

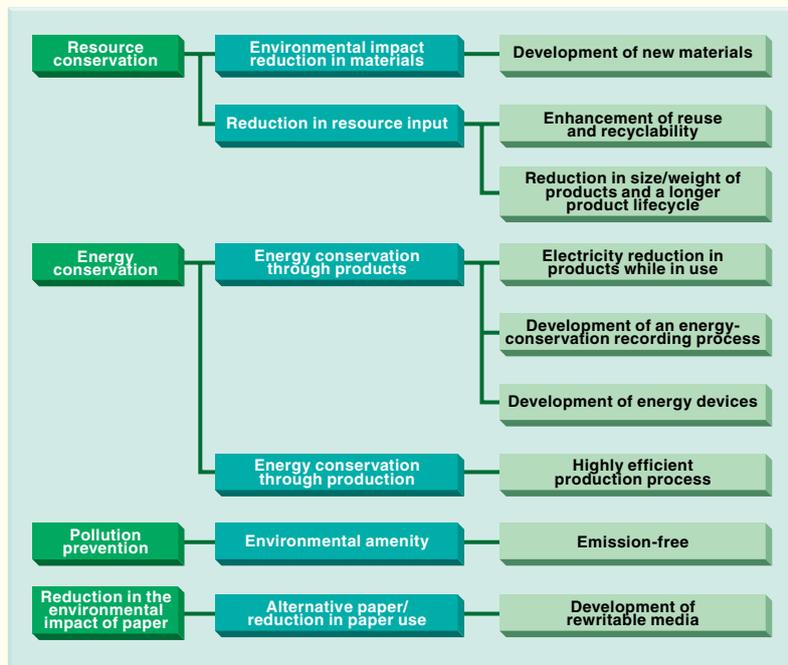
## Promoting the development of environmental technologies and environmentally-friendly products based on the Extra-Long-Term Environmental Vision

### ■ Concept of Product Development

The Ricoh Group develops products that during their lifecycles keep the integrated environmental impact<sup>1</sup> below the limit at which the global environment becomes unsustainable. First, the Eco Balance<sup>2</sup> 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). The design division then draws up LCA-based designs to achieve the targets (Do). Results from the LCA-based designs are reviewed again (Check) before being reflected in development goals for the next models (Act). To effectively reduce environmental impact throughout the product lifecycle, the Group is also working to develop environmental technologies for new product materials and technologies that will help reduce paper consumption. As a next step, we aim to develop environmental technologies that will contribute to reducing the environmental impact of society as a whole.

1. See Page 56. 2. See Pages 56 and 57.

Focused Areas for Environmental Technologies



### Promotion of LCA-based Design

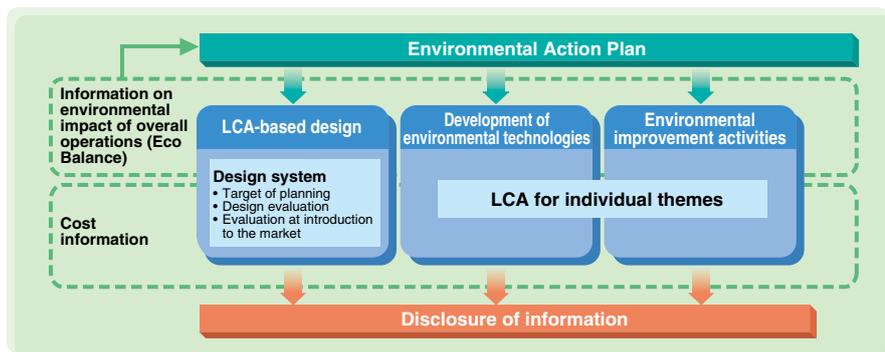
LCA-based design is a process where targets are set to reduce the environmental impact of products throughout their lifecycles, and the PDCA cycle is used to achieve these targets. To effectively reduce the environmental impact across the entire lifecycle of a product, the Ricoh Group quantifies targets for reduction by “integrated environmental impact” and keeps track of how much environmental impact is generated in each lifecycle phase, which ranges from material sourcing to the manufacturing, transportation, use, and disposal of products. In fiscal

2007, we focused on setting LCA-based reduction targets for multifunctional color copiers under development. Going forward, we intend to set reduction goals for all product models using this methodology.

