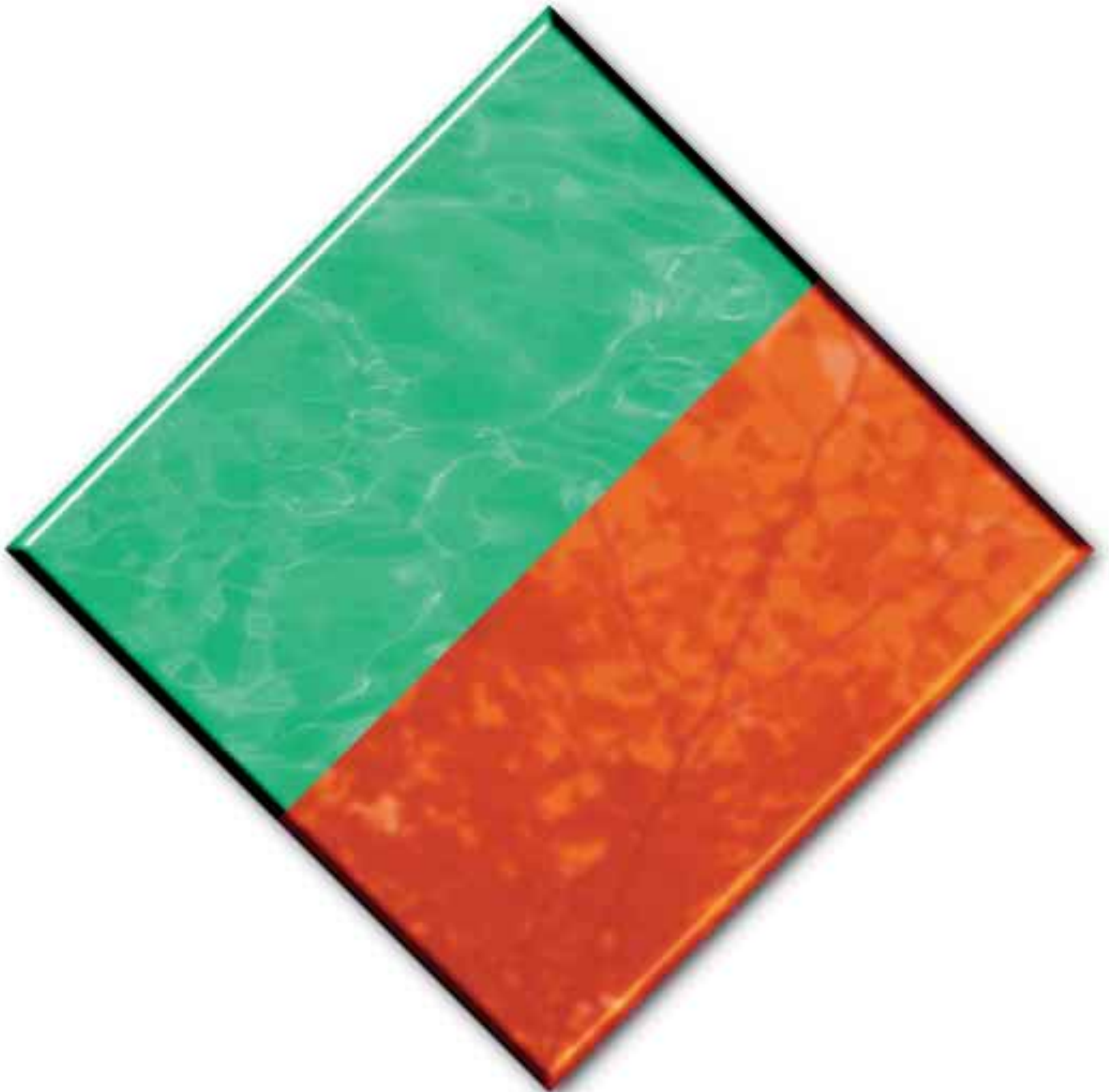


# **Striving for Harmony with the Earth**

SII Group Green Plan



Environmental Report 2001

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## CORPORATE DATA

Corporate Name:	Seiko Instruments Inc.	
Established:	September 7, 1937	
Paid-in Capital:	¥1,000 million	
Fiscal Year End:	March 31	
Annual Sales:	¥220,000 million (As of FY 2000) <small>'99 ¥198,600 million '98 ¥192,500 million</small>	
Sales Breakdown:	Electronic Components	44%
	Production Equipment	22%
	Consumer Products	17%
	Information Devices and Systems	13%
	Others	4%
Number of Employees:	5,400	

## BUSINESS COVERAGE

Development, manufacture, and sales of LCD modules, CMOS ICs, microbatteries, fiber optics, watches, electronic dictionaries, CAE/CAD/CAM systems, analytic and measuring instruments, information technology devices, and other products.

### SCOPE OF THIS REPORT

This report describes environmental conservation activities deployed throughout the SII group in fiscal 2000 (from April 2000 to March 2001). All data, such as quantified environmental impact, introduced herein was gathered from SII group's major business units and companies.

### CONTACT INFORMATION

#### Seiko Instruments Inc.

Environmental Administration Department  
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Website URL: <http://www.sii.co.jp/eco/eg/>



# MESSAGE



**Junichi Hattori** Chairman and CEO  
**Akio Irie** President and COO

Furthering commitment to form a sustainable society is virtually essential for all businesses today to prevent global warming and to reduce impact on the environment. The key is to get all individuals involved in environmental activities. Every employee throughout the SII group is involved in all facets of environmental conservation activities based on the "SII Green Plan." This plan was originated in April 1993, that is symbolized by the three "greens" of "green process," "green products," and "green life."

In March 1999, 11 domestic business units and companies obtained the International Environmental Management System ISO14001 certification. SII is accelerating perfection of zero-emissions and eco-design concepts within its group.

SII demonstrates its leadership as a catalyst in manufacturing energy-saving, resource-saving, compact, lightweight and environmentally friendly products such as watches, low power consumption ICs, liquid crystal displays and other key electronic microparts.

SII strives to sophisticate its environmentally oriented Information Technology which is the key to supporting the era of environmental conservation in the 21st century. While enhancing publicity of environment-related information, SII takes the responsibility of creating a sustainable society.

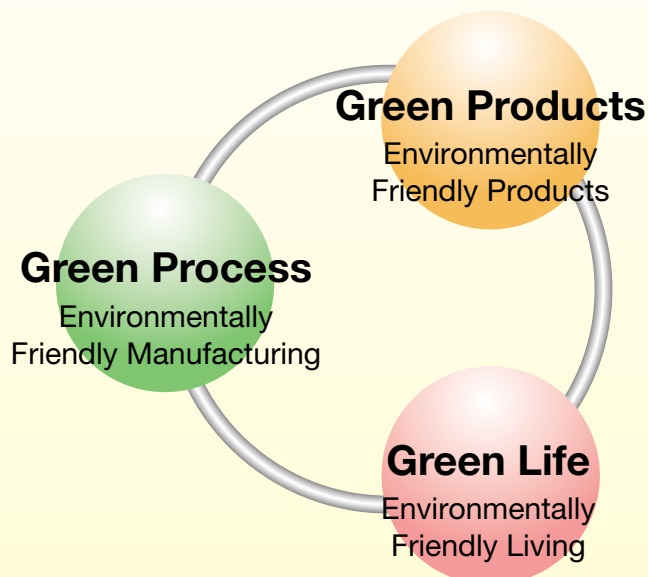
This report summarizes commitment and goals to and of SII group's environmental activities. Your opinion and suggestion is highly appreciated.

