Our aim is to bring about an "industrial revolution of the environment" through the development of innovative environmental technologies, thereby realizing a low-carbon society.

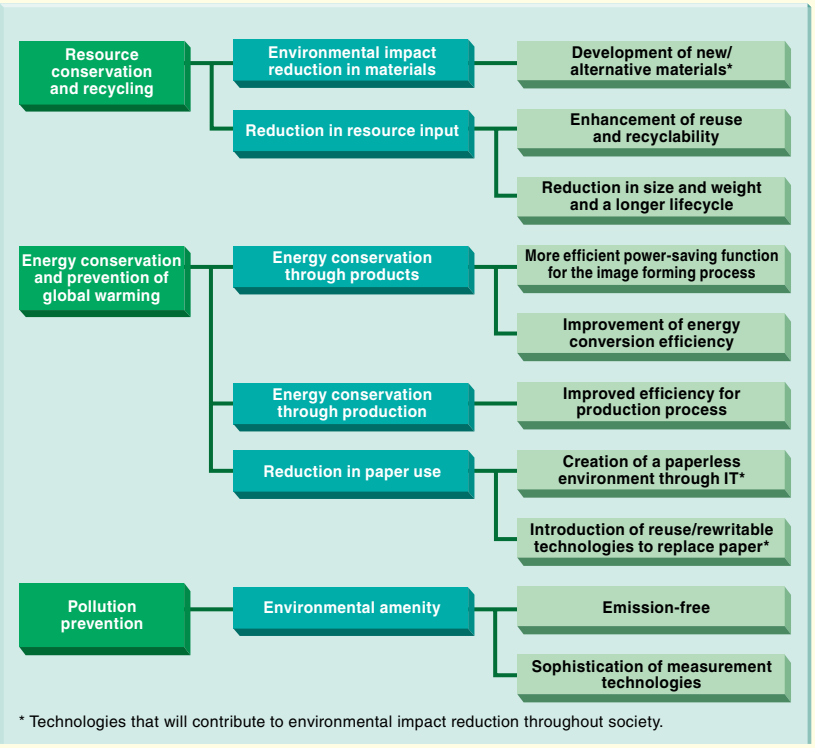
■ Concept of Product Development

The Ricoh Group develops products that—throughout their lifecycles—will keep their environmental impact below the limit at which the global environment becomes unsustainable. First, Eco Balance data on the environmental impact caused by overall business activities are identified and, based on the results, targets for products covered by the action plans are set (Plan). LCA-based designs are then drawn up, and production process technologies are developed to achieve the targets (Do). Results from these designs and process technologies are again reviewed alongside the Eco Balance data (Check) before being reflected in the next targets (Act). In addition to technological development directly related to products, we also work on technological development that will help reduce the environmental impact of society as a whole. We are promoting various activities—such as the development of new/alternative materials, creation of a paperless environment through information technologies, and introduction of reuse/rewritable technologies to replace paper—to further evolve Ricoh's core technologies into environmental technologies that can be applied in a wider variety of areas.

■ Target for Fiscal 2010

◎ Develop environmental technologies that will help reduce the environmental impact of business activities and of society as a whole.

Focused areas for environmental technologies

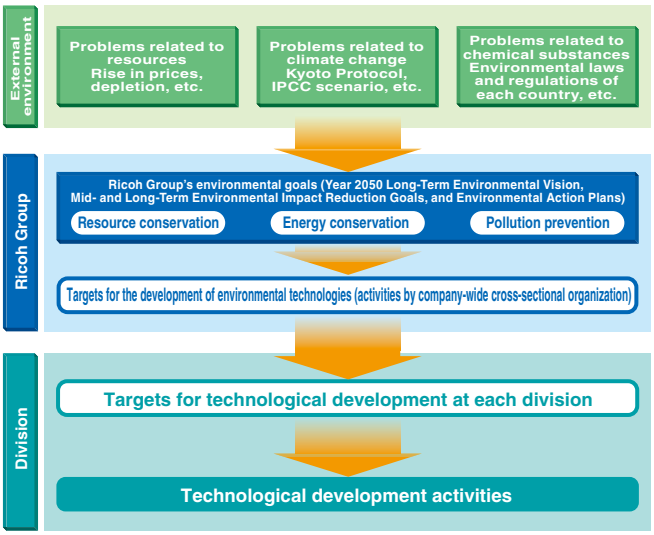


* Technologies that will contribute to environmental impact reduction throughout society.