#### 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.

#### Position of LCA in Sustainable Environmental Management



### Promotion 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 unobtrusively contribute to a reduction in environmental impact while in use” and for simultaneously realizing both a reduction in environmental impact and the creation of economic value. In addition, based on the Year 2050 Extra-Long-Term Environmental Vision, the Ricoh Group has established medium- and long-term plans for four fields: “energy conservation,” “resource conservation and recycling,” “pollution prevention (environmental comfort),” and “reduction in paper use in printing/copying.” In accordance with these plans, the R&D Division as well as all business divisions and affiliates are engaged in developing environmental technologies and products. The Group also began to address a technological theme that helps reduce the environmental impact of society as a whole in addition to the field of copiers.

## Dry Washing Technology for Parts Recycling

A recycling practice will never be called effective if it generates significant environmental impact in the course of recycling resources. Based on this recognition, Ricoh has been making progress in developing resource-recirculating production systems. The development of original dry washing technology is among the latest examples. Previously, we used water to remove toner stain from used parts, which inevitably involves wastewater treatment and energy consumption to dry the washed parts. Using the new technology, which can achieve cleaning quality as high as that of ultrasonic cleaning, toner stain is scraped off by blasting it with tiny sheets of film, rather than water, at high speed. Its first practical use was 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 intend to make this dry washing technology available at other production sites and for wider purposes.



Dry washer

## 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>

## Practical Use of Plant-based Plastic

Ricoh has been working to develop product materials with less environmental impact because it noted the fact that a great percentage of the environmental impact caused by its business activities comes from material/parts procurement and manufacturing. In 2002, we started to develop plant-based plastic for application in our copiers. Plant-based plastic has been receiving increasing attention recently because it is recyclable and contributes less to global warming than its petroleum-based counterpart. In 2005, Ricoh rolled out the industry's first plant-based multifunctional digital copier, of which 50% of the main unit is made from plant-based materials. We intend to raise this ratio gradually in due course. We are also endeavoring to expand the application of plant-based materials into other areas, such as the development of a plant-based toner. As collection and recycling of toners after printing is rather difficult, it is important to reduce the environmental impact of their materials—currently, petroleum-based resins are the primary components. We are also keenly mindful that we should explore some manner of plant resource use that does not compete with sustenance needs.

## RICO<sub>2</sub>RET\*—a Tool for Calculating CO<sub>2</sub> Emissions during Parts Manufacturing

To reduce the environmental impact of its products effectively, Ricoh developed RICO<sub>2</sub>RET (Ricoh CO<sub>2</sub> Reduction & Evaluation Tool) to calculate the CO<sub>2</sub> emitted during the manufacturing process of parts. With this tool, the amount of CO<sub>2</sub> emission can be obtained by process to manufacture one single unit of a part or by facility used for processing, by simply entering the required information, such as the type and quantity of parts materials or manufacturing supplies, and the amount of energy consumed by the use of production equipment, air conditioners and lighting fixtures. The tool is of great help in reducing environmental impact during a parts manufacturing process in an efficient manner, because its graphically presented calculation results explicitly highlight which process is a large CO<sub>2</sub> emitter. To ensure the tool will help reduce environmental impact during part manufacturing, we update the base unit for the calculation from time to time in order to maintain data quality.

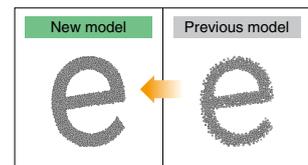
\* See page 13.

## TOPIC

### Development of New Color "PxP" Toner

#### Tin-free low-temperature fixing eco-toner with less environmental impact in the production process

Ricoh's production development policy is to create products that have minimal environmental impact throughout their lifecycles. Our new color PxP toner (a polymerized toner), made from newly developed polyester resin, is designed to fuse at a temperature 20°C lower than its predecessor while achieving higher picture quality with fine and uniform particles. This lower fusing temperature means the copier/printer consumes less energy when in use. Another environmentally-friendly feature of this new toner is the higher recyclability of wastewater and solvent enabled by its resource-saving production process. The new color PxP toner was first introduced in the imagio MP C7500/C6000 series launched in December 2007 in Japan.



Achieving higher picture quality with the new PxP toner

