

Eco-QC Management for the New Generation Company

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Overview

Amid increasing public awareness of environmental issues, companies lacking in ecological consciousness are missing opportunities for future development. A reorganization of management on the principles of Eco-QC (Ecological Quality Control) is the key to establishing a strong base for future growth.

Protecting the environment has conventionally been seen as a matter of controlling specific sources of pollution. However, society is beginning to realize that pollution is a global problem which cannot be solved by such a local, palliative approach. Companies have a major effect on the environment and are an important element in society; they are now under pressure to reform the way in which they do business.

In 1989, amid growing public concern over environmental issues, the “CERES principle” was established in the United States. CERES has published a set of rules aimed to encourage a sense of “environmental responsibility” among corporate America.

In Japan, the Keidanren (the Japan Federation of Economic Organizations) and other business associations have published principles of conduct and are urging companies to act on environmental

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issues. To date, however, few have publicized the need for companies to face up to environmental issues to the same degree as CERES.

Europe and America have led the response to environmental problems, as instanced by the restrictions on fluorocarbons and carbon dioxide. One effect has been profits for Japanese companies able to market their world-leading pollution control and energy-saving technology. Now, however, companies are under pressure to set a global example in developing solutions to environmental problems and to restructure their way of doing business that stresses a new approach towards the generation of profits.

If companies are to maintain past levels of profitability while making a positive contribution to protecting the environment, they must (1) accelerate the expansion of the eco-industry, (2) introduce design and production systems that are both environmentally safe and economically viable, and (3) internalize the costs of environmental protection.

A system of environmental auditing has become established among European and American companies, and Japanese companies are now following suit. In reality, however, environmental audits are still no more than a way of avoiding fines or lawsuits, a means of defense against regulations which require scrupulous management and large-scale investment. To remedy this situation, a new system of quality control is proposed which redefines the quality of a product in terms of the burden it places on the environment. This system, which builds on the current characteristics of QC activities, is called "Eco-QC".

Eco-QC evaluates the quality of a product in terms both of its profitability and the burden it places on the environment at every stage in its life cycle, from raw materials procurement through production, use, and disposal. It aims to prompt the development of a product with higher ethical value.

Many Japanese companies still confine their response to environmental problems to public relations and advertising. However, companies lacking in ecological consciousness are losing opportunities in an expanding market and run substantial risks including the

possibility of incurring liability for compensation in respect of environmental destruction. Under these circumstances, the three essential elements of an environmentally conscious corporate strategy will be innovation, cooperation, and communication.

I. Introduction

Until now, pollution control in Japan has focused on “visible” pollution — smoke, effluents and solid waste from factories, exhaust gases from cars, contamination of river water, and other kinds of environmental pollution and health hazard of which it is possible in some measure to determine the source and cause.

Because the causes and effects of such pollution are relatively clear, it has been possible to take countermeasures. Companies have access to technologies which measure and remove pollutants, environmental protection devices and pollution-free manufacturing processes. This, and the introduction of more stringent environmental regulations, has prompted Japan to make clear progress towards solving many of the environmental problems that stem from industrial pollution.

Today, however, we are increasingly faced by “global” environmental problems such as global warming caused by CO₂, desertification, and depletion of the ozone layer by CFC gases. Unlike conventional forms of pollution, the sources and causes of this global pollution are extremely wide-ranging and the relationships between cause and effect are complex and interwoven. Finding a solution will require a committed response which integrates the activities of private citizens and companies and is supported on a policy level by government.

In particular, companies and industries face strong pressure to change their philosophy and patterns of behavior, both because they are major consumers of resources and energy and therefore have a significant impact on the environment, and because of their important position in society.

II. Corporate Responses to Environmental Problems

1. The American and German Responses

As public concern over environmental problems has grown, a number of associations have been formed and government directives have been issued to promote environmentally responsible management and behavior among companies.

In the United States, ocean pollution on a massive scale following the spillage of 42 million liters of crude oil in the Gulf of Alaska prompted the formation of the Coalition for Environmentally Responsible Economies (CERES). In September 1989, CERES published the CERES Principles (known at the time as the "Valdez Principles") a list of ten concepts that companies should follow to protect the environment. These principles are (1) protection of the biosphere, (2) sustainable use of natural resources, (3) reduction and disposal of waste, (4) wise use of energy, (5) risk reduction, (6) marketing of safe products and services (7) damage compensation, (8) disclosure, (9) environmental directors and managers, and (10) assessment and annual audits. As of August 1993, approximately 60 companies had signed the treaty.

The significance of the CERES Principles is that the signatories, who all have a major impact on the environment, are demonstrating "environmental responsibility". They have shown that they realize their immense responsibility in relation to the environment, present and future, and understand that they must regulate their own activities. They have also perceived the need to rebuild relationships with local society through the disclosure of information and the implementation and publication of environmental audits.

