

For Infinite “Zero Landfill”

Fuji Xerox Integrated Recycling System

— Efforts on Product Recycle —



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Global Environment Problems and Our Effort

Currently, while the globalization of economy is advancing, rapid economical development and industrial growth are continuing in China, Asia and Pacific regions and various other regions in the world. On the other hand, influences on the ecosystem and life are expanding due to the global warming and diffused hazardous chemical substances. Increase of consumption resulting from the industry growth has incurred resource deficiency and other troubles and is concerned as a cause to slow the growth.

Fuji Xerox intends to commit itself to these problems throughout the life cycle of its products as a manufacturer of compound machines and printers to contribute to build up a sustainable society.

Global Warming

Discharge of CO₂ and other gas under the greenhouse effect has been progressing the changes of weather all around the world. New countermeasures are being promoted in international frameworks.

【Our Effort】

By 2020, we will promote the reduction of CO₂ discharged throughout of the life cycle of the Company by 30 % as company to 2005.

Diffusion of Hazardous Substances

As a countermeasure for environmental pollution due to hazardous substances diffused by aerial current or ocean current, movement to restrict the inclusion of hazardous substances on the stage of manufacture of electric and electronic devices has been spread (RoHS Directive of EU, etc.).

【Our Effort】

Not only eliminating or reducing inclusion into new products, we will promote collection and proper treatment of used products to minimize hazardous substances in used products manufactured in the past from being discharged to the environment.

Depletion of Natural Resources

Some regions growing rapidly are confronted with serious lack of resources, while being suffered from waste problems. Recycle activities to reuse used products as resources are more and more expanding.

【Our Effort】

Based on the thought process of “Used articles are not waste materials, but important resources”, we reuse or recycle the used articles and parts collected, and use them again as important resources without disposing them off.

Integrated Recycling System of Fuji Xerox

Company-wide Product Recycle Policy

We established a company-wide product recycle policy in 1995 and has been promoting activities to realize the policy.

Company-wide Product Recycle Policy

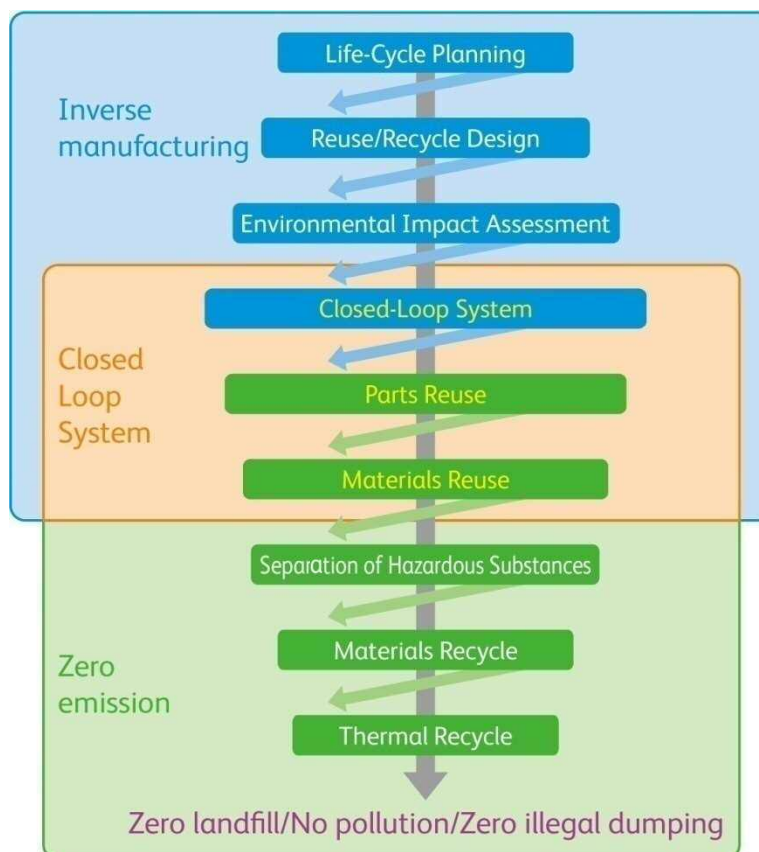
“Promoting Reuse of Resources for infinite “Zero Landfill”

Integrated Recycling System of Fuji Xerox

We established an “integrated recycling system” out of recognition that the efforts to reduce the environmental loads of our used products are one of our CSR (Corporate Social Responsibility) as a manufacturer.

This system aims at reduction of environmental loads of products throughout their life cycle based on the conception that used products are valuable resources, not waste. On the basis of a “closed loop system” in which products released to the market are collected and parts sorted out of them are circulated in a closed circle under strict quality assurance, we have extended the sphere of our activities to the “inverse manufacturing” aiming at products with less environmental loads by reusing parts, and “zero emission” aiming at full utilization of products by selecting out parts which cannot be reused and using them as resources.

～ Integrated Recycling System ～



Our Target and Promotion System

Our Target

When attempting reduction of environmental loads throughout the life cycle of products, we noticed that we can reduce new resources to be used for manufacturing new products and parts and volume of discharge CO₂ in the course of above process can be restricted by parts reuse. Accordingly, we have been striving to expand the reuse parts. When comparing the volume of discharge CO₂ in the copying machine product life cycle between “newly produced machines using only new parts” and “machines using reuse parts” in each process, volume of CO₂ discharged in the material and parts manufacturing processes is significantly different (see the figure below). We will pursue the reduction of environmental loads by parts reuse. In the Asia and Pacific regions and China, our sales territories, we aim at reducing the environmental load by building an integrated recycling system of the same quality as that in Japan.

