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 2007

◎ **Achieve Ricoh's energy-saving goals.**

● Review of Fiscal 2005

We launched monochrome multifunctional office copiers with a copying productivity of 45 pages/min. and a recovery time from energy-saving mode of 10 seconds[1]. In the area of color multifunctional copiers, we introduced the imagio MP C2500/3000 series[2] and imagio MP C1500 SP/SPF series[3]. While the former has a recovery time from energy-saving mode of 45 seconds, which is less than half that of the previous model, the latter has a warm-up time of 5.5 seconds and electricity consumption in standby mode of 2.6 W. We have steadily increased sales of copiers equipped with QSU technology that enables a fast warm-up time of less than 10 seconds, thus reducing CO_2 by 23,000 tons a year (see graph ❺).

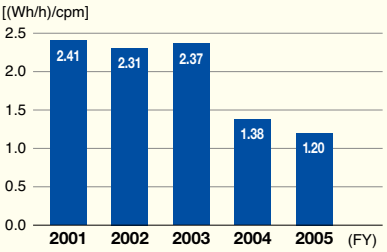
1. This applies to only the model for Japan.
2. The same speed for color and monochrome copies; 25 pages/min. copies for imagio MP C2500 and 35 pages/min. copies for imagio MP C3000
3. For color (6 pages/min.) and monochrome (15 pages/min.) copies (Jel Jet method)

<Japan>

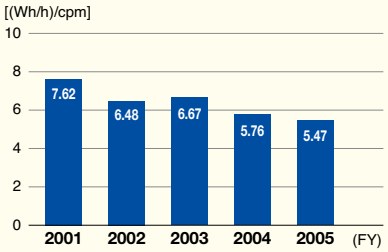
Changes in Energy Consumption

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

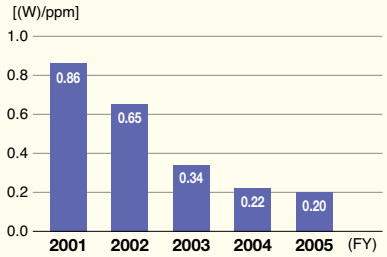


◎ Energy conservation values for copiers are calculated as follows:
Σ [<Energy consumption efficiency (Wh/h)>[1]/<copying speed[2]> × the number of units marketed]/Σ the number of units marketed

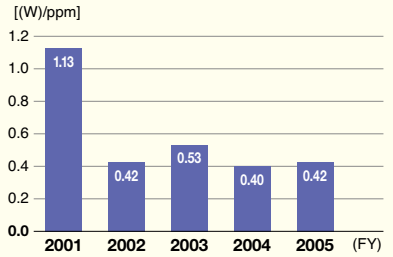
1. Energy consumption efficiency was measured in accordance with the Ministry of Economy, Trade and Industry's Law in Japan Concerning the Rational Use of Energy.
2. Copying speed = copies per minute (cpm)

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 Printers



❹ Color Printers



◎ 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)

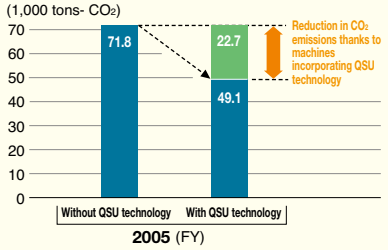
* Data for the four graphs above are calculated based on the number of units marketed in Japan.

● Future Activities

We will further improve QSU technology, so that more customers will use energy-saving mode, and pursue user-friendliness (shorter recovery time from energy-saving mode) and energy saving for 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 ¥2,312.6 million	Reduction in payment for consumed power supply ¥1,387.5 million	Reduction in CO_2 emissions 22,742.8 (t)
	Cost of molds, jigs, parts, etc.	¥671.5 millon			

* The reduction in payment for consumed power supply and CO_2 emissions is the annual benefit brought from 8 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.

User-Friendliness and Energy-Saving by QSU Technology Welcomed by Customers in the United States and Europe