In 1987, the Bundesdeutscher Arbeitskreis für Umweltbewusstes Management (BAUM) was established in Germany. The object of BAUM is to set up environmental control systems within companies and to assist companies in implementing effective environmental policies. BAUM's eight specific objectives are (1) to strengthen environmental responsibility among entrepreneurs, (2) to supply information on issues of ecology and economic efficiency, (3) to

promote systematic exchange of information and experience between companies, (4) to create a new career track in the role of “management ecologist”, (5) to conduct experimental and research projects, (6) to strengthen the obligation of the supplier to protect the environment, (7) to strengthen the obligation of waste management companies, and (8) to commend ecological activities by other organizations including international bodies. As of 1992, BAUM had more than 380 members, including both German companies and German branches of foreign companies. Related organizations have been established in Austria and Sweden. Besides organizing conferences and seminars and supplying up-to-date information on environmental control issues to its members, BAUM encourages the implementation of environmental measures by publicizing the environmental activities of its members and other activities.

2. The Japanese Response

The first Japanese responses to environmental problems were made during the late 1960s, when the Minamata disaster was among a series of pollution incidents that became major social concerns. A variety of support groups were formed, but these were devoted almost entirely to securing compensation and support for the victims of pollution, and there were no CERES-type organizations formed with the object of publicizing companies’ activities and policies on environmental protection.

However, public concern over environmental problems continued to grow. In April 1991, the Keidanren published its Global Environment Charter (*Chikyu Kankyo Kensho*), which called on all companies to submit to environmental assessments of their business activities and sought, among other things, the establishment of an organization of corporate environmental directors. In October 1992, the Ministry of International Trade and Industry (MITI) published its Voluntary Plan on the Environment (*Kankyo ni Kansuru Borantarii Puran*) followed in February 1993, by the Environmental Agency’s Directives on Environmentally Friendly Corporate Behavior (*Kankyo ni Yasashii Kigyo Kodo Shishin*). Both documents aimed to promote corporate action on environmental issues.

3. The Basic Framework for Corporate Action

The basic framework for corporate action on environmental issues solicited by these rules and directives can be summarized as follows:

- Declarations of intent with regard to environmental problems: the creation of charters on the environment, lobbying activities, and formulation of policies.
- Restructuring of internal systems and organizations: the creation of specialist environmental divisions, appointment of specialist staff, environmental education programs for staff, compilation and distribution of information on environmental issues.
- Examination of companies' own business environments and markets: eco-marketing, cooperative ventures with local government bodies, modification of products, environmental assessment of products.
- Investment in developing environmental protection technology: the modification of production processes, development and introduction of technology, environmental assessment of technology.
- Entry into eco-businesses: the development of new products and services.
- Inter-company cooperation and exchange regarding environmental protection projects.

In any country, and especially in Japan, the corporate response to environmental problems can only be effective if such specific measures are preceded by reform of corporate consciousness and systems at a more basic level. In other words, individual companies have until now tended to think of environmental protection as an unprofitable hurdle which they must clear in order to comply with environmental regulations. From a macroeconomic perspective too, environmental protection measures have tended to be perceived as a burden, leading to slower economic growth, higher prices and unemployment, and weakened international competitiveness.

However, as long as companies continue to see heightened public concern over environmental issues as a constraint on business activities, they will find it difficult to evolve standards of corporate behavior that will be acceptable worldwide in the age of “ecological coexistence”.

Following the bursting of the economic bubble in Japan, the fashion for “window dressing” sponsorship of arts and sports to improve the corporate image has declined. In its place, an ecology boom has begun, and a wide range of “eco-goods” have been introduced to the market. However, in many cases it is debatable whether these goods really are “environment-friendly” or whether they are simply exploiting a superficial image.

Japan today finds itself expected to make a major contribution to international society. It is under pressure to abandon old manufacturing systems which pursued low price, high performance and diversity of function at all costs, in favor of new systems which can achieve reasonable levels of price and profit at a reasonable production volume while saving resources and energy and assuring environmental safety. Since most of the outside world’s knowledge of Japan is in the form of industrial products, the country tends to be judged on the value of these products. If Japan create a new international image for itself, it must convert and restructure its production systems.

As may be seen from indices such as the ratio of energy consumption to GNP, Japanese companies have already achieved a high technical standard in terms of productivity, energy efficiency and reducing the burden on the environment.

The oil crises gave Japan the impetus to develop a high standard of energy-efficient technology, which has ultimately boosted corporate profitability. Later, investment in preventing “visible” pollution became the starting point for the development of a range of new technologies. Today, the world looks to Japan both to provide answers to environmental problems and to set an example of how corporations can restructure their way of doing business to stress a new approach towards the generation of profits.

III. Ecologically Conscious, Profit-Oriented Management

If companies are to maintain past levels of profitability while shifting to an ecologically conscious way of doing business, they must focus on three objectives:

- (1) developing eco-business,
- (2) introducing ecologically safe but profitable design and production systems, and
- (3) internalizing the cost of environmental protection.

1. Developing Eco-business

Consumers are beginning to show a tendency to measure the worth of a product in terms of its ecological safety. Books such as *Shopping for a Better World* have become best sellers, and consumers are demanding products which save energy and resources and place less strain on the environment. In response, a wide variety of ecologically safe products are coming onto the market.

