

Fuji Electric's Environmental Preservation and Energy Conservation

Mitsuru Yamada

1. Introduction

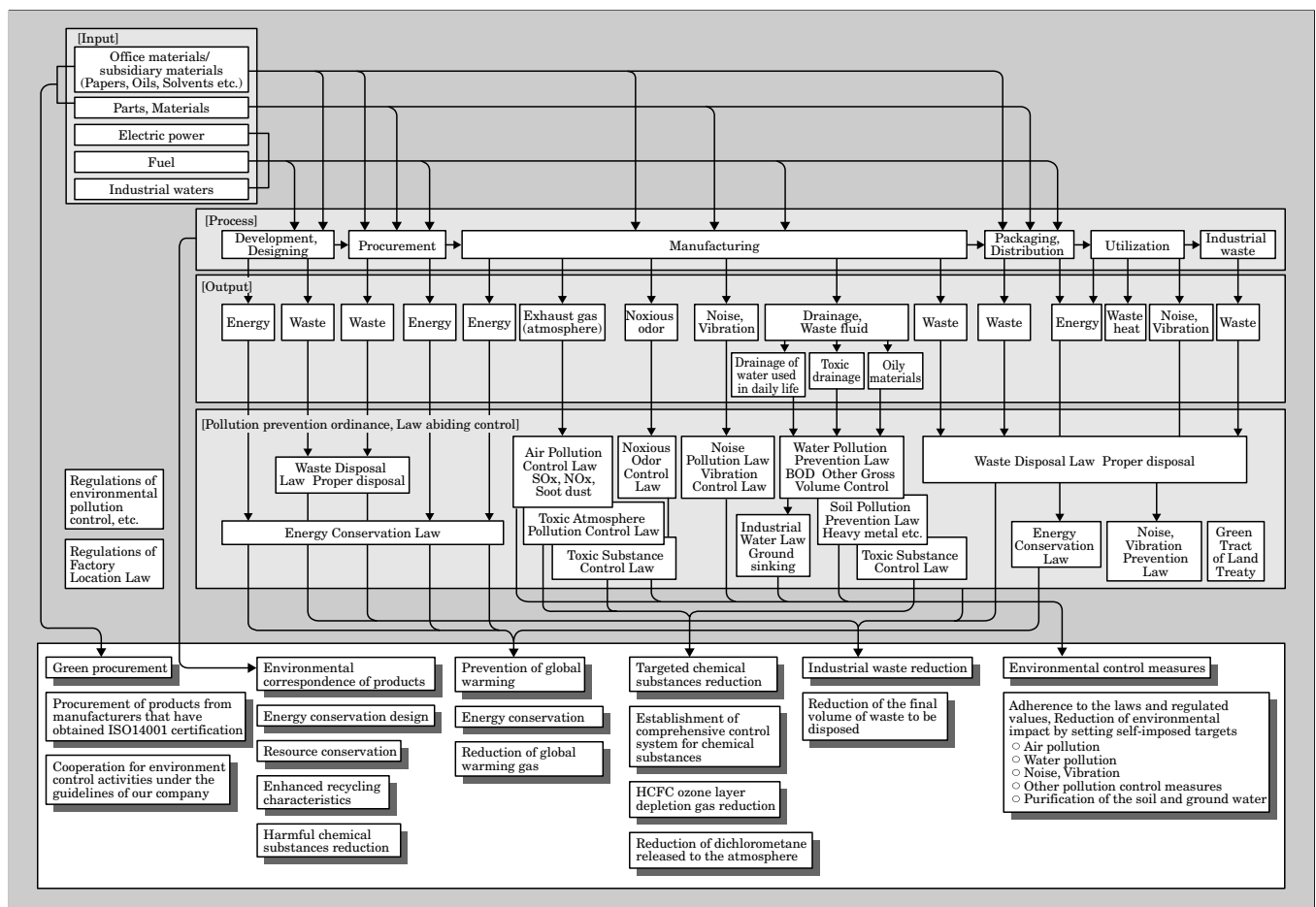
By achieving our corporate mission of “contributing to prosperity”, “encouraging creativity” and “seeking harmony with the environment,” Fuji Electric desires to be recognized as a trusted enterprise among the community, suppliers, and business partners as a good industrial citizen of the global society.