Acceleration of development of environmental technologies

The development of environmental technologies is one of the most important efforts to realize sustainable environmental management. It is the basis for providing customers with products that are low in environmental impact throughout their lifecycle from the procurement of materials and use by customers to their recycling, as well as for simultaneously realizing both a reduction in environmental impact and the creation of economic value. The Ricoh Group is well aware that existing technologies are not sufficient for creating products that will help resolve the current problems of climate change and resource depletion, meet environmental laws and regulations, and expedite the realization of a low-carbon and resource-recirculating society. Ricoh's development of environmental technologies is based on this recognition. In fiscal 2009, we set targets for each stage of the product lifecycle in terms of technology development according to the Group's 2050 Long-Term/2020 Mid-Term Environmental Impact Reduction Goals and drew up technological strategies to achieve these targets. In fiscal 2010, our focus will be on enhancing the system that facilitates cross-cutting cooperation between different technology areas, aiming at more effective development activities concerning environmental technologies. In addition, looking at the 2020 mid-term goals, we will accelerate efforts to advance our environmental technology development, thereby increasing the potential for further reductions in environmental impact.

Ricoh's approach to the development of environmental technologies



Promotion of LCA-based design

LCA-based design is a process where targets are set to reduce the environmental impact of products throughout their lifecycles, and the PDCA cycle is used to achieve these targets. Ricoh developed the LCA calculation tool in fiscal 2006 to enable designers to carry out LCA-based design in a more efficient and effective manner. This tool is now actively utilized to conduct LCA for products in the process of development based on their specifications, and, in accordance with the results, set environmental impact reduction goals for each product.

Life Cycle Assessment (LCA)

LCA means quantitatively identifying which and how much environmental impact exists in the lifecycle of a product, from the resource extraction for the production of raw materials to manufacturing, transportation, marketing, use, maintenance, collection, recycling, and disposal. LCA may also be applied to part of the above cycle.

Disclosure of information using environmental labels

It is important not only to develop environmentally-friendly products through the use of environmental technologies and LCA-based design, but also to disclose information in an easy-to-understand manner. Ricoh is actively engaged in introducing Type I environmental label certifications so that customers will understand that our products are environmentally friendly. We are also working to disclose our environmental information in accordance with Type III environmental declarations.

* For details on environmental labels, refer to our web site:
http://www.ricoh.com/environment/label/index.html

QREX—the industry's first Eco Leaf label product <Ricoh Elemex Corporation (Japan)>

QREX, a microprocessor-controlled LP gas meter from Ricoh Elemex Corporation (REX), was the first product in the industry to obtain certification under the Eco Leaf environmental label[1] program, when it was certified in July 2009. REX has been working to reduce its environmental impact in earnest since around 2005, primarily by discontinuing the use of lead and hexavalent chromium in its LP gas meter products; making these products lighter, smaller, and recyclable; and making the production area more compact. Leveraging these green features of the product to help raise environmental awareness in the LP gas industry, REX decided to apply for this eco-labeling program. In its pioneering efforts to become the first in the industry to receive certification, the company worked with the member companies of the Environmental Working Group of the Japan Gas Meter Industry Association to establish the necessary Product Category Rules (PCR)[2] criteria for calculating LCA data, and cooperated with relevant internal and external organizations to deal with other issues. The establishment of the PCR and REX's success in acquiring certification has spurred other companies in the industry to apply for or plan to apply for the Eco Leaf label certification. The high environmental performance of QREX is not limited to the product itself. The environmental impact of its packaging has also been lowered, for example, by minimizing the volume of waste raw materials unused in the production process and reducing the packaging box size. In recognition of these features, the packaging was selected as the winner of the WorldStar Sustainable Packaging Award sponsored by the World Packaging Organisation (WPO) in May 2008. REX will continue to contribute to industry-wide activities to build a resource-recirculating society by advancing its own efforts to reduce the overall environmental impact of its products throughout the product lifecycles.

