

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 during their lifecycles keep the integrated 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—

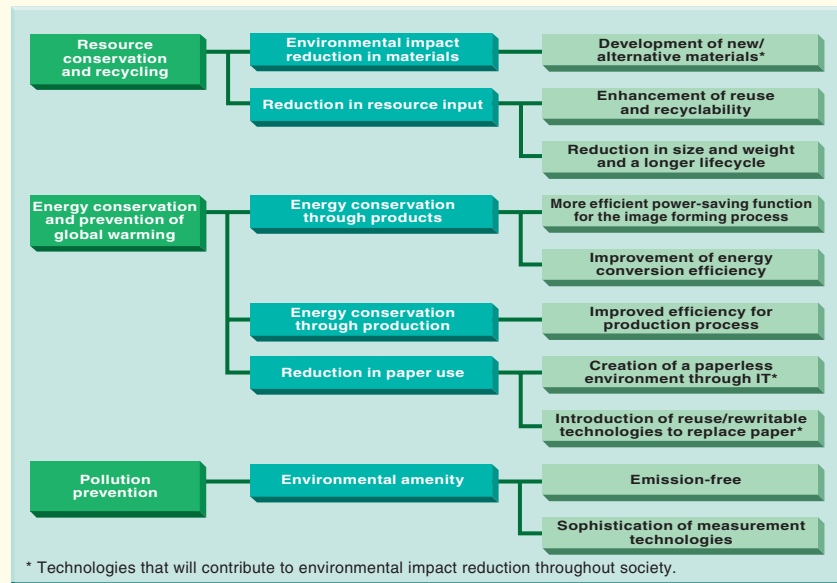
to further evolve Ricoh’s core technologies into environmental technologies that can be applied in a wider variety of areas.

* See pages 5, 58 and 59.

■ Target for Fiscal 2010

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

Focused areas for environmental technologies



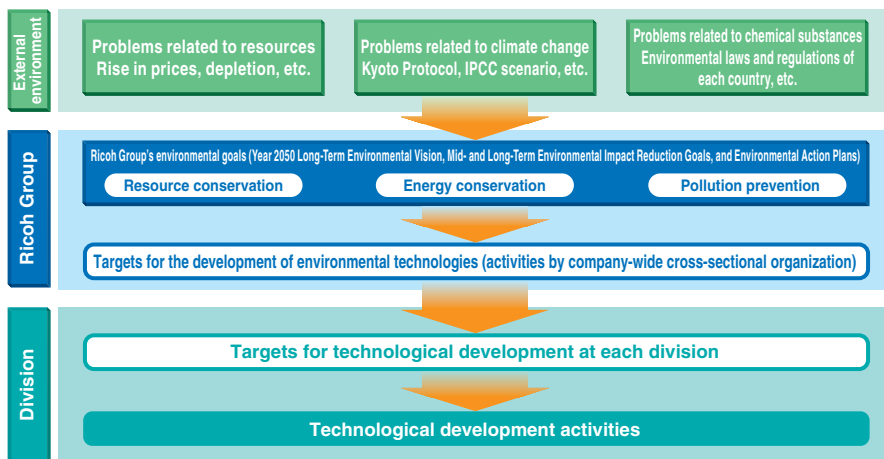
Acceleration of development of environmental technologies

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 solve 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. Based on this recognition, the Ricoh Group established the Environmental Technology Development Promotion Working Group, a company-wide cross-sectional organization with 92 staff members, in January 2008 with the aim of accelerating and promoting the development of innovative environmental technologies. In fiscal 2008, we set targets in the area of technological development based on the Ricoh Group’s environmental goals (Year 2050 Long-Term Environmental Vision, 2050 Long-Term/2020 Mid-Term Environmental Impact Reduction Goals, and Environmental Action Plans), and reflected these targets in the technological strategy of each division, which is to be reviewed in fiscal 2009, and technological development activities performed under the strategy. Six focus areas have been selected under the three fields of “energy conservation,” “resource conservation,” and “pollution prevention;” and various development activities are conducted for each of these areas.

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 an 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 life-cycle 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.

Development of alternative materials using plant-based resins

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 plant-based resins. Plant-based 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 launched development of plant-based plastic for application in our copiers, and in 2005, rolled out the industry's first multifunctional digital copier equipped with plant-based components in its main unit (50% biomass content). In October 2008, we also released the imagio MP C2200, a multifunctional copier for which our new plant-based plastic components with a higher biomass content (approximately 70%) are used. 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 plant-based toners since 2006, and is planning to release them to market in fiscal 2009.

Disclosure of information using environmental labels

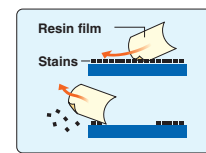
It is important not only to develop environmentally-friendly products through the use of environmental technologies and LCA-based design, but also to disclose information in an easy-to-understand manner. Ricoh is actively engaged in introducing Type I environmental label certifications so that customers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

Dry washing technology for parts recycling

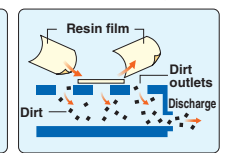
Recycling can never be labeled effective if it generates significant environmental impact in its process. Based on this recognition, Ricoh has been making solid progress in developing resource-recirculating production systems. The development of original dry washing technology is among the latest examples.

Removal of stains



The sheets of resin film are hit hard against the surface in a high-speed air flow to remove the stains.

Separation and discharge of dirt



Only dirt is discharged, and the sheets of resin film are circulated and used repeatedly.

Previously, we used water to remove toner stain from used parts, which inevitably involved wastewater treatment and energy consumption to dry the washed parts. Using the newly developed technology, which cleans to a quality as high as that of ultrasonic cleaning processes, toner stains are scraped off by blasting with tiny sheets of film, rather than water, at high speed. This was first put into practical use for Ricoh Gotemba Plant's organic photoconductor unit cartridge recycling process, which saw considerably less operation time and less energy use for wastewater treatment and drying processes. We also made this technology available for the recycling process at Ricoh Industrie France S.A.S. in fiscal 2008.

TOPIC

Development of Reflective Display

Electronic paper based on inkjet printing technology, realizing significant reduction of environmental impact and costs

Ricoh constantly pursues technological development aimed at reducing the environmental impact of paper consumption and, as part of these efforts, has succeeded in developing a reflective display with fine pixels based on inkjet printing technology to replace the display function of paper. With this technology, which is expected to be utilized for various applications including electronic books and advertisements, transistor electrode patterns are traced on a special resin that becomes hydrophilic when exposed to the UV light, which is coated on the thin, pliable paper-like plastic base (electronic paper), realizing a resolution as high as that of existing electronic paper. While existing electronic paper, which is fabricated by fine semiconductor processing technology, requires a complicated production process and a large-scale vacuum facility, making the environmental impact and costs excessively large, Ricoh's technology is expected to reduce the environmental impact and reduce costs by half.

