We will reduce total CO_2 emissions by 12% by the end of fiscal 2010 to help prevent global warming at a faster pace than set out in the Kyoto Protocol.

● Concept

The Ricoh Group has set goals that it wants to achieve by the end of fiscal 2010, aiming not only to attain the goals set out in the Kyoto Protocol, but also to lead the efforts to prevent global warming. Since a reduction in total CO_2 emissions is important in preventing global warming, the Ricoh Group companies in Japan have set a higher goal of reducing total emissions by 12% over the figures in fiscal 1990 by the end of fiscal 2010, compared with the goal for Japan of a 6% reduction set out in the Kyoto Protocol. Our group companies are striving to reduce global warming under this goal, which has been set in anticipation of an expansion in the scale of production. In order to attain this goal, the Ricoh Group is engaged in improving its production processes, introducing more efficient facilities, and utilizing natural energy sources. Efforts will be made to reduce greenhouse effect gases other than CO_2 by 10% over the level in fiscal 1995 by the end of fiscal 2010.

● Targets for Fiscal 2004 and Fiscal 2010

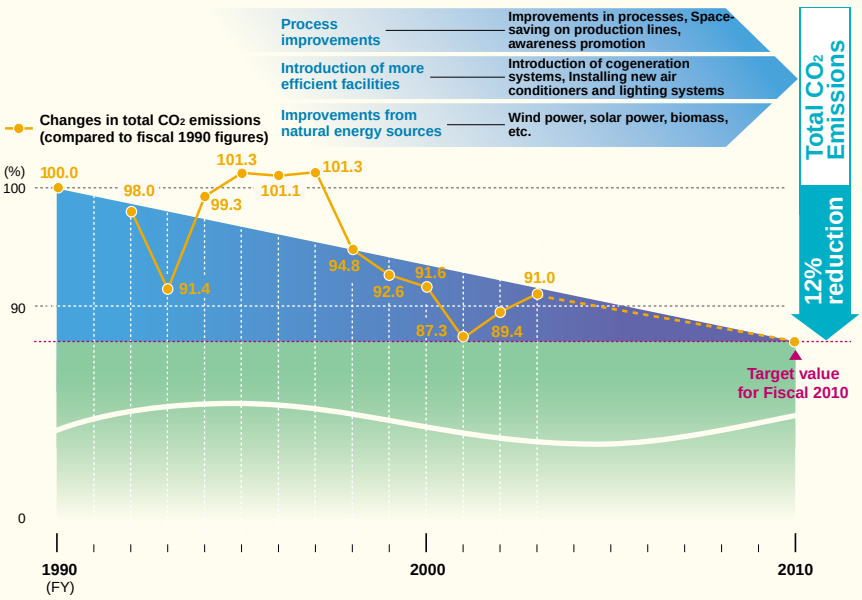
The Ricoh Group's Targets for Reducing CO_2 Emissions (Total Amount Emitted)

		Target for fiscal 2004	Target for fiscal 2010
Japan	Ricoh and Ricoh Group manufacturing subsidiaries	2% reduction (compared to fiscal 2000 figures)	12% reduction (compared to fiscal 1990 figures)
Japan	Ricoh Group non-manufacturing subsidiaries	2% reduction (company goals)	—
Outside Japan	Ricoh Group manufacturing subsidiaries	2% reduction (compared to fiscal 2000 figures)	10% reduction (compared to fiscal 1998 figures)

The Ricoh Group's Targets for Reducing Greenhouse Effect Gases Other Than CO_2 (Manufacturing, Total Amount Emitted)

	Target for fiscal 2004	Target for fiscal 2010
The Entire Ricoh Group	No more than a 1% increase (compared to fiscal 2000 figures)	10% reduction (compared to fiscal 1995 figures)

❶ Scenario for Reductions in Total CO_2 Emissions for Ricoh Group (production) in Japan up to Fiscal 2010



Segment Environmental Accounting of Energy Conservation Activities at Business Sites (The Entire Ricoh Group)

Costs			Effects			
			Economic benefits		Effect on environmental conservation	
Item	Main cost	Costs	Item	Benefits	Reduction item	Amount
Business area cost	Cost of global warming prevention	¥310.3 million	Reduction in lighting and heating expenses	¥17.5 million	CO_2 emissions	7,325.3 (t)

* The following calculation formula is used for CO_2 emissions, in consideration of the sales growth since the previous year. Reduction in CO_2 emissions in a particular year = CO_2 emissions in the previous year × (sales in that year/sales in the previous year) – CO_2 emissions in that year

● Review of Fiscal 2003

CO_2 emissions at production sites decreased over the fiscal 2000 level (decreased by 0.6% at home and by 1.5% abroad) but were larger than those for the previous fiscal year (increased by 1.8% at home and by 0.7% abroad) (see graphs ❷ and ❸). This was because the increased energy consumption due to larger production of consumable supplies more than offset the energy savings resulting from improvements in manufacturing processes, both at home and abroad. CO_2 emissions at nonproduction sites decreased by 6% over the previous fiscal year (see graph ❸). New facilities were introduced for greenhouse effect gases other than CO_2 aiming at achieving the goal.

