Development of User-Friendly and Energy-Saving Technologies

● Concept

Products that are not easy to use will not be chosen by customers, even if their energy-saving performance is good. Such products can neither contribute to energy conservation nor help prevent global warming. Ricoh further develops its unique energy-saving QSU technology*, which enables quick recovery from energy-saving mode, allowing users to make copies whenever they need to. It is also expanding the product line of QSU-equipped machines. Meanwhile, reducing unnecessary paper consumption is important since paper production consumes a lot of energy (indirect energy saving). Ricoh helps decrease the environmental impact caused by customers' paper consumption by offering user-friendly duplex copying functions, digitization, and promoting sales of recycled paper.

* Ricoh's original energy-saving technology that enables quick recovery from energy-saving standby mode.

● Targets for Fiscal 2004

◎ Achieve Ricoh's energy-saving goals.
◎ Develop practical application technologies for alternative paper and rewritable paper.

● Review of Fiscal 2004

Ricoh was the first in the world to market high-speed monochrome digital copiers possessing productivities of 65 and 75 copies/min. and a quick recovery function that enables them to recover from energy-saving mode in 10 seconds or less (these copiers are marketed only in Japan). Ricoh thus completed a lineup of office-use monochrome quick-recovery* digital copiers comprising various machines with productivities that range from 13 to 75 copies/min. Also, the number of quick-recovery products in which QSU technology was introduced and are currently in use outside of Japan increased. As a result, the amount of CO_2 reduced reached approximately 29,000 tons in fiscal 2004, twice that reduced in the previous year (see graph ❺).

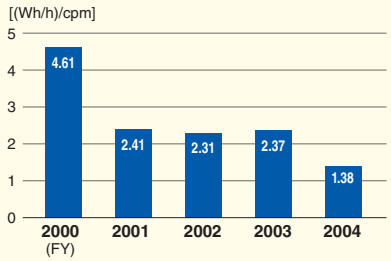
* The time it takes for copiers with a productivity of 45 copies/min. to recover from energy-saving mode is 15 seconds or less.

<Japan>

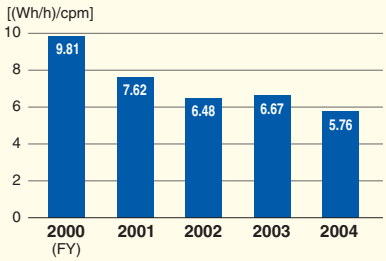
Changes in Energy Consumption

❶ Black-and-White Copiers and Multifunctional Copiers

Black-and-white plain-paper copiers, excluding those that accommodate wide-format paper



❷ Color Copiers and Multifunctional Copiers

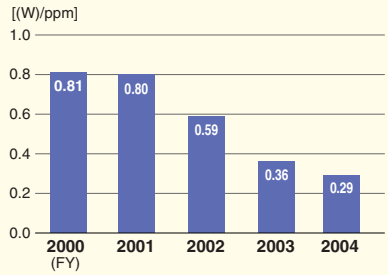


◎ Energy conservation values for copiers are calculated as follows:
Σ [<Energy consumption efficiency (Wh/h)>[1]/<copying speed[2]> × the number of units marketed]/
Σ the number of units marketed

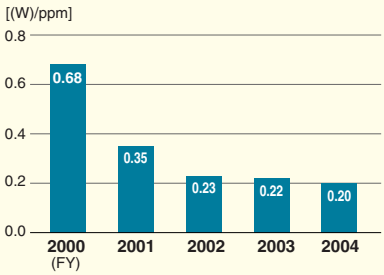
1. Energy consumption efficiency was measured in accordance with the Ministry of Economy, Trade and Industry's Law in Japan Concerning the Rational Use of Energy.
2. Copying speed = copies per minute (cpm)

Data for multifunction black-and-white copiers, color copiers and multifunction copiers are pursuant to the measurement standard for energy consumption efficiency of the Law Concerning the Rational Use of Energy.

