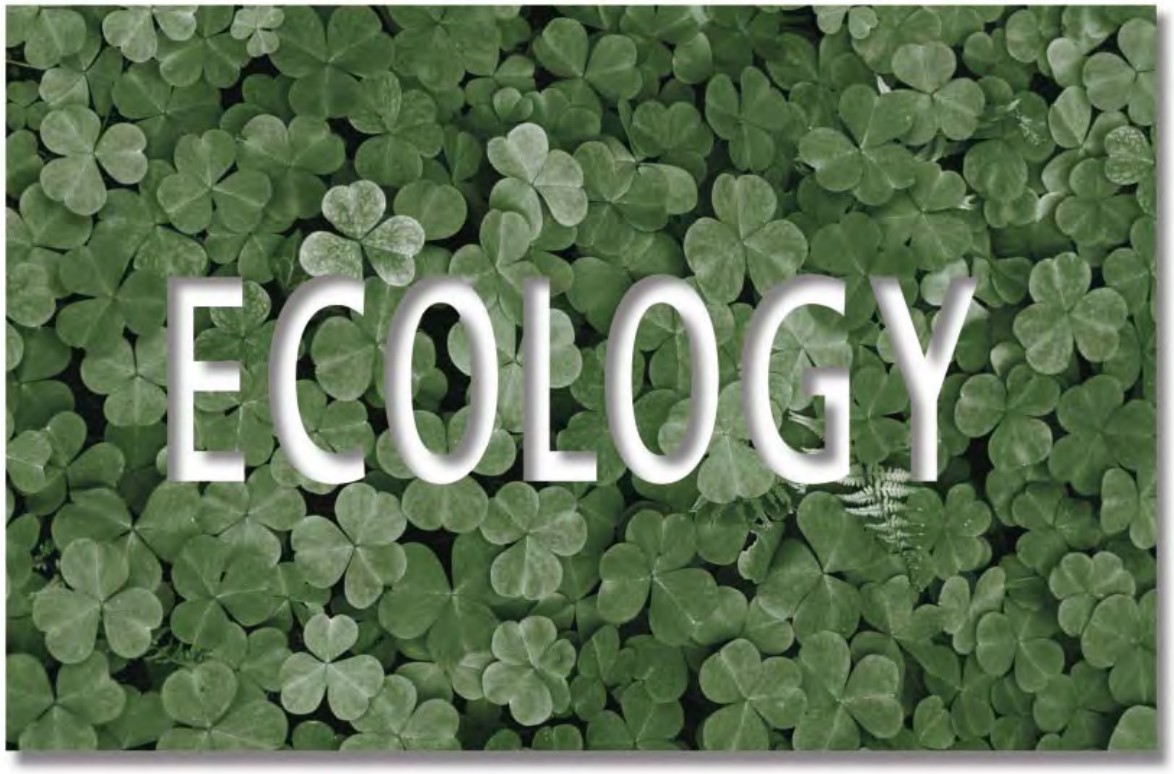
Canon Environmental Report 1999



Canon

Contents

Message from the President

This report outlines some of the results of the Canon Group's environmental protection activities in the past year.

Since 1988, when Canon introduced its corporate philosophy of *kyosei*, or living and working together for the common good, we have placed high importance on and remained active in managing for the environmental protection. Through activities such as a global recycling program, we have always striven to implement appropriate programs for the needs of the age.

Until today, the Canon Group has reported on its environmental protection activities through a variety of media. However, with the goal of instilling a deeper understanding of and promoting further cooperation with these efforts, we decided to gather all of our results, centered on statistics related to our activities, in one publication that will be issued annually.

In the years to come, we will continue fostering environmental protection activities with the aim of contributing to world prosperity and the happiness of people everywhere. I hope that this publication, in conjunction with our *Ecology* brochure, will promote greater environmental communication.

Fujio Mitarai
President and C.E.O.
Canon Inc.

1. Duration of report: This report is compiled based on data collected in1998. Canon plans to issue the report annually from 1999.
2. Operational sites surveyed: Canon Inc. operations (15 sites) and R&D, manufacturing and marketing subsidiaries (25 sites)
(In the future, offshore manufacturing subsidiaries and domestic marketing subsidiaries will be included.)
3. Areas covered: Environmental aspects of business operations (Data concerning products is available on environmental labels.
The Canon publication *Ecology* covers the overall environment-related activities of the Canon Group.)

Operational Sites Surveyed

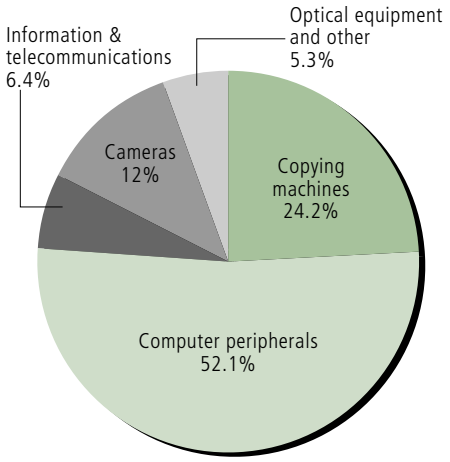
Canon Inc. Operations	
Headquarters	30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501, Japan
Kosugi Office	53, Imaikami-cho, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8501, Japan
Tamagawa Plant	16-1, Shimonoge 3-chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8512, Japan
Fuji-Susono Research Park	4202, Fukara, Susono-shi, Shizuoka, 410-1196, Japan
Canon Research Center	5-1, Morinosato-Wakamiya, Atsugi-shi, Kanagawa 243-0193, Japan
Hiratsuka Development Center	6770, Tamura, Hiratsuka-shi, Kanagawa 254-0013, Japan
Ecology Research & Development Center	1-1, Kizugawadai 4-chome, Kizu-cho, Souraku-gun, Kyoto 619-0281, Japan
Meguro Office	2-1, Nakane 2-chome, Meguro-ku, Tokyo 152-0031, Japan
Utsunomiya Plant	22-2, Kiyohara-Kogyodanchi, Utsunomiya-shi, Tochigi 321-3293, Japan
Utsunomiya Plant (Kanuma Branch)	39, Sendo, Kanuma-shi, Tochigi 322-0002, Japan
Toride Plant	5-1, Hakusan 7-chome, Toride-shi, Ibaraki 302-8501, Japan
Ami Plant	3577, Yoshiwara, Ohaza, Ami-machi, Inashiki-gun, Ibaraki 300-1195, Japan
Fukushima Plant	2, Aza Nihon-Enoki, Sakura-shimo, Fukushima-shi, Fukushima 960-2193, Japan
Ueno Chemical Products Plant	410-7, Higashiomachi, Mita-aza, Ueno-shi, Mie 518-0022, Japan
Utsunomiya Optical Products Operations	20-2, Kiyohara-Kogyodanchi, Utsunomiya-shi, Tochigi 321-3292, Japan

Domestic Manufacturing Subsidiaries	
Canon Electronics Inc. Headquarters	1248, Shimokagemori, Chichibu-shi, Saitama 369-1892, Japan
Canon Electronics Kagemori Plant	1248, Shimokagemori, Chichibu-shi, Saitama 369-1892, Japan
Canon Electronics Yamada Plant	1826, Yamada, Chichibu-shi, Saitama 368-8510, Japan
Canon Electronics Misato Plant	1611, Amakasu, Misatomachi, Kodama-gun, Saitama 367-0192, Japan
Canon Electronics Yokose Plant	5852, Yokose, Yokosemachi, Chichibu-gun, Saitama 368-8511, Japan
Copyer Co., Ltd.	3-3, Shimorenjyaku 6-chome, Mitaka-shi, Tokyo 181-8520, Japan
Copyer Tachikawa Plant	Tachihi 236, 935-1, Izumi-cho, Tachikawa-shi, Tokyo 190-0015, Japan
Copyer Kofu Office	831, Kanegawahara, Misaka-cho, Higashi-yatsushiro-gun, Yamanashi 406-0802, Japan
Copyer Fukui Office	6-4, Technoport 3-chome, Ishibashi-cho, Fukui-shi, Fukui 910-3138, Japan
Canon Precision Inc.	4-19, Nakane 2-chome, Meguro-ku, Tokyo 152-8570, Japan
Hanawa Seiki, Inc.	35, Daijuku Sekisawa, Hanawamachi, Higashishirakawa-gun, Fukushima 963-5341, Japan
Hirosaki Seiki Headquarters & Ishiwatari Plant	5-2, Ishiwatari 3-chome, Hirosaki-shi, Aomori 036-8316, Japan
Hirosaki Seiki Kitawatoku Plant	4-1, Seinofukuro 5-chome, Hirosaki-shi, Aomori 036-8072, Japan
Canon Chemicals Inc. Headquarters & Tsukuba Plant	1888-2, Kukizaki, Kukizaki-cho, Inashiki-gun, Ibaraki 300-1294, Japan
Canon Chemicals Iwama Plant	2600-36, Aza-kamidaira, Ago, Iwamamachi, Nishiibaraki-gun, Ibaraki 319-0206, Japan
Canon Chemicals Ishige Plant	1460-1, Ohaza-sugiyama, Ishigemachi, Yuki-gun, Ibaraki 300-2798, Japan
Canon Chemicals Totsuka Plant	3543, Maioka-cho, Totsuka-ku, Yokohama-shi, Kanagawa 244-0813, Japan
Oita Canon Inc.	710, Shimohara Nakao, Akimachi, Higashikunisaki-gun, Oita 873-0292, Japan
Canon Aptex Inc. Ibaraki Headquarters	5540-11, Sakaidemachi, Mitsukaido-shi, Ibaraki 303-8503, Japan
Canon Aptex Shimomaruko Office	5-15, Shimomaruko 2-chome, Ohta-ku, Tokyo 146-0092, Japan
Miyazaki Daishin Canon Co., Ltd.	4308-1, Ohaza Takajo, Kijo-cho, Koyu-gun, Miyazaki 884-0101, Japan
Optron, Inc.	5-16, Hakusan 7-chome, Toride-shi, Ibaraki 302-0023, Japan
Canon Components, Inc.	3461-1, Nanahongi, Kamisatomachi, Kodama-gun, Saitama 369-0393, Japan
Nagahama Canon, Inc.	1280, Kunitomomachi, Nagahama-shi, Shiga 526-0001, Japan
Nippon Typewriter Co., Ltd. Iwai Plant	1234, Matate, Iwai-shi, Ibaraki 306-0605, Japan

Canon Inc.