Companies which can take advantage of these new business opportunities by making full use of their technical expertise to develop new products ahead of their competitors will be able to secure large market share and achieve high profitability.

Companies must also respond positively to the growing need among developing countries for environmental protection equipment. In recent years, rising living standards worldwide, especially in developing nations, have prompted increased demand for the introduction and replacement of equipment designed to ensure environmental safety. Environmental considerations are becoming increasingly linked to overseas development aid and technical assistance, and debt-for-nature swaps have become popular. According to the Worldwatch Institute in America, an institution specializing in research on environmental problems, the market for ecological products and services is already worth approximately \$200 billion and is likely to grow to \$300 billion by the year 2000. Moreover, the likelihood of stricter environmental protection measures in developing countries, especially those in Asia, will no doubt increase the

pressure on Japanese industry to contribute by developing these nations' eco-business.

2. Introducing Ecologically Safe, Economical Design and Production Systems

Ecological evaluation of industrial products has conventionally focused on the burden which the product places on the environment at certain stages of its life cycle. The factors considered in this evaluation include whether the product releases specific pollutants during use or after disposal, and how easy it is to recycle. A product which makes only a small burden at certain stages of its life cycle may have a large impact at others, and overall may make little contribution to reducing the burden on the environment.

If companies are to reduce the burden on the environment throughout the life cycle of their products while maintaining and improving profitability, they must revise their ways of doing business.

First, they must revise production systems. Traditional systems based on market mechanisms rested on the assumption that the balance of supply and demand would effectuate an ideal distribution of resources. In reality, however, little progress has been made towards internalizing the social costs of environmental protection and of recovery and waste processing. Wasteful use of energy and natural resources has led to environmental destruction, and in many cases over-supply has led to lower product value and profitability. Consumer needs have diversified to the point where the public is no longer satisfied with mass-produced products, and companies are now finding it increasingly necessary to supply a wide range of different products in small volumes. Companies need to revise and improve their production processes by introducing interactive CAD systems and boosting the level of automation at all stages from design to processing. At the same time, they must use new technologies such as virtual reality to re-engineer production processes and reduce the burden on the environment. If companies can supply products that truly satisfy the customer, they will be able to set prices that reflect the higher added value and assure a reasonable profit. The day is in sight

when the profit made on one car can no longer be counted in tens of thousands of yen. It has become necessary to switch from production systems that give priority to profit but entail high production volumes, high energy consumption, and high waste levels, to systems that stress utility and consumer satisfaction.

Second, companies must revise product design systems. Until now, the consumer electronics and car industries have relied on frequent model changes, giving the impression that old models were in some way tainted, to create fresh demand in a saturated market. They are now beginning to realize that such a strategy cannot endure and has proved to be counter-productive. Supplying a flood of products with a host of inessential functions that make them complex to operate ultimately works against the consumer's interest. For manufacturers too, it means time spent on superficial technical development which could be better spent concentrating on developing new basic technology. Frequent retooling of production lines and the attendant growth in parts inventory lead to pressure on profitability and may eventually weaken the company's structure. In the car industry, companies have already adopted longer model change cycles — but they must also revise their policy on design itself if they are to make more effective use of the earth's limited resources.

3. Internalizing the Cost of Environmental Protection

Two proposed bills on recycling — the revised Waste Products Processing Act and the Resource Recycling Promotion Act — and the Basic Law on the Environment suggest that the government may be considering the introduction of both an environment tax and regulations which will oblige manufacturers to recover industrial waste and cover part of the cost of waste processing. These regulations might initially be perceived by manufacturers as a burden but we believe that companies should anticipate such a move and use it as the motivation for developing new technology. The experience of anti-pollution measures to date has shown that *post facto* and *ad hoc* responses often inflate the final cost. An extreme example can be found in the Environmental Agency's estimate of the costs of the

Minamata disaster, given in a report entitled Japan's Pollution Experience (*Nihon no Kogai Keiken*). The agency estimates that neglecting to invest approximately ¥100 million per year in pollution prevention (at 1988 prices) has resulted in total costs of ¥11.9 billion — over 100 times higher — in compensation to victims and local fishermen and the cost of dredging work. To reduce the risk of similar incidents occurring again, it will be necessary from the start to build mechanisms into everyday business activities which prevent environmental problems breaking out.

IV. Eco-QC

1. Environmental Auditing and its Limitations

In order to implement the actions mentioned in the previous section of this report, Japan must develop a new style of corporate behavior. One possible direction is the system of “environmental auditing” which has been widely introduced in Europe and America. An environmental audit measures a company's standards on storage of toxic materials and release of waste into the atmosphere and water against government regulations. As proof of its efforts, the company keeps records and publishes reports of the costs of meeting the regulations and attempts to reduce all types of environmental risk (including liability for compensation). Japanese companies such as NEC and Hitachi, which have a high ratio of exports to Europe and America, have introduced such systems but their numbers remain few in comparison with Europe and America. The British Standards Institute and the European Union have already established systems of environmental control and auditing, and the International Organization for Standardization is working to establish international standards for environmental auditing which it aims to publish by the end of 1994.

