Environmental Technologies and Products Development (Energy Conservation)

Products that are not easy to use will not be chosen by consumers even if their environmental performance is good. Such products cannot contribute to environmental conservation. To do its part in preventing global warming, Ricoh constantly strives to introduce user-friendly, energy-saving functions to its core products, which will be used by more people and lead to a decrease in environmental impact caused by the use of products in general. Also, the Company is highly committed to reducing environmental impact caused by paper used in printing/copying, which is the largest cause of impact[1] to the environment in the life cycle of a printer/copier. Ricoh helps decrease environmental impact caused by consumers' paper consumption by offering a duplex copying function, promoting the use of electronic paper, and aggressively marketing recycled paper[2].

1. See page 27.
2. See page 55.

* See page 17, for contributions made by energy-saving products.

User-Friendly, Energy-Saving Technologies

To make copiers and printers more energy efficient, it is necessary to develop technology that minimizes the machine's electricity consumption while in standby mode and enables it to quickly recover from energy-saving mode as required. Even if a copier/printer that consumes almost zero energy while in standby mode is marketed, consumers will not use the energy-saving function if it takes too long to recover from Energy-Saving mode. If such a copier/printer is not chosen by customers, it will not be able to contribute to reducing the general consumption of electricity. Therefore, Ricoh developed quick start-up (QSU) technology, which enables machines to save energy and recover quickly from energy-saving (off/sleep) mode when needed. The technology was first used in the Aficio 1035/1045 (imagio Neo 350/450) series digital multifunction copier, which was marketed in 2000. The technology was subsequently used in the Aficio 1022/1027 (imagio Neo 220/270) series, one of Ricoh's core models sold in large quantities; the Aficio AP4510 (IPSiO NX920) printer in fiscal 2001; and the Aficio 2035/2045 (imagio Neo 351/451) series digital multifunctional copier and IPSiO NX650S/750/850 printer in fiscal 2002. Thus, Ricoh is committed to reducing energy consumption.

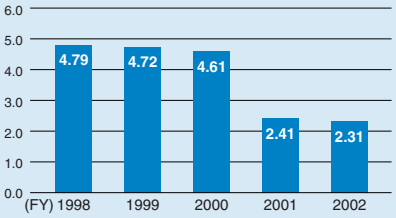
Ricoh will further improve its QSU technology to gain more consumer support for its products.

* The Aficio 1035 (imagio Neo 350) series won the first Copier of the Future Award from the International Energy Agency. The series was the first to win the Minister of International Trade and Industry Prize at the Energy Conservation Grand Prize competition in fiscal 2000. The Aficio 1022/1027 (imagio Neo 220/270) series received the Energy Conservation Chairman's Prize at the Energy Conservation Grand Prize competition in fiscal 2001.

Changes in Energy Consumption of Black-and-White Copiers and Multifunction Copiers

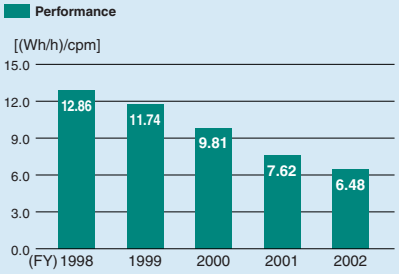
Black-and-white plain-paper copiers, excluding those that accommodate wide-format paper

Reviewed by BVQI (7)



Changes in Energy Consumption of Color Copiers and Multifunction Copiers

Reviewed by BVQI (8)



◎ Energy conservation values for copiers are calculated as follows:

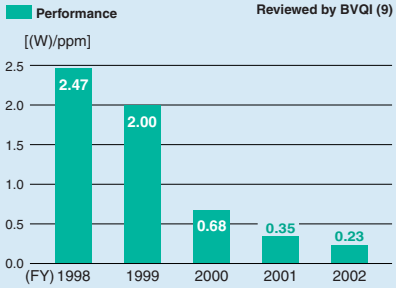
Σ [<Energy consumption efficiency (Wh/h)>[1]/<copying speed[2]> × the number of units marketed]/ Σ the number of units marketed

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.

