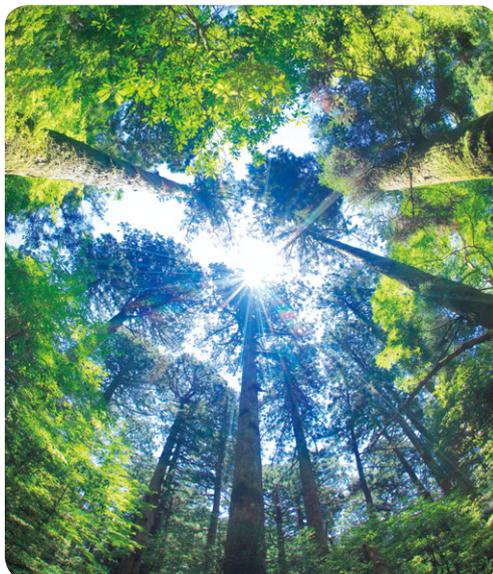
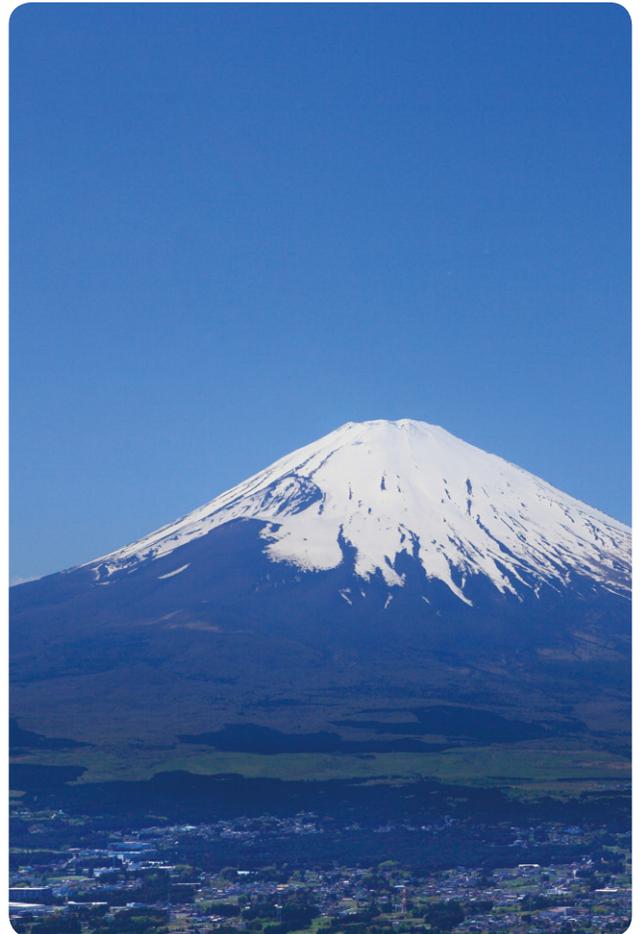


RICOH Eco Business Development Center

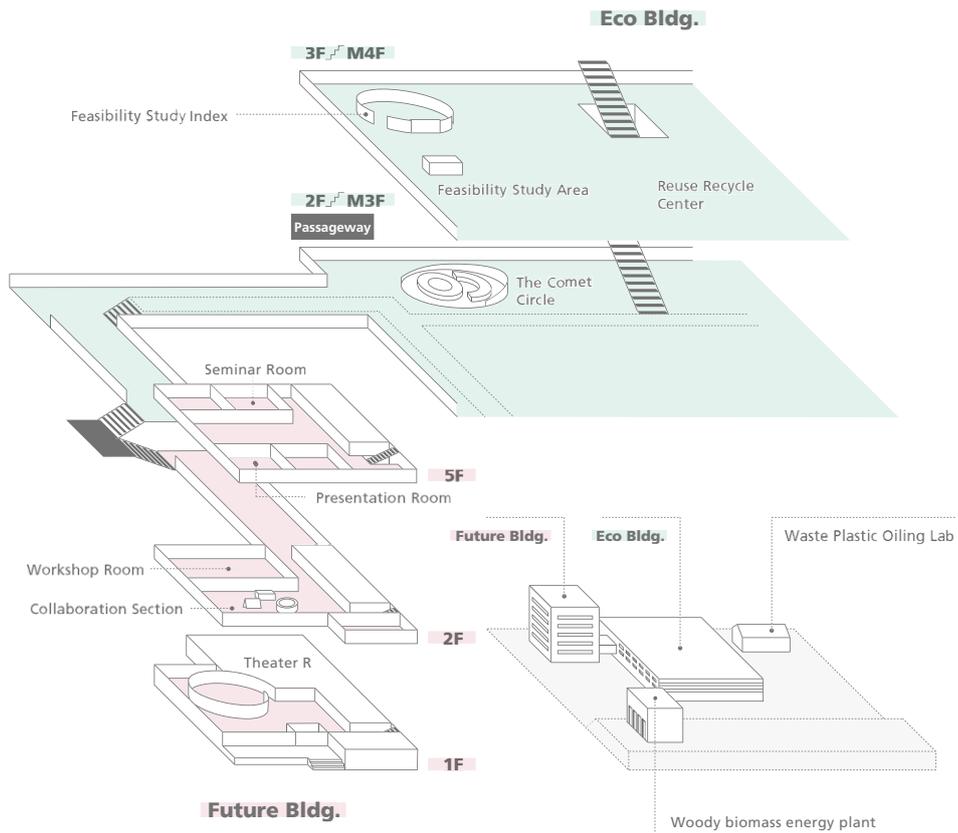
For Zero-carbon Society
and Circular Economy