❸ Black-and-white and Color Printers



❹ Facsimiles (Including Multifunctional Copiers)



◎ Energy conservation values for facsimiles and printers are calculated as follows:
Σ [<Energy Star energy consumption in standby mode[3] (W)>/<printing speed[4]> × the number of units marketed]/Σ the number of units marketed

3. Energy Star energy consumption in standby mode = energy consumption in standby mode pursuant to the standards of the International Energy Star Program.
4. Printing speed = print per minute (ppm)

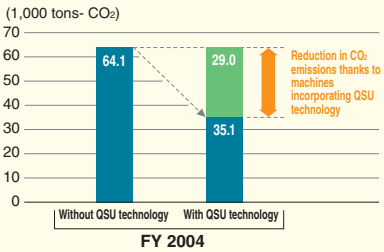
* Data for the four graphs above are calculated based on the number of units marketed in Japan.

● Future Activities

Ricoh will strive to improve its QSU technology to widely promote the use of the energy-saving function. Ricoh will also promote the introduction of user-friendly (reduction in time required to recover from energy-saving mode), energy-saving technologies to color copiers.

<Global>

❺ Reduction in CO_2 Emissions through the Use of QSU Technology



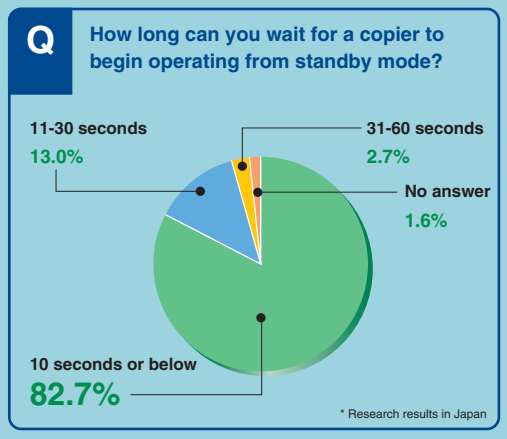
Segment Environmental Accounting of Product Energy Conservation (Benefit on cost in QSU product development)

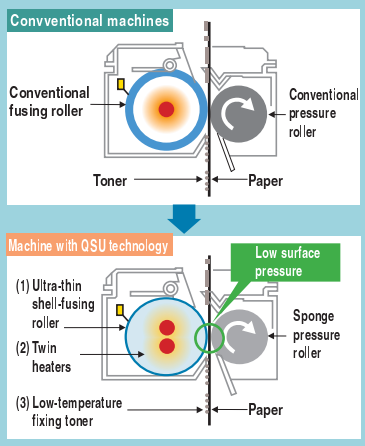
Costs			Effects		
			Economic benefits		Effect on environmental conservation
Item	Main costs	Costs	Internal benefits	Customer benefits	
R&D cost	Cost of developing energy-saving units	¥400 millon	Amount of profit contribution ¥1,894 million	Reduction in payment for consumed power supply ¥1,769 million	Reduction in CO_2 emissions 28,996 (t)
	Cost of molds, jigs, parts, etc.	¥488 millon			

* The reduction in payment for consumed power supply and CO_2 emissions is the annual benefit brought from eight hours of operation per day, 20 days of operation a month. Internal benefits refer to benefits on gross profits in sales results in fiscal 2004.

QSU, Energy-Saving Technology that Realizes Energy-Saving in Standby Mode and Quick Recovery from Energy-Saving Mode

According to Ricoh's market research, most consumers prefer copiers that recover from energy-saving mode in a shorter time (see pie chart). It also shows that many users of machines that need a longer time to recover from energy-saving mode do not utilize an energy-saving function and many users of products to which QSU technology is introduced make use of the function. If it takes too long to recover from the energy-saving mode, consumers will not use the function because they cannot make copies whenever they need to. That is, a copier/printer that takes longer time to recover from standby mode consumes extra energy in the mode. Users of products to which QSU technology is introduced seem to be free from stress and practice energy conservation unconsciously.





● QSU technology incorporated in Aficio (imagio Neo) series

(1) Ultra-thin shell-fusing roller
In order to realize quick start-up, the fusing roller was thinned as much as possible to shorten the temperature rise time.

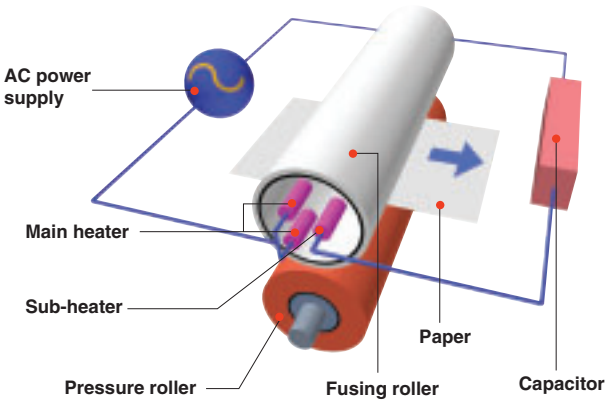
(2) Twin heaters
Because a thin roller is apt to get cold, the temperature is carefully and effectively adjusted by using two separately controlled heaters.

