Industry-affecting Environmental Trends and Green Product Development by FUJITSU TEN.

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1.Introduction

The twenty-first century is said to be the century of the environment. During the twentieth century, economic development consisting of mass production, mass consumption, and mass waste production by the developed countries caused environmental destruction to advance rapidly. With the additional environmental impact of developing countries in this century, some believe that the very existence of mankind is now in danger. The major environmental problems that are occurring in the world today are listed in Figure 1.

Fig.1 Current environmental problems

Nearly all human activities have some impact on the environment. The relative impact that industry has on the environment is particularly large. Products not only affect the environment when they are being made but do so after being supplied to customers; in fact, they continue to do so until the end of their life cycles.

Thus, it can be said that preservation of the environment is a permanent management issue that each company must aggressively tackle if industry is to continue to develop. This report will discuss environmental trends that affect industry as well as the development of green products (environmentally friendly products) by our company.

2.Environmental trends that affect industry

By the end of the twentieth century, the impact of various problems on the environment was becoming evident, including problems related to dioxin from waste products as well as health impediments and the destruction of ecosystems caused by global warming and chemicals. As a result, there has been a growing global awareness of the environment among consumers, investors, business clients, and others with interests in industry. Laws, tax systems, and other social systems that affect business,[*1] however, as well as market trends, differ from country to country.

The construction of social systems in Japan is preceded by laws and regulations. Movements toward deregulation, which is linked to business invigoration, have been slow; and only a few programs such as the automobile green tax system and natural energy use assistance program have been introduced. And while the green purchasing activities[*2] of local governments and companies have flourished in the market, the market for green products, used-product sales, and repair services that target ordinary consumers is small. Imbalances in social systems and delays in the formation of the environmental business market have greatly increased the risks associated with business in the industrial world (Figure 2).

In the countries of the European Union (EU), however, the creation of balanced social systems and the early formation of an environmental business market

*1Environment-related social systems
Environmental laws, green tax systems, eco-funds, etc.
*2Green purchasing activities
Consumer activities that promote the selection of environmentally friendly products and services

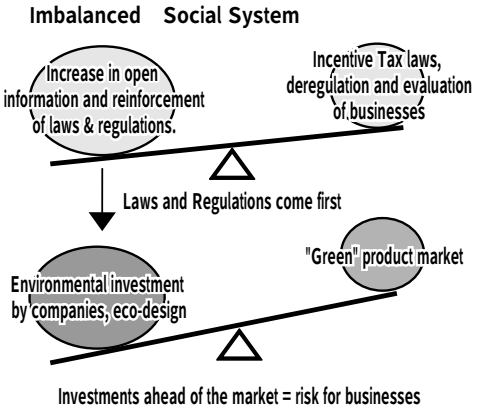

Fig.2 Increase in business risk in Japan

have stimulated the development of management techniques and the avoidance of industrial business risk. As a result, those countries are now in a position of international environmental leadership as they have created global standards for social systems and management techniques*3 (Figure 3).

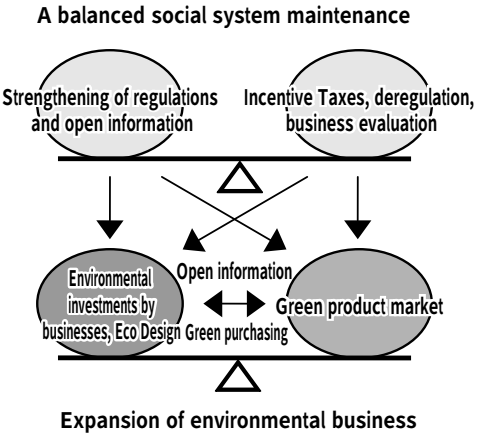

Fig.3 Avoidance of business risk in EU

3.Consumer environmental awareness and action ("Nikkei Ecology" survey)

Figures 4 and 5 show the results of a survey on Japanese consumers' environmental awareness and willingness to take action pertaining to products and services.