Three Functions of RICOH Eco Business Development Center



Floor Map



Giving Shape to Eco Technologies for the Future

Feasibility Studies of New Environmental Technologies

Optimizing district energy use to realize a zero-carbon society

Ricoh has established the “Group’s Environmental Goals” for 2050 based on the Paris Agreement, international agreement adopted at COP 21 to address the issue of global warming, and conducts business activities to be able to achieve the goals. Also, Ricoh has joined RE100*, a global initiative network of companies committed to use 100% renewable electricity, marking a first for Japan. As part of these efforts aimed at a zero-carbon society, the Center operates experimental research projects on energy management for individual offices

and buildings, while also beginning to expand the target of these projects to cover the entire district, seeking to optimize energy use as a whole.

Our plan is to build a system that monitors energy demand for each facility in the district in terms of volume, location and hours, compares the data with energy generation status, and controls power distribution within the entire district so as to optimize supply-demand balance.



* RE100: Companies collaborating in this global initiative seek to source 100% renewable electricity.



* The above shows a conceptual image of an energy flow model

Energy Creation

Woody biomass utilization

Local-production-for-local-use model covering a range of processes from deliberate tree thinning to generating energy from it



Collaborating with the local government and forestry companies, we have simultaneously achieved forest management, CO₂ emissions reduction and energy creation. We will create a recycling model for woody biomass energy that utilizes unused thinned wood in Gotemba, and will introduce this "Gotemba model" across the country to contribute to regional revitalization.



**Wins 2017
Environment Minister's Award
for Global Warming Prevention Activity**

Countermeasures Technology Introduction and Dissemination Category

Minister of the Environment

* Theme : Introduction and dissemination of biomass boilers in collaboration with local governments

Micro hydroelectric power generation

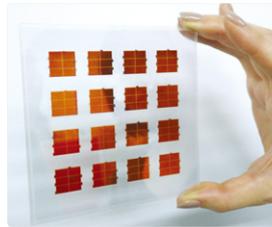
Power generation system that utilizes water flows in various locations



A micro hydroelectric power generation system utilizes numerous water flows that exist as an unused resource in agricultural fields, town area, buildings and factories. We are planning to develop a model that integrates the waterwheel and motor mechanisms to enable water power generation even from low flows and small height differences, which is difficult with conventional technologies, in order to construct locally produced and locally used energy infrastructure.

Energy-harvesting lighting devices

Complete solid-state dye-sensitized solar cell with high conversion rate even from indoor lighting



We produce a safe and durable solar cell that enables stable and permanent operation of sensors without any external power supply from a wall socket or battery. The cell is expected to be a clean and smart independent power source to contribute to spread of the Internet of Things (IoT).

Energy Conservation

Lighting and air-conditioning control system

Control to optimize lighting and air-conditioning operations using indoor environment sensors



The system manages the information obtained via sensors such as lightness, human occupancy and temperature in the cloud, and controls lighting and air-conditioning operations to appropriate levels. It allows for the effortless improvement of energy efficiency while achieving energy conservation, comfort and convenience levels all at once.

Energy-conservation / creation/storage control system for building and plant facility

Energy conservation and creation interlocking control system



This system is for more than just saving electricity for buildings and plants; it aims to optimize energy usage for the entire facility through interlocking control of power conservation, creation and distribution. We also plan to incorporate clean energy generation functions, focusing on solar power, micro hydroelectric power and other systems suitable to building and plant facilities.