Comparison of volume of discharge CO₂ in life cycle of copying machine
(Newly produced machine/machine using reused parts comparison model case)

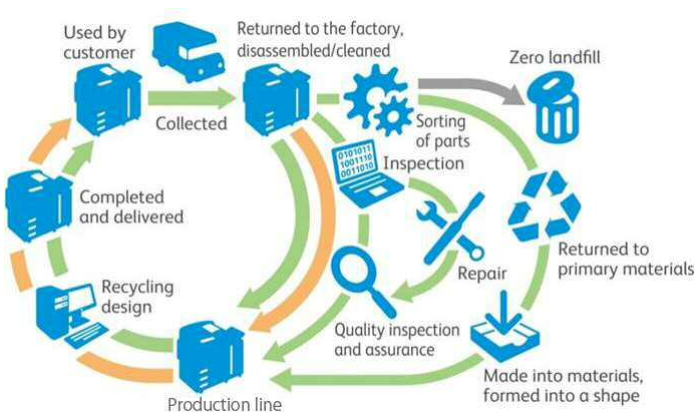
Each process	Manufacture of parts and materials	Assembling processes	Transportation	Use by customer	Collection	Disassembling	Process to reuse as resource
Difference of CO ₂ discharge	⊙ (Great difference)	— (No difference)	— (No difference)	— (No difference)	— (No difference)	≒	○ (Little difference *)

* Difference of volume of discharge CO₂ is caused because the quantity of recycling treatment is decreased by removing the reuse parts.

Promoting Recycling

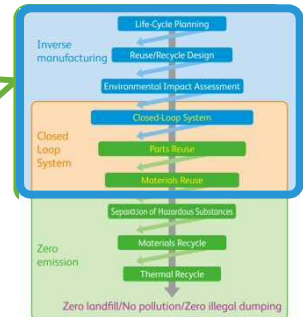
We were the first in the industry to introduce a product using reused parts in 1995. Since then for 21 years, we have promoted more effective use of resources, placing priority on reusing parts. This is because reusing parts uses consumes energy (hence less CO2 emission) than recycling where parts are returned to material and recreated. Then do we reuse anything available at all? The answer is no. Our products using reused parts are not used machines. We estimate the remaining life of each part and only use the part when it meets our strict standard. Therefore, we guarantee the quality of the products using reused parts just the same as brand-new products. We will keep actively promoting the environment-friendly reuse of parts.

Environment-friendly Closed-Loop System to curb consumption of new resources



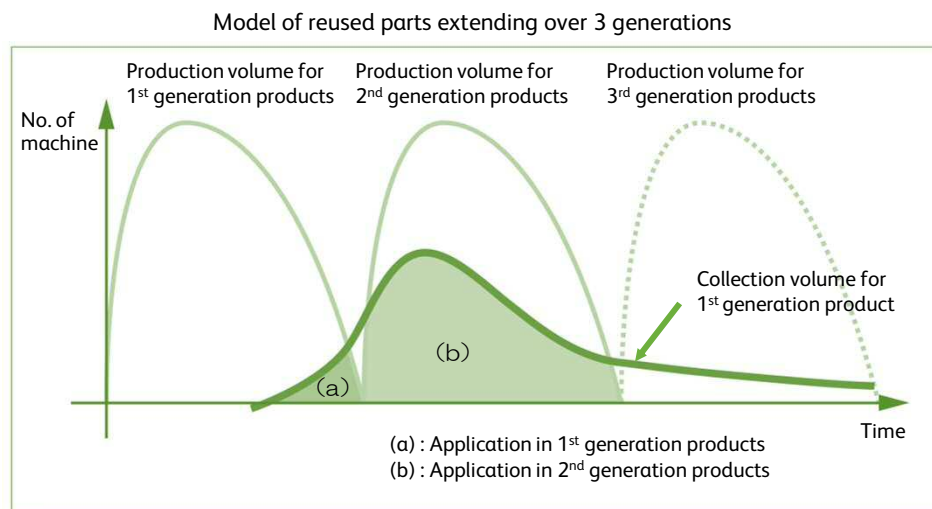
Inverse Manufacturing

Our inverse manufacturing is to plan the life cycle of parts on the assumption of their reuse, design the reuse and recycle of parts to increase their reuse, and assess the environmental influence of products for their less environmental loads, before starting the manufacture of products.



Life- Cycle Planning

Duration of service of copying machines is expected to be 3 to 5 years and change of generation during this term is anticipated. Planning is made extending over multiple generations to allow to reuse parts recovered from collected used products effectively as parts of successor machines.



Reuse/Recycle Design

We established “recycle design guideline” in 1995. In addition, in order to increase reuse of parts, “reuse design guideline” was established to apply the reuse design securely to products when developing new products by developing parts reuse designing method and standardizing the techniques to this end. To intensify the cooperation with parts and material manufacturers, “recycle procurement guideline” was established and cooperation is demanded for sharing knowhow and jointly developing reuse techniques. “Green procurement standard” was also established to reduce specific harmful chemical substances and control inclusion of specific hazardous chemical substances into products and their use in the manufacturing processes.