Over 40% of consumers stated that they take into consideration "environmental performance" (including energy conservation, recyclability, and exclusion of hazardous substances) when they purchase household appliances and automobiles which are associated with

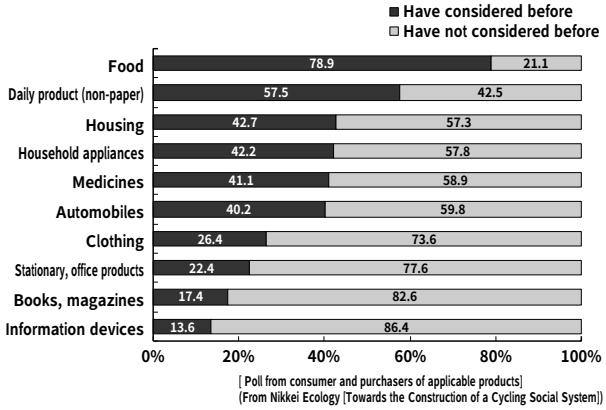

Fig.4 Products whose environmental performance was considered at time of purchase

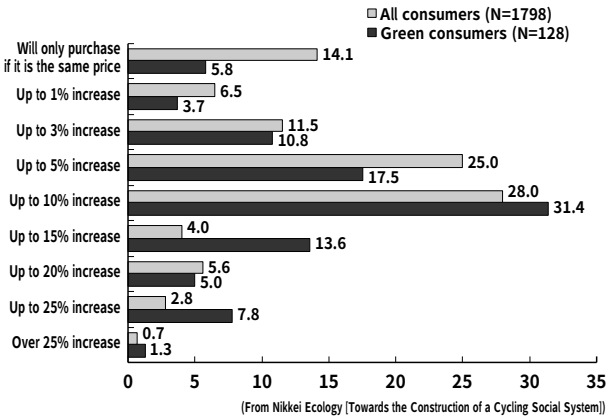

Fig.5 Cost sharing for environmentally friendly products

our company; and approximately 60% of consumers expressed a willingness to pay up to 10% more if a product is environmentally friendly.

4.Challenges of industry

In addition to engaging in activities aimed at reducing environmental loads generated in their business areas, Japan's industries have started to engage in "eco-design" (environmentally friendly design). They have also adopted the use of environmental labels (types I and II)*4 as a way to showcase their environmentally friendly products and corporate image to consumers. But of the green products that have been introduced to the market,

*3Environmental management techniques
Environmental management systems, eco-designs (environmentally friendly designs), environmental accounting, environmental reports, environmental labels, etc.

only a portion, including stationary products, general merchandise, household appliances, personal computers, and automobiles, have environmental performance information that enables comparison. For the time being, until the market expands, upfront investment into eco-design is needed. Such actions are being led by manufacturers of household appliances, communications equipment, and automobiles because of the need to quickly adopt the new environmental management techniques of the environmentally advanced EU countries in order to secure global business.

In the meantime, EU industries are planning to take an even more advanced step. Namely, they are moving to introduce a new information disclosure tool, the type III environmental label, *4 which will actively disclose specific environmental load data to consumers and define "environmental performance" (new added value) as the reduction in environmental load over the life cycle of a product or service. The aim is to expand market share and improve and recover eco-design investment costs by introducing this tool to the green product market and further invigorating green purchasing activities. Furthermore, to secure new business opportunities, investment into eco-design will be additionally expanded. In this way, the type III environmental label can be considered a technique for promoting sound market development.

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*4Environmental labels (types I, II, and III)

Type I : Label for environmentally friendly products whose acceptability standards are established and certified by third parties. Japan's eco-mark is this type of label.

Type II : Label that companies use to independently declare a product's environmental friendliness. Opinions of third parties are not included.

TypeIII: Label that uses quantitative data from life cycle assessments to display the amount of resource consumption, CO_2 emissions, environmental pollutant emissions, hazardous substance content, and other environmental loads