Energy-conservation control system for building and plant facility

Saving energy for existing equipment such as pumps and fans in buildings and plants



This system has been developed to conserve energy required to operate air-conditioners in buildings and plants as well as factory equipment, such as pumps and fans. The system employs a sensor-linked variable-frequency drive, in place of the conventional fixed-frequency inverter control, to optimize facility equipment operations and also to maximize energy conservation effect.

Next-generation agricultural system

Space-saving, high-efficiency plant cultivation system



Housed in a facility refurbished from a previous clean room and equipped with generalized products to save costs, this laboratory specializes in research on plant cultivation technologies. The research function focuses on developments directed at high value-added cultivated plants, such as the rapid growth of plants using ultrafine bubbles and light control for improved antioxidant effect. We are also working on minimizing the power consumption through energy-saving lights for cultivation and utilizing unused energy sources.

Resource Conservation

Waste Plastic Oiling

Generating and extracting oil and metal from waste plastic components



Toner cartridges and bottles are difficult to recycle as they are soiled by toner and contain metal parts. We recycle such waste plastic components as a resource by dissolving them using heat. We plan to further advance this recycling technology to build our model for resource and energy recycling as a structure of local production for local use.

Continue

Circulating Limited Resources Efficiently

Development and implementation of reuse and recycling technologies

Most of our OA device reuse and recycling functions, previously distributed over 17 locations across Japan, have now been consolidated at the RICOH Eco Business Development Center in Gotemba. The Center enjoys a high reputation within the industry for both quality and quantity in processing OA devices. Based on the Comet Circle concept, we further develop reuse and recycling technology at this advanced site. Also, by expanding the target products and areas for reuse and recycling, we plan to reinforce our office equipment business centered on photocopiers and printers and drive the Ricoh Group's eco business forward.



* The unit reuse increase of OA devices collected by using ultra-simple packaging and shipping



imagio MP C4503RC/3003RC

Reuse and Recycle Technologies Employed in Reused Products



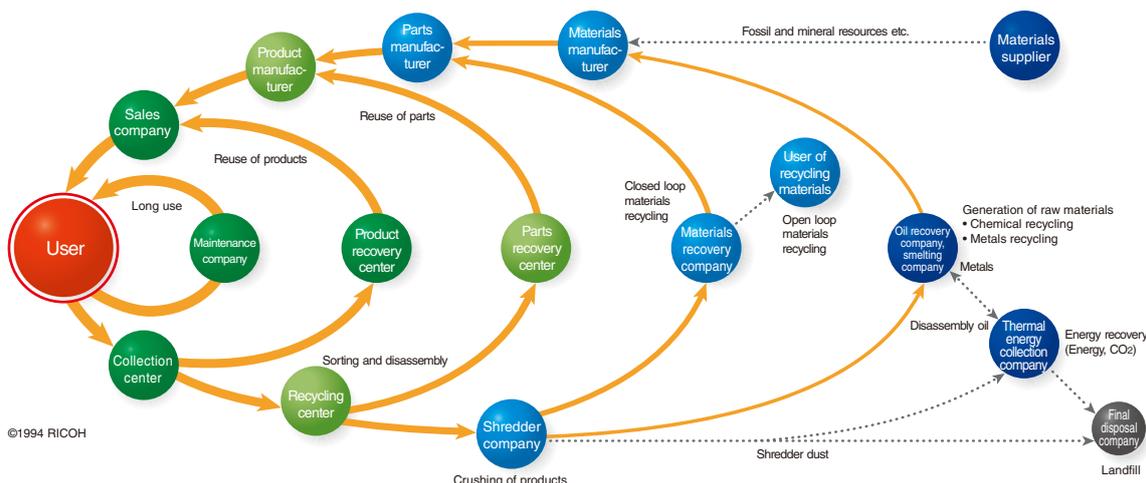
Automatic entering and dispatching system for collected machines using automated guided vehicle (AGV)

We have incorporated the use of automated guided vehicle (AGV) to improve plant operations and space efficiency for entering and dispatching control of collected machines.

Concept of a Sustainable Society: The Comet Circle™

The Comet Circle is a conceptual representation of Ricoh's approach to realize a sustainable society by attempting to reduce environmental impacts throughout the entire lifecycle of a product, not just within the Ricoh Group but also including both the upstream and downstream sections of the supply chain. As shown in

the figure, the smaller the loop (closer to the user), the lower the environmental impact and higher economic efficiency. Ricoh's development of reuse and recycling technology is seeking to make these loops as small and close to the user as possible.