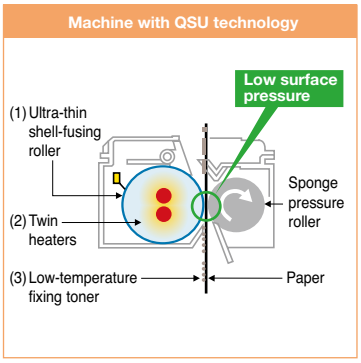
Ricoh provides multifunctional digital copiers equipped with QSU, Ricoh's original energy-saving technology that enables quick recovery from energy-saving standby mode. According to our market research, Japanese customers who use copiers that are not equipped with QSU tend not to use energy-saving mode, and QSU technology helps more customers use energy-saving mode. In fiscal 2005, we conducted similar market research targeting customers in the United States and Europe and found that even customers who use QSU-equipped machines tend not to use energy-saving mode and that the number of such customers is larger than that in Japan. Therefore, we explained QSU technology features to customers so that they can better understand its effectiveness. Then, we asked them to set their machines' recovery time to fewer seconds and see how they work for a week. As a result, many customers appreciated QSU technology, and we received such comments as: "I was really surprised by the quick recovery time," "We will set the recovery time of all Ricoh machines in the office to fewer seconds," and "Thank you for teaching us how to save energy."

● **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.



INTERVIEW

Customer Interview | Seattle City Hall

Ricoh took a survey on the use of the energy-saving mode of its photocopiers in the United States, covering customers mainly in Seattle, Washington. Seattle City Hall has nothing but praise for Ricoh's energy-saving QSU technology, saying, "Ricoh's copiers help improve productivity. We can save energy without even thinking about it."

We changed the setting of our copiers so that they would go to energy-saving mode 10 minutes after use. The recovery time of Ricoh products is short, which makes it easy for us to use.


Office building where the Seattle City Hall is located.

Surprised at the speedy recovery realized by QSU technology

We realized for the first time that our photocopiers are equipped with energy-saving QSU technology thanks to the survey. We were surprised at the recovery speed of 10 seconds. "I thought that the recovery time from energy-saving mode was longer. The short waiting time will lead to better work efficiency," said one of our staff members.


Ms. Roseanne M. Garrett, Department of Planning and Development

Expected to contribute to a better environment and improved productivity

Seattle City Hall has green procurement policies that provide for the use of recycled paper, recycling, and energy saving. Because the people of Seattle are highly aware of environmental issues, it is expected that they will demand even more consideration be given to such issues. As such, we hope to offer products that have higher productivity. If copies can be made more quickly, more work can be done in a given time, which will result in changes in the behavioral patterns of the people working in the office. The invisible effects of QSU technology, which contributes to energy saving and environmental preservation as well as improved productivity in the office, is worth appreciating.

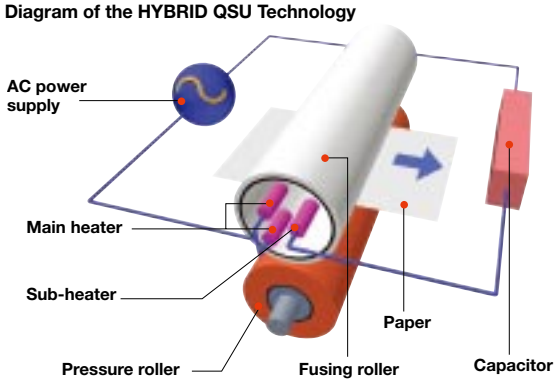
HYBRID QSU Technology

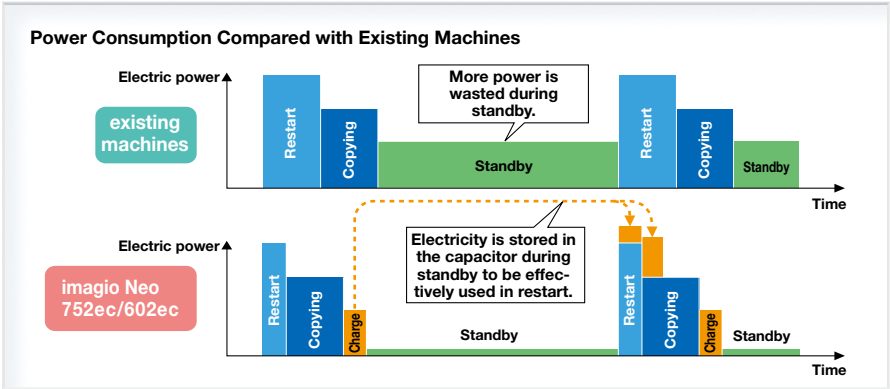
In fiscal 2003, Ricoh introduced the HYBRID QSU, an integration of quick start-up (QSU) technology and capacitors (electric storage devices), to the imagio Neo 752 series of high-speed digital multifunctional copiers. This enabled a 30-second recovery time from energy-saving mode. Subsequently, by improving 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-thin 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 imagio Neo 752ec/602ec, 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 from energy-saving mode without lowering productivity. This is the first time in the world that a 10-second recovery time has been achieved in the field of high-speed digital copiers.