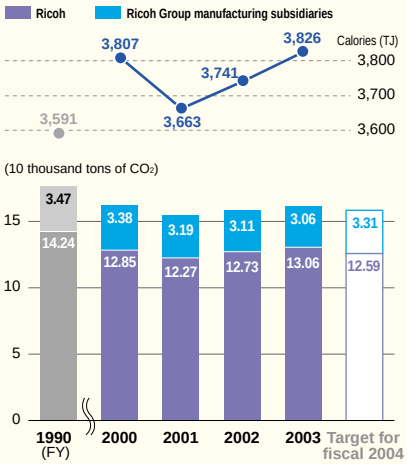
● Future Activities

At the Global Warming Prevention Scenario Committee, consisting of managers from Ricoh's major production sites in Japan, discussions were held on measures to reduce CO_2 emissions at production sites. Aiming at achieving the fiscal 2010 target, the committee agreed to promote the introduction of energy-saving facilities, including cogeneration systems, and natural energy sources, while giving priority to improving manufacturing processes. In the future, efforts will be made for large-scale revisions and improvements in manufacturing and processing.

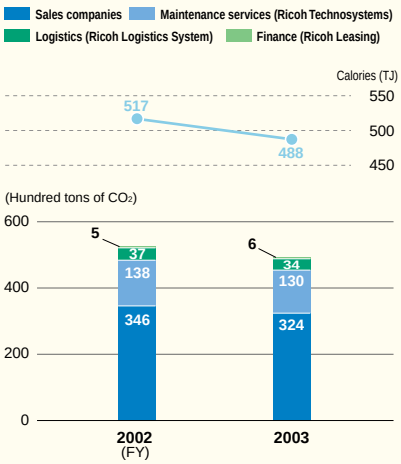
<Japan>

Energy Consumption (CO_2 conversion[1] and calories)

❷ The Ricoh Group (production)



❸ The Ricoh Group (nonproduction)



1. Calculated using a CO_2 emissions potential taken from an examination on greenhouse gas emission calculations issued by the Ministry of the Environment.

Breakdown of Major Energy Consumption

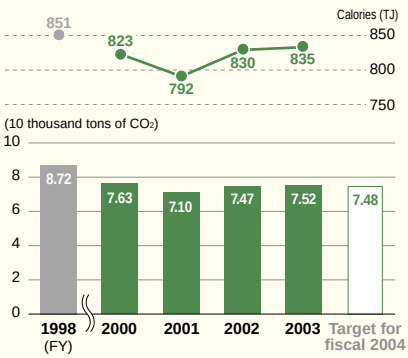
❹ The Ricoh Group (production)

	FY 2000	FY 2001	FY 2002	FY 2003
Kerosene (kℓ)	8,274	7,012	7,628	6,652
Heavy oil A (kℓ)	3,628	3,299	2,945	2,819
Town gas (1,000 m^3)	12,052	11,942	12,823	14,640
Electric power purchased (1,000 kWh)	288,589	281,175	284,554	289,770

<Outside Japan>

Energy Consumption (CO_2 conversion and calories)

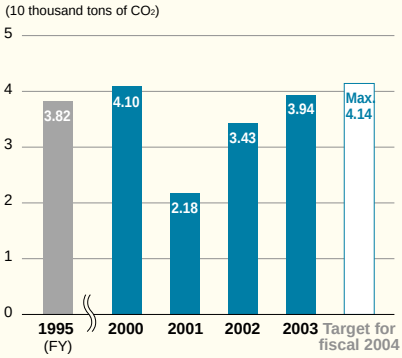
❺ The Ricoh Group (production)



<The Entire Ricoh Group>

Greenhouse Gas Emissions Other than CO_2[2] (CO_2 conversion)

❻ The Ricoh Group (production)



* The following formula was used to determine the greenhouse gas emissions.
Emission = Σ (amount emitted into the atmosphere × global warming potential)

2. NF_3 and substances that have a global warming effect and designated in the Kyoto Protocol

Improving the Toner Production Process

<Ricoh Numazu Plant and other sites/Japan>

To cope with limited production of a wide range of toner products, the Toner Production Center has developed an "On-Demand Toner Filling Machine." Compared with the conventional toner filler systems, the new machine takes only 1/40 of the time to switch between product types, requires 1/40 of the installation space, and uses 1/4 of the electricity. Introducing this toner filling machine into toner production bases and also into logistics bases and sales companies allows toner cartridges to be manufactured at and shipped from sites closer to customers in the same manner as at plants. This has resulted in a reduction in environmental impact from the transportation of cartridges collected from the market for reuse and a shorter lead time. Fifty-six new filler systems are in operation not only in Japan but also in the Americas, Europe, and China.