Name: Canon Inc.
Representative: Fujio Mitarai, President and C.E.O.
Sales: ¥1,566.8 billion
Capital: ¥163.0 billion
Net income: ¥81.9 billion
Employees: 20,654
Main products: Copying machines
Laser beam printers
Bubble Jet printers
Chemical products (toners and cartridges)
Cameras
Video camcorders
Semiconductor equipment
Broadcast equipment
Medical equipment

Canon Inc. Sales by Product (1998)



Canon Inc. Sales by Product (1998)

(Billions of yen)

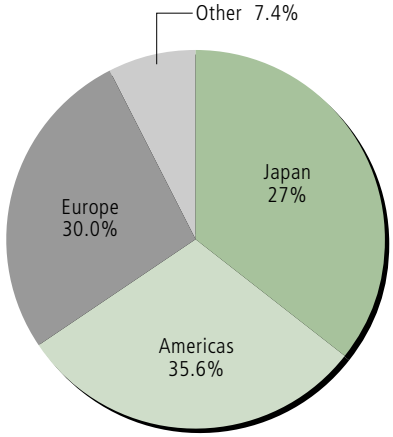
	Copying machines	Computer peripherals	Information& telecommunications	Cameras	Optical equipment and other	Total
1998	378.7	816.7	101.3	187.7	82.3	1,566.8

Canon Group (Consolidated)

Net sales: ¥2,826.3 billion
Employees: 79,799
Capital expenditure: ¥221.4 billion*
R&D investment: ¥177.0 billion*

* Figures are inclusive of regions outside of Japan in accordance with U.S. Securities and Exchange Commission (SEC) standards as of December 31, 1998.

Canon Group Sales by Region (1998)



Canon Group Sales by Region (1998)

(Billions of yen)

	Japan	Americas	Europe	Other	Total
1998	761.8	1,005.7	850.2	208.6	2,826.3

Philosophy and Environment Assurance Guidelines

In 1993, based on its corporate philosophy of *kyosei*, the Canon Group decided to pursue business operations that focus on environment assurance in order to help realize harmony between people and nature. The principle Canon adheres to today is EQCD, which stands for "Environment-Quality-Cost-Delivery" and is based on the realization that a company incapable of environment assurance does not deserve to continue operations.

Corporate Philosophy

Kyosei

Environment Assurance Philosophy

We aim to help achieve sustainable economic development and harmony between the environment and corporate activities to contribute to worldwide prosperity and happiness.

Environment Assurance Basic Guidelines

Based on the EQCD Policy of harmonization between the environment and its business activities, Canon is actively promoting innovative and dynamic environment assurance-related action plans.

E: Environment—Companies incapable of environment assurance do not deserve to continue operations.
Q: Quality—Companies that manufacture products of poor quality do not deserve to sell them.
C: Cost
D: Delivery—Companies that fail to meet cost and delivery requirements do not deserve to compete.

1. Actively develop environment assurance technologies for product development, manufacturing, recycling and evaluation, and to disseminate such technologies throughout society.
2. Conduct environmental impact assessments prior to product development/design. Minimize products' impact on the environment by promoting resource/energy conservation and recycling.
3. Promote resource/energy conservation and waste reduction to minimize the impact on the environment of R&D, manufacturing and sales activities.
4. In procuring resources for business operations, give priority to materials, components and products that have a comparatively low impact on the environment.
5. Examine whether the Group's environment assurance activities are practiced appropriately in line with corporate ethics and social rules and are contributing continuously to the reduction of the Group's impact on the environment.
6. Work together actively with international organizations and government bodies on environmental strategies.
7. As a good corporate citizen, actively support social and local community activities for environmental conservation.
8. Implement Groupwide efforts to boost awareness of environmental conservation among Canon employees through training and education.
9. Pursue environment assurance activities that are transparent and supported by corporate ethics. Actively share environment-related information with others.

Voluntary Action Plans

We have divided our environment assurance activities into two major fields: the environmental aspect of products (product environment) and sites (manufacturing environment). We believe that the core elements of environmental issues in corporate activities are saving energy and resources, and eliminating harmful substances. We are promoting action plans laid down for each of these issues.

The present Voluntary Action Plan, based on the one laid down in 1996 and revised in 1998, clarifies the Group's stance in environment assurance activities toward the year 2000.

Goal	
Product environment	●Improve the energy consumption efficiency of products by more than 35% by the end of 2000.
	●Build a recovery and recycling system for used products. (Improve the recycling ratio of used products from business users.) ●Improve the ratio of reuse and recycling of used products to more than 90% by the end of 2000.
	●Eliminate the use of or find alternatives for hazardous substances contained in products by 2000 (soldering, PVCs for cable insulation, mercury batteries, bromide fire-retardant materials, etc.); achieve goals or decide on measures.
Manufacturing environment (operational sites)	●Reduce the use of gases that exacerbate global warming. ●Cut energy consumption to net sales by more than 30% by the end of 2000 (based on 1990 standards; install cogeneration facilities; improve energy conservation at major production sites). ●Eliminate the use of PFCs, HFCs, and SF_6 (gases that cause the greenhouse effect) by the end of 1999 (with the exception of semiconductor-related uses).
	●Promote use of recycled waste materials within manufacturing processes (parts, major and supplementary materials) and water within operational sites. ●Reduce waste volume by more than 95% by the end of 2000 (based on 1990 standards).
	●Establish a release volume control system for hazardous chemical substances by the end of 1999. ●Reduce volume of hazardous chemical substances released by more than 20% by the end of 2000 (based on 1996 standards).
Green procurement	●Implement green procurement of parts and materials by 2000.
Information disclosure	●Disclose information on product environment. ●Disclose information on manufacturing environment.

Promotional Structure

We recognize environmental issues as an important part of corporate management, and have established a director in charge of the environment. We have also created a group matrix system of committees and a dedicated environment organization, and are carrying out efficient and integrated activities.

Canon Global Promotion Committee

This committee deals with Canon's product and manufacturing environments in order to promote equal and optimal execution in all sites and divisions worldwide.

Canon Global Environment Promotion Committee (Chair: Director in charge of the environment)

This committee deals with environment assurance activities related to products.
Regional and special committees are organized under the main committee.

- Regional committees: Established in five regions (Japan, Americas, Europe, Asia, and Oceania), these committees are engaged in activities related to their regions.
- Special committees: Six special committees (Environmental Information Management, Product Recycling, Environmentally Conscious Products, Product Packaging Materials, Product Chemical Substances and Green Procurement) focus on and resolve important issues common to business divisions.

Canon Global Manufacturing Environment Promotion Committee (Chair: Director in charge of the environment)

This committee deals with environment assurance activities at Canon's operational sites including production plants and R&D bases.
There are operational site committees and special committees under it.

- On-site committees: Environment Assurance Steering committees have been set up in all production and R&D sites, including those located overseas (51 in all). These committees promote on-site environment assurance activities and delegate responsibility.
- Special committees: Four special committees (Operational Site Environment Assurance, Operational Site Energy Conservation, Operational Site Waste Reduction and Environmental Technology Development) committees focus on and resolve issues common to sites.

Dedicated Organization

In 1995, we integrated the environment departments of each division and set up the Environment Engineering Center as a specialized organization in the Canon Inc. headquarters to address environmental issues. The center plays a pivotal role in the environment assurance activities of the Canon Group. Furthermore, as headquarters personnel, staff at the center make plans related to environmental issues, manage and evaluate environmental activities and develop environmental technologies. Organizations have also been set up at each operational headquarters to resolve environmental issues, including the promotion of green procurement, basic research, clean energy research and improving management divisions at operational sites.

Environmental Management System

Canon is involved in environment assurance activities throughout the life cycles of its products, from their planning, development and design through production, sales and disposal. We have introduced systems in each stage of business activities to lessen the impact of our products on the environment. At operational sites, we incorporate this system into ISO 14001 environmental management for efficient execution and utilize the Canon Group Intranet to share environmental information.

Environmental Information Control System

This is an integrated information control system on the Canon Intranet containing global information on the environment. The system makes it possible to share environmental information and take prompt action.

Planning/development and design stage

Product assessment system
This system is designed for the quantitative evaluation (product assessment) of the environmental aspects of products at the planning, development and design stages. Currently, the system incorporates 55 assessment items and is carried out three times for each product starting from the planning stage.

Design disassembling system
Products are initially disassembled at the prototype stage. The ease of disassembly and recycling are assessed, and results are fed back to product development departments for improvement.

Procurement stage

Green procurement system
Green procurement aims for the selection of environmentally friendly materials and components at the product development stage. Under the system, we assess materials, components and the stance suppliers take toward environmental issues.

Vendor support system
We work to obtain vendors' understanding of Canon's corporate environmental and EQCD policy while supporting them so that they can actively promote their own environmental management systems.

Production stage (Operational sites)

We maintain an environmental impact assessment system for selecting construction locations for operational sites, actual construction and the introduction of equipment. Impact on the environment is assessed beforehand at the planning stage when selecting sites, when buildings are constructed or rebuilt and when various types of equipment are to be introduced. Decisions are then made whether to proceed with proposed plans. This system ensures a reduced impact on the environment and the execution of preventive conservation measures.

Chemical substance control system
We check the safety and environmental impact of chemical substances. Data on some 6,000 kinds of substances is registered and used. We are now in the process of updating this system to bring it in sync with the Pollutant Release and Transfer Register (PRTR) system.

Operational site management system
This system, which promotes the environmental management of operational sites, is divided into 14 areas and includes the implementation of preventive conservation measures. Results of environmental analysis, waste records, and other quantitative data are managed in an integrated fashion.

Environmental education system
Environment assurance training is offered to employees in four stages: new employee, environment assurance staff, internal environment auditor, and new deputy manufacturing manager. Those who undergo training are registered within the Canon Group and play the role of leaders in environment assurance activities at their respective workplaces.

Operational site inspection system
Three types of inspections are carried out at operational sites: environmental monitoring by a certified outside organization, inspection by the headquarters Environment Auditing Division (every two years) and internal auditing (annually). The results are reported to and assessed at the headquarters. This system ensures impartial and transparent auditing.

Distribution stage

Distribution control system
We are now in the process of creating a control system aimed at establishing efficient distribution methods that contribute to preventing global warming and pollution, and conserve energy.

Sales stage

Recovery/Recycling system
The objective of this system is to recover and recycle used Canon products.
We implement this system worldwide through bases in the three regions of Asia, the Americas and Europe.