However, some critics point out the limitations inherent in such systems. They maintain that environmental auditing is often little more than a means to avoid fines and lawsuits, a means of defense against regulations which would require scrupulous management

and large-scale investment. In this respect, environmental auditing was one answer to the environmental problems of the 1960s and 1970s but it is of little value as a means of survival in the new age of peaceful coexistence with the environment.

2. Eco-QC

For companies in general and manufacturing industry in particular, the most important consideration in environmental policy is how to express ecological consciousness at the product level.

We therefore propose the concept of Eco-QC as a prototype for means of assuring product quality. Eco-QC redefines the concept of “quality” as a product value in terms of the effect of the product the global ecosystem — the burden that it places on the environment, its resource and energy efficiency, and waste processing costs.

Eco-QC builds on the features of conventional QC activities, whereby a company’s employees themselves carry out a full “bottom-up” inspection of corporate activities by reviewing proposed activities and production processes. It aims to create products which are ecologically conscious in the true sense of the term, and eventually to transform corporate management itself into a similar ecologically conscious structure.

The “quality” which is the object of control in Eco-QC is measured not only in terms of direct production costs and productivity, but also in terms of the product’s:

- ability to offer continuing satisfaction to consumers,
- lifetime cost, including not only the initial production cost but also the cost of use and disposal,
- reliability and durability,
- reusability and recyclability, and
- burden on the environment at each stage in its life cycle, from production, through distribution and use, to disposal.

Eco-QC evaluates a product in terms of profitability and the burden it places on the environment at every stage of its life cycle, from procurement of raw materials, through production, use and disposal, and attempts to realize the development of products with higher ethical value.

3. Eco-QC Checklists

Eco-QC is based on the criteria listed in the following checklists.

Checklist 1 — Energy

Energy costs have a significant influence on corporate management and profitability. This list would be used to monitor actual energy consumption and to seek ideas which help to improve efficiency in the production process.

- (1) Establish a study group consisting of outside specialists and employees from non-production departments such as planning, purchasing, and personnel.
- (2) Collect data on alternative sources of energy and energy-saving technology, and compare with actual energy consumption for each process.
- (3) Study opportunities for financial savings through the introduction of short-term energy-saving technology, and implement them through multiple gradual improvements in the workplace.
- (4) As a long-term energy-saving measure, review those production processes which have low energy consumption in terms of production volume and labor.
- (5) Estimate energy consumption requirements relating to the consumption, use, maintenance and disposal of the product, and calculate total energy consumption.
- (6) If necessary, examine methods of developing totally energy-efficient products, and submit proposals to production divisions.

Checklist 2 — Raw materials

The optimum selection and procurement of raw materials is not only a key to cost reduction; through materials suppliers and trading companies, it can play a major role in protecting the environment.

- (1) Establish the characteristics and functions of raw materials required for the production process and the product itself, then collect information on import and production

sources, extraction conditions, and dangers presented by the materials, and their potential impact on the environment.

- (2) Calculate the volume of toxic pollutants released or generated during the use or processing of the materials and compare these with regulations on release of toxic materials.
- (3) List alternative raw materials and compare the environmental impact of extraction, shipping costs, the cost of environmental protection measures during the production process, and the extent of labor and energy savings.
- (4) Improve methods of storage at the production site, introduce more sophisticated production machinery, step up recovery and recycling, and modify shipping methods to improve the efficiency of raw material utilization and reduce the burden on the environment.
- (5) Over the long term, work with raw materials suppliers to examine sustainable methods of raw material procurement that will reduce the burden on the environment.
- (6) Work to eliminate use of dangerous materials and switch to alternative raw materials. If necessary, ask internal engineering and R&D divisions to develop alternative materials.

Checklist 3 — Product design and development

One basic step companies must take is to consider effect on the environment and profitability from the product design and development stage.

- (1) Review products, and list those which could be redesigned to use new technology, alternative materials, or standardized parts in order to reduce the burden on the environment.
- (2) Design products for ease of maintenance and durability by extending service life, model change cycle, and creating strong sellers.

- (3) Design products for efficient and sustainable use of raw materials with a view to improving recyclability and saving resources.
- (4) Use computer simulations and apply ergonomic principles to design products that are easier to use.
- (5) Develop sophisticated products that make full use of the company's technical expertise. At the same time, plan product ranges so that products which use rare resources and biological materials express sufficient ecological consciousness.
- (6) Pay attention to recovery, recycling and degradability of packaging, as well as ease of shipping and storage.

Checklist 4 — Manufacturing and production processes

The object of reviewing manufacturing and production processes is to reduce the volume of waste generated during each process and, through efficient use of raw materials, to reduce production costs.

- (1) Check that present production processes and technologies satisfy environmental protection standards or stricter standards.
- (2) Implement short-term measures to improve raw material characteristics, control harmful waste and improve energy efficiency in the production process.
- (3) Initiate ongoing reviews and re-engineering of the production process, including introducing alternatives to dangerous materials, new technology, and more sophisticated environmental protection measures.
- (4) Introduce more sophisticated closed systems in the production process, such as recovery of harmful materials, waste recycling, and waste heat utilization.

