experts to evaluate the content of environmental report in advance and includes their evaluation in the report. It is rather difficult for general readers to evaluate the content of environmental reports. This third party evaluation enhances credibility of the content and improves effectiveness of communication. Furthermore, questionnaire is included in the environmental report to stimulate two-way communication.

Balance sheet of environmental activities (IBM)

IBM calculates and publishes expenditures to deal with environmental issues and resultant savings. In 1997, IBM spent 11.4 billion yen worldwide and saved 23.5 billion yen from saving and avoided expenses, obtaining more than doubling effects of expenses.

PERI Guideline for environmental reports

PERI (Public Environment Reporting Initiative), as an attempt to respond to the importance of environmental reports, announces guidelines for contents of environmental reports and support companies' activities for environmental reports.

[PERI Guideline]

- (1) Organizational Profile
- (2) Environmental Policy
- (3) Environmental Management
- (4) Environmental Release
- (5) Resource Conservation
- (6) Environmental Risk Management
- (7) Environmental Compliance
- (8) Product Stewardship
- (9) Employee Recognition
- (10) Stakeholder Involvement

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 6 :

Environmental education should be conducted at all levels and Eco-Management should be incorporated into the corporate structure and culture

Eco-Management should be embodied by environmental education

– Eco-Management in practice should be supported by each and every employee. Lofty principles or environmentally conscious business plans are easy to formulate. But without employee support, Eco-Management will not become a reality. Therefore, it is important to establish a corporate/organizational culture to enhance and support the environmental consciousness of employees. And the entire company should be structured with Eco-Management as its foundation.

– Environmental education should not only spell out Eco-Management policies but also promote a real understanding of environmental issues and challenge employees to reconsider their attitudes toward environment. It is necessary to raise awareness of employees so that each and every employee accepts the importance of "coping with both environment and economy at the same time". Needless to say, environmental education should target management as well.

– Given the broad scope of environmental issues, it is necessary to conduct collective education across the functions and departments of a company and to offer hands-on training that deals with environmental issues in a practical manner. Also it is effective to hold workshops for employees at all levels, including line workers and management, and workshops with customers or citizens in local communities.

Reform of corporate culture should be promoted toward realization of Eco-Management

– As part of a company's shift toward Eco-Management, employee awareness must be enhanced and company activities must be reviewed. An increasing number of companies now employ a "director for environment" and create a designated department for environmental activities. It is important that they include in their activities the reform of corporate culture to embrace the Eco-Management philosophy.

– Mechanisms should be institutionalized to raise the environmental consciousness of

employees in actual business activities. One example is the integration of traditional small group activities for quality control or work improvement with the development of special small group activities for environment. Mechanisms to award high performers should also be developed.

Lifestyle of employees should be also addressed

– There are some companies that use internal newsletters to promote environmental home accounting book and challenge employees to review their lifestyles. Environmental issues cannot be solved by efforts within companies. Therefore, it is important to address lifestyles of management and employees with use of internal newsletters or other communication tools

– Some companies already started to produce environmental reports or handbook for the environment for employees. It is essential to understand the environmental loads as well as environmental activities of their own companies. Environmental communication for employees should be emphasized.

V. Seven recommendations for realization of Eco-Management Initiative

Recommendation 7 :

New industrial clusters should be established that use a recycling-based approach and that aim for Zero Emission

Zero Emission production should be a goal and principle of company operation

- In order to put companies in sync with ecology, everything emitted from corporate activities should be circulated safely back to the environment. Products are sold to consumers who need them. Likewise, when structures are constructed where waste matter and waste energy are not "processed as wastes" but are sent where they are needed, resources can be utilized more thoroughly and the total amount of resources used can be reduced.
- The underlying concept for such activities is known as "Zero Emission" production. We know, from the law of entropy, that it is physically impossible to reduce the environmental impact of industrial activities to zero. But the strategy of "Zero Emissions" offers ultimate goals and practical guidelines for companies to change.

Emission Value Chain should be realized by utilizing IT (information technology)

- An increasing number of plants and offices have begun efforts to make their workplaces "emission-free." Similar initiatives that extend beyond the boundary of individual companies should be promoted more strongly. To this end, mechanisms are needed to facilitate trading of wastes among companies. But wastes from companies are inconsistent in content and quality and are often insufficient in quantity. Therefore, under current business practices, it is difficult to conceive of industrial wastes as tradable commodities.
- What makes waste trading possible is IT (information technology). Information networks can put scattered seeds and needs together and it becomes possible to create an "Emission Value Chain" mechanism in which the values of wastes are shown clearly. Effective information networks are the key to success, just as they have helped successful development of home delivery services. Environmental problems cannot be solved only with hardware. It is essential to address environmental issues with a combination of

