

For Infinite "Zero Landfill"



Fuji Xerox Integrated Recycling System

— Fuji Xerox' Efforts on Product Recycle —

THE DOCUMENT COMPANY

FUJI XEROX

Global Environment Problems and Our Effort

Asia and Pacific regions now form a large economic bloc where economic development and industrial growth are continuing. On the other hand, influences on the ecosystem and life are expanding due to the global warming and diffused hazardous chemical substances. Consumption increased as a result of industrial growth has brought about deficiency of resources or price hikes and is concerned about as a factor to prevent the growth. Fuji Xerox intends to commit itself to these problems throughout the life cycle of its products as a manufacturer of copying machines and compound machines 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】

We will promote the reduction of CO₂ discharged in largest quantities in the manufacture of purchased components throughout the life cycle of products.



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】

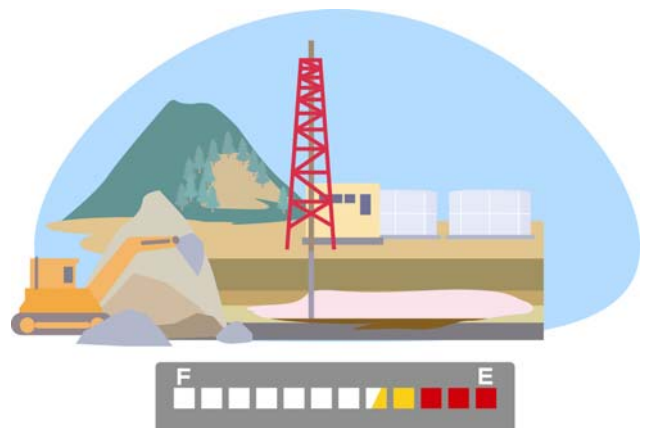
Not only eliminating or reducing inclusion into new products, we will promote collection and proper treatment of used products to minimize hazardous substances in used products manufactured in the past from being discharged to the environment.

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】

The same collection and recycle system as the one completed in 2000 in Japan will be constructed in the Asia and Pacific regions and China to attain the same level (zero landfill) as that of Japan.



Integrated Recycling System of Fuji Xerox

Company-wide Policy

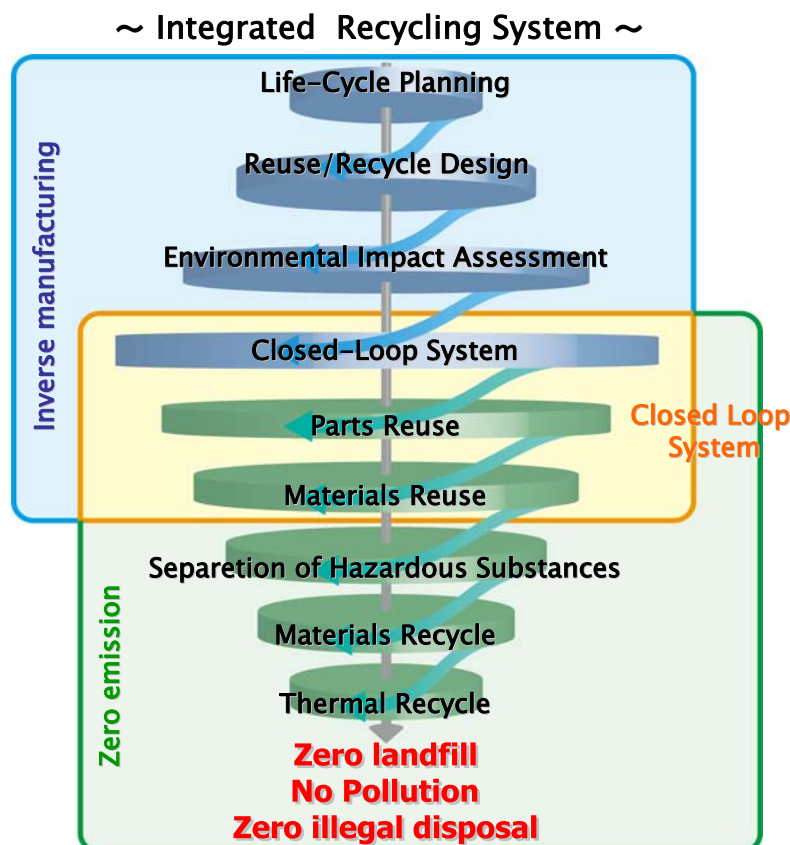
We established a company-wide product recycle policy in 1993 and has been promoting activities to realize the policy.