【Design Guideline】

Long-life design	Secure longer life of parts to reuse them.
Separable design	Short-life parts are separated so that only reusable parts are reused.
Strength design	Minimize damage of parts at the time of use, collection and reuse.
Disassembly design	Design for easy disassembly for breakup and parts assortment.
Use of reusable materials	Select materials which can be reused to recycle them.
Common design	Share the design to allow reuse in other models or subsequent models

■ Examples of reuse/recycle design

◆ Separation design

By designing the caster which had integrated structure before to allow separation, it became possible to use reusable parts other than the wheel to the utmost.



Conventional design

The spindle was caulked, and the wheel could not be replaced.

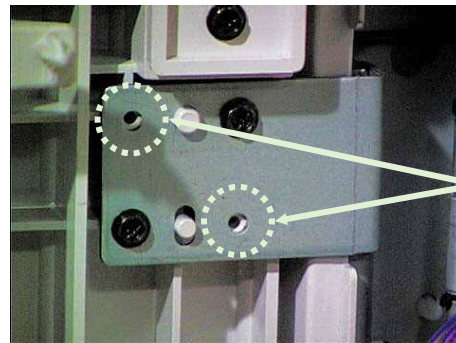
Separated design

The spindle is fixed with an E-ring, and the wheel can be replaced.



◆ Redundant design

By providing a spare hole, when the screw hole has worn away, the spare hole can be used, which allows reuse and eliminates necessity of replacement.



Redundant design

Providing a spare hole allows reuse.

Environmental Impact Assessment

To offer the information on the recycling system widely to the society, information on the environmental considerations of recycling products is provided for each product. Each item of the Closed-Loop System (collection of used product → reuse and recycling of parts → production by recycling production method → recycling design) is evaluated based on our standard. Models which meet this standard are approved as “integrated recycling product” and publicized as a self-certification “integrated recycling product label”.

■ Integrated recycling product label (type II label)

Integrated recycling processes are evaluated based on the original standard. Products in compliance with the standard is approved as “integrated recycling product” and the evaluation results are publicized as “integrated recycling product label”.

Integrated Recycling Product label

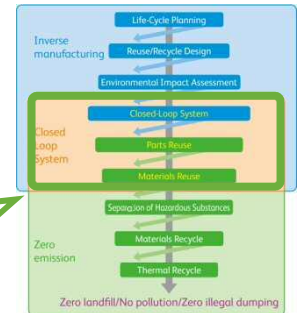


Please refer to P.16 for the approval standard and items.
Visit the home page for approved models.

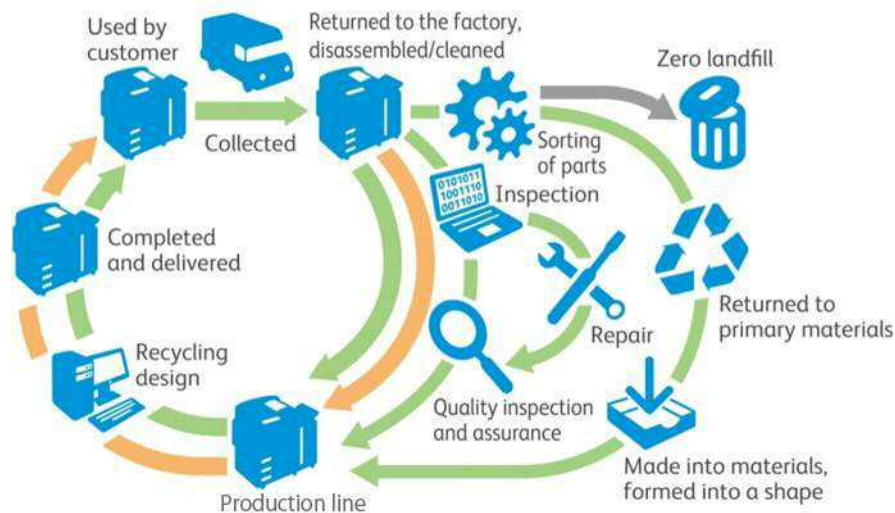
Integrated Recycling product label: http://www.fujixerox.co.jp/eco/cycle/communication/eco_label.html

Closed-Loop System

Basic concept of the Closed-Loop System is “to collect products which were released on the market; make use of collected products exhaustively; minimize adoption of new resources and circulate parts in a closed loop.” We intend to increase reused parts and rate of recycle to attain the inner loop to reuse parts which are changed to materials as parts as far as possible.



Fuji Xerox Closed Loop System



Quality Assurance of Reused Parts

On the assumption of parts reuse, we strictly specify that “products assembled using reused parts” and “products assembled using only new parts” should be equal in ① appearance, ② performance and functions, ③ reliability, ④ and machine life and promote the activities to assure the quality of parts reuse.

