



RICOH
imagine. change.

Resource
Smart
Solutions

Conscious throughout the
complete product lifecycle



Resource Smart At Every Step

The surge in popularity of the Circular Economy presents a good opportunity for Ricoh to share our experience, best practice and challenges in the (re-)use, maintenance and upgrade of resources required for Ricoh's product portfolio. Ricoh is no newcomer in the business of resource recirculation as we are guided by the knowledge of our environmental footprint at each step of our product lifecycle.

In 1994, Ricoh introduced the Comet Circle (Figure 1) principle with the goal of reducing the environmental impact over the entire product life cycle, including associated upstream and downstream processes. The Comet Circle™ centres on the belief that all product parts should be designed and manufactured in a way that they can be recycled or reused. Ricoh believes that the key to mitigating environmental impact is resource recirculation.

Ricoh's Comet Circle

Ricoh's roots stem from the philosophy where reducing our own environmental impact is not enough.

The Comet Circle represents our environmental impact reduction scheme, which includes not only the scope of the Ricoh Group as a manufacturer and sales, but also the entire lifecycle of our products, including upstream and downstream of our business activities.

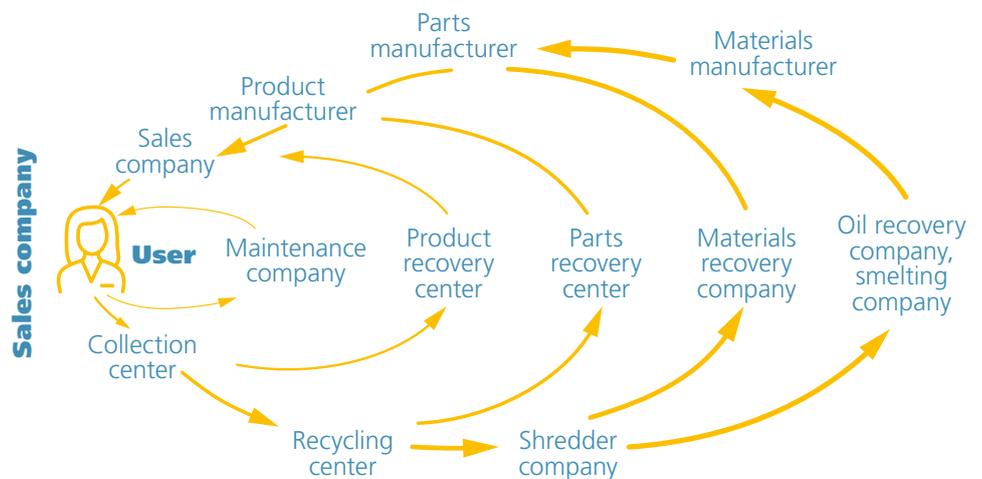
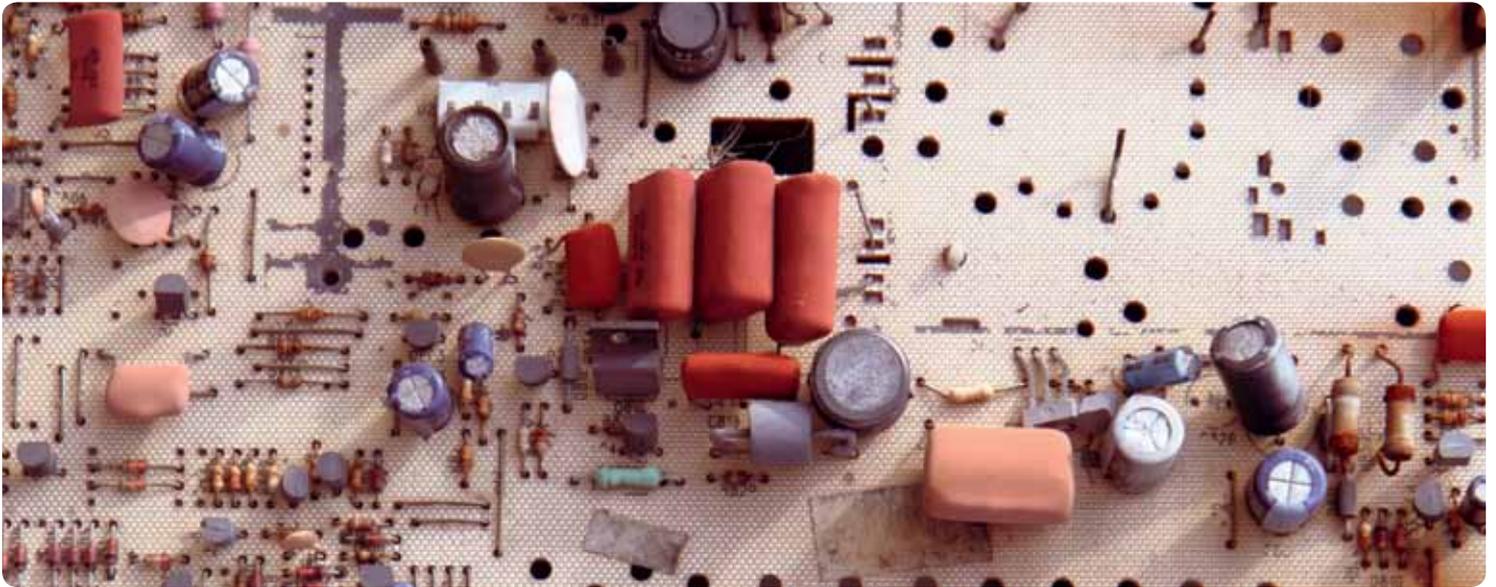