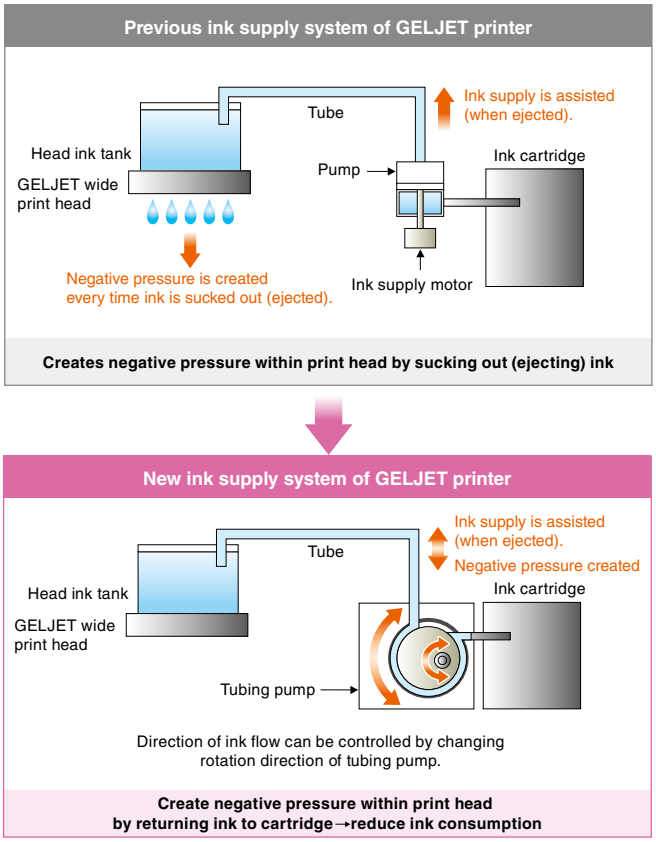
1. A Type III environmental labeling program administered by the Japan Environmental Management Association for Industry (JEMAI). To obtain certification for this label, environmental impact data for the product must be quantitatively assessed using the LCA method and disclosed throughout its product lifecycle from production through use to disposal.
2. Standards that define how LCAs are to be conducted, including the data to be analyzed, for different classes of products, and how the results are to be presented on the product label.

Reducing ink consumption of GELJET printer <Ricoh (Japan)>

Ricoh's GELJET printer features high-viscosity ink, developed to enable high-speed duplex printing on plain paper with high picture quality to support work at offices. Furthermore, to achieve high-volume continuous output, the print head and ink cartridges are separate from each other. To ensure stable printing performance with this layout and using a viscous ink, a state of negative pressure[1] needs to be maintained inside the print head. Previously, to create a constant negative pressure condition within the print head, the GELJET printer was designed to regularly eject ink, even when the machine was not in a printing operation, resulting in the unnecessary consumption of ink. Seeking solutions to this problem caused by the repeated ink ejection pattern, Ricoh developed a new technology to create a constant negative pressure condition within the print head. The key element is a newly developed pump that can convey ink in two directions between the head and the cartridge, as opposed to the conventional one that allows ink to flow only in one direction, from the cartridge to the head. The new dual-direction pump enables the printer to create and maintain a negative pressure status inside the print head by sucking ink from the head towards the cartridge, thus saving ink by eliminating the need for ejection while the printer is not in operation. The new method is also beneficial as it has remarkably improved ink usage efficiency, because less ink is consumed for printing the same volume. This benefit is particularly notable for low print volume users[2], for whom the frequency of the motion for creating negative pressure is relatively high in proportion to print volume. After the first mounting of the innovative pump on the IPSiO GX e3300 printer, released in May 2009, it was employed on the IPSiO GX e5500 series, which was launched in February 2010. Following this recent utilization, the new technology will be mounted on newer models rolled out in the years to come.

1. Refers to a condition of a given area in which gauge pressure is below zero (i.e., negative) compared with the ambient air pressure.
2. Users whose monthly print output ranges approx. from 50 to 100 pages.

Mechanism to create negative pressure within print head



Development of alternative materials using biomass resins

<Ricoh (Japan)>

As part of its efforts to develop alternative materials to realize a low-carbon and resource-recirculating society, Ricoh is working on the development of components and toners for copiers by utilizing biomass resins. Biomass resins have been receiving increasing attention recently as they are recyclable and contribute less to global warming than their petroleum-based counterparts. In 2002, we started development of biomass plastic for application in our copiers, and in 2005, rolled out the industry's first multifunctional digital copier equipped with biomass components (50% biomass content[1]) in its main unit. As collection and recycling of toners after printing is rather difficult, it is important to reduce the environmental impact of their components—currently, petroleum-based resins constitute the primary components. Ricoh has worked on the commercialization of biomass toners since[2] 2006, releasing them into market in November 2009.

imagio MP 6001GP

Ricoh plans to continue technical development toward improving biomass content and expanding the use of biomass resins. At the same time, Ricoh plans to search for possibilities toward commercialization of technology for effectively using limited resources in other materials as well by reducing use of resources that are highly likely to dry up and focusing on alternative resources.