Management Resources and Environmental Accounting

Canon has liberally invested management resources in activities to promote environment assurance activities. We intend to approach environmental issues responsibly by actively using management resources to prevent pollution.

The *Canon Environmental Report 1999* describes how management resources are invested for environmental purposes at target operational sites. We are deepening discussion on these matters and considering our environmental investment efficiency through environmental accounting. At the same time, we are positioning environmental conservation activities as necessary to and sustaining the operations of the Canon Group.

(1) Environmental Expenditures

This report takes up environmental conservation, R&D (on recycling, measures against hazardous substances, bioremediation and clean energy) and personnel expenditures. Also included are the topics of development and designing environmentally conscious products, and developing energy-conserving processes. However, the report focuses only on those activities that can be clearly identified as falling under the aforementioned themes.

We have increased environmental expenditures annually and stepped up efforts to deal with environmental issues. A total of ¥9.5 billion was spent in 1998 on themes covered in the report. We are also actively investing management resources because we believe that technological innovation is important in environment assurance activities. Significant progress has been made, including the development of clean energy, technologies that made possible the 100% recycling of the exterior plastic casings of Bubble Jet printer and the dissolving of chlorine solvents.

Canon will define priorities in important environmental issues that need to be addressed, to efficiently use its management resources and to keep track of the effectiveness of its efforts.

1998 Environmental Cost Breakdown

(100 millions of yen)

	1997	1998
Pollution prevention	18	23
Waste processing	17	9.3
Energy conservation	0.2	0.5
Disaster prevention	1.8	2.4
Other environment assurance items	8.4	8.6
Acquiring and maintaining ISO certification	*	0.2
R&D	19	22
Personnel costs	28	30
Total	93	95

*Costs for ISO certification for 1997 are included in "Other Environment Assurance Items."

(2) Investment in environment-related sites

In this report, expenditures equal the sum of investments that could be clearly identified as investments in environment assurance activities.

The amount invested in environment-related sites in 1998 was about ¥4.3 billion. Water quality-related investment has increased greatly, owing to the construction of a closed-system wastewater recycling plant. We also invested in R&D sites such as an experimental recycling plant.

We have placed priority on energy conservation as a measure against global warming and intend to invest in cogeneration facilities and ice thermal storage systems.

1998 Environment-Related Capital Expenditure

(100 millions of yen)

	1997	1998
Pollution prevention	14	26
Waste processing	0.9	1.6
Energy conservation	0.9	3.8
Other environmental activities	4.7	1.7
R&D	19	9.7
Total	39	43

(Actual results; order base)

(3) Environmental staff

As environmental issues assume greater importance, we have accordingly increased the number of employees in charge of environmental issues. This personnel now accounts for about 6% of the employees at target sites.

We have also increased dedicated environmental staff at the headquarters Planning and Management Division so that we can deal with advanced environment assurance activities and ensure efficiency and speed in specific areas of responsibility. On the other hand, environment assurance activities at respective workplaces are implemented by employees who incorporate them into their other daily responsibilities. As of the end of 1998, the number of environmental staff (registered after taking in-house training) acting as leaders in environmental matters in the workplace totaled 1,347.

Number of Environmental Staff

	1997	1998
Headquarters Planning and Management Division	62	65
Divisions/Office Management Departments	249	248
R&D	155	156
Environmental Staff (concurrent position)	1,021	1,347
Total	1,487	1,816

Summary of the Canon Group's 1998 Goals and Performance in the Manufacturing Environment (Operational Site Activities)

Following is a summary of our 1998 goals and performance for Canon's voluntary action plan in manufacturing environment activities.

The most noteworthy topic for 1998 was the fact that thorough recycling made possible the achievement of "zero waste" at 13 sites. The Material Balance Control System was established to manage chemical substances. ISO 14001 accreditation was acquired by sites in which R&D and production are combined. However, energy conservation measures could not keep up with the increase in energy consumption accompanying the expansion of our operations, and it was not possible to show any significant improvement in terms of energy consumption to net sales. In the future, we will place added emphasis on effective energy conservation measures.

The year 2000 is the last year of the voluntary action plan, so in 1999 we are concentrating on areas in which improvement is necessary to attain the goals of the plan.

Item		1998 Target	1998 Actual	
Energy conservation/ global warming prevention	Operational site: Lower the ratio of volume of energy consumption to net sales (1999 standard)	24% reduction	Increased 6.9%	P.12
	Introduce cogeneration systems (CGS)	Consider introducing CGS	Decision made to introduce at two sites	
	Eliminate global warming gases (PFC, HFC, SF_6)	Use 50.6t (3.5 substances)	Used 46t (3 substances)	P.13
Recycling	Recycle water (from manufacturing processes, plants and equipment and daily usage)	Introduce recycling system	58% of manufacturing process water recycled	P.14
	Reduce waste	Waste volume: 3,280t Reduce 89% from the 1990 level	Waste volume: 3,043t Reduced 91% from the 1990 level	P.14
Chemical substance control	Create list of hazardous chemical substances	Review managed substances	Reviewed substances under control (increased from 1,725 to 1,968 substances)	P.16
	Set up management system for hazardous chemical substance release	Establish system	Established material balance management system	P.17
	Ban three chlorine organic solvents (trichloroethylene, tetrachloroethylene, dichloromethane)	Develop technology to remove dichloromethane (except cleaning)	Developed technology (to be introduced wherever ready)	P.18
	Reduce release of hazardous chemical substances (1996 as the base)	Production: 1,557t Reduce 10% from the 1996 level	Production: 1,452t Reduced 16% from the 1996 level	P.19
Environmental management system	Acquire certification under international environmental management standards	Introduce at combined R&D/ production sites	Received ISO14001 certification (Tamagawa, Hiratsuka, Canon Chemicals Ishige Plant)	P.20
Green procurement	Establish green procurement standards	Evaluate vendors' environment assurance activities	Evaluated 808 vendors	P.21
Information disclosure	Disclose site environment assurance information	Prepare for disclosure in 1999	Completed preparation of data to be disclosed	

Environment Management Performance of Operational Sites for 1998

Environment management data of operational sites is shown below. The management items vary depending on regional conditions unique to the area and the nature of operations, but each sets down its own standard, and implement stricter regulations than are required by law. The 1998 data for the Utsunomiya Optical Products Operations are provided as an example. Data for other operational sites (40 in all) is available on the Canon Web site.

Environmental Management Items: Water/Air/Odors/Noise/Vibration

1998 Data for Utsunomiya Optical Products Operations

Address: 20-2, Kiyohara-Kogyodanchi, Utsunomiya-shi, Tochigi, Japan
Products: Optical equipment
Area: 109,060m^2

Founded: March 1983
Employees: 1,178
Designation of land use: Industrial district

Water Quality

	Item		Wastewater standards	Site standards	Actual results Max.
Health	Cadmium	(mg/l)	0.1	0.005	<0.005
	Cyanide	(mg/l)	1.0	0.08	<0.05
	Organic phosphorous	(mg/l)	1.0	0.1	<0.1
	Lead	(mg/l)	0.2	0.04	<0.01
	Hexavalent chromium	(mg/l)	0.1	0.02	<0.02
	Arsenic	(mg/l)	0.5	0.016	<0.01
	Total mercury	(mg/l)	0.005	0.0005	<0.0005
	Alkyl mercury	(mg/l)	NA	NA	NA
	Dichloromethane	(mg/l)	0.2	0.16	<0.001
	Carbon tetrachloride	(mg/l)	0.02	0.016	<0.001
	1,2-Dichloroethane	(mg/l)	0.04	0.032	<0.001
	1,1-Dichloroethylene	(mg/l)	0.2	0.16	<0.002
	Cis-1,2-Dichloroethylene	(mg/l)	0.4	0.32	<0.004
	1,1,1-Trichloroethane	(mg/l)	3.0	2.4	<0.001
	1,1,2-Trichloroethane	(mg/l)	0.06	0.048	<0.0006
	Trichloroethylene	(mg/l)	0.3	NA	NA
	Tetrachloroethylene	(mg/l)	0.1	NA	NA
	1,3-Dichloropropene	(mg/l)	0.02	0.016	<0.0002
	Thiuram	(mg/l)	0.06	0.048	<0.001
	Simazine	(mg/l)	0.03	0.024	<0.001
	Thiobencarb	(mg/l)	0.2	0.16	<0.002
	Benzene	(mg/l)	0.1	0.08	<0.001
	Selenium	(mg/l)	0.1	0.08	<0.01
Living Environment	pH		5.8~8.6	5.9~8.5	7.9
	BOD	(mg/l)	25	20	2.3
	COD	(mg/l)	25	20	6.4
	SS	(mg/l)	50	40	14
	n-Hexane extract substances (all)	(mg/l)	—	5	<1
	n-Hexane extract substances (mineral oil)	(mg/l)	5.0	—	<1
	n-Hexane extract substances (animal and vegetable oil)	(mg/l)	10.0	—	<1
	Phenol	(mg/l)	1.0	0.8	<0.05
	Copper	(mg/l)	3.0	2.4	<0.05
	Zinc	(mg/l)	5.0	4	0.25
	Soluble iron	(mg/l)	3.0	2.4	0.08
	Soluble manganese	(mg/l)	3.0	2.4	<0.01
	Chromium	(mg/l)	2.0	1.6	<0.02
	Fluorine	(mg/l)	8.0	6.4	0.2
	Coliform group	(counts/ml)	3000	2400	83
	Phosphorous	(mg/l)	16.0	6.4	0.43
	Nitrogen	(mg/l)	120	48.0	7.9

Air Quality

	Item	Operating standard	Actual results Max.
Boiler	Nox(ppm)	150	100
	Dust(g/Nm^3)	0.3	<0.008

Notes: 1. Standard for the Air Pollution Control Law is used as operating standard
2. Boilers emit almost no SOx because they use kerosene

Noise Unit:dB

Category	Operating standard	Actual results Max.
Morning	70	60
Day	75	60
Night	60	58

Note: Utsunomiya City's standard is used as operating standard

Vibration Unit:dB

Category	Operating standard	Actual results Max.
Day	65	41
Night	60	41

Note: Utsunomiya City's standard is used as operating standard

Odors

Note: A survey of the site's boundary conducted in 1995 confirmed that the site's measured values fell inside the allowable limits. In addition, exhaust outlets are measured regularly to ensure that standards at the site's boundaries are met.