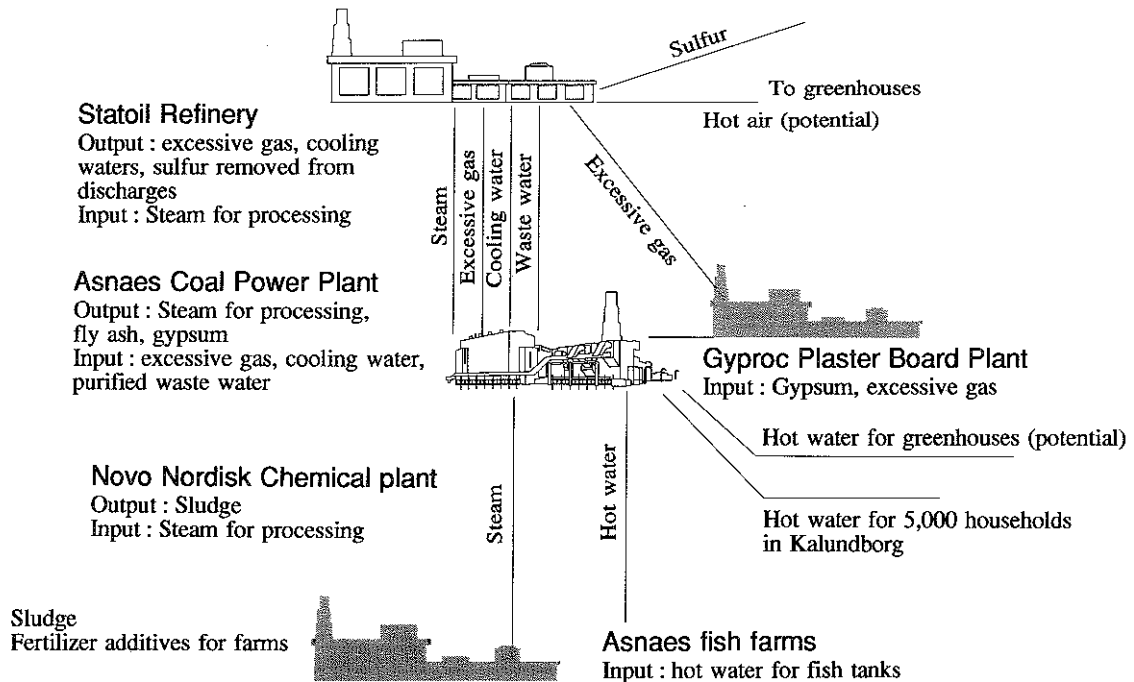
hardware, software and systems.

Networks should be created beyond individual companies

- Industries in Japan traditionally have formed groups mainly based on capital relationships. However, industrial structures should be changed into recycling-based structures by establishing industrial clusters based on "circulation of resources" which transcend scale or category of companies.
- Companies are not the only actors that should be included in such networks. If effective Emission Value Chains are to be established, it is important to encourage the active involvement of government, NPOs and citizens in local communities. How such systems can be created will determine a new source of competitiveness for companies.

Industrial symbiosis flow in Kalundborg

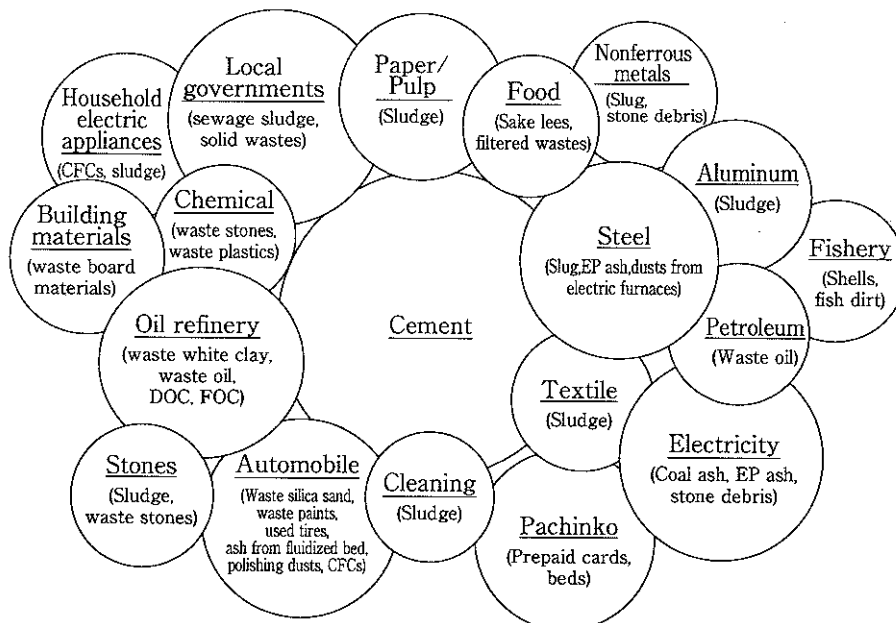
In Kalundborg, Denmark, Emission Value Chain, as shown below, is already constructed.