At present, various threats to the global environment such as global warming, depletion of the ozone layer, acid rain, deforestation and desertification are demanding our attention, and the role of corporate

enterprises in environmental issues is increasing more and more.

In 1992, the “Basic Policies of the Fuji Electric Group on Environmental Protection” was established. Based on efforts to “provide ecological products and technologies that serve useful purposes in protecting the environment,” and to “conduct environmentally conscious production activities,” the Fuji Electric Group is pursuing corporate activities that encourage the development of a “recycling society” that can utilize limited resources efficiently. In addition, from a manufacturer’s perspective, environmental technology

Fig.1 Relationship between enterprise activities and the environment



is considered as one type of production technology, and together with basic manufacturing technology, man-

Table 1 Details of environmental preservation activities

Year	Fuji Electric Initiatives	Trends in Japan
After 1969		1967 Basic Law for Environmental Pollution Control enacted 1968 Air Pollution Control Law enacted Kanemi Oil incident (PCB-tainted oil)
1970	Established company's Pollution Prevention Committee	Established Water Pollution Prevention Law Established Soil Pollution Prevention Law etc.
1971	Commenced maintenance of factory drainage system and living water drainage treatment equipment Suspended the production of equipment that uses PCBs	
1973		NOx Regulations enacted
1977	Introduced low NOx boilers	
1978		Water quality gross volume regulation (COD) enacted
1979	Commenced 10% waste reduction activities	
1981		NOx gross volume regulation enacted
1984	Initiated pollution prevention management at subsidiaries	Provisional drainage standards for trichlene and other chemicals enacted
1988		Ozone Layer Protection Law enacted
1989	Established company's CFC control committee	
1990		Action Plan to Cope with Global Warming (Japanese Government) Law for Promotion of Effective Utilization of Resources enacted
1991	Established global environment protection committee	
1992	Established "Basic Policies of the Fuji Electric Group on Environmental Protection"	Notice of guidelines to indicate dangerous and harmful chemical substances, etc. (MSDS)
1995	Completely suspends use of specified CFCs and trichloroethane Acquired certification of conformance to BS7750 Environmental Management System for Suzuka plant	Container and Package Recycling Law enacted
1997	Total ban on use of Trichloroethylene	3rd Conference of the Parties (COP3) to the United Nations Framework Convention on Climate Change
1998	Acquired ISO14001 certification for all 10 plants in Japan	
1999	Initiated "Green Procurement" standards with suppliers	

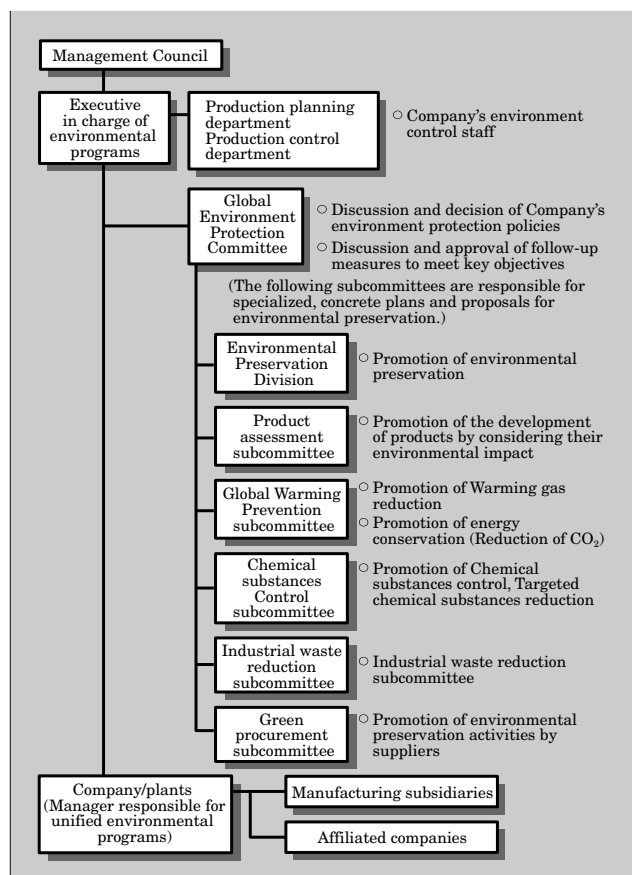
agement technology and quality assurance technology, forms the basis for business activities.