Notes: 1. Legal and regulatory standards: The most stringent legal regulations (Water Pollution Control Law and Tochigi municipal ordinances)
2. Site standards: 80% of the most stringent legal regulations and standards implemented by agreement with the City of Utsunomiya
3. n-Hexane extract substance: (mineral oil) + (animal and vegetable oil) = (all)

Energy Conservation

The goal for energy conservation at operational sites is to reduce energy consumption to net sales by 30% from the 1990 level by the year 2000. Unfortunately, this performance in 1998 improved only slightly. Energy consumption is increasing at an annual rate of about 8% in line with expanding operations, but energy conservation measures are not keeping up with this growth.

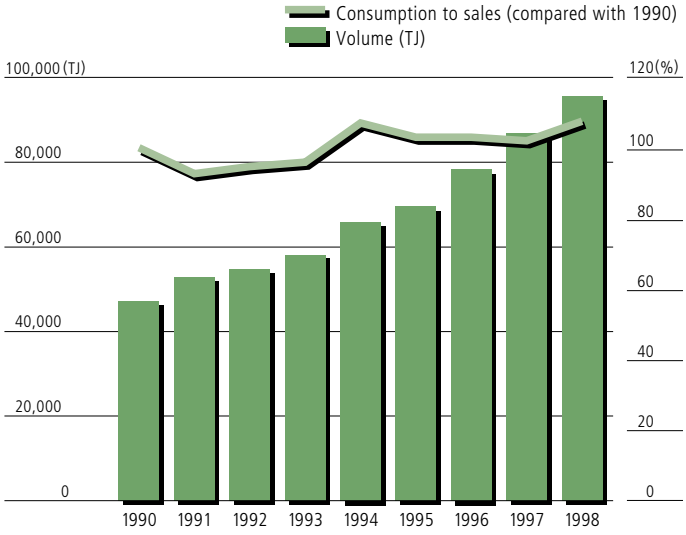
We saved 178 TJ (terajoules) of energy in 1998, which is equivalent to the energy consumed in one medium-sized factory. Specifically, we remodeled production sites, avoided waste and carried out education to reduce energy consumption. We are beginning full-scale investment in energy conservation facilities in 1999 and will introduce a regenerating system in three operational sites, cogeneration systems in two.

Production (including experimental facilities for R&D) and air-conditioning account for about 90% of energy consumption, and we believe that radical energy conservation measures will become necessary in these two areas.

1998 Energy Consumption

	Electricity	Gas	Oil	Total
Volume (TJ)	7,836	555	1,161	9,552
Consumption to sales (compared with 1990)	104.3	111.6	125.8	106.9

Energy Consumption and Energy Consumption to Sales



1998 Energy Conservation Result

(TJ)

Major Activities	Volume of energy conserved
Improvement of production equipment/processes	81.0
Introduction of energy-efficient air conditioners	2.7
Introduction of energy-efficient light fixtures	9.8
Introduction of energy-efficient compressors	8.8
Education and other activities	76.5
Total	178.8

Eliminating Non-Energy Gases that Exacerbate the Greenhouse Effect

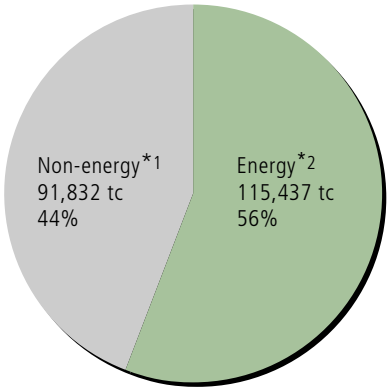
At Canon, we try to prevent global warming from two standpoints: first by reducing CO_2 emissions through energy savings and second by reducing PFCs, HFCs, and SF_6, non-energy gases that aggravate the greenhouse effect.
We commenced efforts to eliminate harmful gases in 1998; converted to CO_2 emissions, the actual amount of PFCs, HFCs, and SF_6 used that year for non-energy purposes was 91,832 tc, or 44% of our total emission of such gases. The main uses were as solvents, aerosol sprays and etching/cleaning for semiconductors.

We have already completed the development of technologies geared toward the elimination of these gases from our processes, with the exception of semiconductor-related applications, and believe we can abolish them by the end of 1999. Our forecast is for reductions of more than 90% of PFCs, HFCs, and SF_6.

Use of PFC, HFC, SF_6 in 1998

	PFC	HFC	SF_6
Volume of use (kg)	44,255	1,457	307
CO_2 emissions (tc)	89,315	517	2,001

Greenhouse Gas Emissions 1998 actual: 207,269 tc



Note:
1. Conversion of PFC, HFC and SF_6 into CO_2 emissions is used for the calculation for the non-energy category (except methane and nitrous oxide).
2. Conversion of electricity, gas and oil into CO_2 emissions is used for the calculation for the energy category.

Reduction of CO_2 Emissions through Efficient Distribution

With the aim of improving efficiency in distribution and reducing CO_2 emissions, Canon started taking action in 1998 in the area of fuel used in the delivery of products and components from suppliers. Currently, although we are still at the stage of collecting data with the cooperation of our major vendors and shipping companies, we plan to raise transportation efficiency (reduce under-loaded vehicles and the long-distance shipping of small orders), concentrate delivery destinations, establish circulating delivery schedules and work out other methods of distribution that will lessen the environmental impact of our distribution activities.

Specifically, we believe that we can reduce the distance covered by trucks and other delivery vehicles to 55% of existing distances. It will also be possible to reduce CO_2 emissions by a value equivalent with about 70,000 km per day. It should be possible to report on actual achievements after 2000.

Effective Use of Water Resources

Water is a valuable resource, and Canon is actively engaged in promoting its effective use. In 1998, we achieved an approximately 50% reduction in our water consumption to net sales from the 1990 level. A total of 58% of the water used in our manufacturing processes is recycled. In 1998, we more or less completed organizing a cascade recycling system of using wastewater from manufacturing processes and daily activities for water needed in facilities. In addition, a new plant with a closed water system will go into operation in 1999 by recycling all water used in manufacturing processes, and daily and other activities.

We plan to effectively use water resources by promoting the recycling of wastewater. In particular, we will reduce water consumption and actively use film-processing technologies.

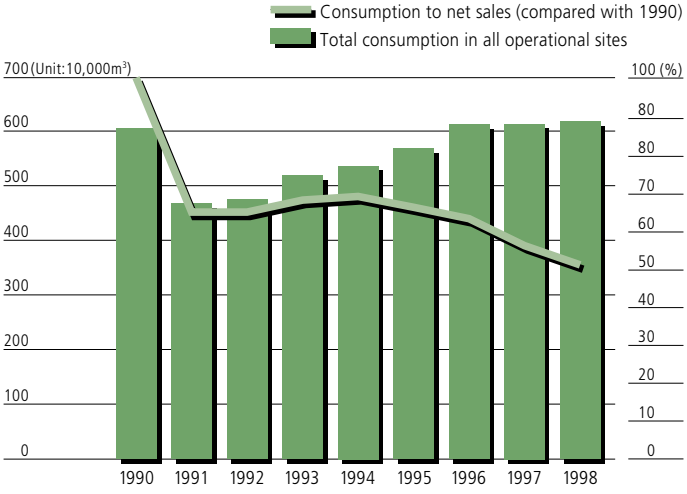
1998 Water Usage

Unit : 10,000m³/year

Supply	Breakdown			Discharge	Breakdown	
	Daily activities	Processes	Air-conditioning and other facility-related		Evaporation	Volume of discharge
620	72	141 59 (82)	489	620	345	275

Notes: 1. Figures in parentheses equal the volume recycled.
2. Evaporation is from the cooling tower and other facilities.

Volume of Water Consumption and Consumption to Net Sales



Reduction and Recycling of Waste

Burying industrial waste from operational sites halts their use as a resource and causes various problems, including a shortage of landfill area. At Canon, we regard waste as a resource and have been working since 1991 on reuse and reducing the amount of waste produced.

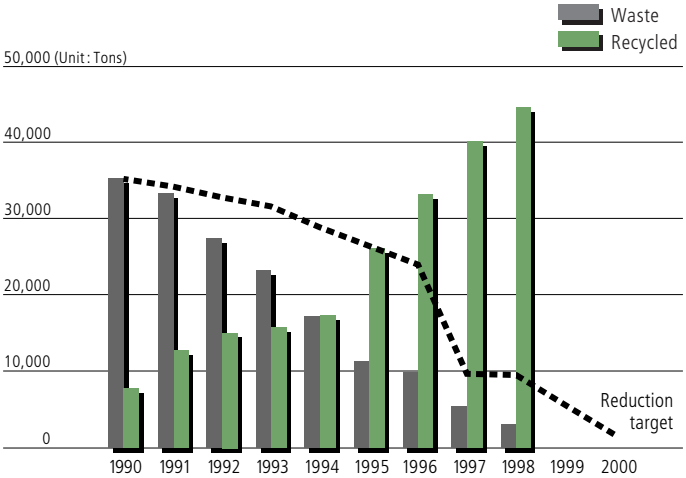
We are now trying to reduce waste by 95% (from the 1990 level) by the end of 2000. In 1998, we achieved a 91% reduction, and 13 operational sites, including the Canon Inc. Ami and Fukushima plants, have achieved zero waste.

1998 Waste Volume and Recycling

(Unit : Tons)

Total production	Waste volume	Recycling	
		Non-valuables	Valuables
47,737	3,043	28,963	15,731

Waste Volume Reduction and Recycling



We have been recycling waste through in-house product and component disassembly, and by comprehensively sorting during collection. Backed by a heightened awareness among employees, we have managed to recycle five times as much waste as in 1990.

At Canon, we mostly depend on cascade recycling (utilizing recycled items in other industries) to reuse waste, with the exception of paper and polystyrene. However, with cascade recycling there is always the risk of the recycling route collapsing once supply exceeds demand. Therefore, we are working to ensure a number of recycling routes, aiming for a closed recycling system and a more efficiently utilized cascade recycling system.

We will step up efforts to sort waste and achieve zero waste at all our operational sites. At the same time, we will try to raise our level of waste reuse and reduce the total amount of waste discharged, including that recycled, from our operational sites.