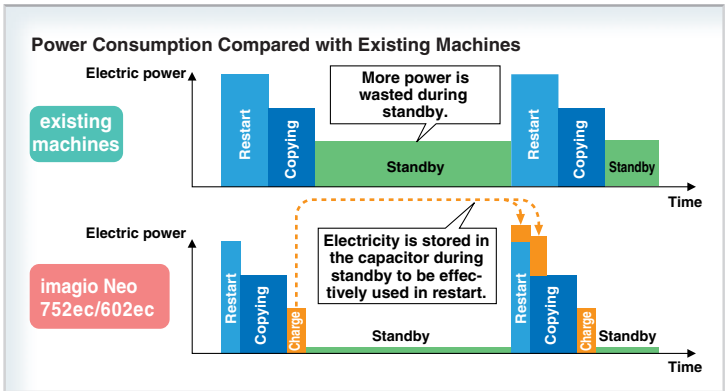
(3) Low-temperature fixing toner
This toner ensures a fixity that is equal to or higher than that of conventional toner even at low temperatures and supports both energy saving and the quick startup function.

Ricoh Achieves the World's First 10-Second Recovery Time High-Speed Digital Multifunctional copier: imagio Neo 752ec/602ec

In fiscal 2003, Ricoh introduced the HYBRID QSU, an integration of quick start-up (QSU) technology and capacitors (electric storage devices), to the imagio Neo 752 series of high-speed digital multifunctional copiers. This enabled a 30-second recovery time from energy-saving mode. In fiscal 2004, by improving the HYBRID QSU, Ricoh launched the imagio Neo 752ec/602ec, which achieves a 10-second recovery time from energy-saving mode. The capacitors have a quick charge and discharge capability. In the past, capacitors were used to supply heat to the fusing roller. This is because although the ultra-shin fusing roller, one of the QSU technologies, shortens the temperature rise time, papers tend to absorb heat easily from the fusing roller during high-speed printing, such as at 75 pages/min., which resulted in a failure to maintain copy quality and productivity. In the new series, capacitors are used both for printing and to help the restart. Using capacitors in this way, Ricoh succeeded in achieving a 10-second recovery time (about 1/30 that of existing machines*) from energy-saving mode without lowering productivity. This is the first time in the world that a ten-second recovery time has been achieved in the field of high-speed digital copiers.

* Comparison with imagio Neo 750 model 75
* Capacitors are incorporated only in the 100V machines marketed in Japan.





Enrichment of Energy-Saving Product Lines

In fiscal 2000, Ricoh marketed user-friendly and energy-saving products, the Aficio 1035/1045 (imagio Neo 350/450), which use Ricoh's original QSU energy-saving technology. Since then, Ricoh has actively incorporated this technology into its copiers and printers. In fiscal 2003, Ricoh developed the HYBRID QSU, an improved QSU technology designed for high-speed machines. Also in fiscal 2004, Ricoh developed the imagio Neo 752 ec series with a copying productivity of 75 pages/min., and a 10-second recovery time from energy-saving mode. This completes our extensive energy-saving product line, with machines with productivities ranging from 13 pages/min. to 75 pages/min in Japan.

The imagio Neo 752ec model 75 with optional equipment

Lineup of Products with QSU Technology in Japan

	Products	Printing speed (/min.)	Time required to recover from energy-saving mode	Energy consumption efficiency
Copier	imagio Neo 135	13 pages	10 seconds	14Wh/h
	imagio Neo 165	16 pages	10 seconds	14Wh/h
	imagio Neo 221	22 pages	10 seconds	29Wh/h
	imagio Neo 271	27 pages	10 seconds	29Wh/h
	imagio Neo 350RC	35 pages	10 seconds	34Wh/h
	imagio Neo 352	35 pages	10 seconds	33Wh/h
	imagio Neo 450RC	45 pages	15 seconds	49Wh/h
	imagio Neo 452	45 pages	15 seconds	48Wh/h
	imagio Neo 603	60 pages	30 seconds	57Wh/h
	imagio Neo 602ec-75	60 pages	10 seconds	—
	imagio Neo 753	75 pages	30 seconds	117Wh/h
	imagio Neo 752ec-75	75 pages	10 seconds	—
Printer	IPSiO NX 86S	20 pages	12 seconds	—
	IPSiO NX 96e	25 pages	12 seconds	—
	IPSiO NX 660S	22 pages	10 seconds	—
	IPSiO NX 760	28 pages	12 seconds	—
	IPSiO NX 860e	32 pages	12 seconds	—
	IPSiO NX 920	45 pages	15 seconds	—