As shown in Fig.1, by clarifying the possible environmental affects which may arise from the business activities of Fuji Electric, the prevention of global warming, reduction of industrial waste, reduction of targeted chemical substances, application of products for the environment, and measures for environmental preservation have been vigorously promoted.

2. Details of Environmental Preservation Activities

The details of environmental preservation activities by Fuji Electric are shown in the Table 1. In 1970, a "Pollution Prevention Committee" was organized and developed to take up pollution prevention measures which were considered the social theme of the time. Further, in 1991, the committee was reorganized to form the "Global Environment Protection Committee," and the company executive in charge of environmental programs was appointed as the committee chairman to deal with today's various environmental problems. In this manner, environmental awareness has been strengthened. The in-house system of promoting environmental preservation activities is shown in Fig. 2.

Fig.2 In-house promotion system of environmental preservation activities



3. Environmental Management System

As shown in Table 2, since Fuji Electric's Suzuka Plant acquired BS7750 certification of the Environmental Management System in 1995, 10 plants have established and acquired ISO14001 certification of the Environmental Management System. Thereafter, in conformance with this system, Fuji Electric has been working to reduce environmental impact and has enjoyed high evaluation during third party surveillance (continuous examination).

Hereafter, to improve the disclosure of information concerning our environmental preservation activities, ongoing environmental performance reviews shall be performed in conformance with the new international standard ISO14031 "Environmental Performance Evaluation," and the evaluation results shall be announced both within the company and to the outside world. At the same time, we will create a system that rapidly reflects these reviews with improved efforts. Moreover, Fuji Electric manufacturing related companies (subsidiary plants) are in the process of acquiring ISO14001 certification.

4. Introduction of Environmental Impact Reduction for the Products

For the purpose of providing products, in consideration of the environmental impact throughout their entire cycle, namely, manufacturing, usage and dispos-

Table 2 Status of acquired ISO14001 certification

Date of certification (Expiration date)	Plant name of site	Certifying body (Certification number)
December 1995 (December 2001)	Suzuka Plant	Japan Audit and Certification Organization (EC98J2011)
March 1997 (March 2001)	Fukiage Plant	Japan Electric Safety & Environment Technology Laboratories (E97-116)
April 1997 (April 2003)	Mie Plant	Japan Audit and Certification Organization (EC97J1001)
August 1997 (August 2003)	Tokyo Plant	Japan Audit and Certification Organization (EC97J1059)
August 1997 (August 2003)	Kobe Plant	Japan Audit and Certification Organization (EC97J1061)
January 1998 (January 2004)	Kawasaki Plant	Japan Audit and Certification Organization (EC97J1177)
March 1998 (March 2004)	Ootawara Plant	Japan Electric Safety & Environment Technology Laboratories (E97-036)
March 1998 (March 2004)	Chiba Plant	Japan Audit and Certification Organization (EC97J1229)
June 1998 (June 2004)	Matsumoto Plant, Yamanashi Plant	Japan Audit and Certification Organization (EC98J1023)

al, Fuji Electric is working to reduce environmental impact, starting at the stages of design and development. By employing individual environmental impact evaluation standards for each type of equipment, measures are being developed to perform environmental evaluations and to reduce the environmental impact. To accelerate the future provision of environmentally conscious products, the development of design technologies, production technologies and evaluation systems will be vigorously promoted. Examples of Fuji Electric's efforts to reduce the environmental impact of products are described below.