Checklist 5 — Recycling

In preparation for the establishment of a full-scale recycling market, review products for recyclability, use recyclable parts and

have government propose measures and support.

- (1) List products which could be converted to use recyclable parts, indicating the costs and benefits of conversion.
- (2) Compare pollution factors, processing costs and energy consumption with those of current disposal methods and project demand for recycling.
- (3) Design products to allow internal recycling and improve resource reuse.
- (4) Work with distributors and recycling companies to establish a recycling market.

Checklist 6 — Sales and marketing

Marketing and sales, which represent a company's most direct contact with its customers, should not merely transmit a superficial image, but should communicate ecological product values.

- (1) Obtain an "eco-mark", review package design to eliminate excessive packaging and use environmentally friendly materials.
- (2) Review current sales systems: improve after-sales service, response to customer inquiries, and the content and media used for advertising and publicity.
- (3) Provide information on the environmental cost of the product to wholesalers and consumers; this would include the proportion of the product price accounted for by environmental costs and the environmental safety of the product itself.
- (4) Select shipping systems with a low environmental cost and revise distribution systems.
- (5) Plan and implement a marketing and sales strategy that addresses market sectors which show preference for products with ecological value.

Checklist 7 — Waste and effluents

Reduce the volume of industrial waste generated by manufacturing activities and the volume of general waste and effluents gener-

ated by corporate activities.

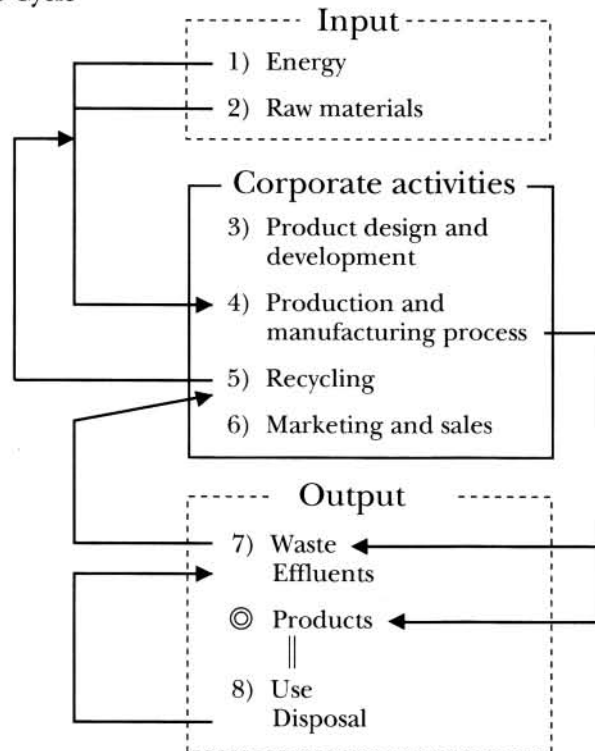
- (1) Assess the volume and sources of waste generated by the company and verify methods of disposal.
- (2) Collect information on industrial byproducts, particularly problems related to toxicity, degrading and processing, and implement a prioritized system of countermeasures.
- (3) Identify processes which generate noise and emissions containing gases, particulates and noxious odors, and examine emission control measures.
- (4) Prepare production plans based on alternative, non-emitting processes, with the object of reducing and eliminating waste and emissions.
- (5) Compare the effectiveness, ease of implementation and financial costs of these plans and select those to be implemented.
- (6) Prepare an action plan for implementation and monitor the effect on the total volume of waste and emissions on a continuous basis.

Checklist 8 — Use and disposal

Companies which supply products must take responsibility for them over their entire life cycle. Companies must carry out checks whether a product is to be used and disposed of by a final consumer, or if it is to be purchased by another company for use as a component or intermediate material.

- (1) Clarify the extent of the environmental impact when the product is used, and the extent of environmental destruction if it is misused.
- (2) Supply information on recommended methods of use and disposal, and other after-sales service.
- (3) Design products to encourage consumers to recycle, and consider support measures to encourage recycling (e.g. repurchasing used products).

Figure 1 Product Life Cycle



Checklist 9 — Systems and policies

It is important to lobby local and central government to implement Eco-QC by applying tax concessions and financial support for environmental protection measures.

- (1) Use current systems to maximum effect, and integrate the resources of the whole company in planning and authorizing investment targeted at development of ecologically conscious products.
- (2) Collect information about local and central government environmental policies on an ongoing basis, and lobby governments to support investment in the environment.
- (3) Exchange information with environment-related consultants and organizations committed to environmental protection, and support a range of projects.

4. A Framework for Implementing Eco-QC

The involvement of both in-house and external specialists with

expertise in production processes and energy/resource issues is essential in implementing Eco-QC. At the same time, activities must not be confined to production divisions, but must also involve personnel, purchasing, sales, planning, and other functions. The individuals chosen to implement Eco-QC must be given adequate power as well as support from the whole corporate organization.