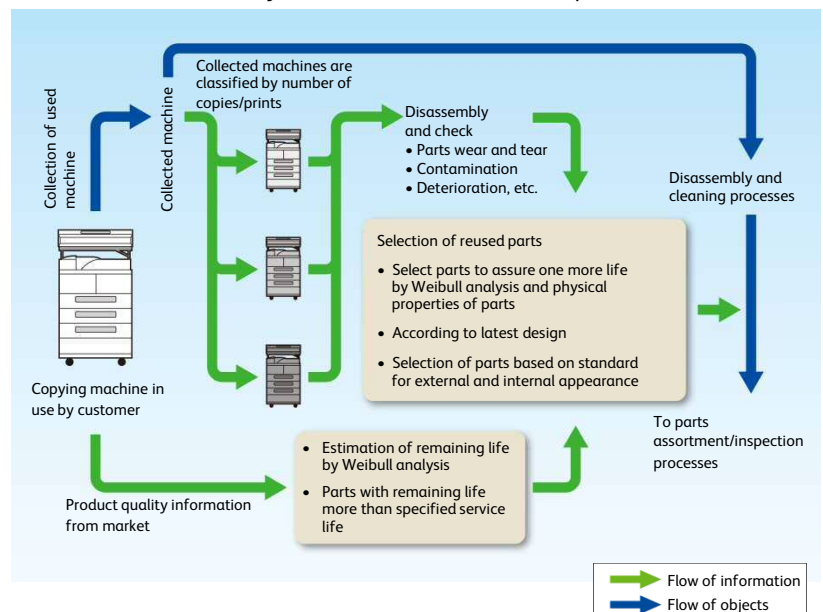
■ Weibull analysis to estimate remaining life of parts

Based on the quality information on products from customer engineers, Weibull analysis is performed to distinguish parts with remaining life and parts which can be reused after repair.

■ Disassembly and inspection of machine to analyze the possibility to use it for one more life (another generation)

By analyzing and investigating a machine which has been used for the time longer than the product service life, consumption, stain, deterioration and other conditions of each part are analyzed to distinguish reusable parts.

Quality assurance activities to select parts



Parts Reuse

We introduced products using reused parts first in the office machine industry in December 1995. Each parts reused is assured the quality in the production processes according to strict standards. Techniques to allow reuse of parts are also developed for this purpose.

Cartridges are disassembled down to the level of components. Reusing only components satisfying our quality standards, new cartridges are produced, assured the quality same as new ones and delivered to customers again.

Recycle line (disassembly and assortment processes)



■ Examples of techniques allowing parts reuse

◆ Cleaning technique

Parts which can be reused are cleaned by the latest technique without damaging metals or plastic.

Automatic shower washer that cleans accessories



◆ Screening technique

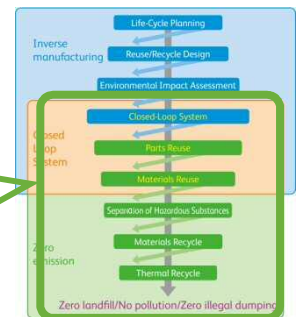
Judging whether parts can be reused or not may require some special screening technique. Motor's possibility of reuse is judged by the AE (Acoustic Emissions) measuring method to catch fine signal by supersonic technique.

AE measurement to catch fine signal



Zero Emission

Zero Emission is an activity to eliminate waste. Parts and products which cannot be reused are assorted into 44 types of components at a maximum by manually disassembling and collected as resources to the utmost. A technique was developed to make available recycled plastic materials of the same quality as new ones jointly with a material manufacturer. Our integrated-recycling system aims at zero waste making use of used resources, without using new resources as far as possible.

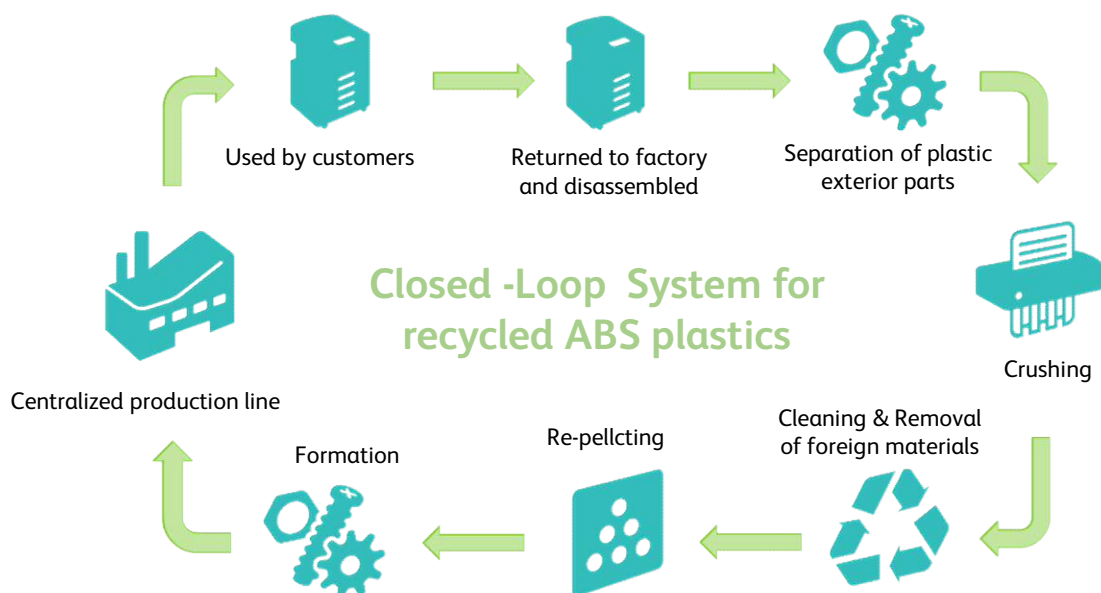


Materials Reuse

Around 1998 when this activity was started, it was said that recycle of plastic is difficult because quality is deteriorated. We, however, succeeded to recycle plastic first in the industry by joint development with a resin manufacturer (UMG ABS).

