

Development of user-friendly and energy-saving technologies

■ Concept

Products that are not easy to use will not be selected by customers, even if their energy-saving performance is solid. Such products can neither contribute to energy conservation nor help prevent global warming. Ricoh is further developing its unique and easy-to-use energy-saving QSU (Quick Start-Up) technology*, which enables users to make copies as soon as they need to. We are also expanding the product lineup of QSU-equipped machines with a view to reducing recovery time from energy-saving mode to less than 10 seconds for all our models in the future. Meanwhile, reducing unnecessary paper consumption (indirect energy saving) is important since paper production consumes a lot of energy. Therefore Ricoh is helping to decrease the environmental impact caused by customers' paper consumption by offering highly productive duplex copying functions, digitization, and by promoting sales of recycled paper.

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

■ Target for Fiscal 2010

- ◎ Achieve Ricoh's energy-saving goals.

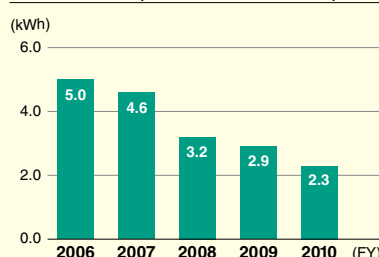
■ Review of Fiscal 2010

We released the imagio MP C3301/2801 series and the imagio MP C2201 series multifunctional color copiers during the fiscal year. These models feature Ricoh's original energy-saving QSU technology and are able to recover from energy-saving (sleep) mode within less than 10 seconds, the first in the multifunctional color copier segment to achieve this. In addition, the imagio MP C2201 series achieved Typical Electricity Consumption (TEC)¹ of 1.07 kWh² by reducing the aforementioned recovery time, requiring less electricity consumption, and achieving quicker switch to energy-

<Japan>

Changes in energy consumption

① Monochrome copiers and multifunctional copiers



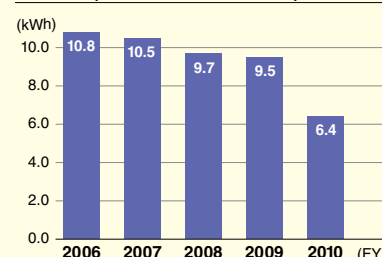
◎ Energy conservation values are calculated as follows:

$\Sigma(\text{Energy consumption when recovery time is 10 seconds (kWh)} \times \text{Annual number of units marketed}) / \Sigma \text{Annual number of units marketed}$

1. Energy consumption when recovery time is 10 seconds: Based on TEC measured for models with a 10-second recovery time from energy-saving mode in accordance with the method defined by the International ENERGY STAR Program. (Electricity consumption in standby mode was measured for models with a recovery time of more than 10 seconds.)

* Graphs ① and ② were compiled based on the number of units marketed in Japan.

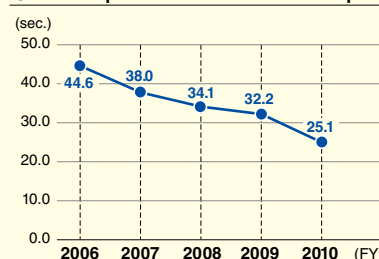
② Color copiers and multifunctional copiers



<Global>

Changes in recovery time from energy-saving mode

③ Color copiers and multifunctional copiers



◎ Energy conservation values are calculated as follows:

$\Sigma(\text{Recovery time from sleep mode (sec.)} \times \text{Annual number of units marketed}) / \Sigma \text{Annual number of units marketed}$

marketed

saving mode after operation. Sales of copiers using QSU technology with a recovery time of less than 10 seconds from energy-saving mode have been steadily increasing, thus reducing CO₂ emissions by approximately 42,600 tons during the year (see Graph ④).

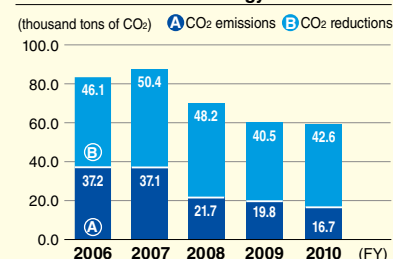
1. The measuring procedure is defined by the international ENERGY STAR Program.
2. Indicates the value for imagio MP C2201 SP. The value for imagio MP C2201 SPF is 1.31 kWh.