Seiko Instruments Inc.  
August 2001

Junichi Hattori  
Chairman and CEO

Akio Irie  
President and COO

## CONCEPTUAL GREEN PLAN SCHEME





# SII GROUP ENVIRONMENTAL POLICY AND PROMOTIONAL ORGANIZATION



## SII GROUP ENVIRONMENTAL POLICY (established in June 1996 and revised in June 1999)

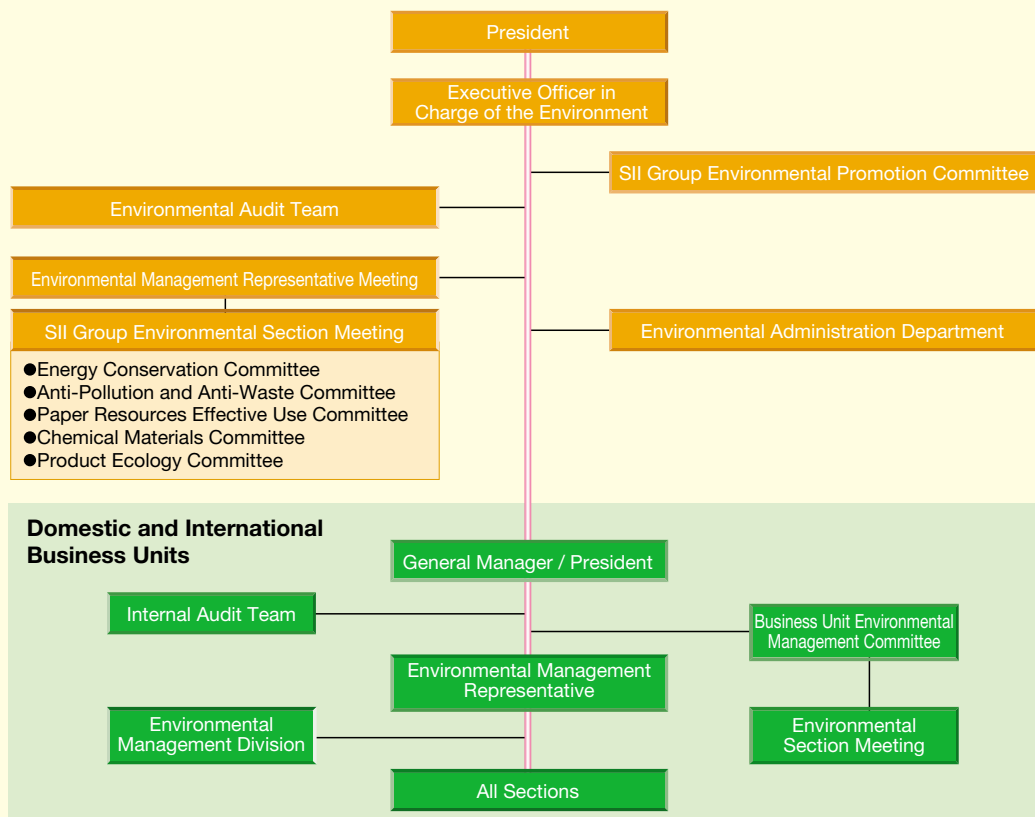
### ENVIRONMENTAL CONCEPT

SII is concerned about every facet of the global environment and is aiming toward a world where all living things can exist in harmony together. SII works for the protection of the environment and its continual improvement in every corporate activity.

### ENVIRONMENTAL ACTIVITIES GUIDANCE

1. Adjust the company structure and prepare relevant documents to implement improved management of the environment.
2. Observe legal regulations and agreements relevant to the environment, and work to prevent all environmental pollution.
3. Work for the continual reduction of the impact on the environment through the following.
  - (1) Provide environmentally friendly products and services.
  - (2) Save energy and contribute to the end of global warming.
  - (3) Conserve global resources through recycling and reducing waste with the eventual goal of Zero Emissions.
  - (4) Encourage employees to protect the environment in their personal life as well as their professional one.
4. Improve management and disposal of chemical materials and reduce the use of these materials.
5. Perform internal environmental audits to improve employee self-management.
6. Contribute to society through environmental activities.
7. Increase employee awareness of corporate environmental policies. Also, establish an environmental policy at each and every plant.
8. Disclose any and all information about the state of our environmental management to outside parties, if necessary.

## ORGANIZATIONAL CHART





# ENVIRONMENTAL MANAGEMENT SYSTEM AND ENVIRONMENTAL AUDIT SCHEME



## ENVIRONMENTAL MANAGEMENT

The ISO 14001 Environmental Management System (EMS) is an effective framework to establish an economically balanced environmental management. To tackle the challenge of sustainable development conforming to the ISO Standard, SII requires each and every business unit to define and systematically accomplish individual goals, taking into consideration the costs and benefits of implementing such a system. SII is taking great strides to continually reduce the impact on the environment.

## ENVIRONMENTAL AUDIT

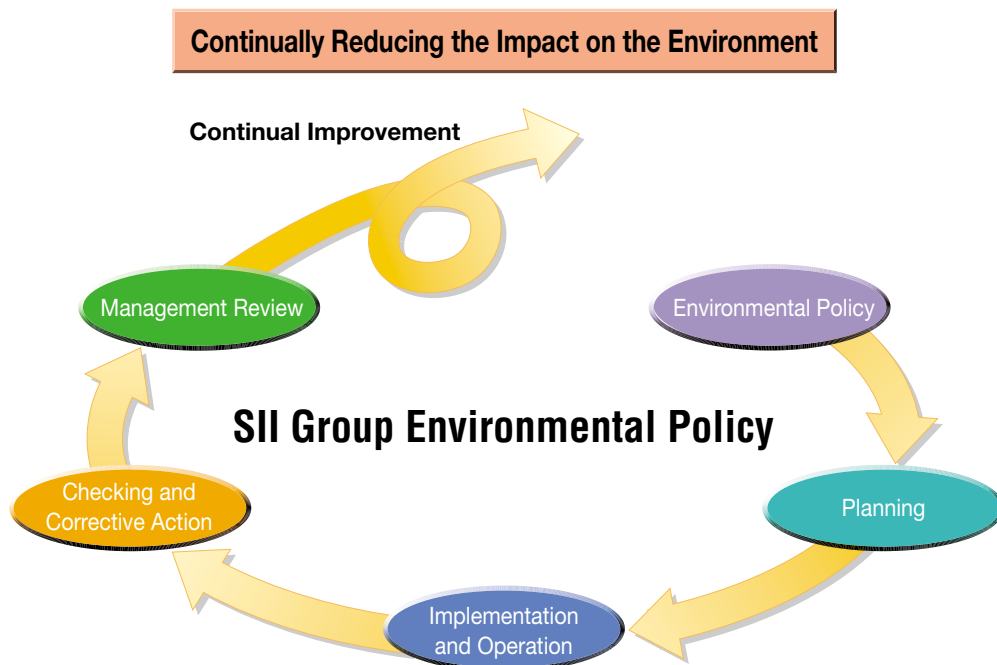
The internal environmental audit is a key factor in checking the implementation status of the group-wide environmental conservation activities. Authorized internal environmental auditors are in charge. The audit result serves as useful data for the SII group to enhance the EMS. To ensure timely internal audits and to upgrade their reliability, employees are trained as a competent and fair-minded auditor based on the SII's grand scheme of internal environmental education. Trained employees are certified under the "SII Environmental Auditors Certification System" established in 1998.