(Sources) Compiled from "Challenge for Eco-Efficiency" (Nikka-Giren Publisher)

Industrial cluster centering on Cement industry

Japanese cement industry already formed a cluster with various companies and local governments, using discharge from industries and local governments as raw materials and fuels for cement production. Furthermore, as a result, they have realized the highest quality and the lowest heat unit for production in the world.



VI. Toward a recycling-based society

Establishment of a recycling-based economic system based on the principle of Zero Emission

– To realize sustainable development, the economic system should become a recycling-based system. One-way systems have inherent limits but recycling-based systems do not. By transforming the economy into a resource recycling system, it becomes possible to use fewer resources for a richer life.

– Zero Emission is an ultimate principle for the realization of a recycling-based economy. By recycling resources, total resource use and environmental impact are reduced, while economic efficiency is increased. This Zero Emission principle should be promoted around the world as a principle of Eco-Management originating from Japan.

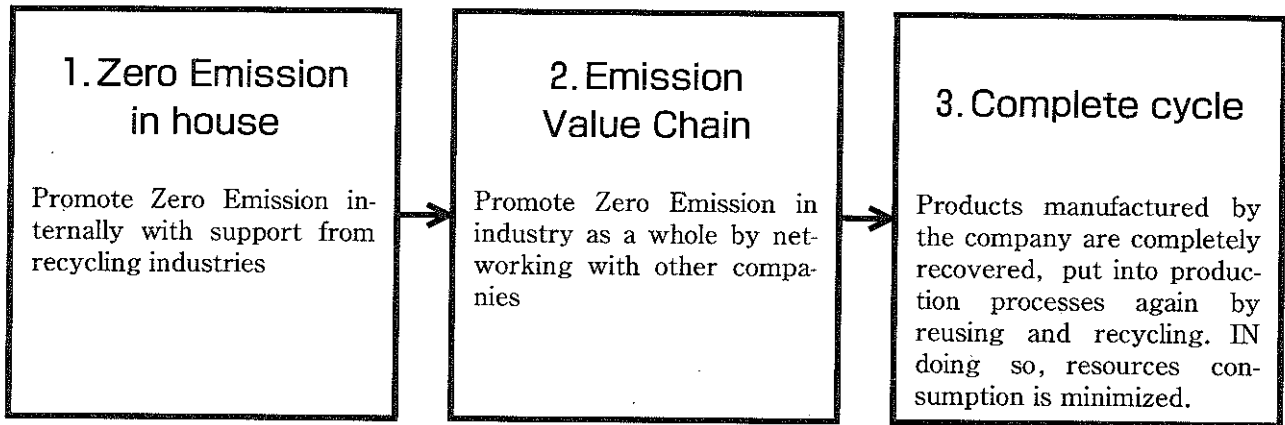
– Resource recycling economy means a shift from an economy focused on possession of goods to one focused on utility. Here, what matters is not hardware itself but the services that hardware can offer. Cycling mechanisms should be established that send hardware, once services are delivered, not to a disposal site but back to its manufacturer.

Partnership among government, citizens and companies

– Partnership among companies, government and citizens is essential for realization of a recycling-based economy. Companies should not only strive for their own Eco-Management but also make active approaches to consumers and government for green consumerism, for a lifestyle not based on possession and for cooperative relationship in circular economic system.