A number of priorities apply in implementing Eco-QC. In descending order, these are: (1) Adherence to legal standards, (2) Cost reduction and expansion of profit, (3) Economically neutral environmental protection policies, and (4) Environmental protection policies that involve economic losses. Particularly at stage (4), in which profit and environmental considerations are at variance, detailed study is required which involves conversion of the environmental impact into financial terms. This conversion should take into account factors such as the potential for restoring the affected environment, the potential for destructive accidents, and the harmful impact on people, flora and fauna.

Figure 2 Example Application of Eco-QC Within a Company

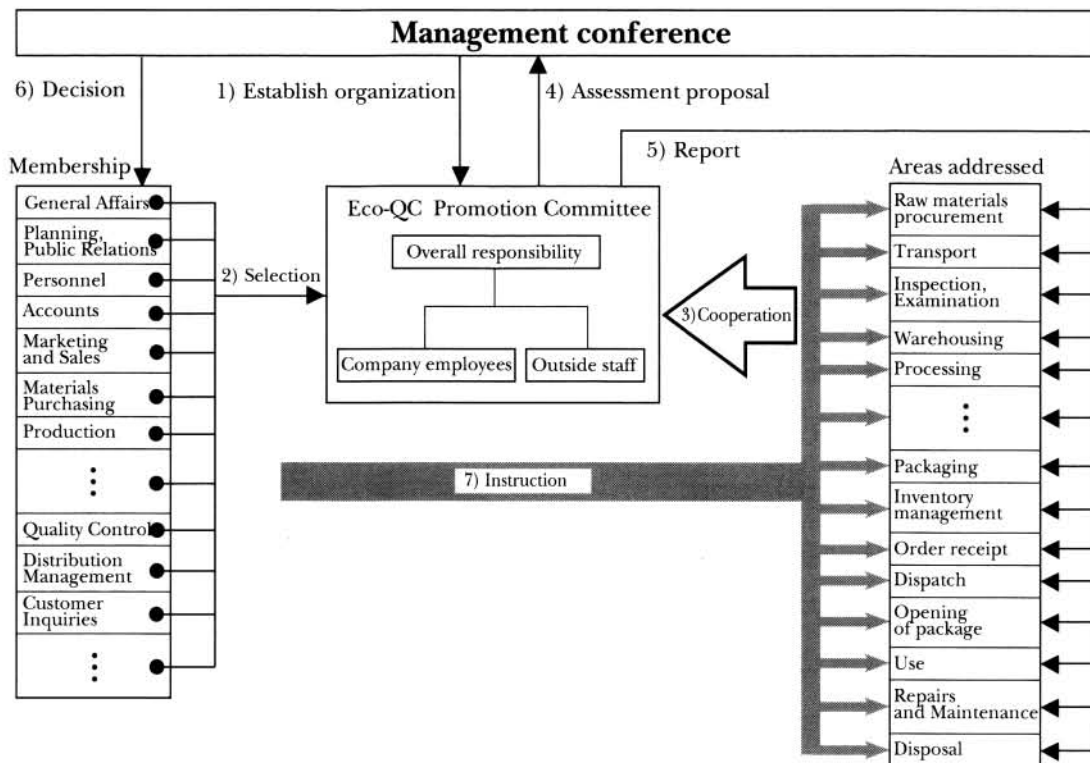


Figure 3 Example Report

		Material A	Material B	Material C	
Resource savings	Timber trees	+	+	+	..
	Training	- -	- -	- -	
Energy savings	Deforestation	+ + +	+ +	+ +	..
	Transport	- -	+	±	
	Warehousing and Management	±	±	±	
	Design	+ +	±	-	
	Cutting	-	+ +	- -	
	Painting	+	+ +	+ + +	
	Assembly	±	+	+	
	Polishing	- -	+ +	±	
	Packaging	+	±	+ +	
	Delivery	-	+	-	
	Use	+ +	+	+ +	
Reduced disposal	Recycling
	Break-up	.	.	.	
	Efflorescence	.	.	.	

Figure 4 Example of Checklist Use

Raw Materials
<p>The following points should be taken into account in order that our method of selecting and procuring raw materials focuses not simply on reducing costs, but also recognizes the major impact it has on the international environment.</p> <p>First, we should compile data regarding the negative environmental impact of the raw materials required to provide specific properties and functions in production processes. We should then calculate the volume of waste and pollutants generated by the use of these materials in production, and should compare this with current environmental regulations.</p> <p>At the same time, we should build a file of alternative resources, comparing in each case the environmental impact and the effect on transport costs, environmental protection costs during processing, and the extent of savings in labor and energy.</p> <p>We should then increase the effectiveness of raw material use while lessening the impact on the environment by improving warehousing methods at production sites, upgrading production machinery, strengthening recycling...</p>

V. Proposals for a New Style of Corporate Management

1. The Georg Winter Model

In the early 1980s, the German entrepreneur Georg Winter proposed an “integrated system of ecologically conscious management” which identified six problem areas for companies lacking in ecological consciousness. These were

- (1) That the management systems of companies without ecological consciousness present a threat to the continued existence of humanity.
- (2) That an industrial sector whose approach is not popularly accepted is politically threatened.
- (3) That companies are missing opportunities in a fast-expanding market
- (4) That companies face liability for huge volumes of damages in respect of environmental destruction and that management and employees run the risk of facing claims for personal damages.
- (5) That companies are missing a great number of opportunities to reduce costs.
- (6) That companies’ absorption with their own activities creates the risk of destroying satisfaction in one’s work and devotion to the job.