## SII GROUP'S ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) CERTIFICATION STATE

		SII's Business Units and Companies	Certification Date
Domestic	1	Takatsuka Unit	11/13/96
	2	Narashino Unit	01/19/97
	3	Miyakubo Unit	03/25/97
	4	SII Microtechno Inc.	04/01/97
	5	Morioka Seiko Instruments Inc.	04/12/97
	6	SII Quartz Techno Co., Ltd.	02/24/98
	7	Oyama Unit	08/25/98
	8	Akita Seimitsu Denshi Kogyo Co., Ltd.	01/27/99
	9	SII Microparts Ltd.	02/15/99
	10	Ohno Unit	03/10/99
	11	Nastec Precision Co., Ltd.	03/10/99
Worldwide	1	Seiko Instruments Singapore Pte., Ltd.	05/28/97
	2	Dalian Seiko Instruments Inc.	06/25/01

Qualification		Number of Qualified Employees
SII Certified Environmental Auditors		<b>30</b>
Trainees who completed Environmental Auditor Education		<b>262</b>
Official Environmental Auditors (CEAR* Registered Auditors)	Lead Auditors	<b>3</b>
	Auditors	<b>3</b>
	Provisional Auditors	<b>7</b>

\*CEAR : Environmental Management System Auditor Assessment Registration Center  
As of March 2001





# FY2000 RESULTS AND FY2001 ACTION PLANS



## RESULTS IN FY2000

The FY2000 interim targets set by the SII Green Plan adopted in FY1996 had already been achieved by FY1999 in two major areas, waste reduction and the effective use of paper resources. However, the interim target for energy conservation was not achieved.

Items	Targets	Quantified Targets	Actual	Assessment (○:achieved △:ongoing ×:not achieved)	Refer to page	
Energy Conservation	Bring CO <sub>2</sub> (carbon dioxide) emission levels down to the 1990 level by 2000.	Bring CO <sub>2</sub> emission levels from 100 down to 100 by the end of FY2000 (20,920 tons-C).	110.6 points <b>23,136 tons-C</b>	×	Energy consumption jumped by 6.6 points because of the expansion of LCD panel manufacturing facilities. (1,382 tons-C increase)	9
Waste Reduction	Reduce office and factory waste by 10% from the 1992 level by 2000.	Bring waste emission levels from 100 down to 90 by the end of FY2000 (3,123 tons).	42 points <b>1,443 tons</b>	○	SII achieved a 10.7-point improvement over the previous fiscal year by further increasing the recycling of sludge, waste oil, waste plastics, waste alkali, etc. (371 tons-C decrease). [ The goals for FY2000 had already been achieved in FY1999 ]	7・8
Paper Resources Conservation	Lower paper use and recycling below the 1993 level by 2000. Office Related Paper Use - 100 to 75	Bring the paper resource use levels from 100 down to 75 by the end of FY2000 (115 tons).	64 points <b>98 tons</b>	○	[ The goals for FY2000 had already been achieved in FY1999 ]	8
	Paper Reuse - 66 to 95%	Raise paper reuse ratio from 66% up to 95% by the end of FY2000.	99%	○		
	Recycled Paper - 19 to 50%*	Raise paper recycling ratio from 19% up to 50% by the end of FY2000.	63%	○		
Environmentally Friendly Product Development	Approach perfection of environmental assessment of products by the year 2000.	Approach perfection of environmental assessment of products by FY2000.	90%	×	SII achieved a 10-point improvement over the previous fiscal year but did not yet reach 100%, which is expected to be attained in FY2001.	10

\*Paper Recycling Recycling (%) =  $\frac{\text{Used Paper}}{\text{Used Paper} + \text{Non-recyclable waste}} \times 100$

## FY2001 ENVIRONMENTAL CONSERVATION ACTION PLANS

SII prepared an interim environmental conservation action plan for FY2001 and thereafter based on the goals attained in FY2000.

Plans	Actions	Interim Goals
1 Provide products and services that are compatible with environmental conservation (Green Products)	<ul style="list-style-type: none"> <li>● Enhance SII's Green Product line</li> <li>● Promote Green Purchase of materials for manufacturing</li> <li>● Eliminate the use of lead-containing solder</li> <li>● Encourage the use of life cycle assessment (LCA)</li> </ul>	<ul style="list-style-type: none"> <li>● Green Product ratio of 30% or higher by end of FY2004</li> <li>● 100% Green Purchase by end of FY2002</li> <li>● Increased marketing of lead-free solder from FY2001 to FY2004</li> <li>● LCA implementation rate of 70% or higher by end of FY2004</li> </ul>
2 Promotion of energy conservation (Green Process)	<ul style="list-style-type: none"> <li>● Reduce CO<sub>2</sub> emissions in carbon equivalent compared to 1990 (20,920 tons-C)</li> </ul>	<ul style="list-style-type: none"> <li>● -1 point (20,710 tons-C) by end of FY2003</li> <li>● -3 points (20,290 tons-C) by end of FY2010</li> </ul>
3 Achievement of zero emissions (Green Process)	<ul style="list-style-type: none"> <li>● Eliminate burial of emissions</li> </ul>	<ul style="list-style-type: none"> <li>● To be achieved at SII Group's major domestic business units by end of FY2003</li> </ul>
4 Management and reduction of chemical substances (Green Process)	<ul style="list-style-type: none"> <li>● Manage and reduce chemicals regulated by the Pollutant Release and Transfer Register (PRTR) Law, etc.</li> </ul>	<ul style="list-style-type: none"> <li>● Reduce use of regulated substances by 10% compared with 2001 by end of FY2004</li> </ul>
5 Green Life	<ul style="list-style-type: none"> <li>● Reduce the use of paper (1993 = 100, 153 tons)</li> </ul>	<ul style="list-style-type: none"> <li>● -40 points (92 tons) by FY2003</li> </ul>



# MAJOR ACTIVITIES AND RESULTS

## LEAD-FREE SOLDER

The lead contained in solder pollutes the environment, so there is an urgent need to develop lead-free soldering materials and compatible soldering equipment. In July 1999, SII began our Lead-Free Solder Promotion Project, and we now give high priority to the elimination of lead from the electrical terminals of our electronic products and to the development of technology for mounting electronic components to substrates using lead-free solder. In FY2000, we issued guidelines regarding the use of lead-free solder in order to establish internal standards, and we began promoting the use of lead-free solder in displays and other mass-produced products. We have also set targets for phasing in the mass production of electronic components such as semiconductors using lead-free solder. By working together with our partner companies, we expect to further accelerate the adoption of lead-free solder.