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Promote

A Center for Environmental Communications

Sharing Ricoh's Current and Future Environmental Activities

Future Bldg.

1_F



Theater R

Visitors can learn about Ricoh's concept and its approach to the environmental business and experience our vision for the future.

2_F



Collaboration Section

The latest environmental solutions presented through hands-on sessions.

Eco Solutions Showcase

Our latest products introduced in trade shows, including those that have recently been released or forthcoming, are on display.

One Message for One Tree

Utilizing the digital signage-based technology for MICE* solution, visitors can write their own ECO Declaration on their photographs, with Ricoh donating one tree for each declaration.

* Meetings, incentive tours, conventions, conferences and exhibitions

2_F3_F



Stairwell View (Illustration & Art Objects)

In the stairwell, we display illustrations of various animals and plants found in the Mt. Fuji area as well as art objects made from repurposed waste materials.

3_F



Overview of Eco Garden City Project (with Projection Mapping)

You can view video picture of "Gotemba City's Eco Garden City Project" with projection mapping.

Eco Bldg.

2_F



The Comet Circle

This is a real-life presentation of the Comet Circle, Ricoh's resource recycling concept to realize a sustainable society, using actual products and components.

3_F



Feasibility Study Index

This space is dedicated to collaboration with visitors and discussing concrete ideas on environmental issues. An overview of the various environmental topics under which we conduct demonstration tests is introduced, including the vision, background, technological features, Ricoh's advantage, business plan and schedule.

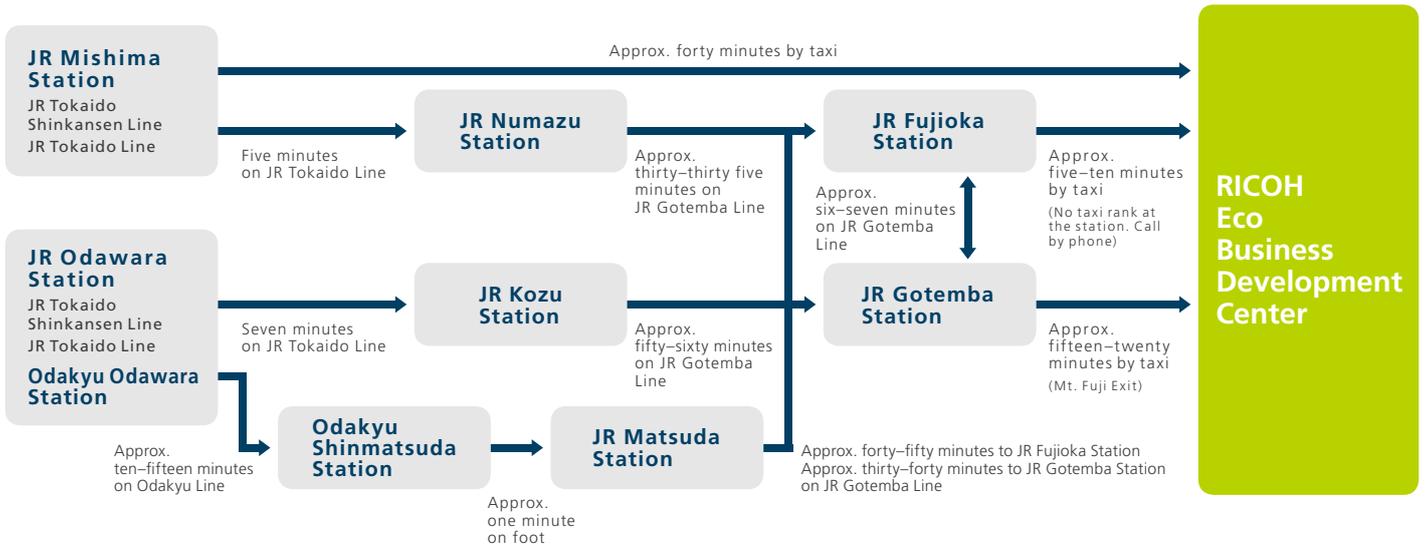
Access

By Car

- Exit the Tomei Expressway at Gotemba IC and take R138 in the direction of Lake Yamanaka. Turn left at R246 crossing and drive towards Numazu. Turn right at Yabai crossing to Komakado Industrial Estate.
- Exit the Tomei Expressway at Susono IC and take R246 bypass route towards Tokyo. Turn left at Komakado-Kazaana crossing to Komakado Industrial Estate.



By Train



RICOH
imagine. change.

RICOH Eco Business Development Center

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