“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 Societal 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.



Our Target and Promotion System

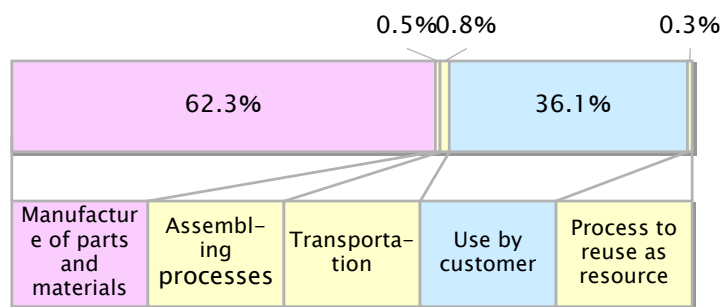
Our Target

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 CO2 discharged in the course of above process can be restricted by reusing used parts. Accordingly, we have been striving to expand the reuse of parts.

The largest amount of CO2 is discharged in the parts and material manufacturing processes during the life cycle of copying machines (see the right figure) and we will pursue the reduction of environmental loads by reusing parts.

In the Asia and Pacific regions, our sales territories, we aim at realization of a integrated-recycling system of the same quality as that in Japan.

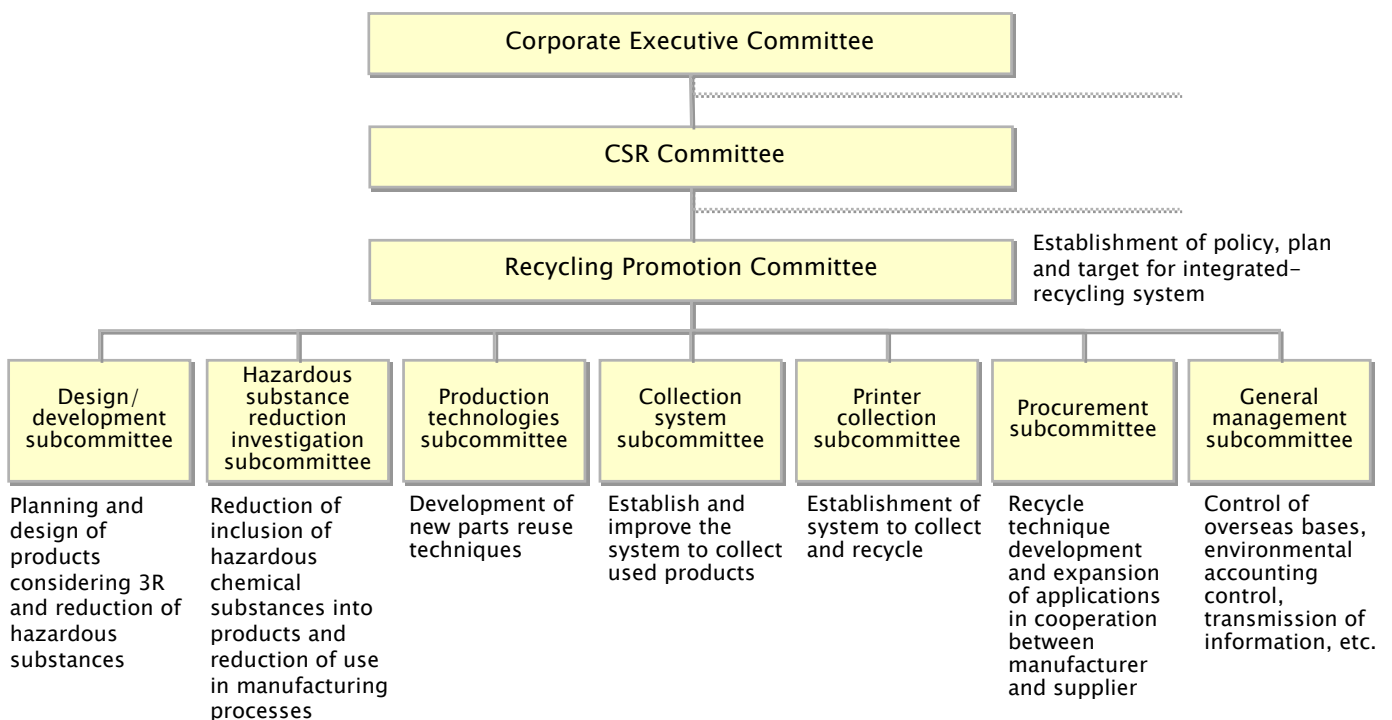
Model of rate of CO2 discharge in life cycle of copying machine (%)