Winter also proposed three vital elements for a management strategy to overcome these problems: innovation, cooperation, and communication.

Innovation

There are two kinds of ecological technological innovation: the first reduces the impact of corporate activity on the environment, while the second brings customers the benefit of the environment. The first reduces costs, the second brings competitive advantage.

Cooperation

Unlike the principle of competition as an economic engine, ecology relies on cooperation in every stage of the product’s life cycle, from production through use to disposal.

Communication

In conventional corporate strategy, communication and publicity have been the domain of marketing, and have focused on publicizing the company's products and creating a favorable corporate image. Now that companies and industry in general are threatened by environmental problems, communication is a vital element in the strategy for recovering public trust.

A number of companies have begun to work towards establishing ecologically conscious management systems of this kind.

Innovation is being supported by major increases in funding. A report by the Management and Planning Agency shows that overall funds for research into science and technology at companies and universities rose in 1989/90 by 10.7% to pass ¥13 trillion for the first time. Within this total, spending on research into environmental protection rose 20.3%.

This investment in research has led to the introduction of a wide variety of new products and has encouraged the establishment of environmentally friendly production systems. German car manufacturer BMW recovers materials and parts from scrapped vehicles to provide parts both for its new vehicles and for other industrial manufacturers. The company has established a vehicle development system that incorporates the potential for re-use into component design. A new research center, opened in July 1990, is working on improvements in the manufacturing process that will reduce the volume of waste when a BMW 5-series car is scrapped from the present 260 kg to 70 kg. Based on this work, the company plans to establish a network of recycling facilities across Germany by 1995.

In Japan, Toyota's ecological manifesto, *Comprehensive Approach to Global Environmental Issues: Earth Charter* sets a target for increasing the ratio of reusable materials in new cars from the present 75% of weight basis to 85% by 1996. Companies large and small are holding exhibitions of eco-goods and a wide variety of environmentally conscious products are entering the market.

In the area of cooperation, companies are beginning to take a positive stance towards the exchange of information and technolo-

gies. Many voices in industry also stress the need to transfer environmental protection technology and offer support funding to developing countries. Domestic car manufacturers are working to establish systems for cooperation in environmental issues and are exchanging information on environmental technologies with American and European firms. Product liability will increasingly require manufacturers to assume liability for accidents and injuries caused by their products, and the Japan Federation of Bar Associations (*Nihon Bengoshi Rengokai*) and other legal bodies are lobbying for the introduction of a legal product liability framework. However, it is not only manufacturers who must take responsibility for the impact of their products and services on the global environment and biosystems; the people who use those products and services must also be involved. Today, the "green consumer" movement is shifting from the one-sided confrontation between consumers and manufacturers in which producers were regarded as the enemy towards one in which consumers and manufacturers are joining forces to protect the planet from destruction. Companies themselves must evolve a new philosophy of business, and fulfill their social responsibilities. To this end, it is important that they quantify the environmental impact of each product at each stage of its life cycle, from raw materials procurement, through production, consumption, and disposal, and allow consumers access to this information.

The third element, communication, embodies a concept of moving away from the conventional focus of advertising on promoting sales in favor of a new form of dialog with customers, consumers and local society.

In 1990, the Swedish car maker Volvo published a poster bearing the slogan "We are destroying the environment". This self-criticism by a company that helped to create the car-oriented society of today attracted a great deal of attention. Volvo believes that unless we restructure our society to position cars in a non-destructive relationship with the environment, the auto industry itself will be endangered. The company holds that management and employees should focus not so much on selling the maximum number of cars as

on how to reduce the number of cars in cities, and is supporting the introduction of measures such as traffic cell systems to ease urban traffic problems. Many other companies also take an active role in protecting the environment. British cosmetics manufacturer Body Shop sells products which are designed to be as natural and compatible with the human body as possible. The company has introduced a unique series of ecology-oriented measures through its chain of stores in more than 40 countries. It urges consumers not to use more shampoo or facial cream than is absolutely necessary, sells "refill" packs to avoid wasting containers and uses degradable packaging materials to keep waste to a minimum. American clothing manufacturer Esprit's catalog urges consumers not to buy a product unless they really need it. Eco-goods mail order specialist Seventh Generation runs consumer education schemes. Pharmaceutical manufacturer Johnson and Johnson stays true to its charter by involving itself in a range of social and environmental responsibility programs. Minnesota Mining and Manufacturing (3M) operates what it terms the 3P Program for pollution prevention, by which it aims to cut production costs, as well as reduce the volume of materials used and promote recycling under the slogan "Pollution Protection Pays". Following the tragedy at Bhopal in India, Union Carbide has initiated a full-scale program of environmental auditing.