Conventional toner filler

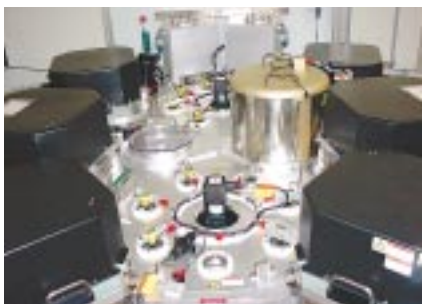
Newly-developed On-Demand Toner Filling Machine

Improvement of Semiconductor Production Process

<Ricoh Yashiro Plant/Japan>

One hundred and seventy eight pump inverter units developed by Ricoh were introduced in addition to the vacuum pumps that have been used in the semiconductor manufacturing process. Consequently, electricity consumption decreased by 50%, or about ¥20 million annually, resulting in a reduction in CO_2 emissions of about 680 tons. High vacuum is needed in the process chamber when products are processed, while a partial vacuum is sufficient when they are in standby mode. The newly-developed inverter units can control the rotation speed of pumps by unit. When attached to semiconductor manufacturing equipment with traditional pumps, the inverter units contribute to further conservation of energy.

Pump inverter unit



Process chamber

Installation of High-Efficiency Turbo Freezer

< Ricoh Numazu Plant/Japan>

At the OPC[1] Production Center, high-efficiency turbo freezers were installed for air-conditioning of the clean room in March 2004. It is necessary to maintain the temperature and humidity of the clean room at a certain level and keep the room clean to ensure high quality OPCs. Because of this, a clean room needs an air-conditioning system of a larger capacity than that needed for ordinary process chambers. In addition, the operating load differs depending upon the season. It is therefore important to find a way to operate multiple freezers in an efficient manner. As a result of the installation of high-efficiency turbo freezers, the energy efficiency of the air-conditioning has improved significantly, while CO_2 emissions during the manufacturing process have been halved. This case was acknowledged as a “Emission Trading Pilot Project” supported by the Ministry of Economy, Trade and Industry, and accordingly, subsidies are paid to Ricoh by NEDO[2].

1. Organic Photo Conductors
2. New Energy and Industrial Technology Development Organization

High-efficiency turbo freezer

Energy-Saving Air Conditioning Uses Outside Air

<Ricoh Electronics, Inc. /U.S.A.>

In December 2003, Ricoh Electronics, Inc., introduced a smart air cooling system called an “economizer,” which automatically takes in outside air when the temperature of the outside air becomes lower than the inside preset temperature and humidity. The device is expected to save approximately 534,200 kWh annually and will be developed at other facilities in the future.

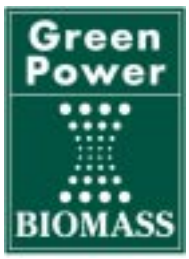
Introduction/Promotion of the Use of Natural Energy Systems

<Ricoh Unitechno, Tohoku Ricoh, Ricoh/Japan>

Many of the Ricoh Group’s plants are preparing to introduce natural energy systems to utilize solar and wind power, as well as other natural sources. Ricoh Unitechno Co., Ltd. has reduced annual CO_2 emissions by 3 tons with a solar power generation system (10kW), while Tohoku Ricoh Co., Ltd. has achieved a 0.5-ton annual reduction in CO_2 emissions by using solar and wind power generation systems (1.5kW). In the meantime, Ricoh purchased energy produced by wind power from Japan Natural Energy Company Limited under the Green Power Certification System, reducing annual CO_2 emissions by about 357 tons. Ricoh also concluded a five-year agreement in March 2003 to purchase biomass green electricity. This will lead to a reduction in annual CO_2 emissions of about 100 tons.