Promotion System

All sections of our company including affiliates are promoting the integrated-recycling system (product recycle activities). "Recycle Promotion Committee" composed of officers in charge and managers of related departments decides the policy, promotion system, strategy and other conditions and inform the recycle bases on the inside and outside of the country of the conclusion.

Integrated-Recycling System Promotion System



Inverse Manufacturing

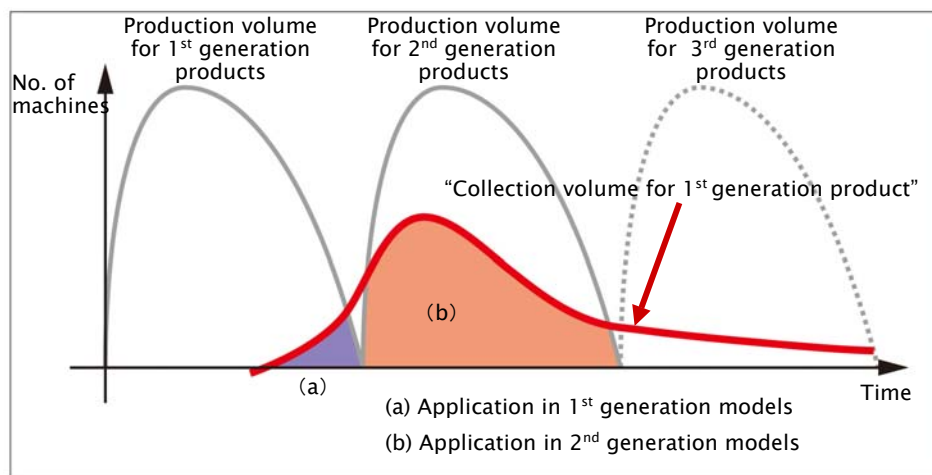
Our inverse manufacturing is to plan the life cycle of parts on the assumption of their reuse, design the reuse and recycle of parts to increase their reuse, and assess the environmental influence of products for their less environmental loads, before starting the manufacture of products.



Planning of Life Cycle

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.

Model of reused parts extending over 3 generations

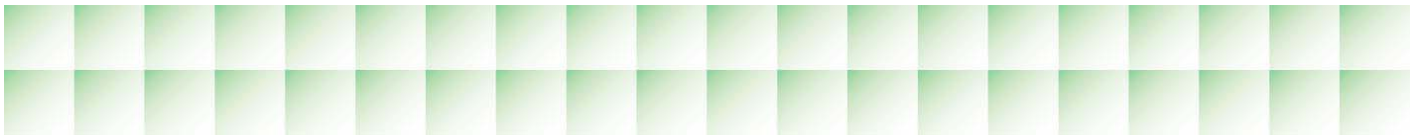


Reuse/Recycle Design

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.



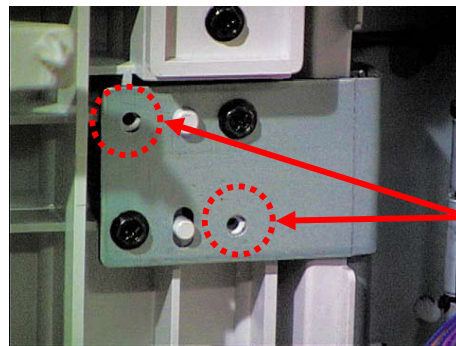
Conventional design
The spindle was caulked, and the wheel could not be replaced.