Figure 1



Committed Environmental Targets

We have strengthened our 2050 Long-Term Environmental targets with 2030 mid-term environmental impact reduction goals as mileposts (Figure 2). These environmental targets include Energy Conservation and Prevention of Global Warming, Resource Conservation and Recycling, and Pollution Prevention.

Ricoh has set the goal of sourcing 100% renewable electricity worldwide by 2050. Our greenhouse gas (GHG) reduction targets have been recognised as scientifically-based targets in line with the Paris Agreement¹, which aims to achieve the 2-degree goal.

Environmental Materiality Issues

In addition to the GHG targets in line with the Paris Agreement, Ricoh has identified the environmental materiality issues, which contribute to environmental conservation and generation of prosperity for our customers. Among Ricoh's materiality issues are the further reduction of new resource inputs in Ricoh products by switching to the raw materials with lower environmental impact, further enhancing product recovery and recycling.

This commitment to environmental materiality issues ensures that Ricoh continues to apply this consideration throughout the product lifecycle.

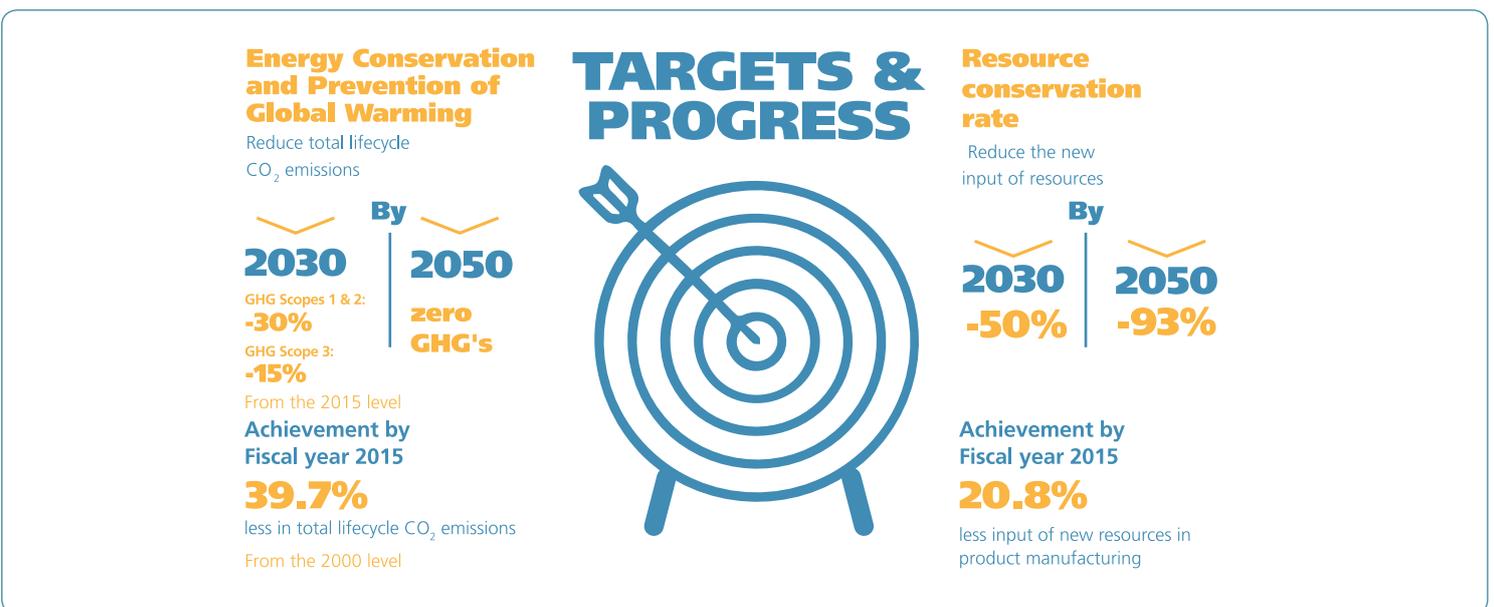


Figure 2

¹ This international agreement was adopted at COP21 and specifically addresses the issue of global warming

Ricoh And The Product Lifecycle

Ricoh's resource conservation initiatives being implemented throughout the different stages of the Ricoh product lifecycle, ensuring that we are committed to resource conservation at every step:

- Smart Design
- Smart Manufacturing
- Smart Packaging and Logistics
- Smart In-Use solutions to save resources by Customer
- Smart Maintenance
- Smart Collection and Re-Use
- Material Recovery