Solar power generation system at Ricoh Unitechno

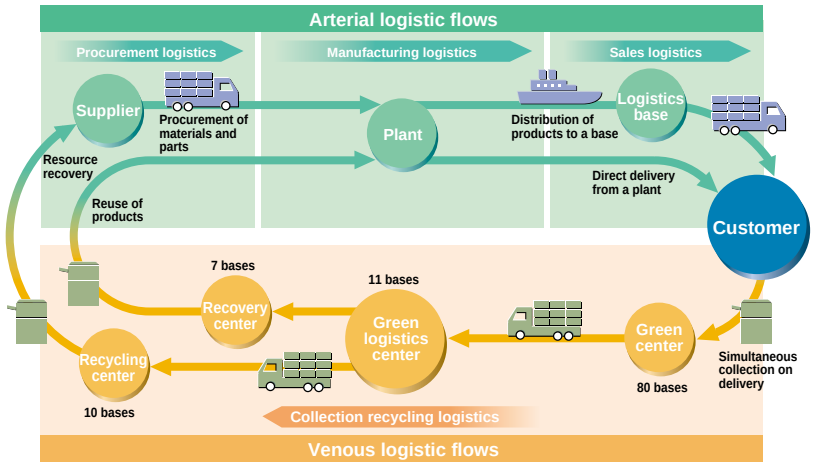
Green Power certification mark



The Ricoh Group is working to establish a resource-recirculating logistics system that integrates the arteries and veins of the logistic Flow.

To achieve a sustainable resource-recirculating society, one important issue is the establishment of a logistic system for transporting products. The Ricoh Group, led by Ricoh Logistics System Co., Ltd., is striving to create a resource-recirculating logistics system that integrates the arteries and veins of the logistic flow, including a system for direct transportation to and collection from customers. Examples that are successful in Japan will be introduced around the world, aiming at establishing global supply chain management (SCM).

Resource-recirculating Logistics System that Integrates the Arteries and Veins of the Logistic Flows (Japan)



Arterial logistic flows
- Establishment of a direct transportation system from plants to customers
- Modal shift from truck to railway and marine transportation
- Uses of reusable packaging materials*

Venous logistic flows
- Establishment of a direct collection system for used products
- Expansion and improvement of infrastructure including collection centers*

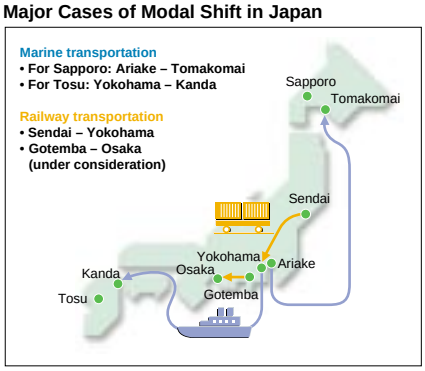
* See page 45.

Promoting Modal Shift

<Ricoh Logistics System/Japan>

Ricoh Logistics System Co., Ltd. is actively promoting a modal shift to transportation methods that have less environmental impact. In fiscal 2003, it shifted more than 90% of product transportation between Ricoh Gotemba Plant and Tosu in Kyushu to sea transportation. This has reduced CO_2 emissions by about 400 tons annually. In fiscal 2004, it will promote a modal shift in product transportation to Osaka. In addition, transportation of products shipped from Tohoku Ricoh Co., Ltd. between Sendai and Yokohama was shifted from truck to railway transportation, which has resulted in a 280-ton reduction in annual CO_2 emissions.

Major Cases of Modal Shift in Japan



Improvement in Vehicle Mileage and Introduction of Low-Emission Vehicles

<Ricoh Logistics System, etc./Japan>

Ricoh Logistics System Co., Ltd. is striving to improve vehicle mileage by utilizing digital tachometers and giving energy-conservation and safety education to drivers. By March 2004, 50% of the vehicles (127 vehicles out of a total 254) were equipped with digital tachometers. As a result of drivers recognizing their own eco-drive levels, mileage improved by from 10 to 20%. In fiscal 2004, full-scale energy-conservation and safety education is to be given not only to staff members of the company, but also at partner companies, which handle 70% of the total distribution volume on consignment. 2,459 low-emission vehicles such as hybrid cars have been introduced, some of them for use at sales companies in various parts of Japan and Ricoh Technosystems Co., Ltd.

❶ NOx and SOx Emissions in Transportation by Ricoh Logistics System

	NOx	SOx
2002	4.0 (t)	0.4 (t)
2003	2.6 (t)	0.4 (t)

Development of Logistics Know-How

<Ricoh Logistics System, Ricoh Express (S.Z.) Warehouse Ltd./China>

Ricoh Logistics System Co., Ltd. is introducing Japanese logistics know-how into other areas of the world to promote the establishment of global SCM. In China, a delivery system based upon four regional delivery centers is being established aimed at improving efficiency, and Ricoh Logistics System is offering know-how on warehouse and transportation management. At the same time, transportation routes are being revised and office work is being centralized. Trucks have traditionally been used for the transportation of products manufactured by Ricoh Asia Industry (RAI) to the port in Hong Kong for export to Japan and Europe. Currently however, Ricoh Express (S.Z.) Warehouse Ltd., which is close to RAI, handles the office work and products are shipped from a port in China, which has improved efficiency.