Lead-free solder-based PCB mounting machine (under development)



Lead-free solder-mounted PCB sample

## GREEN PURCHASE

The SII Group has made a commitment to implement Green Purchase by end of FY2003 for 100% of the manufacturing materials that we purchase, and we are working to promote our Green Purchase activities. To achieve this goal, we have expanded our Supplier System Survey and Purchased Materials Survey from their original focus on our major suppliers and purchased materials so that these surveys now cover all of our suppliers and purchases. In March 2001, we also established principles for green materials for the SII Group, and we now give priority to the selection and purchase of green materials.



Green Purchase Documents

### SII's Green Material Principles

- Green materials contain no banned substances.
- Green materials are not manufactured using any banned substances.
- Every supplier's environmental system meets SII's standards as determined from surveys of the supplier's environmental management system.

Environmentally compatible products cannot be created only through purchasing decisions. SII is also committed to promoting Green Purchase by having our product planning, design, and technology departments cooperate closely with the upstream divisions that select materials.

In September 1999, SII promoted Green Purchase further by establishing an Internet purchasing system for office supplies so that ordering departments can choose environmentally friendly products.

## CHEMICAL MANAGEMENT AND REDUCED USE

SII recognizes chemical materials as a serious environmental concern. In February 1998, SII created an "SII Chemical Materials Guide" to raise immense awareness among all employees in charge of development, design, production, and waste disposal, and to improve their chemical management. Chemicals are classified into three categories: 1) Prohibited chemicals, 2) Controlled chemicals, and 3) Approved chemicals. In particular, new chemicals to be newly introduced are specified and implemented after having been subject to check and approval of the Environmental Committee established by each individual business unit and company.

Following early discontinuation of ozone-layer depletion materials (discontinuation of specific fluorine: August 1992; Trichloroethane in November 1993) and voluntary discontinuation of organic chloride solvents, such as Trichloroethylene, SII discontinued in March 2000 the use of alternative fluorine HCFC-141b whose global warming factor is high.

In accordance with the Pollutant Release and Transfer Register (PRTR) Law, SII surveyed all of its manufacturing sites throughout Japan in FY2000. As shown in the table below, a total of 73.6 tons of chemical substances were found to be covered by that law. SII will continue to manage, reduce, and recycle these substances and to disclose information about their use.

## PRTR Investigation Result in FY2000

(unit: t)

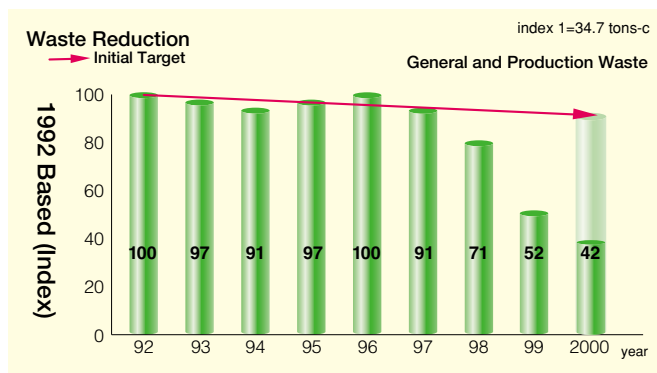
Name	Amount Handled	Emissions to air	Emissions to water	Emissions to soil	Amount transferred	Amount Recycled	Amount consumed*1	Amount removed*2
2-aminoethanol	6.10	1.22	0	0	0	4.58	0	0.30
Antimony and its compounds	0.83	0	0	0	0.60	0	0.23	0
Ethyl benzene	0.24	0.06	0	0	0	0.18	0	0
Xylene	24.38	2.58	0	0	21.07	0.73	0	0
Chlorodifluoromethane	5.00	5.00	0	0	0	0	0	0
Cobalt and its compounds	0.04	0	0	0	0	0	0.04	0
2-ethoxyethyl acetate	1.59	0.85	0	0	0	0.74	0	0
Inorganic cyan compounds (except complex salts and cyanate)	1.04	0	0	0	0.58	0	0	0.46
Dichloropentafluoropropane	3.22	2.81	0	0	0.41	0	0	0
1,3,5-trimethylbenzene	0.28	0.01	0	0	0	0.27	0	0
Toluene	1.81	0	0	0	1.81	0	0	0
Lead and its compounds	0.66	0	0	0	0.30	0.03	0.33	0
Nickel compounds	3.90	0	0.01	0	0.30	2.31	1.16	0.12
Phenol	0.42	0.06	0	0	0	0.34	0	0.02
Hydrogen fluoride and its soluble salts	17.62	0.32	0.02	0	0	5.89	0	11.39
Boron and its compounds	0.30	0	0.06	0	0	0.24	0	0
Manganese and its compounds	6.17	0.09	0	0	0.43	0	2.74	3.00
Total	73.60	12.91	0.09	0	25.50	15.31	4.50	15.29

\*1 in products, etc. \*2 Amount of removed: Means the amount of transformation to another material due to neutralization, dissolution, chemical reaction and other processing of PRTR materials in sites.

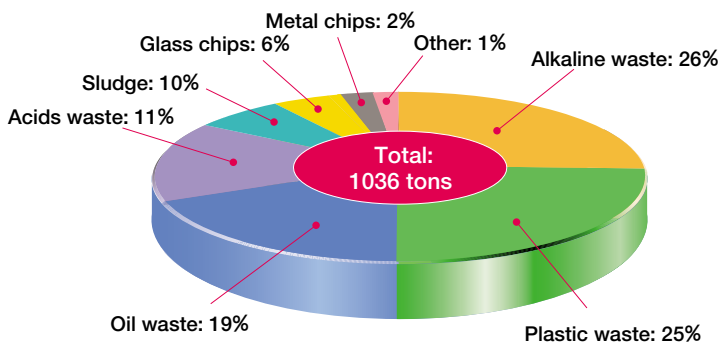
# GREEN PROCESS: AIMING AT ZERO-EMISSIONS

Reduction in wastage of resources is fundamentally compatible with the sustainability that will enable a sustainable society on the Earth, humans and other life thereon.