* Capacitors are incorporated only in the 100V machines marketed in Japan

Diagram of the HYBRID QSU Technology





Ricoh Receives Low Carbon Leaders Award

In December 2005, Ricoh was ranked fourth in the Green Technology Innovator's category of Low Carbon Leaders Awards supported by The Climate Group, an NPO dedicated to advancing business and government leadership on climate change. The awards aim to recognize businesses, national/local governments, cities, and individuals around the world who have taken a dynamic and proactive approach to climate change. In the innovation category, awards are given to companies that have developed innovative technologies. Ricoh was recognized for its contribution to the prevention of global warming through the development of a nifty copier, i.e. a high-speed copier that has a warm-up time of 10 seconds and is equipped with HYBRID QSU user-friendly energy-saving technology.

Low Carbon Leaders Awards trophy

Indirect Energy Saving through Reduced Paper Consumption

Development of User-Friendly Duplex Copying Function with High Productivity

In an effort to cut paper consumption, Ricoh has developed more user-friendly and more high-speed duplex and multiple-page copying functions (copying multiple pages on one sheet of paper) so that more customers use less paper. The imagio MP 7500/6000 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 more high-speed duplex copying of two-sided documents at the same speed as single-sided document copying. 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 simple → 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.

RECO-View® IC Tag Sheet—Capable of Displaying Data on Rewritable IC Tags

In fiscal 2003, Ricoh developed the RECO-View® IC Tag Sheet by combining IC tags with Ricoh's own rewritable technology, making the RECO-View® IC Tag Sheet capable of rewriting and displaying data written on cards or sheets. This sheet displays digital data recorded on a tag, and the display changes as the tag is rewritten. Operators are thus able to visually confirm management information regarding the operation process written on IC tags. Because this helps prevent human error, RECO-View® IC Tag Sheets are now being used by customers in various industries, including distribution and healthcare. As a sheet is capable of being rewritten approximately 1,000 times, customers using this sheet as a shipping label have significantly reduced paper consumption. Such customers used to consume 100,000 conventional paper shipping labels a year. It is estimated that the amount of CO_2 emissions is reduced by about 80% through the use of this sheet compared with that of paper. RECO-View® IC Tag Sheets are drawing attention as a new medium that satisfies multiple needs, such as reducing environmental impact, by replacing paper, improving efficiency, and ensuring security.

Printer for IC tag sheet

RECO-View® IC tag sheet

INTERVIEW

Employee Interview | Combining Rewritable Technology and RFID Technology

By identifying customers' potential needs, we developed a new product that enables both improvement in operations and reduction in paper use.

Tatsuro Saito
Project Office of Thermal Rewritable for Industrial Use
Thermal Media Company

Applying rewritable technology to IC tags to display recorded data

Industries began paying close attention to RFID* technology in around 2001, when the JR RFID train pass was introduced. For instance, if workers could accurately read product information at a distance for process management on production lines or inventory/distribution management, scanning the bar code of each product would no longer be necessary. RFID, however, had a serious drawback: the information recorded on tags cannot be seen. Because operators cannot understand data recorded on tags, they make mistakes or other inconvenient events occur. To solve this problem, it is necessary to develop a system that is capable of both displaying data recorded on IC tags and enabling the simultaneous rewriting of information on IC tags and displayed images. Ricoh believed it could use its own rewritable technology to overcome this challenge and began development.

Sheet cleaner

Human error—the challenge to be addressed at the introduction of IC tags—eliminated

To verify the practical application of rewritable sheets with IC tags, a trial run was conducted on a toner filling line. The results proved that human error, such as mix-ups, that occurred when conventional IC tags were used was eliminated. There were a number of issues yet to be solved, however, such as the tag's durability, prevention of sheets from curling and wrinkling, and improvement in legibility and clean erasures, but we studied them one by one. There were also problems that customers pointed out after using the sheets experimentally. Collectively, the problems we had to address included how to prevent oil and dust from damaging the tags and how to identify a printing speed that does not delay operations. After clearing all these hurdles, we succeeded in producing the RECO-View® IC Tag Sheet on a commercial basis in the fall of 2003. To meet the diversified customer needs that were revealed during the development period, we also developed a cleaner and a special pen designed for the user's business and convenience. Now, we not only provide sheets but also offer customers a system consisting of sheets and other items, such as cleaners and pens. As for the brand name RECO-View® IC Tag Sheet, RE stands for *rewritable*, *recycle*, and *reusable*, and ECO stands for *economy* and *ecology*.

*RFID stands for radio frequency identification and is an individual data recognition system using radio. The IC tag is its tool.