■ 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.

Effect of QSU technology

④ Reduction in CO₂ emissions through the use of QSU technology



* A + B : CO₂ emissions generated if there had been no QSU-equipped models

A : Actual CO₂ emissions

B : CO₂ emissions reductions realized by the QSU-equipped models

Evolution of QSU energy-saving technology

QSU (Quick Start-up), Ricoh's original energy saving technology, was developed to achieve effective energy conservation for copiers. It enables quick recovery from the energy-saving mode, allowing users to make copies whenever they need to. The use of the energy-saving mode helps reduce environmental impact, but the longer it takes to recover from the mode, the less it is used by customers. Ricoh focused its efforts on developing energy saving technologies in a way that satisfies both user-friendliness and energy conservation so that our customers will use the energy-saving mode more often. In 1997 we established an energy-saving committee to accelerate the development of such technologies, and developed QSU technology. In 2001, we launched the imagio Neo 350 series, the first multifunctional monochrome copiers equipped with QSU, and this product, which recovers from the energy-saving mode in only 10 seconds (30 seconds or more for previous models), received the Minister of Economy, Trade and Industry Prize, the highest prize of the Energy Conservation Grand Prizes presented by the Ministry in Japan. Following that, we introduced HYBRID QSU, an integration of traditional QSU technology and capacitors (electric storage devices), in high-speed multifunctional monochrome digital copiers, and have since reinforced the lineup of QSU-equipped products.¹

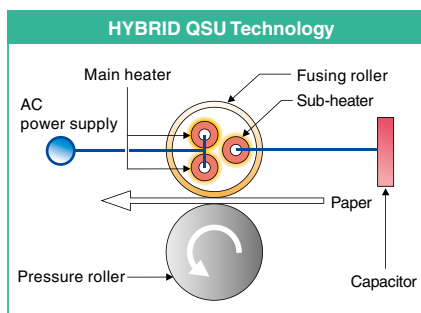
In fiscal 2006, Ricoh developed Color QSU technology, which adopts the IH² fusing system and successfully reduces recovery time from the energy-saving mode for multifunctional color copiers, which had been a difficult challenge. The imagio MP C3301/C2801 series, released in November 2010, offers higher thermal efficiency due to the Color QSU technology and the color P_xP toner with a lower melting point. These are the first color copiers that recover from the energy-saving mode in 9.9 seconds, as fast as monochrome copiers. Also, for typical electricity consumption (TEC)³ we have achieved a reduction of around 50% compared with previous models.

In addition, we also developed energy-saving printers that use our GELJET technology, including the IPSiO GX e2600 series launched in December 2009, which boasts a very low power requirement: average power consumption in operation of less than 36 watts, equivalent to the energy consumption of a fluorescent light; and power consumption in energy-saving mode of less than 1.4 watts.

1. Capacitors are incorporated only in the 100 V machines marketed in Japan.
2. IH stands for "Induction Heating," a technology that heats metal instantly using the magnetic field generated by an electric current passing through a coil. This technology is also widely incorporated in electric rice-cookers and stoves.
3. Figures measured using the method designated under the international Energy Star Program.

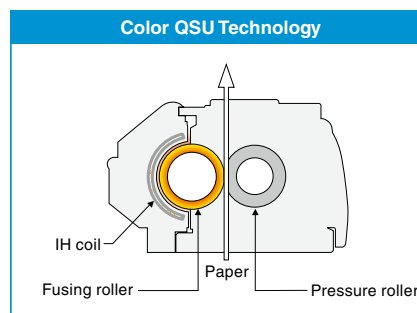
● HYBRID QSU Technology

Traditional QSU technology is combined with a capacitor (electric storage device) to store electricity while in standby mode so that it can be used for start-up and printing operations. This technology is adopted in high-speed type multifunctional copiers.



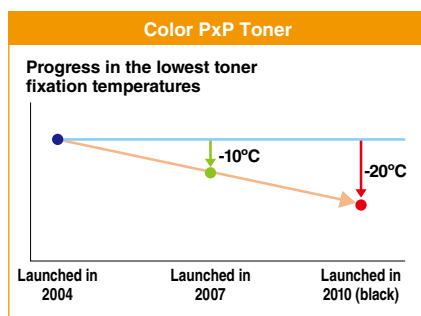
● Color QSU Technology

This technology is based on IH (Induction Heating), which uses magnetic force to produce heat, and has been further improved in such a way to cause the fusing roller itself to generate heat. With increased heat efficiency, this technology shortens warm-up time, thus enabling color copiers to be both user-friendly and energy-saving.