We established a material reuse system to break up the external cover (ABS resin) of used products, clean and use it as recycle plastic (ABS resin) equal to new one for our products. The recycled plastic is assured the same quality (forming efficiency, physical properties, color tone, etc.) and certified by the US safety test organization, UL (Underwriter's Laboratories).

Recycle techniques for recycled PS-ABS resin to blend 20 % of PC-PS resin, which is now the mainstream of plastics used for parts of copy machines, were established and this material is being introduced to new products.

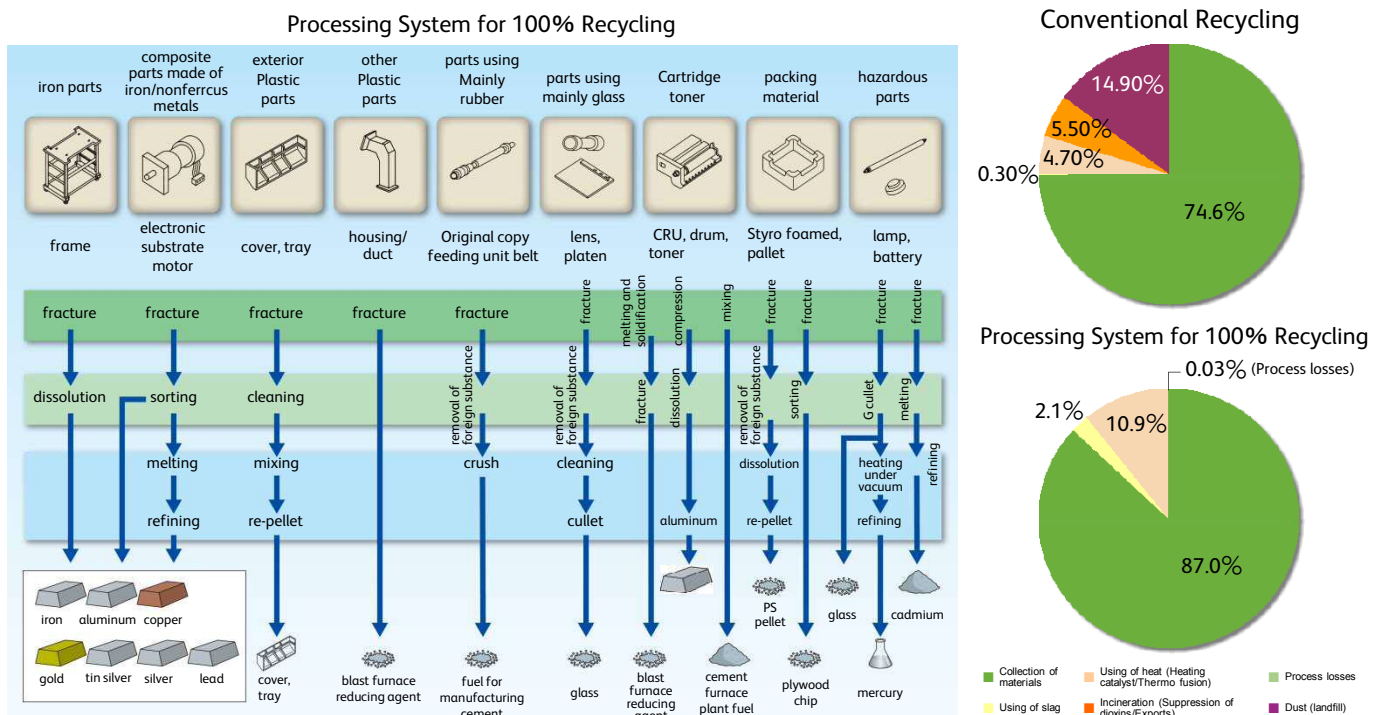


Separation of Hazardous Substances and Material/Thermal Recycle

In the former material recycling method, only the iron and other metals were mainly collected and other materials were disposed of as landfill. In order to attain the company-wide policy, "Aiming at Zero Landfill (zero landfill and zero simple incineration)", we established a treatment system to reuse 100 % of materials as resources and systematically manage from disassembly and assortment of used products to reuse them as resources.

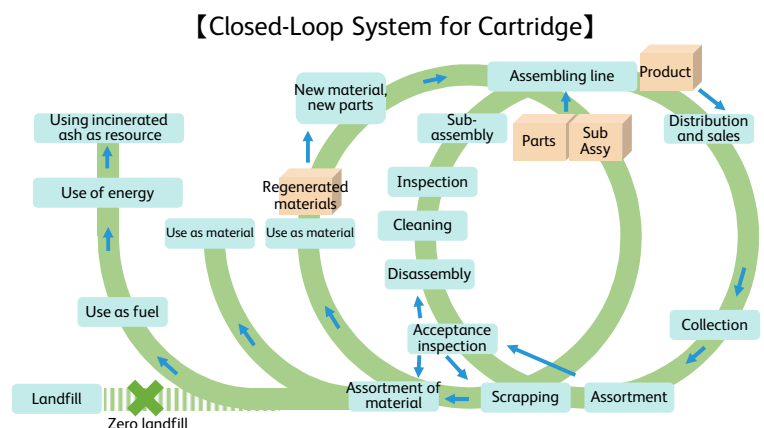
This system was put into practice in August 2000. With this system, used products from all parts of the country are assorted to 44 components at a maximum in 14 disassembly/assortment bases throughout the country and collected as resources through a network connecting with recyclers (29 companies*) with the latest recycle techniques. * As of September 2016.