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.

Assessment of Environmental Impacts

Information on environmental consideration for integrated recycling products is disclosed on each product with a self-certification “integrated recycling product label” and “product eco data” showing results of LCA evaluation.

■ 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”.

■ Product eco data: Developed jointly with Mitsubishi Research Institute, Inc.

Entire life cycle is divided into “manufacturing”, “service”, and “after-service” stages and environment information evaluated by LCA or other method is disclosed as “product eco data”.

Integrated Recycling Product label



Product eco data



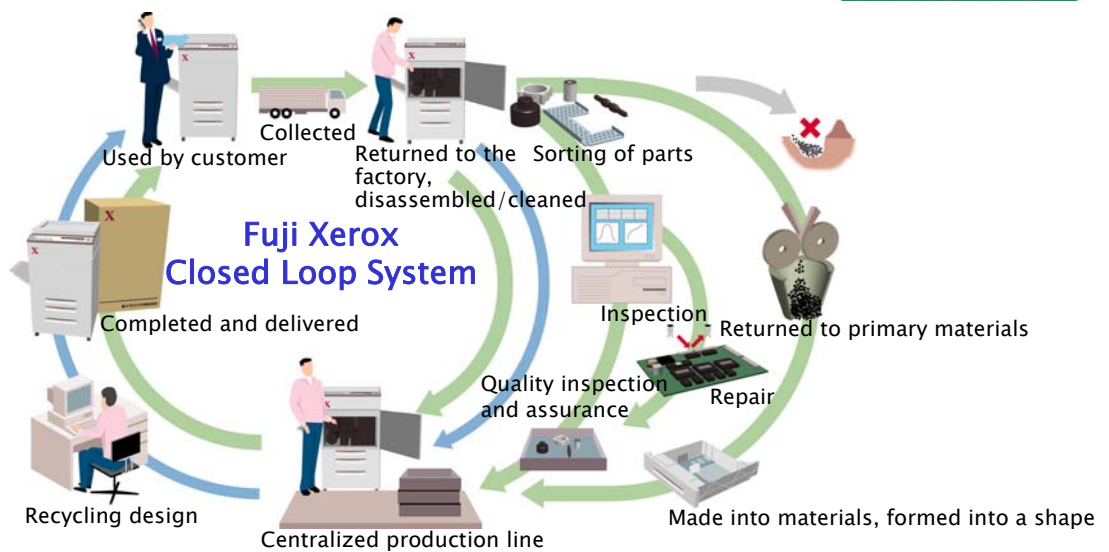
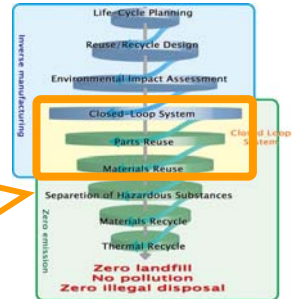
Please refer to P15 for the standards and items which are approved and disclosed. Visit the home page for models which are approved and disclosed.

Integrated Recycling product label: <http://www.fujixerox.co.jp/arm/index7.html>

Product eco data: http://www.fujixerox.co.jp/eco/product_eco/index.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.



Quality Assurance of Reused Parts

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

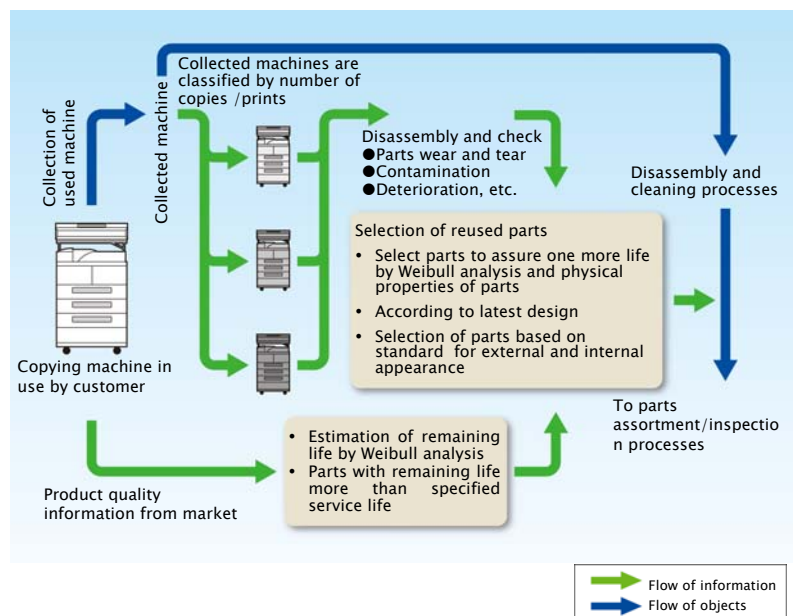
■ Weibull analysis to estimate remaining life of parts