Breakdown of Recycled Materials (1998 results)

	Type	Recycled to	Recycled volume (tons)
Paper (11,328t)	Printing paper (test paper, office equipment paper)	Rolled paper, recycled plain paper, office equipment paper, etc.	3,088
	Cardboard and other	Cardboard boxes, cardboard, plywood, pulp mold	5,063
	Confidential documents	Toilet paper	593
	Newspaper and magazines	Newspaper, plywood, cardboard, construction board, cardboard boxes, packaging materials	827
	Other(processed paper, mixed material paper, miscellaneous)	Toilet paper, cardboard boxes, processed paper, etc.	1,758
Plastic (7,477t)	PE sheets (packaging, film, delivery bags, component cases)	Fuel rods, plastic materials, railroad ties, cement	1,310
	Component unit (MT, defective cartridges, etc.)	Cement, aggregates, roadbed materials	705
	Substrate waste	Metal recovery	187
	Toner (test toners, used toners)	Cement, aggregates, roadbed materials, combustion improvers	909
	Foam materials (polystyrene, buffer materials)	Polystyrene, roadbed materials, resins	184
	Molded resin (polycarbonate, Noryl, acrylic, etc.)	Fuel rods, plastic products	1,069
	Other plastic (component cases, chemical containers, food containers, etc.)	Cement, aggregates, roadbed materials, heat recovery, resin materials, solid fuels, combustion improver pellets	3,113
Sludge (3,797t)	Sludge from daily activities	Cement, aggregates, organic fertilizers	632
	Sludge from facilities	Cement, aggregates, roadbed materials	3,166
Wastewater (11,097t)	Waste oil (waste solvents)	Recycled solvents, combustion improvers	2,262
	(Waste oil, painting materials, etc.)	Cement, aggregates, recycled oil, combustion improvers	1,074
	Waste acid/alkali (Waste ink, cleaning agents, plating materials, hydrochloric acid, sulfuric acid)	Cement, roadbed materials, metal recovery	7,761
Other (10,994t)	Wood (wooden pallets, etc.)	Wood boards, wood chip, fuel, soil improvers, paper materials, pulp chips	1,597
	Metal (iron, aluminum, etc.)	Metal materials (aluminum ingots, etc.)	7,616
	Glass, ceramics (fluorescent lights, beverage bottles, etc.)	Recycled glass	123
	Combustible garbage	Soil improvers, fertilizers	24
	Fiber	Combustion improvers	27
	Night soil	Fertilizers, roadbed materials	1,357
	Other (batteries, etc.)	Metal recovery, etc.	250

Note: Figures inside parentheses represent the total tonnage of recycled materials in respective categories.

Control of Chemical Substances

It goes without saying that chemical substances have made great contributions to our society; on the other hand, their inappropriate use and disposal are seriously affecting the environment. We believe that safety must be ensured at all stages of product lives, from their development and production to their use, recycling and disposal, and we have stepped up efforts in the control of chemical substances since 1996.

In 1998, we newly added endocrine disrupters to the list of controlled substances made in 1996. Our reduction activities are carried out according to PRTRs, including the tracking of usage, amounts transferred to products and amounts discharged.

Rank	Control Level	Applicable Chemical Substances	Number of substances	
A	Banned	●Chemical weapon substances designated by the Chemical Weapons Convention	170	1,968
		●Type 1 and Type 2 substances designated by the Law Concerning Examination and Regulation of Manufacture, etc., of Chemical Substances		
		●Substances the manufacturing of which is banned by the Industrial Safety and Health Law		
		●Type 1 specified substances designated by the Prevention of Damage from Designated Substances Law		
		●Part of health-related items in the Water Pollution Control Law		
		●Designated substances under the Law Concerning the Protection of the Ozone Layer		
		●Specified types of dust designated by the Air Pollution Control Law		
B	Reduced	●Substances designated by the Air Quality Preservation Standard (3 substances)	36	
		●Priority Substances Hazardous to Air Quality (22 substances)		
		●Health-related substances designated by the Water Pollution Control Law		
		●Global warming gases		
		●Substances restricted under laws concerning waste processing and cleaning (hazardous substances)		
C	Emission/ Production Controlled	●Substances designated by the Chemical Weapons Convention	1,762	
		●Poisons and substances of oral lethal dose (LD50) under 30mg/kg designated by the Poisonous or Deleterious Substance Control Law		
		●PRTR substances designated by OECD		
		●Hazardous wastes designated by the Basel Convention		
		●Specified substances designated by the Law Concerning Examination and Regulation of Manufacture, etc. of Chemical Substances		
		●Poisons and substances of oral lethal dose (LD50) under 100mg/kg designated by the Poisonous or Deleterious Substance Control Law		
		●Organic solvents and specified substances designated by the Industrial Safety and Health Law		
		●Substances related to water (including substances to be monitored), air and soil environment standard items under the Basic Environment Law		
		●Substances restricted under the Water Supply Law (46 items)		
		●Hazardous substances and specified substances designated by the Air Pollution Control Law		
		●Hazardous air-polluting substances designated by the Air Pollution Control Law (234 substances)		
		●Substances designated by the Offensive Odor Control Law (22 substances)		
		●Substances designated by chemical substances usage status survey conducted by Kanagawa Prefecture		
		●Items subject to surveys for water quality preservation		
		●Endocrine disrupters (environmental hormones)		

1998 Control Balance Sheet (PRTR)

The 1998 performance of the Canon Group under the Environment Agency's PRTR pilot operations for 178 substance groups, which began in 1997, was 2,023 tons in terms of the total amount used. Of this total, 19% was emitted as exhaust, wastewater and waste matter. Exhaust control, such as the recovery and removal of substances contained in exhaust, is becoming an important issue, since those released into the atmosphere account for 94% of those emitted.

(Unit: tons/year)

NO	Substance #	Substance	Volume of use	Transfer to products	Emissions into the atmosphere	Discharge into water	Production of waste	Recycled volume	Removal volume
1	1	Zinc and zinc compounds	54.17	49.90	0	0.07	0.12	3.86	0.22
2	2	Acryl amide	1.24	0	0	0.03	0	1.21	0
3	15	Hydrogen chloride	569.92	1.43	210.24	0.35	0.07	73.60	284.23
4	21	Xylene	28.95	0.04	16.84	0	0.12	10.05	1.90
5	24	Chromium compounds (Hexavalent)	4.67	0.29	0	0	0	3.65	0.73
6	37	Cyanide compounds	0.85	0	0	0	0.42	0.04	0.39
7	42	1,4-Dioxane	3.09	0	2.65	0	0	0.44	0
8	50	Dichloromethane	165.68	19.44	38.06	0	0	108.18	0
9	58	N,N-Dimethylformamide	130.42	0	5.11	0	0	125.31	0
10	61	Oxalic acid	5.35	0	0.30	0.05	4.52	0.46	0.02
11	63	Styrene (monomer)	313.43	310.71	0.08	0	0	2.64	0
12	68	Copper and copper compounds	225.00	86.63	0	1.00	0	137.37	0
13	79	Toluene	94.50	2.84	65.64	0	3.25	22.77	0
14	80	Lead and lead compounds	13.88	5.60	0.03	0	1.06	7.19	0
15	81	Nickel compounds	178.39	151.39	0	0.10	3.11	23.48	0.31
16	83	Thiram	0.26	0.26	0	0	0	0	0
17	94	Hydrogen fluoride	21.54	0	0.11	1.23	0	20.20	0
18	95	Fluorine	0.20	0	0	0	0	0	0.20
19	96	Fluorine compounds (inorganic)	27.04	18.86	0	0	8.18	0	0
20	104	Boron and boron compounds	0.71	0	0	0	0.13	0.58	0
21	105	Formaldehyde	9.80	0	7.35	0	0	2.45	0
22	107	Manganese and manganese compounds	1.02	0	0	0	0	1.01	0.01
23	118	Aluminum compounds (soluble salts)	110.68	21.68	0	0.83	0.26	68.83	19.08
24	121	Ethanolamine	20.08	12.97	7.11	0	0	0	0
25	124	2-Etoxyethanol	2.19	0.79	1.40	0	0	0	0
26	133	Methyl chloride	10.79	8.10	0.04	0	0	2.65	0
27	134	2-Etoxyethanol acetate	3.06	0	3.06	0	0	0	0
28	142	Diphenylamine	1.78	0	0	0	0	1.78	0
29	147	Silicon carbide	1.11	0	0	0	0	1.11	0
30	149	Tetrahydrofuran	24.01	0.92	15.34	0	0	7.75	0
		Total	2,023.81	691.85	373.36	3.66	21.24	626.61	307.09

Notes: 1. Substances designated under PRTR: Environmental Agency's 178 substances
2. Offices with no use of subject substances (16 sites): Kosugi Office, Canon Research Center, Meguro Office, Utsunomiya Plant (Kanuma Branch), Fukushima Plant, Canon Electronics (headquarters, Yamada and Misato plants), Copyer (headquarters, Tachikawa Plant), Canon Precision, Hanawa Seiki, Canon Chemicals (Totsuka Plant), Canon Aptex (headquarters, Shimomaruko Office), Miyazaki Daishin Canon

Elimination of Substances Harmful to the Ozone Layer

Since 1987, Canon has striven to halt its use of chlorofluorocarbons (CFCs), trichloroethane, and hydro chlorofluorocarbons (HCFCs). Each of these substances is a factor in the destruction of the ozone layer, an environmental issue that was taken up globally in the 1980s. We approached this matter comprehensively, utilizing a wide range of technology. Specifically, in our production processes we have switched to product cleaning with water, selected and developed alternative solvents and reviewed our methods, including the removal of cleaning processes in certain cases. As a result, we eliminated CFCs from our production in 1992, trichloroethane in 1993, and HCFCs in 1995.

Elimination of Substances Harmful to the Ozone Layer

	Year Eliminated	4th UNEP Abolition Deadline*
CFCs	1992	1996
Trichloroethane	1993	1996
HCFCs	1995	2020

*Reduction/Elimination deadline under the Fourth Montreal Protocol

Elimination of Organic Chlorine Solvents

We have striven since 1993 to halt our use of organic chlorine solvents, which have been found to have carcinogenic properties. At the time, these solvents were mostly used for cleaning, so we concentrated our reduction efforts in this area. Consequently, we successfully ceased using these substances in cleaning processes in 1997. As for dichloromethane, the remaining organic chlorine solvent we have used, we installed recovery devices at all exhaust emission outlets and have strictly maintained the internal standard of limiting dichloromethane emissions to 10 parts per million (ppm) or less.