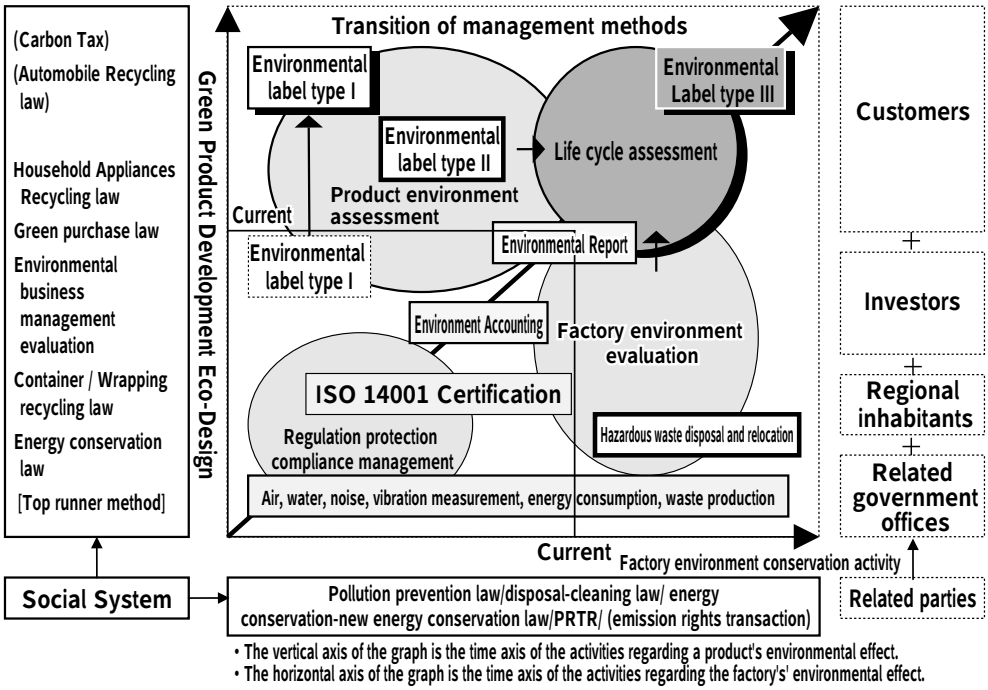

Fig.6 Changes in the social system and management techniques at Fujitsu Ten (disclosure of information)

"Life cycle assessment (LCA),"[*5] a key word in eco-design, as well as the "type III environmental label" will be analyzed and compared to our company's product environmental assessment and environmental information disclosure. Future reform-related issues will also be examined.

5.Current status of Fujitsu Ten's product environmental assessments

Since 1995 we have been conducting product environment assessments. A product's environmental impact is assessed at the design stage. If the product passes the assessment, then it is produced. Our product environmental assessments include the following:

- "Product" assessment: evaluation of finished product
- "Part" assessment: evaluation of individual parts, and investigation of substances that cause environmental loads
- "Packaging" assessment: evaluation of product packaging

Items that are currently included in a "Product" assessment are shown in Table 1. In fiscal year 2000, resource conservation during the design/manufacturing stage was added as an assessment item, raising to 20 the total number of items and broadening the range of a product's environmental impact assessment. Each assessment item is graded based on a 10-point scale according to the level of the measure and is weighted for each assessment item classification for a total of 100 points. Acceptability is determined based on the total score. Furthermore, standards were established by which a product is certified as a "Green product", if it passes the " Product " assessment with a high score and also receives 10 points for certain mandatory items. At the present time, we are aiming to achieve "Green product" certification for all of its products by the end of FY 2002. Fundamental technologies development and environmentally friendly designs are being promoted by each of our business groups in order to reduce product and manufacturing environmental loads.

Also, starting from 1999, we have introduced an environmental assessment information system. This system made it possible for designers to evaluate, approve, and check results from the Web by using their computer terminal, which made usage more efficient. At the same time, a database of the hazardous substances in parts was created as part attribute information.

Table 1 "Product" assessment items

Area	Evaluation Item	Evaluation Standard	Points
Product energy conservation / resource conservation	Miniaturization, weight reduction	∗1	
	Low power consumption		
	Idling current reduction		
Product recycle	Ease of removal from the vehicle		
	Usage of recycled resins		
	Improvement of repair-ability		
	Ease of Ni-Cd battery replacement		
	Display of the recycle mark on Ni-Cd batteries.		
No usage of hazardous materials to products	Abolish usage of all ODS, Asbestos, Cian, and other specified bromine flame retardant materials		
	Abolish usage of all PVC (polyvinyl chloride)		
	Abolish usage of all Cadmium		
	Abolish usage of Hexavalent Chromium		
	Abolish usage of all lead(except solder)		
	Usage of lead-free solder		
	Environmental consideration for LCD Backlighting		
	Listing of cautions when disposing		
Energy and resource conservation to the manufacturing process, no usage of hazardous materials	Reduction of work processes		
	Abolish usage of toluene and xylene in the manufacturing process		
Energy and resource conserving design	Reduction of development processes		
	Reduction of numbers of prototyping		
		Total	／100