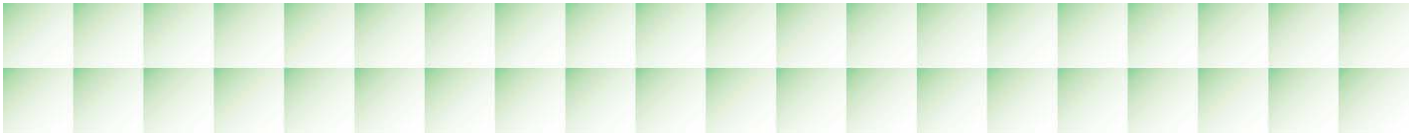
Based on the market quality information which we have accumulated in the rental business, Weibull analysis is performed to distinguish parts with remaining life and parts which can be reused after repair.

■ 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





Reuse of parts

We introduced products using reused parts first in the office machine industry in December 1995. Each parts reused is assured the “same quality as new one” 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.

Parts reuse line (disassembly and assortment processes)



■ Examples of techniques allowing reuse of parts

◆ Cleaning technique

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

Automatic shower washer that cleans accessories



Blast cleaner that cleans large units



AE measurement to catch fine signal

◆ 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.



Zero Emission

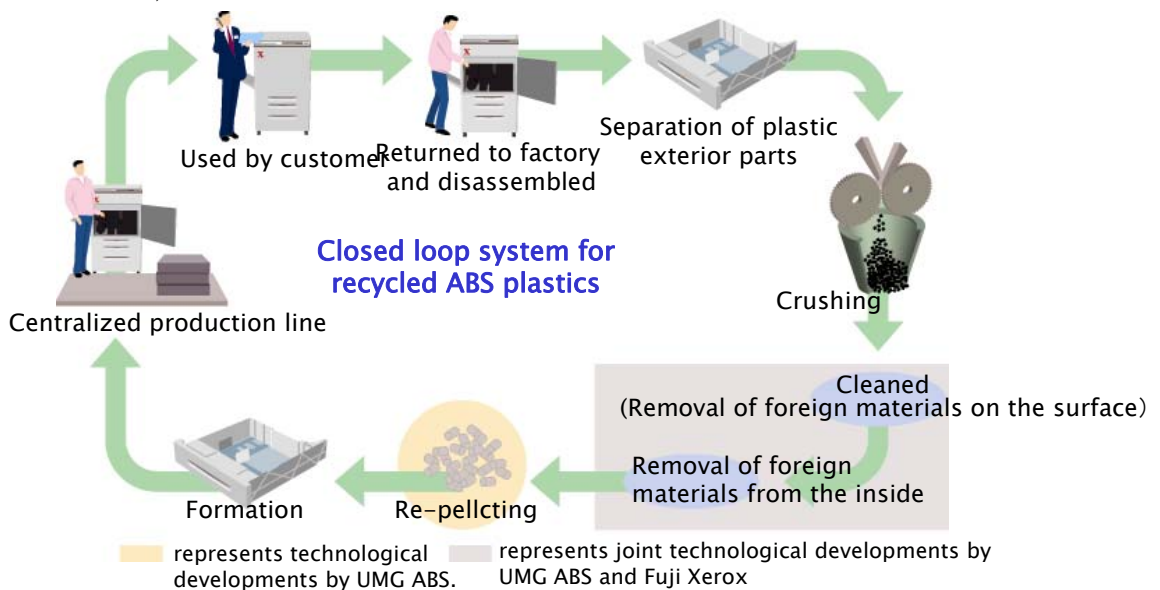
Zero Emission is an activity to eliminate waste. Parts and products which cannot be reused are assorted into 44 types of components at a maximum by manually disassembling and collected as resources to the utmost. A technique was developed to make available recycled plastic materials of the same quality 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