To ensure the goal of "no waste to be emitted," called Zero-Emissions, one criterion for a society to be sustainable, SII tries not only to reduce the amount of waste emitted by each individual business unit, but also reuse the recovered waste. SII is concentrating on early implantation of the zero-emissions concept (targeted at March 2004) by promoting the recycling of used paper, plastic waste, waste oils, liquid waste, and sludge.



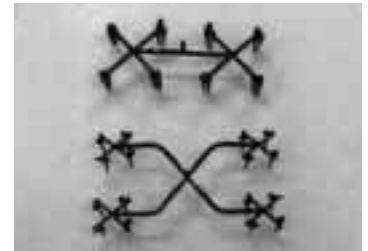
## Breakdown of Industrial Waste



With the cooperation of our contracted waste disposal companies, SII surveyed the final disposal of wastes discharged from our business units in FY2000. We also established relations and signed contracts with new recyclers and reduced the amount of wastes that we send to final disposal sites. Each of SII's business units also prepares a zero-emissions report so that information and technology can be shared within the SII Group. As a result, in November 2000 SII's Ohno business unit became the Group's first unit to achieve zero emissions.

## PLASTICS RECYCLING AND REDUCED USE

Over 90% of plastic materials used in watches are lost from the runner during injection molding. To minimize this loss, SII decreased the size of the runner, improved production from 4 units to 8 to 16 units, and increased the recycling ratio to 75%. As a result, the use of plastics was reduced by 27.4%.



Runner Before improvement (Top)  
After improvement (Bottom)  
Doubling yield and reducing waste materials

## MACHINING OIL RECYCLING THROUGH

SII introduced a new machining oil recycling system in 1998. The system consists of an iron, stainless steel and aluminum chip processor, a chip chute and a chip collection bin. When workpieces are processed by automatic lathes or grinding machines, oil collects on the chips. The chip processor automatically separates the oil from the chips and breaks down the chips into small pieces, and collects the pieces for recycling. The oil retrieved from this process accounts for 40% of the machining oil used at specific plants with in the SII Group.



Chip Processor : Separates the oil from the chips and breaks the chips down into small pieces for recycling.

## FERRIC-CHLORIDE RECYCLING

By establishing relations with companies that recycle waste fluid containing the ferric-chloride that is formed in the circuit board etching process, SII has succeeded in reducing both the amount of industrial wastes and the disposal costs at our factories.



## WASTE WATER RECYCLING

SII introduced a waste water recycling system to turn waste water produced at other plants into pure water. The pure water is then used in the etching process for printed circuit boards (PCB) and for washing parts.



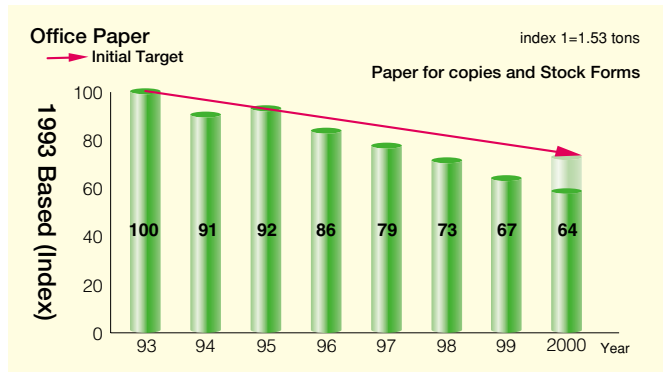
Waste water Recycling system Recycles a total of 150 tons a day.



## RECYCLING PAPER

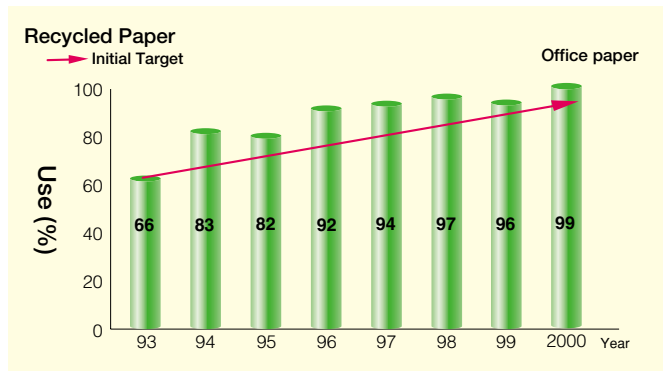
SII is continuously striving for perfection of recycling paper. The "Clean Arrow" Recycling Packer Truck, introduced in 1993, collects used paper from the Makuhari Head Office and neighboring business units (Keiyo District). Sorting, litter collection and one-time processing of confidential paper by a large-scale shredder makes it possible to recycle a total of 400 tons of paper a year, which translates to about 8000 trees.

SII received an award for recycling from the Recycle Promotion Committee in October 1996.



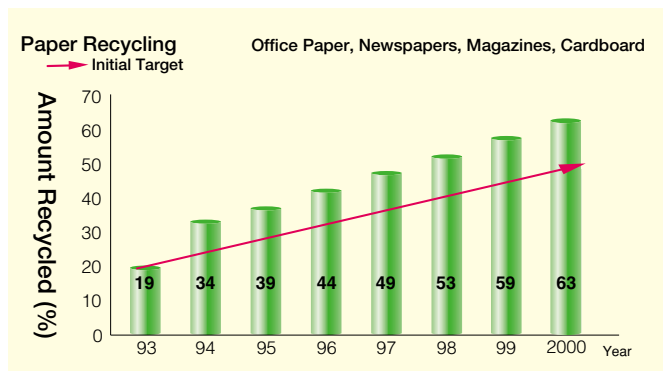
## PACKING MATERIALS REDUCTION AND RECYCLING

In an effort to lower the consumption of packing materials, all divisions have been instructed to design packages that use less paper, are non-toxic, more durable, and can be easily recycled.



## PROCESSING KITCHEN WASTE

Since the installation in kitchens of the Makuhari Head Office's cafeterias in April 1996, large-scale kitchen waste processors not only reduce the amount of kitchen waste, but also process kitchen waste to organic compost, which is now being offered to employees free of charge upon their request. At SII's other business units and companies, kitchen waste produced from their cafeterias is processed and used as compost to raise flowers and ambari hemp in and around sites.



## SORTING AND COLLECTION

Waste generated through everyday corporate activities, such as used paper (print paper, newspaper, confidential documents), corrugated cardboard boxes, cans, plastic bottles, flammables, batteries, and inflammables are sorted correctly and collected.