Throughout its history, Ricoh has initiated many efforts to **reduce the new input of resources** required as part of the product manufacturing process. These include developing recyclable designs, longer parts life, switch to alternative resources with lower environmental impact and higher economic benefit, products re-use and more, all helping us to achieve the reduction in the use of new resources (Figure 3).

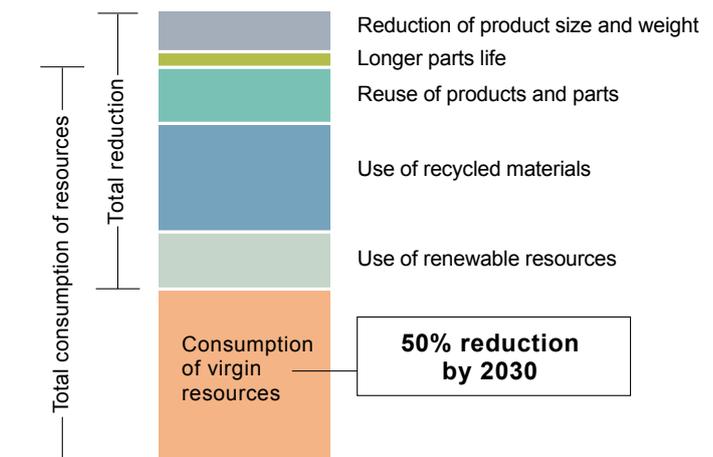


Figure 3

Smart Design

To further boost innovations in sustainability, Ricoh launched the "Ricoh Sustainable Products program"(RSPP). This is an internal assessment programme to assess and improve Ricoh's products and services based on Ricoh internal criteria for environmental performance, usability, comfort, CSR with an eye to promote technological development in a sustainable way.

Here are some examples of Resource Smart innovations in product design:

- Latest MFPs are designed **smaller and lighter**. One example is the full colour MP C6004 series, which is over 65% lighter than previous models in their class and smaller in the dimensions by more than 37%, due to the redesign of the paper feed²
- Use of **alternative raw materials** as bio-based plastic, electric furnace steel plates for MFP components from steel scrap, reclaimed plastic from post-consumer waste

The Ricoh Eco Business Development Center in Japan (former Gotemba plant) is the center to drive change and expand eco-management initiatives in tandem with customers. This is also where new innovative ideas and applications are thoroughly tested before being put into practice throughout the product lifecycle. Among its major technological themes are such Circular Economy initiatives as Oil recovery from waste plastic, and wood biomass utilisation.

80 tonnes plastic reduction

Ricoh factories in Europe have switched to the more environment friendly raw materials for Ricoh toner bottles: PET plastic produced from discarded household post-consumer waste. The switch to the PET#1 plastic would jointly reclaim more than 80 tons of post-consumer plastic on the monthly basis in Ricoh toner bottles.