∗1 Evaluation point standard(example)
Weight reduction of 30% from previous products : 10 points
Weight reduction of 20% from previous products: 9 points

6.Actions for disclosing information by Fujitsu Ten (currently: first step)

At the present time, we are making preparations to disclose product environmental information as our "Green products" make their appearance on the market. As the first step toward achieving market appeal, the information disclosure tools described below will be utilized.

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*5Life cycle assessment

Technique that is used to quantitatively and objectively evaluate the following items throughout all product stages, from the collection of resources to manufacturing, usage, disposal, and distribution: (1) the input of energy and resources, (2) the discharge of water pollutants, atmospheric pollutants, and solid wastes, and (3) effects on the earth and its biological ecosystems.

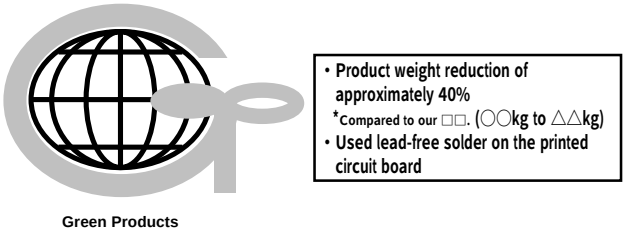

Fig.7 Environmental label of Fujitsu Ten (type II)

First, the type II environmental label will be introduced and the remarkable results of eco-design will be emphasized to customers. For Retail products, this will be implemented in June of ,2001.

Second, hazardous materials that are contained in products will be disclosed in quantitative data. Specifically targeting products for automobile manufacturers, we will report the amount of hazardous materials contained in a single product from the approximately 300 types of hazardous materials for which companies have requested controls. Our product environmental assessment information system will be used to automatically gather the hazardous material content from parts lists and attribute information (results of "Part" assessments). (Implementation is planned to begin with products coming off the line in April 2002.)

7. Problems in the product environmental assessment

Currently, our product environmental assessments have played the role of capturing environmental concerns that are associated with our products, and indicates to the designers the achievement level and issues of the "Green product" development. Furthermore, we have nearly achieved the level of environmental data that is required for the type II environmental label, whose use has spread to Japan's domestic household appliance field. To promote full-fledged environmental communication (and introduction of the type III environmental label) for invigorating the market as sought by EU industries,