1. Percentage of biomass resins included in components
2. Designed to be used for Ricoh products

History of Ricoh's biomass resin material development

2002	**Began developing biomass plastic components as materials for copiers**
2005	**Became the industry's first to employ plastic with 50% biomass content in the main component of a multifunctional digital copier**
2006	**Began efforts toward commercialization of biomass toners**
October 2008	**Released the imagio MP C2200 model, which employs a newly developed plastic component with roughly 70% biomass content**
November 2009	**Released the imagio MP 6001GP, equipped with "for E Toner," and became the world's first manufacturer to employ a biomass toner (25% biomass content)**

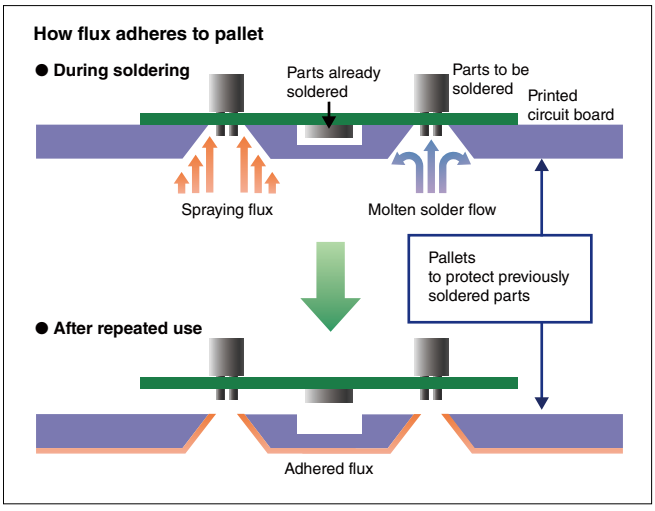
Development of Environmental Technologies at Business Sites

Dry washing technology for reduced environmental impact of production processes

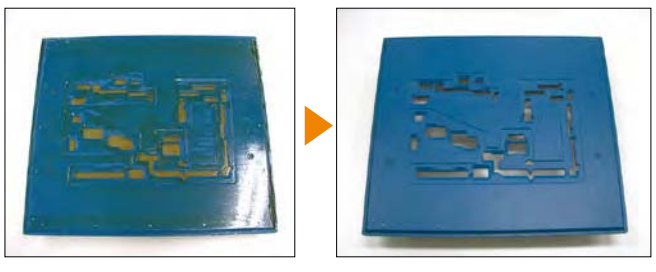
Recycling can never be labeled effective if it generates significant environmental impact in its process. Based on this recognition, Ricoh has been making solid progress in developing resource-recirculating production systems. The development of original dry washing technology is among the latest examples. To recycle parts stained with toner, we previously employed an ultrasonic cleaning process that required the use of water, which inevitably involved wastewater treatment and energy consumption to dry the washed parts. With the newly developed technology, which cleans to a quality as high as that of ultrasonic cleaning processes, toner stains are scraped off parts by blasting them with tiny sheets of film, rather than water, at high speed. This new technology has been in practical use since fiscal 2007, mainly in the organic photoconductor unit cartridge recycling process both in Japan and overseas, and it has led to considerably less operation time and less energy use than wastewater treatment and drying processes. In fiscal 2009, we succeeded in applying this dry washing technology for the removal of adherents on the mounting of electronic components.

In the automated soldering process for the production of semiconductor circuit boards, jigs called pallets are used to protect already soldered parts from heat. In this process, in order to remove oxidized coating from the joint surface, flux is sprayed onto the spots where parts are to be soldered. As the pallets are used repeatedly, flux residue will accumulate and become fixed on the pallets over time. This needs to be periodically removed. As flux removal with the use of organic solvent requires the treatment of liquid waste and burdensome manual labor, a new technology that could reduce the associated workload, environmental impact, and operational costs had been eagerly awaited. Application of the dry washing technology to pallet cleansing has resulted in: shortening the time needed from 120 minutes to 2 minutes; ending the need for treatment of liquid waste; and reducing CO_2 emissions by an estimated 50 to 90%. In fiscal 2009, the technology was introduced at the Ricoh Hatano Plant and at Shanghai Ricoh Office Equipment Co., Ltd. It is hoped this technology, which serves to create a resource-recirculating society, will be applied to a wide range of areas in the future. Ricoh will continue to advance this technology in anticipation of it being adopted by other companies and industries.

* "Ricoh technology: a special round-table talk by the developers of the dry washing technology" is available at: http://www.ricoh.com/technology/voice/f_runner/fr08/



Pallets before/after dry washing



Pallet with flux adhering

Pallet after flux washed away