² Based on full colour Ricoh MP C6004 compared to MP C6001

Smart Packaging and Logistics

Ricoh also applies considerations across the use of packaging and logistics throughout the supply chain.

Packaging

10,000 parcel boxes re-used

on the monthly basis for shipping parts to service engineers EMEA which is 40% of all boxes used

Packaging of Ricoh products for office use approved under the Blue Angel RAL UZ 205 is designed in such a way to give consideration to weight and volume reduction, priority to the use of recycled materials and the materials which are easy to recycle and re-use. Paper and cardboard packaging have at least 80% paperboard recovered fibre content.

Logistics

In 2011 Ricoh's European supply chain reported and subsequently baselined its CO₂ footprint, giving insights for future reduction opportunities across the entire supply chain.

In the area of transportation we looked at our inbound flows, like transport of deep sea containers, air-freights, inbound flow by sea & truck from our European factories. In the outbound flows we mapped parcel deliveries of toners to end customers and service parts to engineers with our courier partners. We also mapped emissions from the line-hauls to our satellite warehouses and the direct shipments into our Operating Companies. By using modal shift from air to rail from Asian factories to Europe we shipped 80³ containers via rail avoiding 3,346 tons of CO₂.

92 tonnes CO₂ reduction

By optimising the loading patterns inside the containers, we were able to ship the same volume of products as the previous year using 157³ containers less

To optimise the loading of inbound containers from our factories in Asia we improved the way the factories design packaging and by optimising the loading patterns inside the containers, we were able to ship the same volume of products as the previous year using less containers, resulting in 92 tonnes of CO₂ reduction.

10 million gallons of fuel saved

Our transport provider UPS implemented optimisation initiatives which saved 10 million gallons of fuel

For the outbound delivery network to Ricoh sales organisation and end customers, our logistic partners use road-trains (a truck with two additional units) that shuttles into their distribution hubs which is cost-effective, and has lower CO₂ emission levels. Where possible we are also using multimodal trains to deliver from the central hub in Europe to our local satellites.

Ricoh also ensures that our partners are committed to improvement. We have a mechanism ensuring that our logistic partners continue to improve their efficiency and, as a result, our CO₂ footprint. With each transport tender we require that our suppliers comply with ISO 14001 standard and sign the Ricoh Code of Conduct. On a regular basis we review the fleet composition of all our carriers for emissions standards and fuel efficiency. We expect that their fleet has no less than EURO 4 norm level and that they are making progress to achieving level 6 efficiency.

EURO 4 required minimum

Emission standards and fuel efficiency norm for our logistic partners

³ 2015 figures
⁴ 2016 figures

Smart manufacturing

Ricoh production facilities innovate in manufacturing processes aimed at reducing CO₂ emissions across the entire business operations.

Examples include downsized production lines to reduce energy consumption, Ricoh's original cart production line for low environmental impact & highly flexible manufacturing, and a factory configuration service using resource-recirculating eco-packaging (Figure 4).

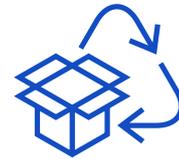
Innovations in manufacturing processes



Downsize production lines of copiers and consumables to reduce energy use



Ricoh's original cart production line for low environmental impact and highly flexible manufacturing



Factory configuration service using resource-recirculating eco packaging

Figure 4

Furthermore, many Ricoh manufacturing hubs have gone beyond ISO 14001 by implementing an energy management system and certifying it according to ISO 50001 (including Ricoh Industry France). Numerous sites also have implemented Quality Management Systems in compliance with ISO 9001, which ensures that Ricoh continually works to improve performance and enhance customer satisfaction.

Ricoh also ensures our operations meet the requirements of Health and Safety Management according to OHSAS 18001, and Ricoh production locations across the globe adhere to ILO international labour standards, while some sites have additionally enhanced their CSR performance in line with ISO 26000.