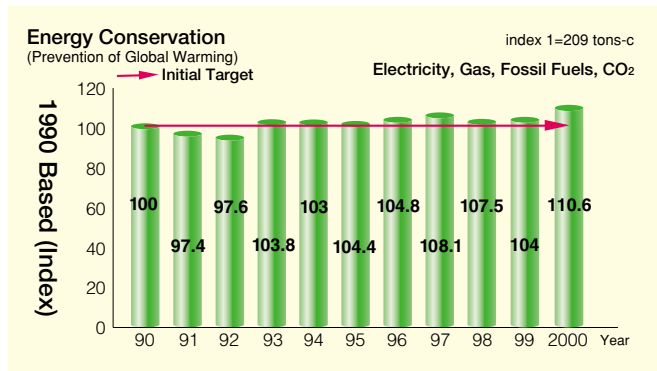


# GREEN PROCESS: ENERGY-SAVING AND PLANT ENVIRONMENTAL CONSERVATION



## ENERGY CONSERVATION

To solve global-wide environmental issues such as global warming, the pressure is put on all humans on the Earth to further reduce CO<sub>2</sub> through all possible individual energy-saving approaches. The SII group is trying to minimize the energy being consumed by everyday offices and factory workplaces. In other words, SII is aiming not at "Energy-Saving" but "Lowest Possible Energy."



Although we have made steady improvements in air conditioning equipment and in cool and warm water generating systems, factory expansions and other factors unfortunately resulted in energy consumption in FY2000 that was 10.6% (2,216 tons-C) above our initial goal of equaling 1990 levels.

## PLANT ENVIRONMENT CONSERVATION AND RISK-SOLUTIONS

Drainage, gas waste, noise, vibrations and other serious factors emitted from factories are restricted under manufacturers' voluntarily-established standards which are stricter than governmental ordinances. Environmental conservation and pollution protection at factories and their surroundings are ensured through regular measurements of environmental risk factors as well as maintenance, management, and control of environmental conservation facilities and machines. To prevent the discharge of nutrients that can cause red and blue tides in Tokyo Bay, SII has made investments to reduce even further the amounts of nitrogen and phosphorus in our waste water. We have also implemented comprehensive risk solutions that include emergency interrupter systems for rain and waste water, the installation of barrier dikes around liquid tanks, and the replacement of aging pipes. We also implement realistic emergency training on a regular basis at all of our worksites.



Scrubber



Cool and warm water generating system



Energy saving in a clean room



Sound isolator



# GREEN PRODUCTS: ENVIRONMENTALLY FRIENDLY PRODUCTS



The SII group shows its long standing concern for the environment with everything it makes, providing consumers with products which are free of any toxic materials and consume less resources and energy.

## ECOLOGY ORIENTED DESIGN AND ASSESSMENT

The SII group established an ecology oriented design system to create products with low impact on the environment. In this system, environmental reviews are made at the product design stage, where even the product life cycle is considered in regard to environmental conservation and safety.



## DISPLAY OF THE TYPE OF PLASTIC USED

SII stamps the type of plastic used in a product containing 25 g or more directly on the product to facilitate recycling.



## REMOTE CONTROLLED INFRARED LIGHT SENSITIVE MODULES

This module drastically reduces the power consumed by the standby setting of home electronics. SII strives to develop and commercialize a further miniaturized and power-saving light sensitive module.



## ULTRA SMALL SURFACE MOUNT QUARTZ CRYSTAL RESONATORS

SII created ultra small crystal resonators with half the mount area of conventional products. These energy efficient resonators are used in state-of-the-art products such as cellular and PHS phones, PDA camera-integrated VTRs, digital camera timers, digital clocks, and other high-tech devices.



## SIX-COLOR INK-JET PRINTER USING OIL-BASED PIGMENTS

The IP-4500 is a large-format six-color ink-jet printer that uses oil-based pigments and does not require printing plates or masters. Because the IP-4500 eliminates the prepress process and uses and wastes very little ink, it helps to conserve resources during printing. The IP-4500 is also registered in the International Energy Star program, so it meets international standards for electricity consumption in stand-by mode.



As an ENERGY STAR® Partner, Seiko Instruments Inc. has determined that this product meets the ENERGY STAR guidelines for energy efficiency.

## GAS HEAT PUMP COMPRESSORS

SII manufactures energy-saving, and environmentally clean gas-heat compressors for use in office and shop airconditioners as a solution to global warming.





# SII'S UNIQUE ENVIRONMENTAL COMMITMENT TOWARDS THE 21ST CENTURY



## ANALYTIC INSTRUMENTS

Ordinances such as the Law Concerning Special Measures against Dioxins and the Basic Law for Formation of Sustainable Society were established in 1999 and 2000. Companies and citizens must follow these ordinances. SII is dedicated in providing customers with a broad range of environmental analytic instruments to support their environmental conservation activities.

### HIGH-FREQUENCY INDUCTIVE CONTACT PLASMA (ICP) MASS-SPECTROMETER

Inductive Contact Plasma (ICP) Mass-Spectrometer: Equipped with an optimized environmental analysis system, the ICP mass-spectrometer analyzes multiple elements in several types of specimens at one time. It is widely used in universities, company laboratories, and production lines.



### Near-Infrared Portable Spectrophotometer

It sorts 15 different types of plastics in a moment to recycle waste plastics.

## ENVIRONMENTAL IMPACT REDUCTION AND INFORMATION TECHNOLOGY (IT)

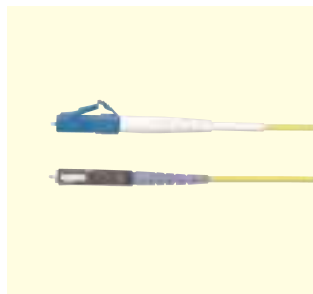
With the remarkable swelling of the Internet, wireless and optical telecommunication as a communication infrastructure to support the IT revolution, the society moves towards less movement of people, things and cash. This is accelerating social and industrial trends towards a greater decrease in the impact on the environment. The SII group is continuously trying to manufacture small size, lightweight, power-saving wireless and optical communication systems and devices with high reliability.

**CREPICO:** SII has succeeded in commercializing the Japan's first wireless credit card terminal system that has been on the market since April 1999. The CREPICO series includes the world's smallest debit card terminal to provide customers with higher convenience at a taxi charge payment.

**Optical Communication Supporting Parts:** SII is offering optical connectors and switches to ensure highly reliable connection and branching of optical fibers.



Japan's first wireless credit card terminal CREPICO



Optical fiber connectors  
(Top: LC-type connector; Bottom: MU-type connector)

## RESEARCH OF A MICROFACTORY

SII is performing research in pursuit of a dream of an ultrasmall, compact and power-/resource-/ and space-saving factory called a microfactory. The microfactory will result in a futuristic and promising plant towards the 21st century where all processes of microparts ranging from carrying/loading/unloading, machining, and assembling to inspection are vertically integrated in only a 1 square meter space and with one tenth to one hundredth energy and resource. In the microfactory, only a few devices are run because they have multiple functions which flexibly respond to the effective manufacture of diversified and complicated products.

SII proceeded with this research project which has been commissioned through the Macromachine Center Corporation by the NEDO\* under the Industrial and Scientific Technology Research and Development System. SII is now modeling a micro-machining and assembling prototype system that is subject to further discussion on their practical use and problems. Specializing in electrolytic machining technique, SII offers a useful and cost-effective system to electrolytically machine workpieces.