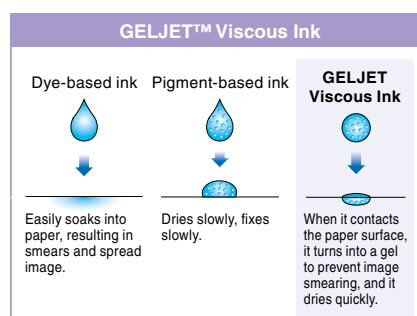
● Color P_xP Toner

Using newly developed polyester-resin particles of a smaller and uniform size, this toner is designed to fuse at a temperature 20 degrees lower than conventional polymerized toners. This new toner realizes a shortened warm-up time, faster continuous output, and less energy consumption when in use.



● GELJET Viscous Ink

GELJET Viscous Ink is a pigment-based ink with high viscosity and high penetration, which enables high-speed duplex printing on plain paper with a picture quality as high as that of laser printers. Its low energy consumption also allows users to save running costs.



Efforts to realize a more user-friendly energy-saving mode

The energy-saving mode is automatically activated to minimize power consumption when products are left in standby mode for a certain period of time, and thus it contributes to energy conservation for customers who use Ricoh copiers. To maximize energy-saving effects, it is necessary to set the time of the shift to a higher energy-saving mode to be as short as possible (see the table on next page). According to a customer survey, many customers feel that the waiting time is too long when the recovery time from the energy-saving mode exceeds 10 seconds. Therefore, to encourage customers to use the energy-

saving mode without the stress of waiting, Ricoh is committed to technological development aimed at reducing the recovery time from the energy-saving mode to less than 10 seconds.

For models whose recovery time from the sleep mode* still exceeds 10 seconds, the "preheating level 2" button is provided to realize a recovery time of 10 seconds while allowing customers to save energy—although not as much as when in sleep mode—to the maximum extent possible. In this way, Ricoh is offering its customers a way to promote energy conservation without sacrificing user-friendliness.

* A type of energy-saving mode. See the table on next page.

Energy-saving mode levels and their effects

Setting mode	Displayed term	Description	Energy-saving effects
Preheating	Panel Off	A ready-to-use status, but only with the control panel display cleared.	Small
Low power consumption	Energy Saver	A status where the temperature of the fusing heater, which consumes most electricity, is lowered to save energy; takes longer to recover than from the preheating mode (only for some models).	Medium
Sleep	Auto Off	Power to the fusing heater is turned off to save most energy. If the machine cools down to room temperature, the recovery time may take as long as the warm-up time.	Large

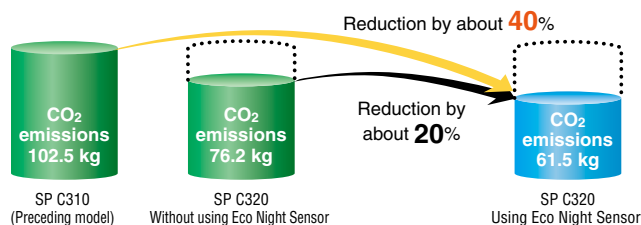
* See the manual for each model for specific energy consumption information and other data related to each setting in the energy-saving mode.

Eco Night Sensor introduced in IPSiO SP C320

<Ricoh Co., Ltd. (Japan)>

IPSiO SP C320, our color laser printer released in December 2010, boasts a Typical Electricity Consumption (TEC)¹ of 2.64 kWh, requiring approximately 25% less power than a conventional model. This was achieved by improving the thermal conductivity of its fusing parts, which represent a large percentage of the total energy consumption of the equipment. Another notable feature of this model is the introduction of Eco Night Sensor, a function which automatically turns off the device when it is not in use by detecting when the surrounding area becomes dark, thereby eliminating standby power consumption to zero. By activating the Eco Night Sensor, we estimate that power consumption can be reduced by some 40% compared with conventional models. Featuring a smaller imaging module, IPSiO SP 320 is as compact as a monochrome model², which means it is resource-efficient. The model contributes to

Eco Night Sensor allows even greater energy-saving performance



more effective use of resources with its significantly greater durability, allowing the printing of up to 360,000 pages.