Smart In-Use solutions

Ricoh has also developed a number of smart in-use solutions so that our customers can save resources while using our products, in a simple and efficient way:

- Eco-friendly widget on the Smart Operation Panel that gives useful information on eco-friendliness of a print job combined with tips for better results
- Print&Share Eco smart printer driver helping a customer reduce paper and avoid paper waste in just one click, reducing both TCO and CO₂ emissions
- The unique staple-less finisher staples up to five pages together without using a staple
- Standard duplex functionality in all our latest MFPs
- Sustainability Optimisation programme offering customers immediate and measurable reductions of CO₂ emissions in In-Use phase by optimising document production and Total Cost of Ownership. The consultancy approach consists of 5 steps and is supported by Ricoh's smart technologies leading to zero carbon footprint of the document output

Smart maintenance

At Ricoh we take care of the environmental impact of our Technical service and engineers. The CO₂ footprint of our car fleet is environmental impact that we consistently reduce.

To make our fleet more ecologically responsible, we've taken a number of measures to reduce our footprint, including resolving problems over the telephone, e-learning programmes for engineers, preventative maintenance visits to contribute to call avoidance and many other initiatives (Figure 5).

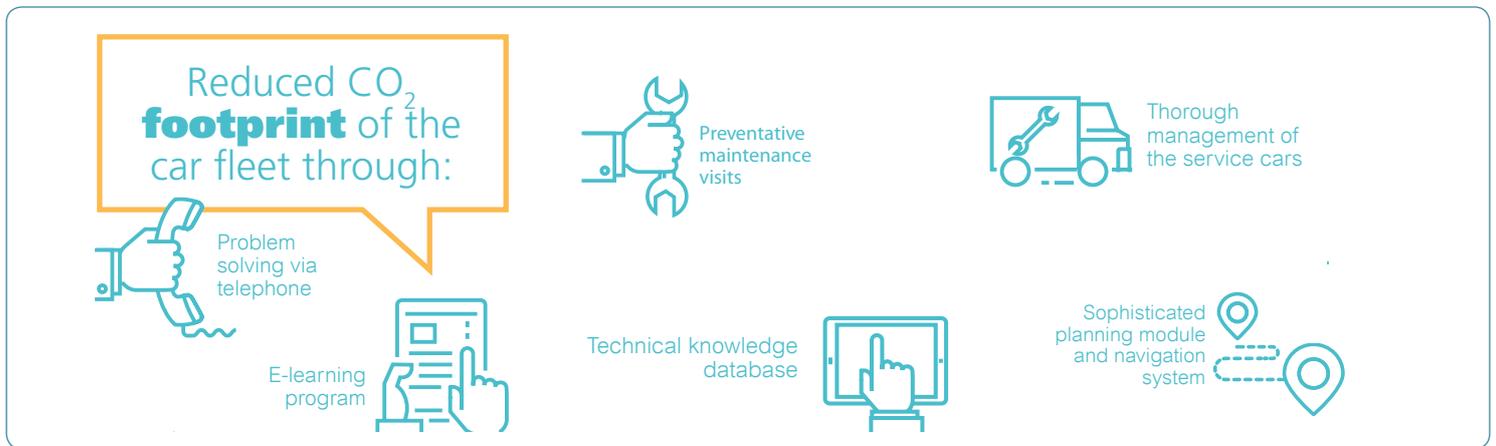


Figure 5

Smart collection and Re-Use

A sophisticated return & sorting process is key for optimal resource recovery. When Ricoh parts need to be replaced or supplies are empty, we want to prevent them from going to waste. Therefore, we offer a free-of-charge and easy to use Ricoh Resource Smart Return Program via the web portal www.ricoh-return.com. This easy-to-use return service ensures that Ricoh used parts and empty supplies will be delivered to our sorting centres in EMEA.

Ricoh Asset Management System

All our sorting centers are working in a uniform and audited way, using our Ricoh Asset Management System (RAMS) for easy sorting. This serial number scanning system enables sorting centers to recognise parts and supplies - containing

reusable components for our renewal reduction lines. After identifying reusable components they will be re-packed according to factory demands in a way that they immediately can be re-used in relevant factory processes (Figure 6)

Ricoh also conducts continuous feasibility studies to recover products for re-use in our own production processes. This way we achieve the maximum recoverability of returned items, while non-renewables will be treated in the most sustainable way. This sophisticated sorting process results in a high resource recovery rate of valuable raw materials, including metals, plastics, and cardboard. All recovered raw materials are scaled up to a high quality level, guaranteeing that they can be re-used in a wide variety of industries.