4.1 Vending machine, refrigerated showcase

(1) Energy conservation

An automatic tuning system was developed which is capable of controlling the operation of refrigerated showcases and refrigerators in supermarkets or conveniences store in accordance with seasonal or day and night varying conditions. Through applying this system, electric consumption has been reduced by approximately 49% per year (compared to our company's other products) and the emission of carbon dioxide (CO₂) was reduced by 47% on average per year.

(2) Resource conservation

By making canned beverage vending machines smaller and lighter weight, the number of parts has been reduced and the parts have been standardized. As shown in Fig. 3, by improving the storage efficiency, a reduction of 27% in volume, 40% in total number of parts and 30% in the mass of products was attained when comparing a 1999 model vending machine to a 1990 model.

4.2 Electromagnetic switch

Energy conservation was achieved through the utilization of a new type of super magnet that can reduce input power by 40% and coil consumption power by 20%.

Fig.3 Resource conservation of the canned beverage vending machine

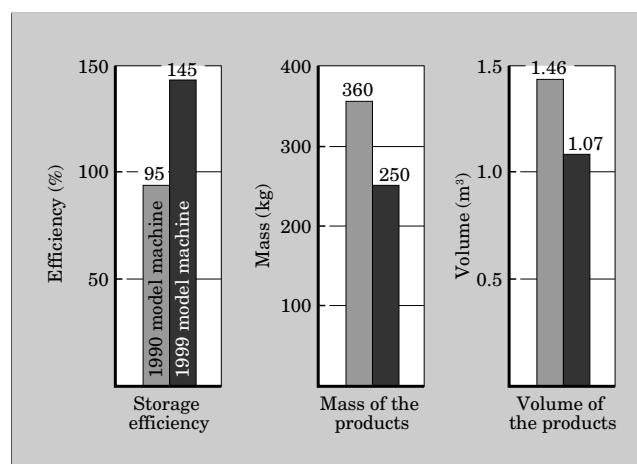
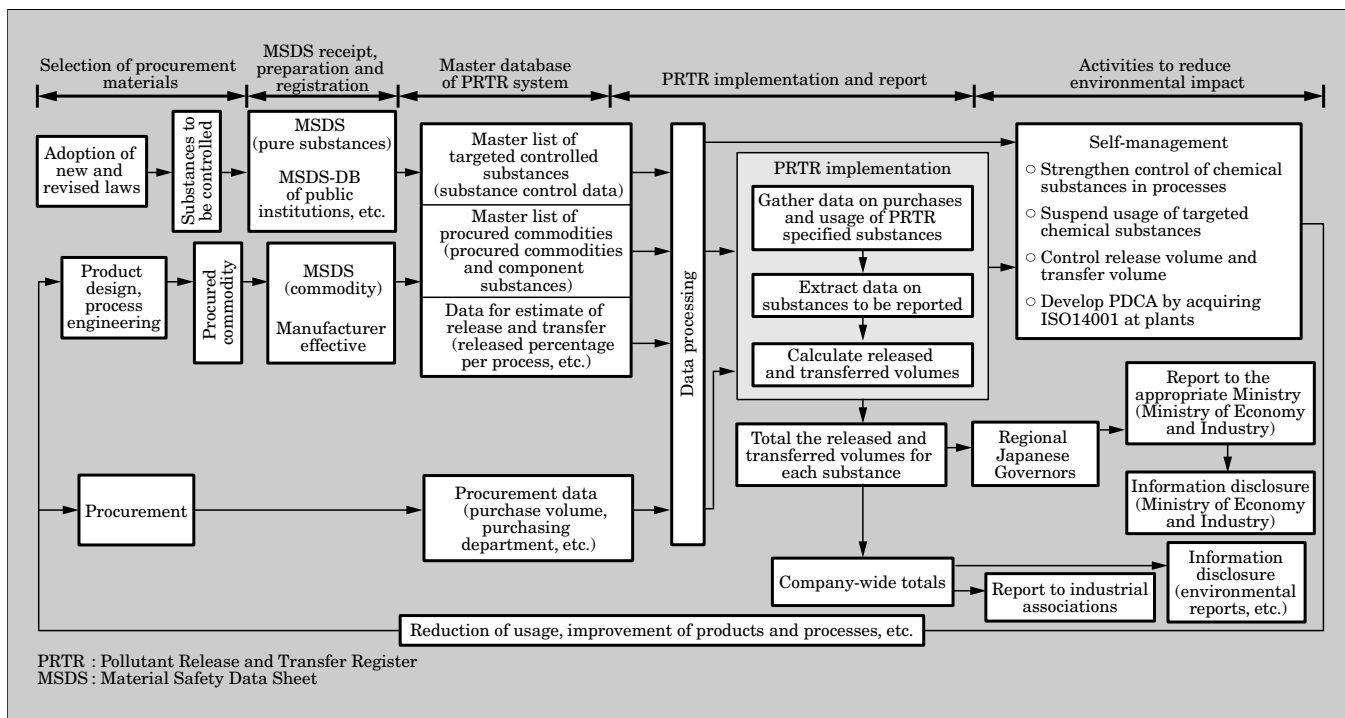