A future microfactory will make it possible to provide a new space covering from corporate manufacturing to personal creation, and bring a decisive contribution to a new century of energy-saving and resource-saving production.

\*NEDO: New Energy and Industrial Technology Development Organization

## Citi Service Co., Ltd.

Global conservation oriented services including comprehensive facilities main-tenance to reduce the use of energy while improving efficiency and ensuring a safe operational environment.



## Seiko I Techno Research Co., Ltd.

This company provides technical consulting on device analysis, environmental analysis, the measurement of electromagnetic interference, and measurement management. In the area of environmental analysis, the company is making steady improvements in analysis techniques, including the analysis of trace quantities, in order to meet environmental needs in the new century.



## SII Logistics Inc.

This company handles comprehensively the inventory management, packaging, and shipping of products and other materials. Certified packaging specialists design packaging based not only on the quality and strength of the materials but also on their recyclability. Whenever possible, paper materials are used as package cushioning. The company's cooperative shipping system has resulted in fewer truck trips and a 13% (12.3 tons-C) reduction in CO<sub>2</sub> emissions.







## GREEN LIFE: ENVIRONMENTAL CONSERVATION-ORIENTED LIFE



Through a myriad of activities, SII strives to raise the awareness of each and every employee toward the environment at both work and home. These programs are beginnings to pay dividends in the form of reduced waste and consumption in every facet of life.

### PARTICIPATION IN Think the Earth PROJECT

Think the Earth is a nonprofit project aimed at creating frameworks through which business can contribute to society and at promoting the development of innovative products with Earth-based themes. A portion of the revenues from the sales of Think the Earth products and services are allocated to the project to support the project's activities and to fund other nonprofit and nongovernmental organizations. SII supports the Think the Earth project and has developed its first product, the wn-1 watch.

This 24-hour timepiece uses an image of the globe that allows the wearer to both watch the time and watch the Earth. SII's hope is that the watch will encourage people who wear and see it to think more about the Earth.



Website URL of Think the Earth :  
<http://www.thinktheearth.net>

### AMBARI HEMP CULTURE

At the Oyama unit, kitchen waste produced from its cafeterias is processed and used as compost to cultivate ambari hemp in and around the site. Approximately 100 kg of ambari hemp (3.85 m long at maximum) was yielded in FY2000. Contributed to local welfare homes, ambari hemp is reproduced into cane-twisted picture frames, sheath-tissue dyeing paper, and ambari hemp dyeing shawls by people of the homes.

\*Ambari Hemp: An annual mallow that is well known to absorb CO<sub>2</sub>.



### UNNECESSARY CAR IDLING REDUCTION CAMPAIGN

Since June 1997, SII has campaigned against unnecessary car idling because CO<sub>2</sub> emissions are a key cause of global warming. The campaign includes the attachment of "STOP CAR IDLING" bumper stickers to each company car and bus; and the placement of "STOP CAR IDLING" flags in the parking to inform suppliers and vendors, too.



### RECYCLING MILK CARTONS

Each and every business unit collects and recycles empty milk cartons disposed of at vending machines or internal shops. Milk carton recycling is led mainly by the SII Labor Union.

### ENVIRONMENTALLY-ORIENTED COMMUNITIES

Aiming at realizing a global enterprise in harmony with the environment and communities, SII holds Eco-Events, such as the "Cleanup Campaign," "Factory-Tour," and "Summer Festival" in neighboring communities to improve environmentally friendly activities. SII's Makuhari Head Office offers an exhibition space and utilities for the "Eco-Messe Chiba" held in the Makuhari New Metropolitan, makes questions in an environmental quiz show and parti-cipates in Eco-Events including EcoBazaar every year.



\*2 Eco-Messe Chiba:

To be held under a sponsorship of Chiba Prefecture and other organizations by citizens, enterprises, and administrative organs unanimously at the Makuhari New Metropolitan area every year since 1996 as one environmental problem solution.





# ENVIRONMENTAL ACCOUNTING ENVIRONMENTAL EDUCATION SYSTEM



## ENVIRONMENTAL ACCOUNTING

After running environmental accounting trials in the previous fiscal year, SII collected data for the second time in FY2000 in accordance with the guidelines of the Ministry of the Environment. SII's total investments in environmental conservation were 1,029 million yen, and expenses were 1,438 million yen. Unfortunately, because of factory expansions and other factors, the results for the environmental conservation effect showed an increase in CO<sub>2</sub> emissions over the previous year. The increased utility expenditures resulted in a loss in the real economic benefit of -123 million yen. The economic benefit including de facto benefits was 879 million yen.

## ENVIRONMENTAL CONSERVATION COSTS AND THEIR EFFECTS

Data collected by: SII Head Office, and 11 domestic business units and companies Data collected from: April 1, 2000 through March 31, 2001. Unit: 1 million yen

Environmental Conservation Costs					
Classification		Description	Investment (yen)*1	Costs (yen)*2	
(1)	Environmental conservation costs to reduce the environmental impact produced in and around each business unit and company through the production, service and other corporate activities (Internal Business Costs).				
	Breakdown	a. Pollution prevention costs	Water, atmosphere, noise and vibration	670.8	398.2
		b. Global conservation costs	Global warming prevention and ozone-layer protection	290.8	265.3
		c. Recycling costs	Resource-saving and waste-reducing costs	24.6	363.8
(2)	Environmental conservation costs to reduce the environmental impact produced up-stream and down-stream through production, service and other corporate activities (Up- and Down-Stream Costs).	Product, package recycling	0.0	46.5	
(3)	Environmental conservation costs through management and other corporate administrative activities (Administrative Activities Costs).	Implementation of environmental education and environmental management.	43.2	267.1	
(4)	Environmental conservation costs through R & D activities (R & D Costs).	Development of environmentally-friendly products, lead-free solder mounting technology.	0.0	57.0	
(5)	Environmental conservation costs through social activities (Social Activities Costs)	Tree planting, spectacular preservation, disclosure of environmental information	0.0	40.1	
(6)	(6) Environmental damage recovery costs (Environmental Damage Costs)	Soil pollution recovery fees	0.0	0.0	
Total			1,029.4	1,438.0	

\*1: For only FY2000 \*2: Including depreciation of investment for FY 1999 and previous fiscal years

Effects were calculated based on the environmental conservation and economic effects gained through environmental conservation activities. Presumable economy effects were calculated based on the SII's unique definition.

Environmental Conservation Effects		Economical Effects Through Environmental Conservation Activities		Total 878.5	
Environmental Impact	Reduced Amount (FY99 to FY2000)	Substantial Amount	Subtotal -123.3	Presumable Effect	Subtotal 1,001.8
CO <sub>2</sub>	-1,382 t-C	-147.4		Prevention of any operational stop due to air or water pollution and other serious factors	316.0
City water	-88,000 m <sup>3</sup>	-8.7		Soil pollution prevention	500.0
Paper resources	4 t			Prevention of punishment due to unlawful (malicious) abandonment	185.8
Industrial waste	373 t	1.3			
General waste	-2 t	Profit of sales of securities 31.5			

(unit: 1 million yen)

## ENVIRONMENTAL EDUCATION SYSTEM

Because the success of each environmental protection activity depends on the cooperation and action of every employee, SII provides a set of environmental education seminars to increase employee consciousness of the environment and deepen the understanding of SII's environmental policy. SII's environmental education system consists of general, special, and environmental auditor seminars.