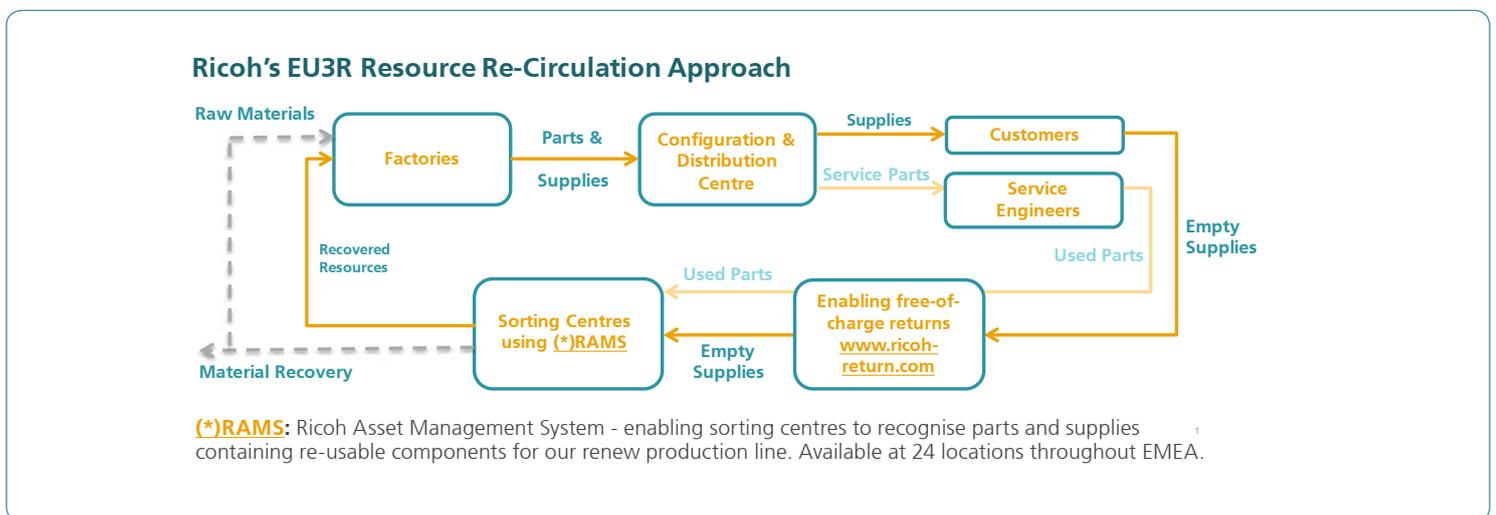


Figure 6

Re-used & remanufactured products

Ricoh has a clear process for pre-owned devices coming from the field at the end of their contract. Some devices get their second life through trader sales, other devices are selected for re-manufacturing at Ricoh reconditioning centers and the remaining ones go through the material recovery process.

This systematic procedure extends the useful life of the device and allows for the re-circulation of resources according to Ricoh's Comet Circle principle. Ricoh remanufactured devices have as good as new quality and go back to the field for different niche needs, for example, short term rental.

Material recovery

At Ricoh the material recovery process involves creating commodities out of our wasted products, essentially making old outputs new inputs for similar or adjacent products. In line with Ricoh's Comet Circle principle returned product parts and consumables that cannot be re-used are processed for material recovery with energy re-generation.

Ricoh's Zero-waste-to-landfill policy formed the basis of the Resource Recovery Criteria that take into account the recovering ratio of the residues from the waste treatment process. This very ambitious approach imposes a strict monitoring of our suppliers and their results.

Regular audits and reporting allow us to ensure traceability and the control of the treatment of our waste.

Ricoh is compliant to the WEEE regulations requiring to strictly measure the weight of products put onto the market, and all minimum recycling requirements to be met. We ensure that no product ends in landfill, and product parts are reused in our refurbishment programs wherever possible.

RICOH
imagine. change.

www.ricoh-europe.com

The facts and figures shown in this brochure relate to specific business cases. Individual circumstances may produce different results. All company, brand, product and service names are the property of and are registered trademarks of their respective owners. Copyright © 2017 Ricoh Europe PLC. All rights reserved. This brochure, its contents and/or layout may not be modified and/or adapted, copied in part or in whole and/or incorporated into other works without the prior written permission of Ricoh Europe PLC.