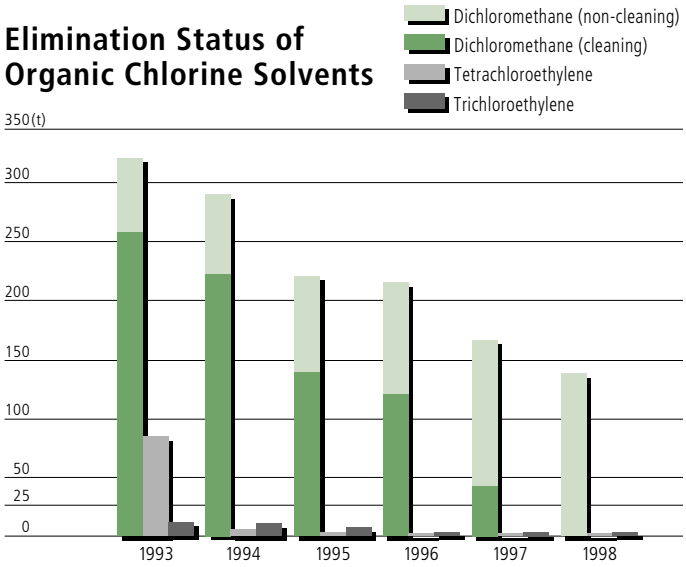
To a large extent, by 1998 we have been able to find alternatives to dichloromethane in non-cleaning applications. We expect to completely cease usage of this substance at Canon sites by 2000.

1998 Chlorine Organic Solvents Usage

(tons)

	Status
Tetrachloroethylene	Eliminated 1996
Trichloroethylene	Eliminated 1996
Dichloromethane (for cleaning)	Eliminated 1997
Dichloromethane (for other purposes)	140

Elimination Status of Organic Chlorine Solvents



Reduction of Hazardous Chemical Substance Emissions

Canon's efforts in this area are to reduce the volume of hazardous chemical substance emissions (exhaust, wastewater and waste matter) by 20% by the end of 2000 from the 1996 level. We succeeded in reducing these emissions in 1997, but they increased in 1998 owing to a rise in the amounts of these substances used in our operations. In 1998, our operations discharged 1,452 tons of these substances, 80% of which were hydrogen chloride, methanol, isopropyl alcohol and monochlorobenzene. Efforts to reduce these substances will be continued via thorough material management, switching to safer substances not included in the control list, and recovery/removal at the point of discharge.

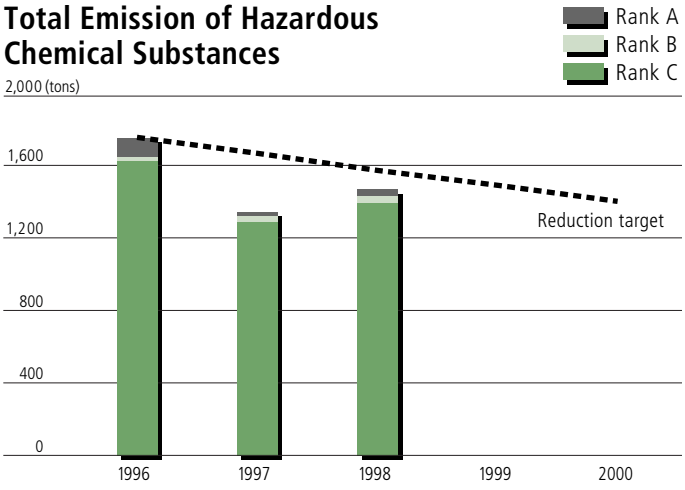
1998 Hazardous Chemical Substance Emissions

(tons)

Control Level	Production			Total
	Air	Water	Waste	
Rank A	38.1	0.0	0.0	38.1
Rank B	31.3	0.1	4.3	35.7
Rank C	1,148.5	137.6	91.9	1,378.0

Note: For details of ranks, please see page 16 (Chemical Substance Control)

Total Emission of Hazardous Chemical Substances



Dioxin Countermeasures

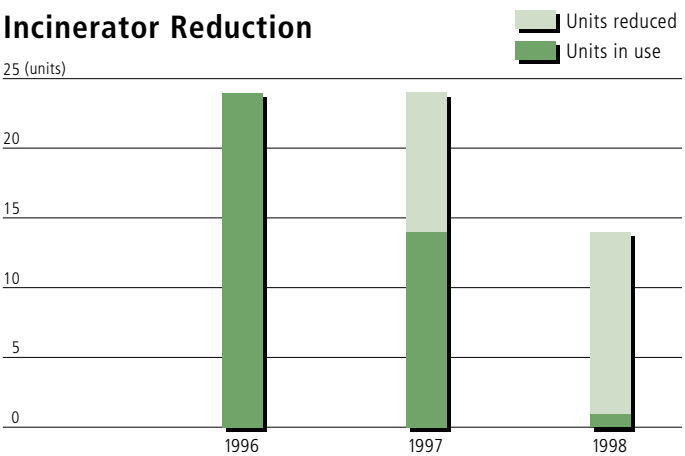
Canon has reconsidered its dependency on incineration for the disposal of waste material. In particular, we are abolishing incinerators by improving our waste sorting and recycling in order to deal with the problem of dioxins.

We reduced the number of incinerators to a single facility in 1998, from 24 in 1996. The remaining unit handles waste fluid. We established countermeasures for exhaust fumes from this furnace in 1993, and the dioxins measured at the exhaust outlet in 1998 were 0.00053 ng-TEQ/m^3N, well below the government's recommendation of 10 ng-TEQ/m^3N (under a partial revision to the Air Pollution Control Act Enforcement Ordinance announced on August 29, 1997). We are now considering the development of a new technology for our waste fluid incinerator that will make disposal possible without incineration in the near future.

1998 Incinerator Reduction

Type	Number of units reduced
Small incinerators	2
Rubbish furnaces	3
General-purpose incinerators	2
Shaft furnaces	2
Gasification furnaces	2
High-polymer incinerator	1
Smokeless incinerator	1
Total	13

Incinerator Reduction



Environmental Auditing

Acquiring ISO Certification

Canon is promoting environmental management in accordance with ISO 14001 international standards to step up, and implement in a more systematic and efficient manner environment assurance activities at sites. In 1995, Canon Inc.'s Ami and Ueno Chemical Products plants became the first production sites in the Canon Group to acquire certification under BS7750, the British environmental management standard that formed the basis of ISO 14001.

In 1998, three sites, including two that have both R&D and production functions, acquired ISO 14001 certification. We also intend to step up efforts to acquire this certification at sales sites.

ISO Certified Sites and Subsidiaries

Site/Subsidiary	Certification Date (y/m)
Ami Plant	1995.02
Ueno Chemical Products Plant	1995.02
Toride Plant	1995.05
Fukushima Plant	1995.09
Hirosaki Seiki Ishiwatari/Kitawaoku plants	1995.09
Canon Electronics Misato Plant	1995.10
Canon Aptex	1995.11
Nagahama Canon	1995.12
Utsunomiya Plant	1996.01
Oita Canon	1996.01
Nippon Typewriter	1996.07
Canon Chemicals Tsukuba Headquarters	1996.07
Copyer Kofu Plant	1996.11
Copyer Fukui Plant	1996.11
Copyer Tachikawa Plant	1996.11
Canon Components	1997.02
Hanawa Seiki	1997.02
Miyazaki Daishin Canon	1997.03
Canon Chemicals Iwama Plant	1997.04
Utsunomiya Optical Products Operations	1997.12
Canon Chemicals Ishige Plant	1998.01
Tamagawa Plant	1998.11
Hiratsuka Development Center	1998.12

Environmental Auditing by the Headquarters

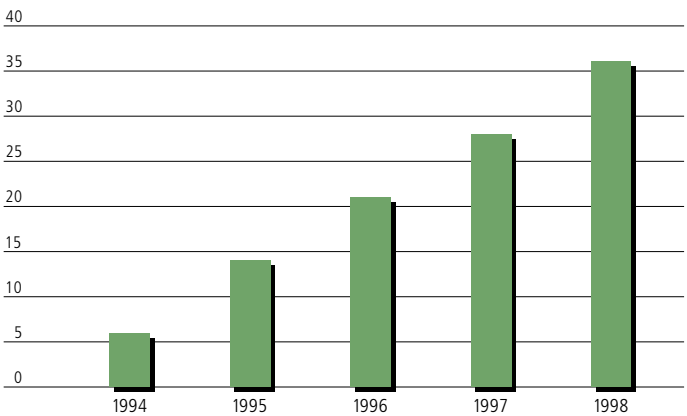
As a supplement to environmental surveillance by certified outside organizations, we conduct internal environmental auditing through Canon Inc.'s headquarters Environmental Engineering Center. The purpose of these activities is to inspect the actual environmental management conditions at Canon Group operational sites from a third-party standpoint. The specialized Environmental Engineering Center organizes teams and conducts inspections covering 156 items. The results are digitally assessed at four levels and reported to Canon Inc. President and C.E.O. Fujio Mitarai. Operational sites are required to take prompt steps to improve their environmental performance as indicated by audit results. This system supports more objective environment assurance activities.

Environmental auditing through the headquarters was conducted at eight operational sites in 1998. In addition, auditing is scheduled so that every site is inspected biannually.

1998 Auditing

Site	Auditing month
Oita Canon	2
Utsunomiya Plant	3
Canon Components	4
Canon Chemicals Tsukuba Headquarters	5
Canon Chemicals Ishige Plant	6
Miyazaki Daishin Canon	7
Utsunomiya Optical Products Operations	10
Canon Chemicals Iwama Plant	11

Number of Audited Sites



Environmental Analysis and Measurement

Canon Inc.'s Environmental Engineering Center incorporates an Environmental Measurement Certifier and Working Environment Measurement Function, which collectively analyze our operational sites from an environmental standpoint. Under this system, we conduct high-level environmental analyses with speed and efficiency by adopting advanced analytical instruments and experts in analysis.

More than 87,000 samples were analyzed in 1998. As necessary, analysts were sent to sites, and measurement certifications were issued. We continuously work to improve our analysis techniques and accuracy, with the goal of becoming a leader in the environmental analysis field.

1998 Environmental Analysis

Number of samples analyzed	87,012
Areas of Analysis	Water, air, odor, soil, waste, operating environment, noise, vibration

Main Analyzing Equipment

Ion chromatograph
Gas chromatograph
High-performance liquid chromatograph
Induced coupled plasma (ICP) spectrometer
X-ray fluorescence spectrometer
BOD automatic analyzer
Fluorine automatic distilling equipment
Gas chromatograph mass spectrometer - addition

Installed in 1998

Green Procurement

Canon has established green product procurement standards incorporating seven corporate constitution and 11 product criteria. With the cooperation of our vendors, we use these standards to assess the components and materials we procure. We firmly believe in the importance of using components and materials that have the least environmental impact possible in order to improve the ecological value of our products.