451 employees have participated in the Special Environmental Education Seminar and 262 in the Environmental Auditor Education Seminar. After participation in the seminars, the newly trained auditors are sent out to further enhance the EMS and environmental performance of each business unit and employee.

### GENERAL ENVIRONMENTAL EDUCATION SEMINARS

Seminars	Participants	Curriculum
Current environmental issues and measures	New employees	SII group's environmental measures
EMS	Middle and senior staff	Environmental management techniques and the ISO14001
Environmental management system enhancement and performance improvement	Managers	Global Environmental Trends Performance Improvement Measures

### SPECIAL ENVIRONMENTAL EDUCATION SEMINARS

Seminars	Participants	Curriculum
Chemical handling and Waste management	Chemical handling personnel Environmental facility and equipment operators	Chemical materials study and management of chemicals, water and environmental pollution prevention related knowledge, and waste related knowledge
Energy-saving measures	Manufacturing and production engineers	Energy-saving manufacturing technologies and other energy-saving approaches
Product environmental impact assessments	Product development personnel	Approaches to reduce the impact of products on the environment, and examination of other manufacturer's environmentally friendly products
Dangerous article handling and high pressure gas handling	Dangerous article handling personnel Qualified high pressure gas handling personnel	Key points of safekeeping and management of dangerous articles and high pressure gases

### ENVIRONMENTAL AUDITOR EDUCATION SEMINAR

Seminar	Participants	Curriculum
Internal environmental auditor training	Dedicated auditors at each and every business unit	Necessary skills to conduct internal environmental audits

# ENVIRONMENTAL CONSERVATION ACTIVITIES TIMELINE

## ENVIRONMENTAL AWARD SYSTEM

SII holds a meeting in April to award business units and employees who have achieved the best results in their environmental activities.

## PUBLICITY AND INTERNAL PROMOTION

SII provides outside entities with information relevant to the environmental protection activities throughout the SII group.

PR Brochures and Documents	SII Green Plan (Annual Voluntary Environmental Protection Activities Plan and Report), Official Website of SII Green Plan
Environmental Information Exchange	Answer environment related questions Setup environment related lectures requested by outside authorities Participate in the exchange of environment related information and meetings sponsored by corporations in different fields.
Promotion Activities	Unnecessary Car Idling Reduction Campaign
Cooperation with suppliers and subcontractors	Inform suppliers and subcontractors of SII Environmental Policy and request them for their cooperation. Exchange environmental information of supplies.



## EXTERNAL ENVIRONMENTAL AWARDS

- October 1996: SII group's 6 business units and companies received the "Recycling Promotion Association President Award" for their paper recycling activities.
- June 1998: SII Microtechno Inc. (former Akita Precision Ltd.) received the "Environmental Grand Prize" sponsored by Akita Prefecture.
- June 1998: Morioka Seiko Instruments Inc. received the "Excellent Environmental Conservation Enterprise Award" sponsored by Iwate Prefecture.
- May 2000: SII's Head Office received the "Chiba-City Specific Building Environmental Hygiene Control Association Chairman Award" sponsored by Chiba City.

## ENVIRONMENTAL CONSERVATION ACTIVITIES TIMELINE

- Dec. 1988 Fluorocarbon Countermeasures Promotion Committee Established
- Aug. 1992 Use of CFCs Discontinued
- Dec. 1992 Environmental Administration Office Established
- Apr. 1993 Environmental Protection Plan, "SII Green Plan," Created
- Aug. 1993 Used Paper Collection Packer Truck, "Clean Arrow," Introduced
- Nov. 1993 Use of Trichloroethane Discontinued
- Apr. 1994 Monthly Management of Energy, Paper Use, and Waste Initiated
- Aug. 1995 Environmental Management System (ISO14001) Introduced at SII Board Meeting
- Aug. 1996 "SII Green Plan," Including Reports on Environmental Protection Activities, Revised
- Oct. 1996 Chiba keiyou-6 Business Unit. Awarded for Paper Recycling
- Nov. 1996 Takatsuka Unit (Chiba) ISO14001 Certified
- Jan. 1997 Narashino Unit (Chiba, former Seiko Seiki Co.,Ltd.) ISO14001 Certified
- Mar. 1997 Miyakubo Unit (Chiba) ISO14001 Certified
- Apr. 1997 SII Microtechno Inc.(Akita, former Akita Precisi Ltd) ISO14001 Certified
- Apr. 1997 Morioka Seiko Instruments Inc. (Iwate) ISO14001 Certified
- May. 1997 Seiko Instruments Singapore Pte., Ltd. (Singapore) ISO14001 Certified
- Dec. 1997 Campaign to Reduce Unnecessary Car Idling Started
- Feb. 1998 SII Quartz Techno Co., Ltd. (Tochigi) ISO14001 Certified
- Feb. 1998 SII Chemical Management Guide Published
- Jun. 1998 SII Microtechno Inc. Awarded for "Best Environmental Activities" in Akita Prefecture
- Jun. 1998 Morioka Seiko Awarded for "Superior Environmental Activities" in Iwate Prefecture
- Aug. 1998 Oyama Unit (Shizuoka) ISO14001 Certified
- Jan. 1999 Akita Seimitsu Denshi Kogyo Co., Ltd. (Akita) ISO14001 Certified
- Feb. 1999 SII Microparts Ltd. (Miyagi) ISO14001 Certified
- Mar. 1999 Ohno Unit (Chiba) ISO14001 Certified
- Mar. 1999 Nastec Precision Co., Ltd. (Tochigi) ISO14001 Certified
- Mar. 1999 ISO14001 Certification Completed at All 11 of Our Major Domestic Plants
- Apr. 1999 Asian Electronic Technology Pte., Ltd. ISO14001 Certified
- Mar. 1999 Use of Chlorine Solvents (trichloroethylene/methylene-chloride) Discontinued
- Oct. 1999 SII Standard of Purchasing Green Materials Published
- Nov. 2000 Ohno Unit Achieved zero-emissions
- Mar. 2001 262 Employees Completed the SII Internal Auditor Training Seminar
- Jun. 2001 Dalian Seiko Instruments Inc. ISO14001 Certified



### SII's Makuhari headquarters received the "Nikkei Superior Trend-Setting Office Award in 1993"

from the Nikkei Newspaper Group. The building was built to convey, and has since been recognized as, SII's continual commitment to the improvement of the environment. It is equipped to handle today's fast paced, information oriented society and strives to create the most productive environment for each and every employee.



Activity Symbol



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