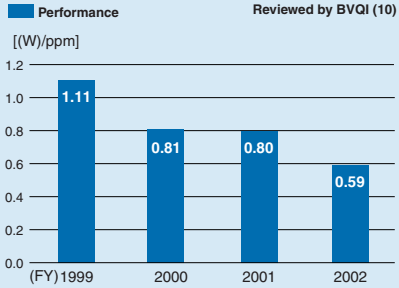
Changes in Energy Consumption of Facsimiles (including multifunction copiers)

Reviewed by BVQI (9)



Changes in Energy Consumption of Black-and-White and Color Printers

Reviewed by BVQI (10)



* In fiscal 2002, additional efforts were made to reduce total energy consumption of printers by marketing the IPSiO 650S/750/850 equipped with QSU technology as well as the Aficio AP4510.

◎ 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

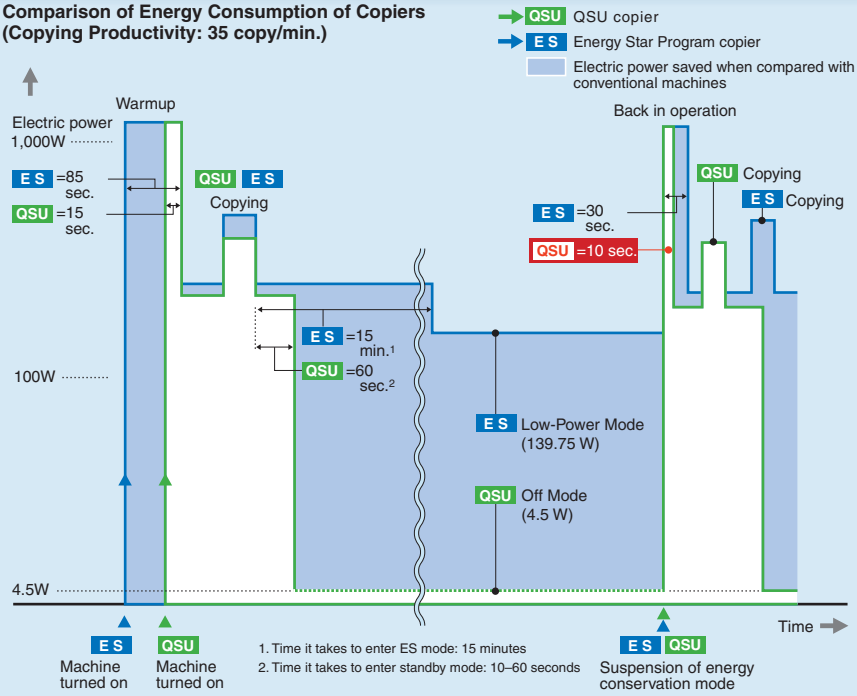
3. Energy Star energy consumption in standby mode = energy consumption in standby mode pursuant to the standards of the International Energy Star Program.
4. Printing speed = print per minute (ppm)

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

IPSiO NX850

Aficio 2035/2045 (imagio Neo 351/451) (Model 765 with optional functions)

Comparison of Energy Consumption of Copiers (Copying Productivity: 35 copy/min.)



1. Time it takes to enter ES mode: 15 minutes
2. Time it takes to enter standby mode: 10–60 seconds

By introducing a power-saving controller and high-efficiency power supply unit (PSU), the power consumption of the Aficio 2035/2045 (imagio Neo 351/451[3]) while in off mode was reduced from 7 W[4] to 4.5 W. The Aficio 2035/2045 requires only 10 seconds to begin operating from off mode, enabling users to start copying immediately. An energy-saving fusing unit and toner that allow ink to be fixed at low temperatures realize low energy consumption while in operation as well.

3. The Aficio 2045 (imagio Neo 451) requires 15 seconds to begin operating because of its high copying productivity of 45 copy/min. (continuous copying of A4-size paper, bypass).
4. Electric power consumption of the Aficio 1035/1045 (imagio Neo 350/450), in which QSU technology was first incorporated
5. The rule stipulates that the time it takes to enter Low-Power mode or off mode may be 15 minutes or less if the warmup time is 30 seconds or less.

Standard Values Set by Laws and Regulations and Values Achieved by Ricoh Machines (Copier with Copying Productivity of 35 copy/min.)