High priority is given to assortment and proper treatment of parts containing hazardous chemical substances to utilize all materials as resources without generating environmental loads.



Reuse and Recycle of Cartridges

We started collection and recycle of used consumables early. In 1994, a cartridge recycle line was established in the company. In a Closed-Loop System for cartridges, collected used consumables were disassembled and cleaned, went through a series of regeneration processes such as assortment or repair, and only parts in compliance with strict quality standards were adopted into the production line and circulated. In this way, most of collected cartridges are reused, 100 % of parts which cannot be reused are utilized as resources and zero landfill (zero emission) of waste has been continuing from 1997.



Spread of Integrated Recycling System

International Resource Recycling System ~Evolution of Integrated Recycling System to Overseas~

It is our conception that we are responsible as a global company for the reduction of environmental loads in our sales territories such as Asia and Pacific regions and China, not only in Japan where an “integrated recycling system” covering whole life cycle of materials was constructed. We established a recycling base in Asia and Pacific region (Thailand) in 2004, Taiwan in 2007, and Suzhou, China in 2008. In 2012, Australia, New Zealand, and Korea started recycling of resources on their own, where this was so far handled in the recycling base in Asia and Pacific region (Thailand). With that, we have established the same recycling system as Japan in all regions where we have business..

* Hong Kong and Macao were integrated into the recycle system in the Asia and Pacific regions.



Basic Principle of International Resource Recycling System Construction

To build up an international resource recycling network, “basic conception for overseas expansion” was established in addition to the former product recycle policy of company for the purpose that related stake holders can cooperate us without concern.

【 Basic Conception of Overseas Evolution 】

1. Control and manage factories under the manufacturer’s responsibility avoiding risks
2. Assure the consistent recycle quality same as in Japan
3. Aim at reduction of environmental loads in each country and region

Four basic principles were provided for the international resource recycling system to avoid loads on recycle base construction countries or regions or environmental loads, to realize consistent recycle quality assurance and efficiency.

【 Four Basic Principles 】

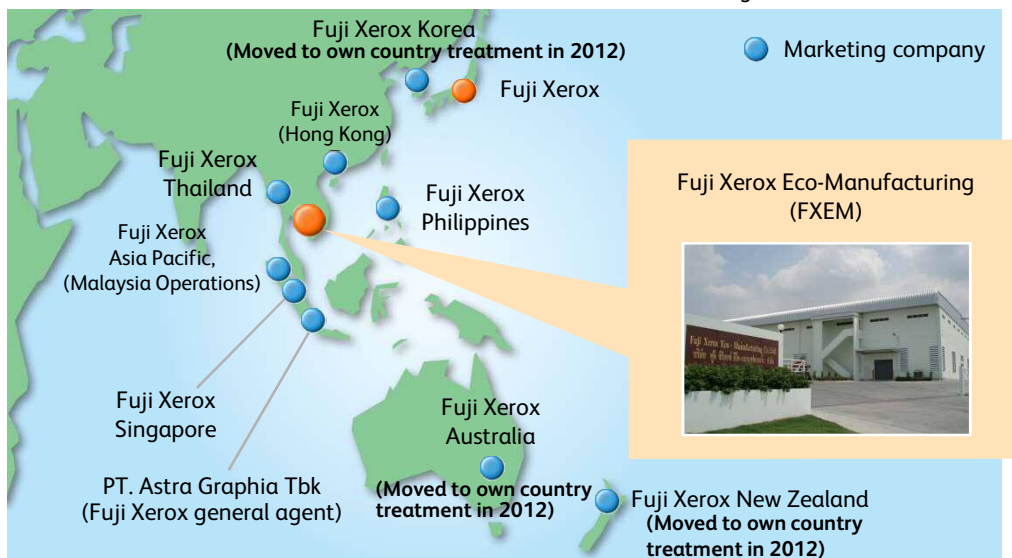
- (1) Collection of used products under manufacturer’s responsibility prevents illegal dumping.
- (2) Not to import wastes
- (3) Not to incur environmental impact on importing countries and regions (recycle base construction countries/regions)
- (4) Return of merits to importing countries and regions (recycle base construction countries/regions)

Overseas spheres of activities

The international resource recycling system in the Asia and Pacific regions started operation in December 2004. Sales subsidiaries in 9 countries and regions* in the Asia and Pacific regions collect used products and transfer them to the recycle base established in Thailand, "Fuji Xerox Eco-Manufacturing." Used products are thoroughly disassembled and assorted into 90 categories and the resources are recovered by a highly reliable recycle partner. In Korea, Australia, and New Zealand, in order to comply with Basel Convention and stricter domestic laws (rules and regulations concerning export of hazardous waste), moved to the recycling treatment in own countries from 2012. Collected cartridges are disassembled thoroughly down to the parts level, only parts assured the quality equivalent to new parts are introduced to the cartridge production line and parts which cannot be reused are reconverted to resources.

* Australia, Philippine, Hong Kong, Indonesia, Republic of Korea, Malaysia, New Zealand, Singapore and Thailand

Involved areas of activities in the Asia and Pacific regions



Recycling system in China started operation in January 2008.