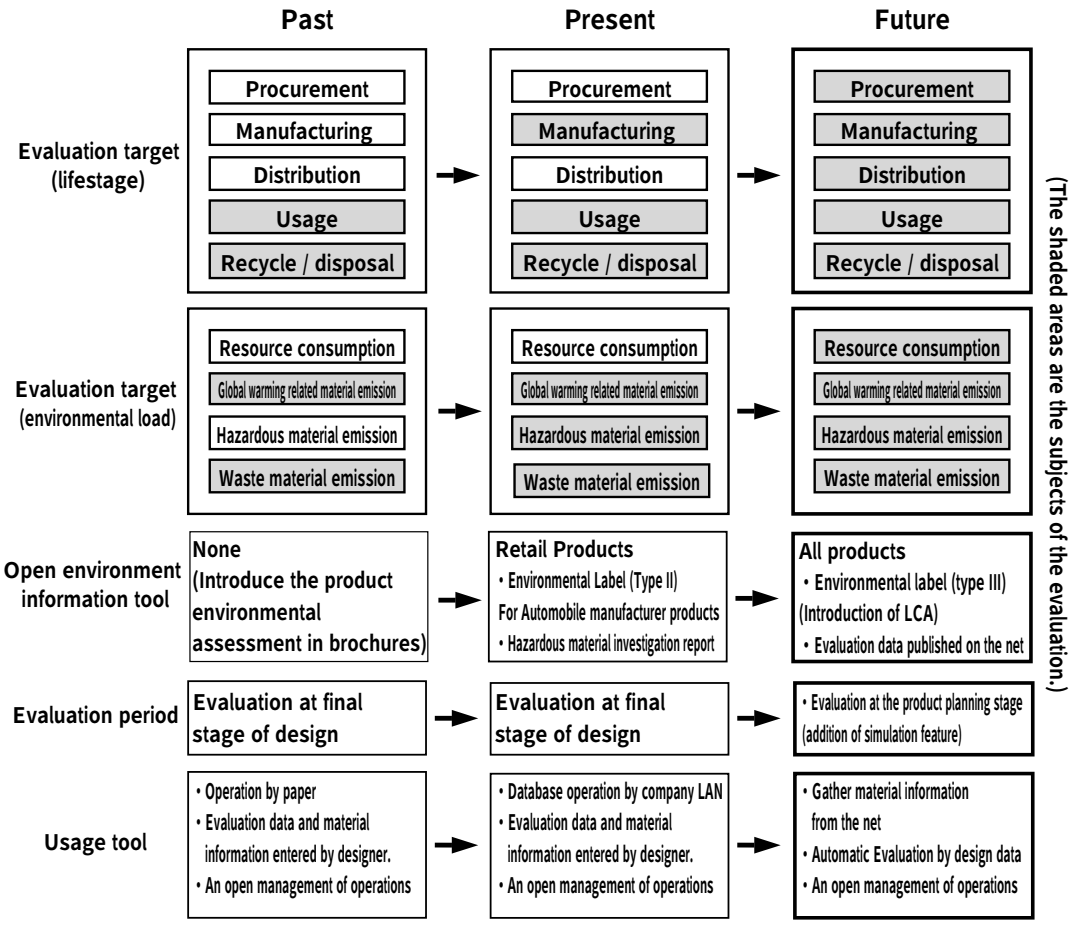

Fig.8 Product environmental assessments and future reforms of Fujitsu Ten

however, the problems described below require resolution.

- The product environmental assessment items/indicators include points that lack objectivity, such as "Difficult for consumers to understand" and "Not evaluated using absolute quantities." With the exception of hazardous materials, there are no indicators or standards that capture the absolute quantities of environmental loads.
- As shown in Figure 8, environmental performance data that can be directly presented from the product environmental assessment information system does not indicate the entire load of a product during its life cycle.
- To solve the aforementioned problems, a database of environmental load information that is lacking must be created and load quantities must be monitored. This will require a considerable amount of time and expense, however.

8. Actions for disclosing information (second step)

Although the type III environmental label has still not been established as a global standard, it is a technique whose introduction is essential for avoiding business risk; thus, it is necessary to prepare for its introduction. It will make it easier for customers to understand the environmental performance of our products, utilizing items and indicators that enable comparison to the products of other companies.

To promote efficient eco-design, it will be necessary to introduce the life cycle assessment technique, which evaluates the environmental loads of inputs and outputs at each stage of a product's service life and, from the results, derives improvement items (such as a reduction in weight or hazardous material) and improvement targets (such as product mass or hazardous material content). It will also be necessary to promote infrastructure improvements for development and design work in order to quickly verify whether the targets and standards for established improvement items and improvement targets, as well as for assessment items that are added with the implementation of environmental laws, are cleared during the design process.

Specifically, since the time and amount of designer labor required to conduct product environmental assessments are expected to increase, it will be necessary to introduce a network service tool that can instantaneously perform product environmental assessments from prepared design drawings, parts lists, and attribute information. (This includes the collection of information such as the mass and hazardous material content of a product, and determination of its acceptability based on evaluation standards.)

Tools for improving the efficiency of such verifications (such as design simulation software that combines Fujitsu's three-dimensional CAD and automatic environmental load calculation software) are already at the practical application stage; thus, the time of implementation has arrived.

9. Conclusion

The need for action to preserve the environment will continue into the future. We are in an era in which both the globalization of production and overseas transfer of product design are advancing. We must carefully monitor changes in other countries' environmental laws, trends in industry, and advances in management techniques.

Certainly, there are a number of other problems that confront us in our lives. But to enable our descendants to live happily on a green earth, let's not put off until tomorrow what we can do today to help resolve those problems.

Profiles of Writers

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