Items governed by law		Standard values of laws and regulations	Aficio 2035
Law Concerning the Rational Use of Energy (Japan)	Energy consumption efficiency (Wh/h)	2006 standard value 125 Wh/h	33 Wh/h
	Low-Power Default Time	15 minutes	60 seconds[5]
International Energy Star	Low-Power Mode	139.75 W or less	4.5W[6]
	Recovery Time from Low-Power Mode	30 seconds or less	10 seconds

6. Low-Power mode for the Aficio 2035/2045 (imagio Neo 351/451) is the same as off mode or sleep mode thanks to the use of QSU technology.
7. Copying productivity (copy/min., continuous copying of A4-size paper, bypass)

Energy-Saving Capabilities of the Latest Copier, the Aficio 2035 (imagio Neo351)

Japan's Energy Saving Law stipulates that all copiers capable of 35 cpm[7] must satisfy the energy consumption efficiency (average electric power consumption per hour) requirement of 125 Wh/h by 2006. The Aficio 2035 (imagio Neo 351) has surpassed the requirement and achieved 33 Wh/h. This was possible because the amount of time required to warm up the Aficio 2035 was significantly shortened to 15 seconds or less, as opposed to the 85 seconds required by conventional machines, and the time it takes to begin operating from off mode was shortened as well, to 10 seconds.

According to the rule for measuring energy consumption efficiency, energy-saving mode is not to be entered for 15 minutes (see Low-Power mode in the figure) after copying. This is to avoid a long waiting time before resuming copying. The rule, however, has an exception in that a machine may enter Low-Power mode or off mode in 15 minutes or less only when its warmup time is 30 seconds or less. Because the Aficio 2035 requires only 15 seconds to warm up, it is able to enter off mode within the 15-minute restriction[8].

The Energy Star standards stipulate that the time required to begin operating from Low-Power mode should be 30 seconds or less for copiers capable of 20<cpm[7]≤44 and that electric power consumption in Low-Power mode should be 139.75 W or less for copiers capable of 35 cpm. It can be said that, compared to these standards, the specifications for the Aficio 2035 (10 seconds for start of operation and 4.5 W of electric power consumption in Low-Power mode) represent extremely high energy-saving capabilities.

8. If the time it takes to enter off/sleep mode is too short, the settings in the machine while operating may be cancelled. Ricoh set such time to one minute in consideration of user friendliness.

User-Friendly Duplex and N-Up Copying Functions

To provide more consumers with user-friendly duplex and n-up copying (copying multiple pages on one sheet of paper) functions and reduce environmental impact caused by the use of paper, Ricoh developed faster duplex and n-up copying technologies that are more user friendly. To speed up the duplex copying of two-sided documents (the printing function that takes the longest amount of time complete), the Aficio 1060/1075 and imagio Neo 601/751 digital printer series simultaneously reads both sides of a document with a single scan. Also, touchscreens were improved so that the duplex and n-up copying functions would be more comfortable to use. The Aficio 1060/1075 and imagio Neo 601/751 series achieved nearly 100% duplex productivity* while in continuous operation. Many of our other products achieved high duplex productivity as well.

* Duplex copying productivity (%) = (Time spent on simplex → duplex copying)/(Time spent on simplex → simplex copying) × 100. 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.

imagio Neo601/751
(Model T with optional functions)