Fig.4 Concept of comprehensive chemical substance control system



4.3 Earth leakage circuit breaker, wiring circuit breaker

Some of the plastic material used in covers for earth leakage circuit breakers and wiring circuit breakers was changed from thermosetting resin to thermoplastic resin, which can be recycled. By adopting the above measure, product waste at the time of scrapping was reduced through recycling by approximately 54 tons/year.

4.4 Development of environmentally conscious technology

Two types of solder, lead-free high melting point soft solder (tin, silver alloy base) and low melting point soft solder (tin, bismuth alloy base), were developed in-house and have started to be used in some products.

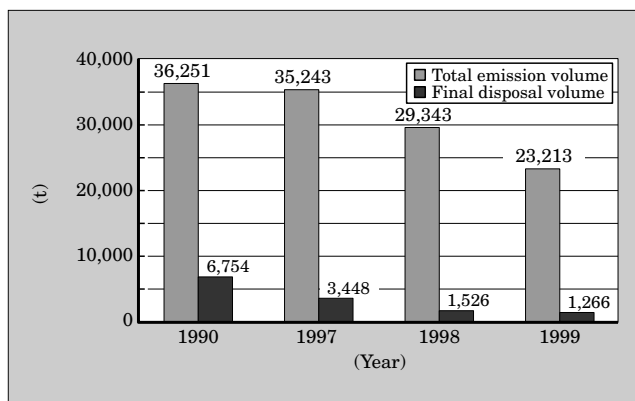
5. Efforts to Decrease Chemical Substances

Now that the problem of environmental pollution by chemical substances has intensified, Fuji Electric is working to develop its own chemical substance comprehensive control system to respond to needs for risk management and information disclosure, in addition to dealing with the prior issues of ozone layer preservation, global warming prevention, and the reduction of chemical substances such as harmful air pollutants.

With the above system, Fuji Electric promotes the precise reduction of chemical substances through the comprehensive management of purchasing volume, emission and transfer volume of all chemical substances it uses.

Figure 4 shows the concept of the Comprehensive Chemical Substance Control System which is under

Fig.5 Waste emission totals



development at present.

6. Reduction of Industrial Waste

So far, Fuji Electric has worked to reduce the volume and promote recycling of industrial waste. On the other hand, demands for a “recycling society” have increasing with the enactment of laws such as the Container and Package Recycling Act in April 2000 and the Household Appliances Recycling Act in April 2001, etc.

In response to these trends, Fuji Electric is promoting new efforts aiming to “strengthen control against outbreaks, utilize recycled resources, and recycle to reduce the volume of final waste disposal.” As shown in Fig. 5, Fuji Electric’s total emission and final disposal of industrial waste were reduced drastically in 1999 compared to 1990. We plan to reduce the

emission of voluminous waste (such as plastic waste, wastepaper, etc.) to the final disposal site, by tracing the waste to its source and implementing remedial measures.