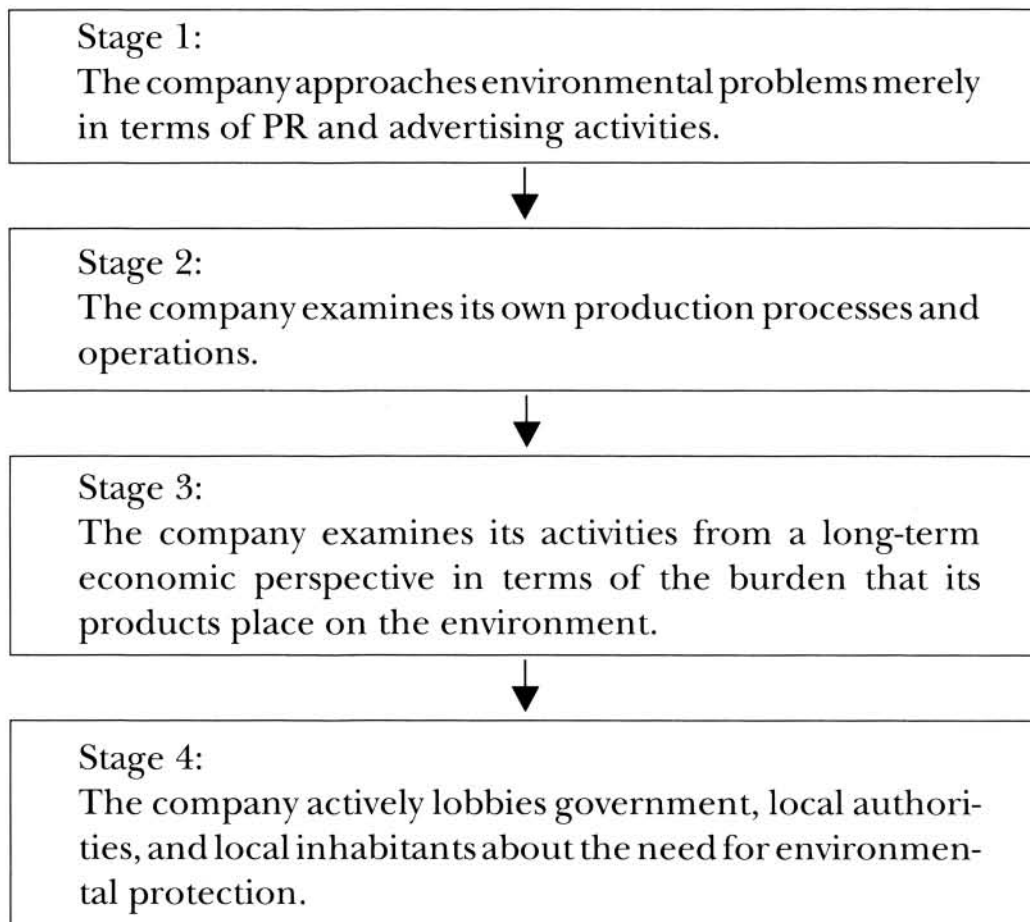
Although the proportion of companies following such measures remains small, these examples are a sign that some companies are beginning to communicate with the regions in which they operate in order to foster positive action to protect the environment.

In Japan, major construction company Obayashi Corporation has estimated that the volume of carbon dioxide generated by the construction industry accounts for around one third of all the carbon dioxide generated in Japan. Obayashi's Global Environment Department says it published the figure to stress the impact of the construction industry on the environment and to serve as a basis for setting targets for protecting the global environment. The publication of this information is also a worthy attempt by the company to fulfill its responsibility towards the environment by communicating with society.

2. Steps to Creating The Ecologically Conscious Corporation

In assessing the actual involvement of companies in tackling the issue of the environment, it is helpful to refer to the four-stage ranking devised by Lester Brown of the Worldwatch Institute.

Figure 5 Evolution of Eco-QC activities in Companies



Judged by these standards, most Japanese companies are still at Stage 1, and even the more progressive companies have gone no further than Stage 2. It is to be hoped that our proposed Eco-QC activities will help many more companies progress to Stages 3 and 4. Besides supporting individuals and associations tackling environmental problems with their human and financial resources and

funding, companies will probably need to develop and supply products that allow consumers to improve their own quality of life in environmental terms and produce user manuals that include advice on protecting the environment during use and on disposal.

Measures such as this will ensure that the effects of Eco-QC are confined within companies. In the future it is to be hoped that corporations will come to view the product as a medium for supporting a higher quality of life for consumers as they aim for a more elevated way of doing business.

One final element of importance is the significance of a company's environmental stance in recruiting and keeping human resources. A company which uses its products to project a message in the same way as it uses advertising can appeal to students and people changing jobs. In future, companies which do not have an appropriate product development strategy are likely to suffer the double handicap of losing consumers and being unable to retain high-quality personnel.