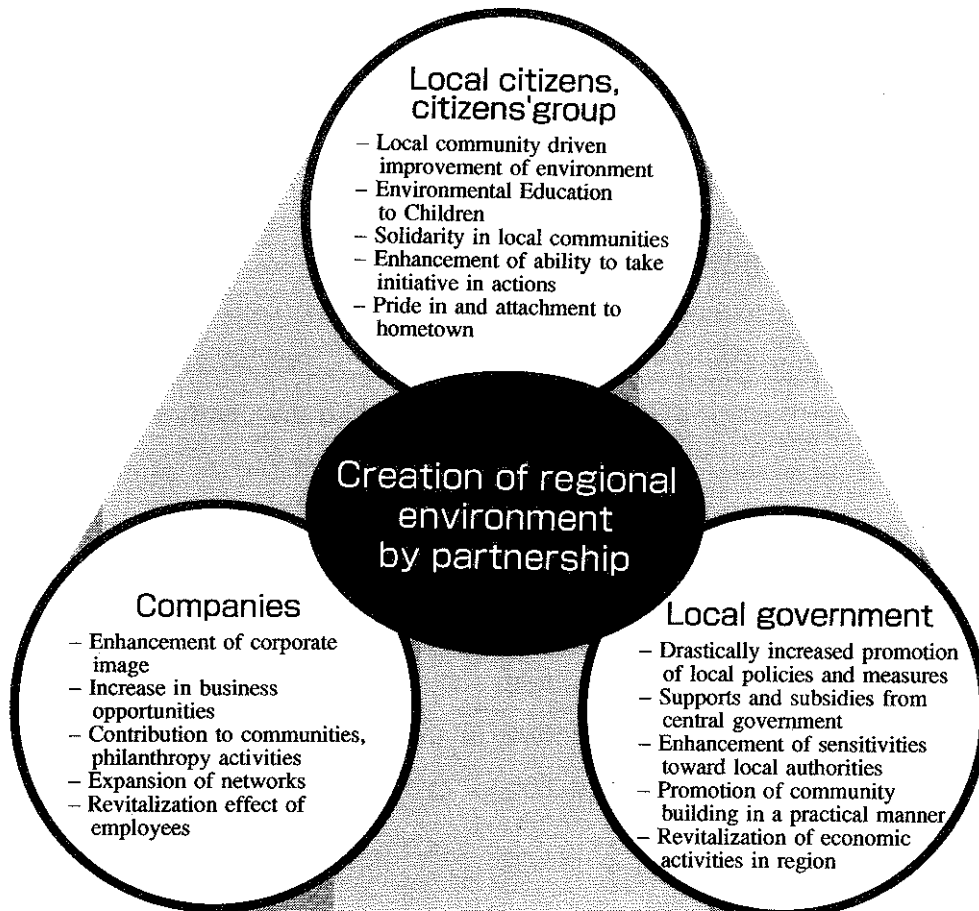
– It is also important to clearly indicate the company's attitude toward the environment in its corporate mission statement. Companies in the future should not be reactive to requests from stakeholders but be proactive in clarifying the corporate attitude and in changing society itself into recycling-based system in partnership with supportive shareholders and customers.

Three stages in development of Zero Emission



Ground Work by partnership among citizens, government and companies

Ground Work activities to improve environment started in the 1980s in UK. Citizens, government and companies work together in establishing specialized organization (trust), reviewing nearby environment (ground) and improving by their own efforts (work). In many parts of Japan, various types of Ground Work have started.



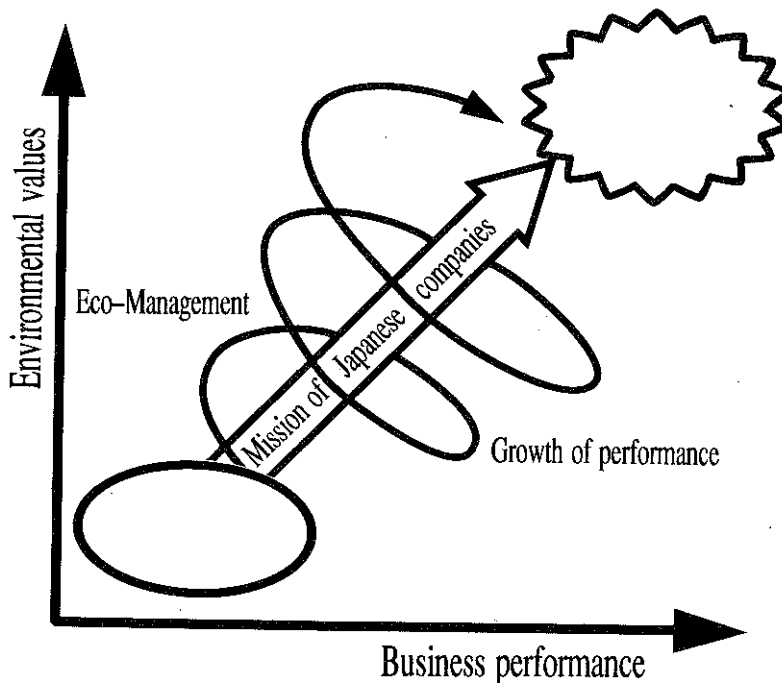
Source : Japan Ground Work Association

Mission of Japanese companies : Proposal for global standards in Eco-Management

– In order to integrate ecology and economy, traditional industries and corporate management should be drastically changed. The economic system of mass production, mass consumption and mass disposal should be reviewed and the consumption of resources and energy should be minimized. A system of Zero Emissions should be realized which actually creates and enhances the value of resources.

– Japan has an ancient tradition of recycling. And as shown in quality control and productivity improvement programs, Japanese companies have traditions of step-by-step improvement and participation of employees. Japanese companies are well-positioned to take the lead in global Eco-Management initiatives. It is a mission for Japanese companies to propose global standards in corporate management toward realization of a recycling-based economic system with Zero Emission as a central principle.

Establishment of global standard of Eco-Management is a mission of Japanese companies



Special gratitude to members of "Forum on Eco-Management Initiative in the 21st century" in formulating the recommendations.

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Eco-Management Initiative for New Growth and Development of Companies

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