In 1998, we accumulated corporate constitution data on 808 companies, equivalent to 94% of our suppliers in terms of purchase value. We have recommended green procurement for items used in-house, as well, and have added 470 office supplies to a list of certified products. In addition to assessing supplies, we have also held study meetings to promote environmental activities with 31 vendors. In the future, we will continue to assess products supplied to the Canon Group.

1998 Green Procurement Evaluation

Green Evaluation			Number of vendors
Company constitution evaluation			808
Product evaluation	Electronic parts	(semiconductors, transformers, motors, printed circuit boards (PCBs), electric wire, batteries, resistors, condensers and others)	144
	Machinery parts	(Rubber rollers and others)	24
	Raw materials	(Resins, steel sheets, paper and others)	56
Green Recognition			**Number of items**
	Office supplies		470
	Personal computers (PCs)		Established standards
	Printed matter		Established standards

Product Recycling

Copying Machines

Canon regards used products as an important global resource and are seriously engaged in their recycling. We always recycle products with four classifications in mind: high-degree reuse (product remanufacturing), parts reuse, recycling as materials and reuse as heat sources.

We commenced product remanufacturing in 1992 in the Americas and Europe and in 1998 in Japan, thereby completing an organization of three major global bases. Domestically, we recovered as many as 61,000 used copying machines in 1998 alone. After selecting those that can be remanufactured, we disassemble them, then sort parts and materials that can be reused.

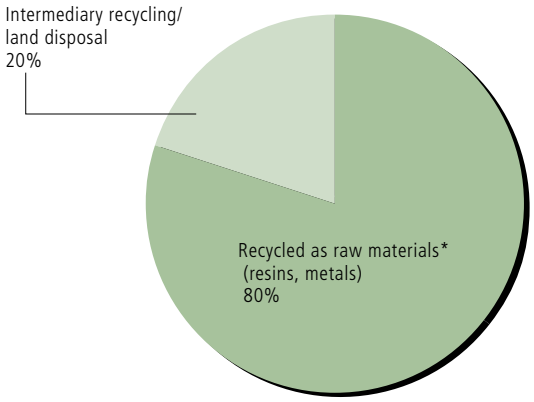
The current recycling rate per remanufactured machine is 80%, but we are aiming for 100% by adopting more environmentally conscious designs and developing recycling technologies. We will assume an active role in the building of a resource circulating society through efforts to use recycled materials and improve the efficiency of used machine recovery operations.

1998 Copying Machine Recovery (Japan)

(Thousands of units)

(Year)	1994	1995	1996	1997	1998
Units recovered	52	58	63	63	61

1998 Recycled Ratio: 80%



*Inclusive of reuse of parts and remanufacturing of previously owned

Toner Cartridges

The recycling of toner cartridges used in personal copying machines, laser beam printers and facsimile machines should lead to a great reduction in the impact our products on the environment. We began recovery and recycling activities in 1990 and are now engaged in recovery in 21 countries and recycling in the three regions of the Americas, Europe and Asia.

With awareness growing among users, the number recovered has gone up yearly in Japan as well as in other countries. In 1998, we recovered as much as 900 tons in Japan alone. The cartridges recovered in Japan are, together with those recovered in other Asia and Oceania, comprehensively recycled at Canon Dalian Business Machines in the People's Republic of China (PRC).

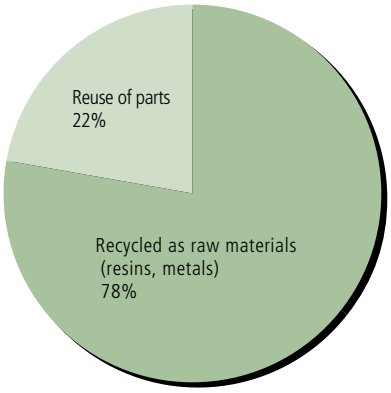
We intend to further increase our rate of used product recovery by working to achieve market cooperation.

1998 Toner Cartridge Recovery (Japan)

(tons)

(Year)	1994	1995	1996	1997	1998
Weight of cartridge recovered	368	461	580	713	879

Recycled Ratio in the Second Half of 1998: 100% (Canon Dalian Business Machines)



Bubble Jet Ink Cartridges

As with toner cartridges, we have been recovering and recycling Bubble Jet ink cartridges in Japan since 1996.

We recovered about four tons in 1998 and expect to recover six tons in 1999. Recycling is implemented according to the most efficient methods possible to avoid impacting the environment. By weight, we are recycling more than 97% of these cartridges. The distinctive aspect of our system is the closed recycling (reuse as parts) of the main resin used in the cartridges. We regenerate resins from used cartridges for parts in new ones. In the future, we plan to regenerate all the resins used in our ink cartridges.

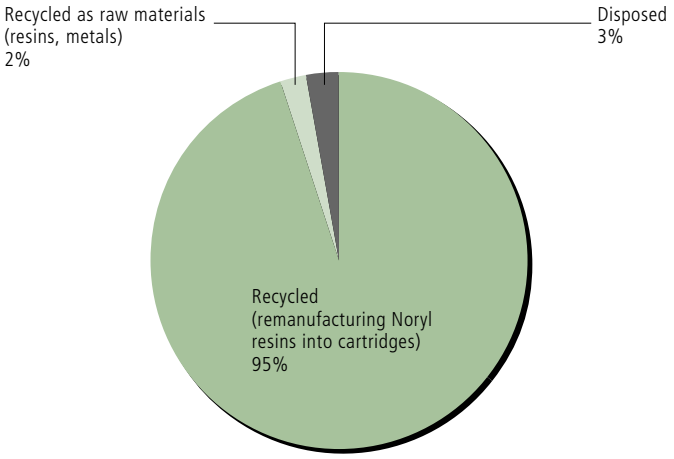
With the cooperation of our customers, we also hope to increase the number of ink cartridges recovered and further enhance the efficiency of our recovery and recycling system.

1998 Bubble Jet Ink Cartridge Recovery Weight

(tons)

(Year)	1996	1997	1998
Recovery weight	0.4	2.2	3.8

1998 Recycled Ratio: 97%



Polystyrene

Canon has worked to reduce packaging materials since 1991. Polystyrene foam, in particular, has created serious problems in our society. As a first step to reducing this material in our packaging, we began switching to pulp molds and other buffer material that could easily be recycled. We also modified the designs of packaging materials.

In the second step, in 1998 we established a closed recycling system for polystyrene used in packaging within the Canon Group by recovering and remolding the foam. The amount recycled in 1998 was small in proportion to the total, but we intend to reduce the environmental impact of our packaging by combining the two efforts: reducing the amount used and further promoting the closed recycling system.

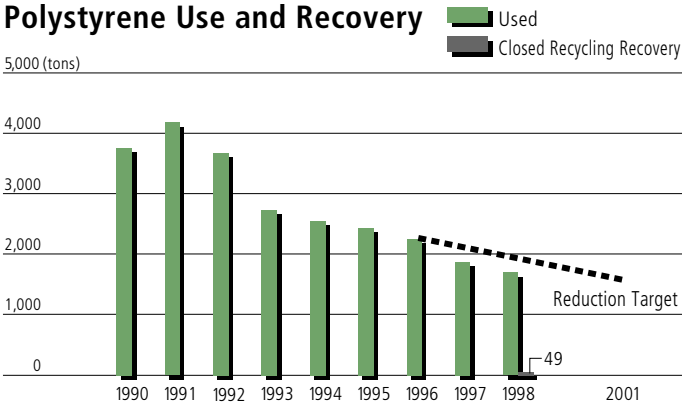
1998 Polystyrene Recovery/Recycling

(tons)

Recovered	(Breakdown)		Recycled
	Sourced item packaging	Recovered from market	
49.1	32.6	16.5	10

Note: The amount recovered but not recycled in 1998 will be recycled in 1999.

Polystyrene Use and Recovery



Environment Assurance Results

Education

Environmental Education

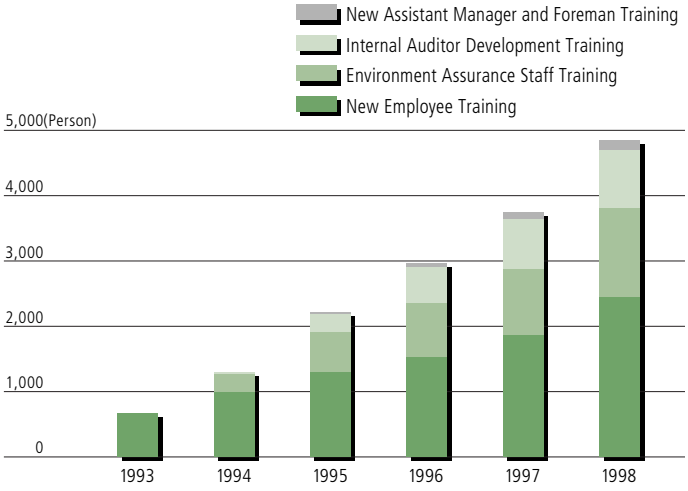
We provide two kinds of training—that for people with responsibilities not directly related to the environment and specialized training—with the aim of getting all employees to incorporate environment assurance activities in their daily activities. Those who participate in environment assurance staff training and internal auditor development training are registered in Canon's training files and take leadership roles in their respective workplaces for environmental activities. New employees are required to undergo training to acquire basic knowledge of environmental issues and an understanding of how action guidelines can be put into practice. In 1998, we recorded the highest number of participants in these courses, an indication that our environment assurance activities have become firmly ingrained in our operations. The Canon Group will further improve its environmental education to implement concerted efforts to deal with global environmental issues.

1998 Environment Education

(Person)

New Employee Training	591
Environment Assurance Staff Training	326
Internal Auditor Development Training	140
New Assistant Manager and Foreman Training	45
Total	1,102

Number of Participants in Environment Education



Environment Assurance Results

Industrial Safety

Working Environment

The theme "Health Comes First" is clearly stated in our action guidelines, which is why we strive to maintain a healthy working environment for our employees. In this area, we survey even those workplaces not stipulated in the Industrial Safety and Health Law through our Analysis Center, which is registered as working environment inspection organization.