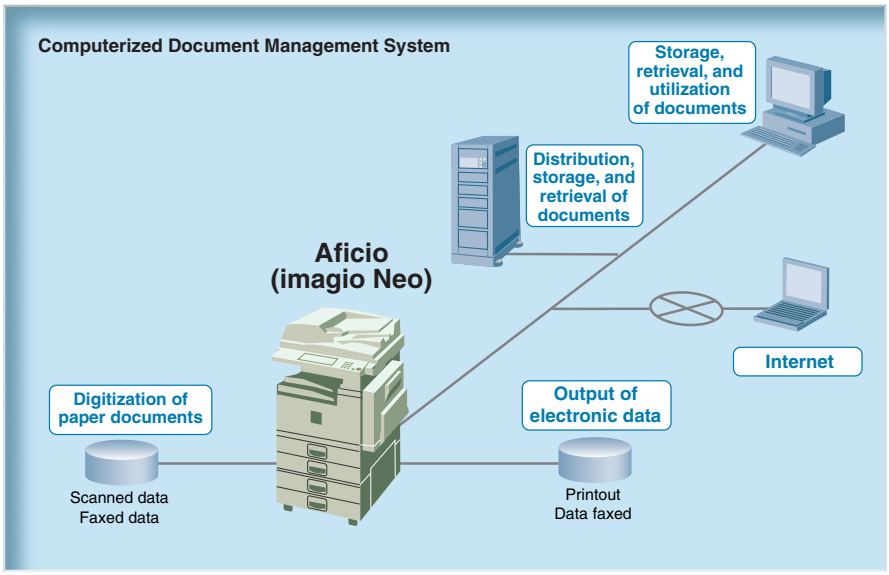
Contribution Made by Duplex Copying

The duplex copying function of the Aficio 1035 (imagio Neo 350) and Aficio 1075 (imagio Neo 750) series saves users 408 kWh and 2,550 kWh of energy per unit/year, respectively. This is equivalent to a 145 kg and 910 kg reduction in CO_2 emissions*.

* The figures were calculated assuming that the Aficio 1035 (imagio Neo 350) uses an average of 10,000 sheets of paper per month for copying and the Aficio 1075 (imagio Neo 750) uses an average of 50,000 sheets per month, reducing the use of paper by 2,000 sheets (20%) and 12,500 sheets (25%), respectively, by duplex copying, and based on the conversion coefficient (1 kWh = 0.357 kg – CO_2) used in Japan.

Reducing Paper Consumption by Computerization

Ricoh provides customers with an ideal printing environment with its high-value-added products, including multifunctional printers (printers that can also be used as copiers and facsimiles). In addition, by scanning and digitizing paper documents and showing them on a networked PC screen, Ricoh printers provide customers with an efficient electronic document management system. For easy duplex and n-up printing, the Ricoh has developed a unique printer driver called RPCS.



Reducing Environmental Impact by Manufacturing P × P Toners

Ricoh developed the industry's first polyester polymerization toner (P × P toner)*, which is chemically manufactured using polyester resin materials, coloring agents, and wax to ensure higher copying/printing quality. Compared with traditional toner particles made by crushing materials, the energy (in CO_2) required to manufacture P × P toner is reduced approximately 35%. Also, thanks to the uniform thermal properties obtained by the use of polyester resin, the fixing temperature can be lowered which, in turn, contributes to energy conservation while the toner is used.

* P × P toner was developed using Ricoh's unique polymerization method. P × P stands for polyester × polymerization. Traditional polymerized toner is made from styrene and acrylic resins while P × P toner contains polyester resins.

Rewritable Printer & Paper

According to a survey, 70% of the paper used in offices will never be used again, which means only 30% is stored for a long time after being printed on. Ricoh, making the most of its exceptional thermal paper technology, developed a rewritable printer and paper that can be reused more than 200 times. The rewritable paper is very similar in texture to ordinary paper and can be written on using an exclusively developed red-colored pen.

Rewritable Printer & Paper

Energy-Saving Digital Cameras

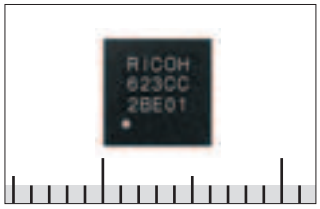
Ricoh strives to improve the performance and multiple functions of digital cameras while promoting their energy-saving capability. The Caplio RR30, which was marketed in fiscal 2002, can use lithium batteries or two AA batteries. The previous model required four AA batteries. The new model reduces electricity consumption approximately 59% compared with the previous model marketed in fiscal 2001.

Caplio RR 30 digital camera

Analog One-Chip Energy-Saving LSI for Cellular Phones

In the area of cellular phones, which are increasingly being downsized and added with more functions, it is very important to prolong the life of the batteries the phones use. Ricoh developed an analog one-chip LSI, which can halve the electricity consumed by a cellular phone by effectively controlling the electricity. The LSI is equipped with a voltage regulated power supply in ECO mode*. The product is supplied to cellular-phone manufacturers. In fiscal 2002, the product contributed to reducing CO_2 emissions by 1,000 tons on an annual basis.

* Patent registered in the United States and applied for in Japan



Analog one-chip LSI for cellular phones