Used products and cartridges are collected from the whole of China* to the recycle base established in Suzhou, "Fuji Xerox Eco Manufacturing (Suzhou)", thoroughly disassembled and assorted to 64 categories, and recovered as resources by a highly reliable recycle partner. * Excluding Hong Kong, Macao and Taiwan.

Collected cartridges are reused as parts and reconverted into resources as in the Asia and Pacific regions.

Involved area of activity in China

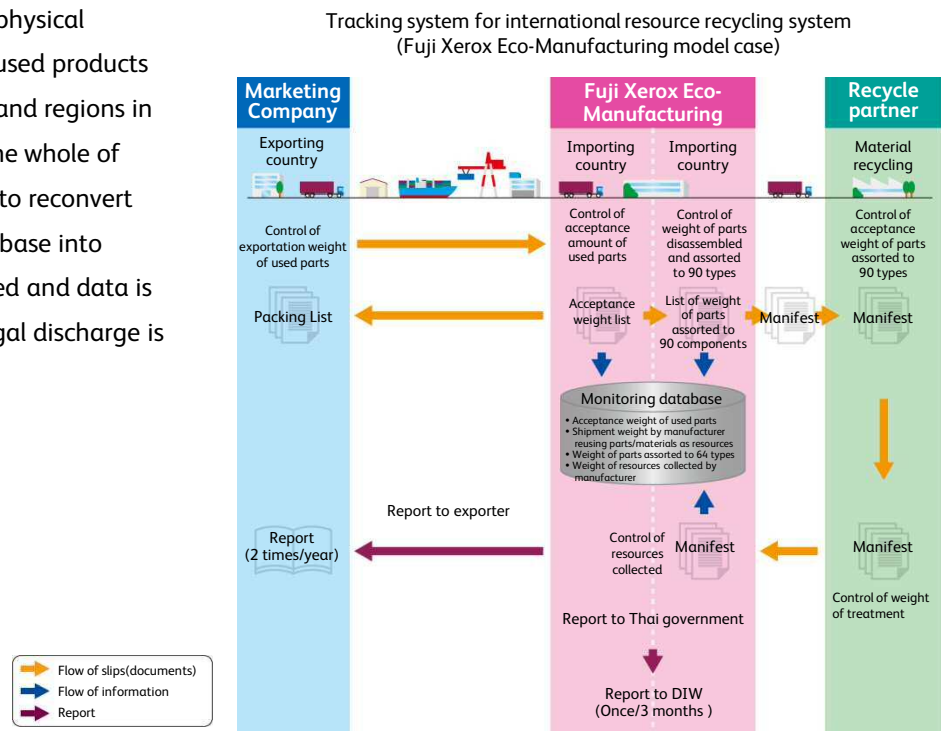


International Resource Recycling System in Asia-Pacific Region

Activities according to 4 basic Principles

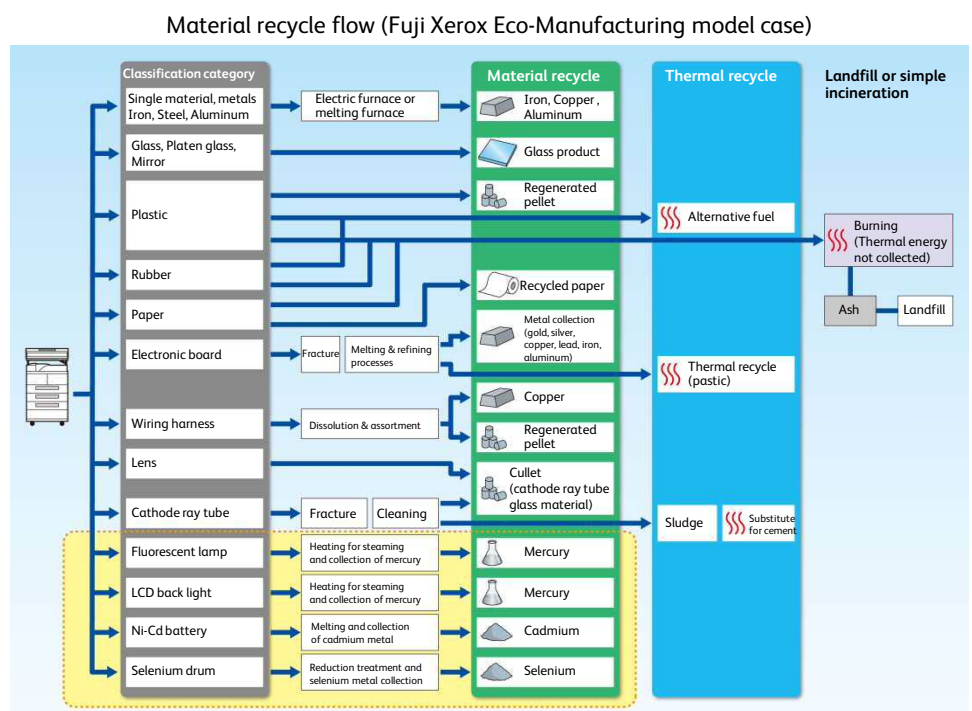
Basic principle 1 Collection of used products under manufacturer's responsibility prevents illegal dumping

At every important place of the physical distribution processes to collect used products and cartridges from 9 countries and regions in the Asia and Pacific regions or the whole of China and the recycle processes to reconvert the parts assorted in the recycle base into resources, etc., weight is measured and data is compared to make sure that illegal discharge is not conducted.