1. The measuring procedure is defined by the international ENERGY STAR Program.
2. 400 (W) x 480 (D) x 387 (H) mm



The Energy Testing Lab becomes an EPA-accredited laboratory

<Ricoh Co., Ltd. (Japan)>

The Energy Star Program is an international energy conservation program for office equipment. The operating rules of the program were enhanced in January 2011, and now companies applying for the use of the Energy Star logo for their products sold in the North American market are required to receive third-party certification for the products from an EPA-accredited body prior to applying to the EPA¹. Ricoh had been providing products that meet the criteria of the program, and to further promote the sales of its energy-efficient products, had Ricoh Technology Center's Energy Testing Lab ISO/IEC 17025-certified, which is a requirement to becoming an EPA-accredited lab.² The Energy Testing Lab has thus become an EPA-accredited lab. As a result, Ricoh can now receive third-party certification for its products more easily, which in turn makes it simpler for the company to provide products that meet the criteria of the program in a more speedy and efficient manner.

1. US Environmental Protection Agency
2. ISO/IEC 17025 is an international standard covering general requirements concerning the competency of testing and calibration laboratories, developed by the International Organization for Standardization. The Energy Testing Lab of the Environmental Center at Ricoh Technology Center received this certification from International Accreditation Japan (IA JAPAN) of the National Institute of Technology and Evaluation (NITE).

For details, visit the following site and input "Ricoh" as a search keyword:

http://www.energystar.gov/index.cfm?fuseaction=recognized_bodies_list.show_RCB_search_form

Preventing Global Warming through Reduced Paper Consumption

RECO-View RF Tag Sheet—capable of displaying data on rewritable RF Tags

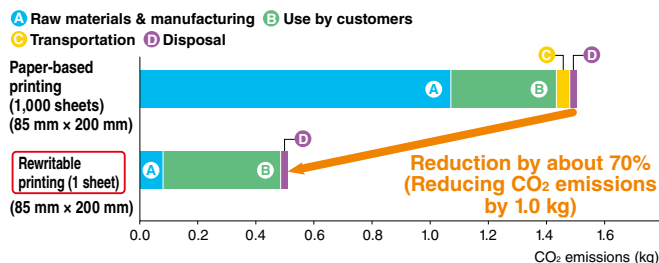
<Ricoh Co., Ltd. (Japan)>

In fiscal 2003, Ricoh developed the RECO-View RF Tag Sheet by combining RF tags with Ricoh's own rewritable technology, making the RECO-View RF 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. A sheet is capable of being rewritten approximately 1,000 times*, making it possible to cut CO₂ emissions by 80% across its lifecycle compared to paper-based printing. This tool also helps prevent human error, as operators are able to visually check information on the management of operation processes written on RF tags, and it is currently utilized in a wide variety of areas, including logistics, medical care, and office work.

* This number may vary, depending on the condition of use.

* Visit <http://www.reco-view.com> for further details of the RECO-View RF Tag Sheet.

CO₂ emissions during 1,000 printing operations



[Data coverage] ■ Raw materials & manufacturing: Materials (RECO-View, inlay) and manufacturing processes ■ Use by customers: RW printer (RP-K series) (calculation based on electricity consumption)/laser printer (NX810) (calculation based on electricity consumption and toners) ■ Transportation: Shipment: 100 km transport by a 4-ton truck from the product warehouse/Collection: 100 km transport by a 4-ton truck from the usage site ■ Disposal: waste disposal (with thermal recovery)/waste disposal (w/o thermal recovery)/landfill/collection of used paper (for paper-based only)

[Sources] ■ Paper: JLCA Database by Japan Environmental Management Association for Industry (JEMAI) ■ RHM: on materials, JLCA Database by Japan Environmental Management Association for Industry (JEMAI), Materials Database (4000ss) by the National Institute for Material Science (NIMS); on manufacturing process, Electricity & gas, data from the Japanese Ministry of the Environment ■ Laser printer: Data on IPSiO NX810 (publicly available from the JEMAI Ecoleaf program) ■ Transportation and disposal: Japan Tappi Journal 55(6) 838- 852(2001)