30-Second Recovery Time for Color Printers

Ricoh launched color printer Aficio CL4000DN (IPSiO CX400) with a copying productivity of 25 pages/min. in February 2005. This machine, which has a 30-second recovery time from energy-saving mode and consumes less than 6W of energy in standby mode, combines user friendliness with energy-saving.

Aficio CL4000DN (IPSiO CX400)

Indirect Energy Saving through Reduced Paper Consumption

Development of User-Friendly Duplex Copying Function with High Productivity

To provide more customers with user-friendly duplex and n-up copying functions (copying multiple pages on one sheet of paper) and to reduce paper consumption by users, Ricoh has developed higher-speed duplex and n-up copying technologies that are more user-friendly. The Aficio 2075/2060 (imagio Neo 753/603) series, in which a single-path system is used, simultaneously reads both sides of a two-sided document with a single scan by two scanning sections, and realizes higher-speed duplex copying of two-sided documents at the same speed as single-sided document copying. The series also achieves 100% duplex copying productivity* while in continuous operation. Many of our multifunctional digital copiers also achieve 100% duplex copying productivity while in continuous operation.

* Duplex copying productivity (%) =(Time spent on simplex→duplex copying)/(Time spent on simplex→simplex copying)×100. The time is measured from the moment the desired number of copies is entered and the "Copy" button is pressed to the moment the copier is ready for the next batch of copying.

Solutions to Reduce Paper Consumption for Users

Ricoh provides its customers with printing solutions to realize an ideal printing environment that meets each customer's business needs. In addition, document solutions are available to scan and digitize paper documents, and confirm/share the data on networked PC screens. With these solutions, Ricoh contributes to a reduction in paper consumption for its customers.

RECO-View® IC Tag Series that Visualizes Rewritable IC Tag Information

Rewritable IC tags that record the latest inventory, production capacity, etc. are now used extensively to manage information in many different areas such as production and distribution. However, these IC tags have a drawback that the recorded data is invisible. Using thermal rewritable technology that is used for loyalty cards, etc., Ricoh has developed the RECO-View® IC Tag series that makes it possible to display and rewrite data recorded on IC tags. This technology enables simultaneous rewriting of information on IC tags and printed images on sheets and tags. These IC tags were tested at the Ricoh Numazu Plant and marketed in December 2003. Today, printers, readers and writers that respond to the RECO-View® IC Tag series have been launched by different makers, and RECO-View® IC Tags are used by more than 30 companies, mainly in the manufacturing sector.

Printer for IC tag sheet

RECO-View® IC tag sheet

INTERVIEW ⟹ Customer feedback

Introduction of the Ridoc IO Gate (integrated print management system) and printers

Keio University

The introduction of an integrated print management system brought paper consumption down approximately 50%.

Improvement of printing environment a big concern

Among other things, Keio University was concerned about the need for better printing environment to deal with its growing technological and administrative requirements. At the Mita and Hiyoshi campuses, every two PCs were locally connected to one printer. This setup necessitated a considerable number of printers and was causing immense problems in terms of cost and machine maintenance.

On-demand printing system
The printing function can be executed by selecting the printing job at the terminal next to the printer.

Improvement in user convenience for students and reduction in cost and environmental impact

Keio University introduced Ricoh's integrated print management system to its Mita, Hiyoshi, Yagami, and Shinanomachi campuses at about the same time. The on-demand pay printing system is connected to 57 printers in total. The network connection saves maintenance work and cost, and the optimal system allocation improves convenience for students. Under this system, users pay ¥5 per copy for black-and-white printing and ¥30 per copy for color printing. This made students more aware of the cost of printing, and some campuses succeeded in cutting down the number of copies to about 50% that in the previous year.