In 1998, measurements determined that we operated some workplaces at Category 2 and Category 3. However, we improved the air-conditioning and local ventilation at these facilities, making them compliant with a Category 1 classification. Canon maintains healthy working environments to ensure that its employees can work comfortably.

Industrial Accidents

All Canon employees are trained in five areas to prevent accidents: organization, tidiness, cleanliness, cleaning and business manners. Most of the accidents experienced at Canon are minor injuries, but we are endeavoring to maintain zero accidents by organizing a safety and sanitation committee at sites and conducting KYTs (danger forecast training) and safety patrols of workplaces.

1998 Working Environment Inspection

(Number of workplace)

	Category 1	Category 2	Category 3	Total
Number of workplaces inspected	747	28	17	792

Category 1: Working environments in which hazardous substances are used, but the workplace is operated satisfactorily, and maintenance conditions should be upheld.

Category 2: A working environment that ranks between Category 1 and Category 3, and requires improvements.

Category 3: A working environment in which significant environmental improvement is required.

1998 Industrial Accidents

(Number of cases)

	Accidents requiring facility closing	Accidents not requiring facility closing	Latent accidents	Total
Accidents	8	60	46	114

Note: Data is for Canon Inc. only

Social Contribution

Canon regards social contribution to be an important part of cooperation with the community and is engaged in a wide range of activities in the international arena and local communities. In 1998, we participated in advanced environmental conventions and exhibitions, including the Factor 4+ Congress and Trade Fair organized by the Wuppertal Institute for Climate, Environment, and Energy in Germany, as well as the Shiga Environmental Business Messe '98, the first environmental convention held at the prefectural level in Japan. We will continue to take part in environmental conservation initiatives worldwide, not to mention activities in the local community, and promote volunteer activities of our employees and their families.

1998 Social Contribution Activities

Headquarters	
Educational	Aoyama Gakuin University (lecture course)
	Factor 4+ (trade fair)
	Shiga Environmental Business Messe '98
Lectures	The 31st VE National Convention
	Division of the Society of Polymer Science, Japan
	The Coalition of Local Government for Environmental Initiative Japan
	Harmony with the Earth: Gathering in Hyogo '98
	Japan Management Association
	Other
Writing contribution	7 articles

Office/Plant	
Headquarters	Neighborhood street cleanup
Canon Research Center	Participation in greenery protection activities in local communities
Utsunomiya Plant	Neighborhood cleanup
Toride Plant	Neighborhood street cleanup Picking up cans
Ami Plant	Neighborhood cleanup around the plant and JR Arakawa-Oki Station
Fukushima Plant	Neighborhood cleanup
Utsunomiya Optical Products Operations	Neighborhood cleanup
Oita Canon	Neighborhood cleanup
Miyazaki Daishin Canon	Neighborhood cleanup
Nippon Typewriter	Neighborhood cleanup

Awards

Canon has received numerous awards from groups and organizations to commend its forward-looking stance in tackling global environmental issues and its efforts to develop environmental technologies.

In June 1998, we were presented with the Award for Excellence at the Green Purchasing Awards organized by the Green Purchasing Network for clearly defining green procurement standards and utilizing them in procuring materials, components and office supplies. In October 1998, we received the Prize of the Minister of Science and Technology Agency Award from the Japan Institute of Invention and Innovation for our energy-saving SURF (Surface Rapid Fusing) technology.

Environment Assurance Awards

Date	Awards	Sponsoring Organization
November 1994	Tree-Planting Excellent Operations	City of Hiratsuka
June 1995	Environment Prize	Environmental Research Center Nikkan Kogyo Shimbun Ltd.
October 1995	Japan Internal Audit Association Director's Award	Japan Internal Audit Association
January 1996	Energy Conservation Vanguard 21 Natural Resources and Energy Agency Director General's Award (for LBP-730, FC310/330)	Energy Conservation Center (Japan)
October 1996	Excellence Award for Companies Excelling in Appropriate Waste Disposal	City of Tokyo
March 1997	Fiscal 1996 Environmentally Excellent Company Award (Environmental Management Auditing)	Ibaraki Prefecture
July 1997	Environmental Preservation Award	Kanagawa Prefecture Environmental Preservation Society
June 1998	Award for Excellence at the Green Purchasing Awards	Green Purchasing Network
October 1998	The Prize of the Minister of Science and Technology Agency Award Invention Practice Service Prize	Japan Institute of Invention and Innovation

		Canon's Response	
	Issue/Trend	Organization	Activities
1960			
	Pollution Countermeasures Basic Law		
	Air Pollution Prevention Law & Noise Regulation Law		
	OECD Becomes involved in acid rain issue		
1970			
	Love Canal Incident		
	Water Pollution Prevention Law & Waste Disposal and Refuge Collection Law		
	United Nations Human Environment Council		
	United Nations Environment Program (UNEP) begins	Establishment of Central Pollution Prevention Committee	
	Six Chromium Pollution Issue		Pollution Prevention Management Standards enacted
	London Dumping Convention on ocean dumping		
	Washington and Ramsar conventions		
	Seveso explosion (hazardous substances disposal)		
1980			
	Superfund Act		
	Convention on Long-Range Transboundary Air Pollution (acid rain)		
	OECD Report on Transfrontier Movement of Hazardous Wastes		
	Ozone Hole Report		
	Chernobyl accident		Initiation of research on amorphous silicon solar cells
	Rhine River pollution incident		
	Montreal Protocol	Establishment of Fluorocarbon Countermeasure Committee	
	Vienna Treaty (ozone layer protection)		
	Exxon Valdez oil spill (Ocean Pollution)		
	Helsinki Declaration on abolition of CFCs		Establishment of standards on disposal of specific types of bromide flame-retardant plastic material waste
1990			
1990	Action Plan for the Prevention of Global Warming	Naming of Environment Assurance Director in Charge Establishment of Dedicated Environment Assurance Organization Establishment of Environment Assurance Promotion Committee	Initiation of toner cartridge recycling Start of clean energy operations
1991	Law for the Promotion of Recyclable Resources German Ordinance on Packaging Control Keidanren Global Environment Charter	Establishment of Waste Countermeasures Committee	Creation of Environment Assurance Promotion Plan Initiation of cartridge recycling at Canon Dalian Start of waste separation and recovery Joint development of lead-free glass Initiation of copying machine remanufacturing activities
1992	Voluntary Plan of Environmental Management Global Summit Rio Publicity BS7750		Initial indication of plastic material qualities Establishment of harmless glass sludge technologies Eliminate use of fluorocarbons Joint sponsor of UNEP World Environment Photo Contest
1993	Basel Convention Basic Environment Law (Japan) Energy Star Program Plan Ozone Labeling Regulations Environmental Basic Plan	Completion of Ecology Research & Development Center Establishment of Environmental Audit Room Revision of Structure of Dedicated Environment Assurance Organization Revision of Structure of Environment Assurance Promotion Committee	Environmental Voluntary Plan established Beginning of activities at Canon Manufacturing U.K. Initiation of product assessments Eliminate use of trichloroethane Initiate environmental audits
1994	Treaty for Framework on Climatic Change		Canon Giessen receives EMAS certification Eliminate use of HFCs
1995		Establishment of Environment Engineering Center	Receive BS7750 certification (Ami, Ueno plants), first case in Japan
1996	German Sustainable Economy Law (waste) International ISO 14001 Standards	Creation of Global Environment Promotion System (North America) Cartridge recycling operation begins (IRT established)	Receive ISO 14001 (DIS) certification (Utsunomiya Plant, Oita Canon) Begin recycling of Bubble Jet cartridges Eliminate use of trichloroethylene and tetrachloroethylene
1997	Package Recycling Law Third Conference of the Parties (COP3) International Summit	(Europe) Cartridge-recycling operation begins (Operations started as CBSA)	Establishment of global green purchasing and procurement standards Eliminate use of dichloromethane (for cleaning)
1998		(Japan) Copying machine remanufacturing begins (NP6250)	Closed recycling begins for polystyrene for packaging (Japan) Reduction plans for PFCs, HFCs and SF_6 elimination established Establishment of intermediate environmental policies and targets for the Canon Group

<キリトリ線>

We Want to Hear from You

This report is a compilation of environment-related data of Canon's operations in 1998. The next issue is scheduled for release in the year 2000, and we would very much like to hear from you to make it an environmental report of higher quality. Please let us know your opinions and suggestions regarding the report. We would very much like to reflect them in our next issue.
Please fax or mail us the form on the reserve side of this page.
This form can also be found on the Canon Inc.'s Web site.

Send to:

【Mail】
Environmental Planning Department
Environmental Engineering Center
Canon Inc.
30-2 Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501, Japan
【FAX】
+81-3-3757-6339

Web site
URL:http://www.canon.co.jp/ecology/

Q1 What did you think of this report (please circle one)?

1. Was it easy to read?

Very easy — **Easy** — **Average** — **Difficult** — **Very difficult**

Comments

2. What did you think of the content?

Very easy — **Easy** — **Average** — **Difficult** — **Very difficult**

Comments

3. What is your evaluation of Canon's environmental activities?

Good — **Relatively good** — **Fair** — **Relatively poor** — **Poor**

Comments

4. Was there anything that was not explained sufficiently or needs to be improved? Please give us your suggestions.

a. Sufficient information was provided **b. Needs improvement (please specify)**

Q2 What would you expect from Canon regarding environmental issues?

Q3 Which of the following best describes you?

a. Involved in finance/investment **b. Ranking institute** **c. Public administration**
d. Resident near a Canon operational site **e. Canon client/vendor** **f. Environmental specialist**
g. Press **h. Environmental department of corporation** **i. Student** **j. Product user**
k. Other (please specify) (**)**

Q4 How did you learn about this publication?

a. Newspaper **b. Magazine** **c. Canon dealer** **d. Canon salesperson**
e. Canon homepage **f. Environmental or other seminars**
g. Other (please specify) (**)**

Thank you for your cooperation

Name Age

Address

Occupation/Company Title

Telephone Fax E-mail

Canon

If you have comments or questions regarding this publication, please **contact:**

Manufacturing Environmental Planning Section
Environmental Engineering Center
Canon Inc.
30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501, Japan
Telephone +81-3-3758-2111 (switchboard)
Fax +81-3-3758-6339
URL : http://www.canon.co.jp/ecology/
E-mail : ecoinfo@web.canon.co.jp

●This publication is printed on 100% recycled paper that can be recycled again for reuse.

Published in October 1999

PUB.ECO04 1099S6 Printed in Japan