7. Environmental Preservation Measures

In response to the expansion of international regulations regarding the prevention of global environmental pollution since the Montreal Agreement of 1987, a basic policy for the total abolition of specific CFCs has been decided and efforts are progressing to reduce usage of benzene, trichloroethylene, and tetrachloroethylene. As a result, usage of specific CFCs and trichloroethane was banned in 1995, and trichloroethylene was banned in 1997. In addition, a wide array of environmental preservation activities are underway, geared toward prevention of environmental pollution, including the enacting of laws and regulations, and the implementation of measures to lessen the risk of pollution.

8. Promotion of Environmental Preservation Activities by Suppliers (Green Procurement)

Approximately half of Fuji Electric's total production yield depends on the procurement of supplies from third party vendors. For this reason, it is considered necessary that environmental preservation be expanded to third party vendors so that Fuji Electric's products shall be environmentally conscious products.

At Fuji Electric, Green Procurement is advanced on a broad scale ranging from the products themselves from the perspective of life cycle assessment, to manufacturing activities and regular work duties, including office supplies. As such, Fuji Electric is requesting suppliers to cooperate in efforts to preserve the global environmental and to control pollution.

9. Measures to Prevent Global Warming

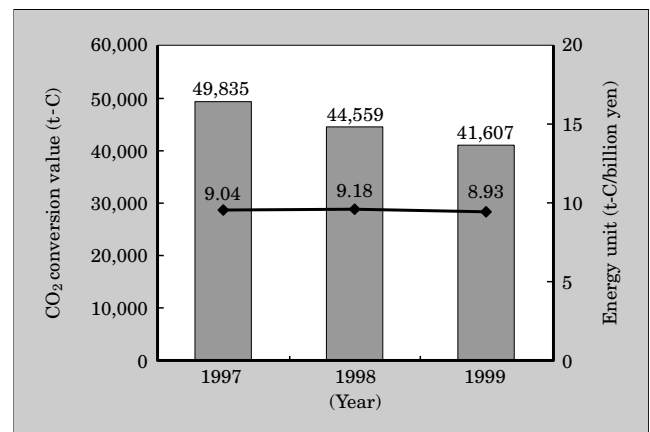
9.1 Efforts to conserve energy

Based on the Global Warming Control Kyoto Protocol (COP3), the target reduction rate for global warming gas emissions in Japan was set at 6%. To achieve this reduction, the Japanese "Comprehensive Global Warming Prevention Measures Act" was enacted in 1998, and domestic measures to address global warming were strengthened.

The history of energy conservation activities of Fuji Electric can be traced back to the time of the Oil Shock. Since then, the following steps and measures have been explored and promoted.

- (1) "Energy Rationalization Law" (Energy conservation law)
- (2) Setting of self-imposed targets (voluntary plan) introduced by the Japan Electrical Manufacturer's Association (JEMA)

Fig.6 Results of energy conservation



- (3) System improvement to monitor and control energy consumption conditions
- (4) Quantitative monitoring of energy consumption volume, and changing the setting of air conditioners
- (5) Efforts dealing with both aspects of the heightened conservation awareness and enforcement activities that specifically relate to the wasted consumption of energy

From the viewpoint of capital investment in energy conservation, the introduction of such energy conservation equipment and facilities as inverter systems, high-efficiency motors, distributed installation of air conditioners, power saving equipment and permanent heat storage equipment, etc. have been encouraged. Thus it has been planned to reduce the number energy units per production yield.

In June 1998, on the occasion of an amendment to the Energy Conservation Law, Fuji Electric established a minimum energy conservation target of 1%/year reduction in energy units.

By introducing power saving equipment made by Fuji Electric and through measures to conserve lighting power, Fuji Electric has been using power monitoring devices to precisely control power. As shown in Fig. 6, it has been planned to reduce the total energy volume to 2.952 t-C (CO₂ conversion value) compared to the year 1998; thus the energy unit per production yield becomes 8.93 t-C/billion yen and a year-over-year reduction of 2.7% is achieved.

10. Conclusion

Some of Fuji Electric's environmental activities have been introduced above, but continuous improvement of environmental policy is one stipulation of the ISO14001 standards. Aiming at further improvement, this matter will be vigorously dealt with in the future.

In addition, the contents introduced in this paper have been reported in the "Environmental Report", 2000 edition, published by Fuji Electric.



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