Basic principle 2 Not to import wastes

In the recycle bases in Thailand and Suzhou in China in the Asia and Pacific regions, used products and cartridges collected are thoroughly disassembled and assorted to 90 categories of parts and materials. Recycle partners with high techniques and reliability regenerate assorted parts as resources. Parts which cannot be properly treated in Thailand and China are transferred to Japan and treated there. By these activities, used products are utilized as “resources” not as waste.



Basic principle 3 Not to incur environmental impact on importing countries and regions (recycle base construction countries/regions)

It is intended in the recycle bases to take into account the environment and occupational health and safety in all the recycle processes until products and cartridges are used and collected as resources.

In the recycling base in Thailand Fuji Xerox Eco-Manufacturing, environment/occupational health and safety policy was established when the company was incorporated and the environmental and occupational health and safety have been controlled from the beginning of operation. As a result, ISO14001-2004 certification was given in September 2005. In October 2007, OHSAS18001, an international occupational safety management system, was certified.

In the recycle base in China, Fuji Xerox Eco-Manufacturing (Suzhou) which started operation in January 2008, activities aiming at certification of ISO9001, ISO14001-2004, and OHSAS18001 were started under the policy to establish trinity of quality, environment and occupational safety at the beginning of foundation. All of these certifications were obtained in February 2009. Such activities were the first in Fuji Xerox and affiliated companies.

When selecting a recycle partner, we attach the importance to the commitment of the partner to environmental conservation. Environmental researches are conducted by periodical visits to the partner.

Certificate of registration issued by BSI



Environment/occupational health and safety control check items for recycle partner

1	Environment management system is available and functioning.	Certified by a third party. Annual Report is issued.
2	Enough occupational health and safety (OHS) measures are taken.	Certified by a third party. Enough OHS measures are taken for employees. Enough measures are taken to minimize impact on neighboring inhabitants.
3	There are proper monitoring, recording and reporting programs for environment and safety.	Impacts on environment (waste water, exhaust, noise, etc.) are periodically monitored according to related laws. Accidents of employees are recorded. If wastes cannot be treated by the company, they are collected and treated by a method friendly to the environment.
4	There is proper education program for employees.	There is an education program to distinguish and handle hazardous substances and the hazardous substance handling administrator is trained to avoid dangers and take emergency response measures Responsibilities, authority, and their mutual relation of employees taking charge of administration of affairs, performance and monitor giving influence on the environment are documented.
5	There is proper emergency response measure plan.	There is a plan for emergency response measures. Disaster prevention training is conducted.

Basic principle 4 Return merits to importing countries and regions (recycle base construction countries/regions)

We consider it necessary to provide merits to importing countries and regions (recycle base construction countries/regions) in order to continue the integrated recycling system in the Asia, Pacific and China regions.

Based on the treatment for resources aiming at zero landfill, used products are regenerated as resources by recycle partners in Thailand or China and used effectively as materials in each country. By these processes, it can be said that used products are imported as resources for regeneration, not as wastes.

Disclosure of Information

Disclosure of Product Environment Information

We disclose the information on our considerations to environment about the integrated recycling products with the self-certification “integrated recycling product label.”

Integrated Recycling Product Label (TYPE II)

Since 1999, company standards for integrated recycling have been established including “establishment of collection system”, “reuse of parts/components of collected products or recycle”, “production in integrated production processes”, “design allowing reuse in next generation” and others. Products meeting these standards are recognized as integrated recycling products and “Integrated Recycling product label” certifying compliance of products to standards are open to the public.

Integrated recycling product label recognition standard

(Standard was amended in February 2009.)

Establishment of collection system	
Mandatory standard	A collection system for the main body which has actual effective collection performance should have been established.
Semi-mandatory standard	A collection system for the cartridge which has actual effective collection performance should have been established.
Reuse of parts/components of collected products and recycle	
Mandatory standard	Rate of reuse of parts should be more than 45 % by mass, or there should be parts reuse plan at the start of sales and planned rate of possible parts reuse should be more than 45 % by mass.
	Rate of parts which can be used as resources to the whole machines should be more than 95 % by mass.
	Parts should be able to be removed for reuse with commercial tools only .
Semi-mandatory standard	Plastic regenerated from own products collected from the market should be used or parts after the use of products should be usable as regenerated plastic and parts for own products, or regenerated plastic materials (except for the plastic regenerated from own products) should be in use.
	Production reusing parts of cartridges should be conducted or planned to be conducted.
	Rate of reuse of package or use of parts as resources should be more than 95 % by mass.
Production in integrated production processes	
Mandatory standard	“Disassembly of collected parts – parts regeneration process” and “product assembling process” should be centrally controlled and from acceptance of collected products to assembly of products using new purchased parts and regenerated parts should be carried out or planned to be carried out in “integrated production processes” which are considered to be a consecutive production line.
Semi-mandatory standard	Chemicals specified by our standard should not be used in the manufacturing processes.
Design allowing reuse in next generation	
Mandatory standard	Product assessment should be carried out.
	Our self-standard should be met.
Semi-mandatory standard	The energy saving law should be strictly observed.



For more information or detailed product specifications,

Please call us on 02 4220 5000 or visit us at fxillawarra.com.au

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