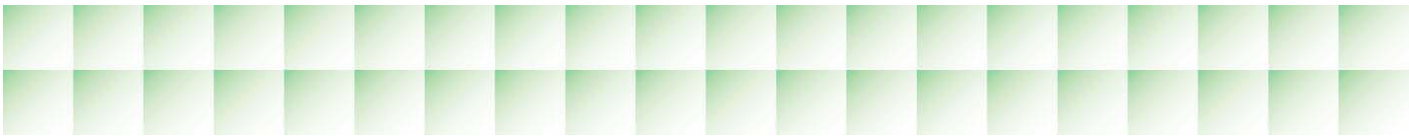
Around 1998 when this activity was started, it was said that recycle of plastic is difficult because quality is deteriorated. We, however, succeeded to recycle plastic first in the industry by joint development with a resin manufacturer (UMG ABS).

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).



ABS plastic assorted and fractured



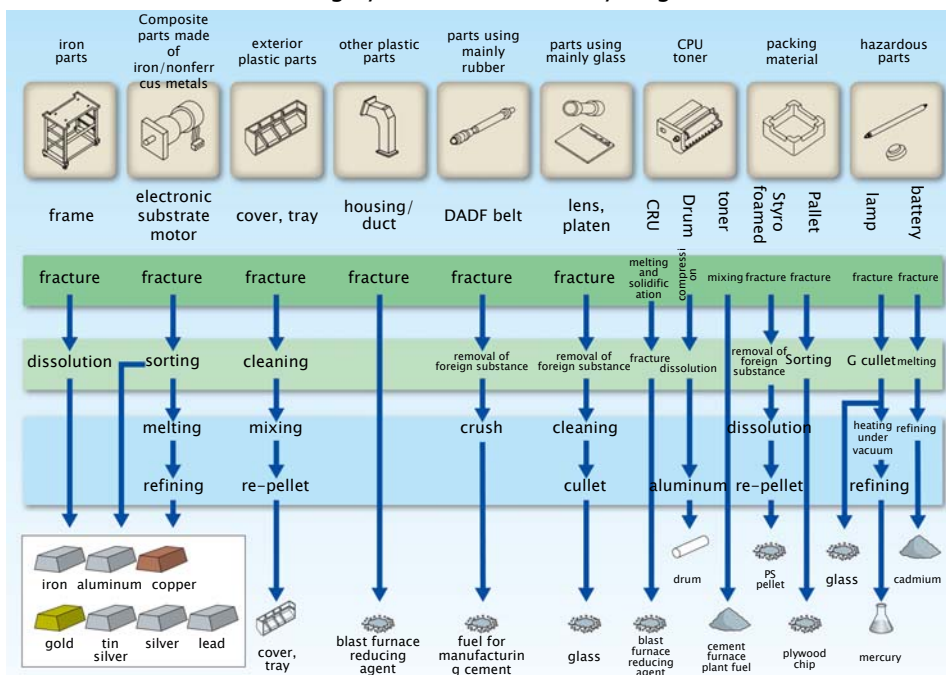


Separation of Hazardous Substances and Material/Thermal Recycle

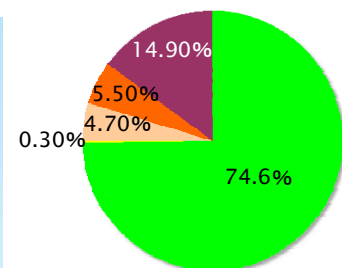
Some materials of collected used products were disposed of as landfill before by the former material recycle method except for the major materials such as iron or other metals. In order to attain the company-wide policy, "Aiming at Zero Landfill (zero landfill and zero simple incineration)", we established a treatment system to recycle 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 6 disassembly/assortment bases throughout the country and collected as resources through a network connecting 29 recycle companies* with the latest recycle techniques.

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. * As of July 2007.

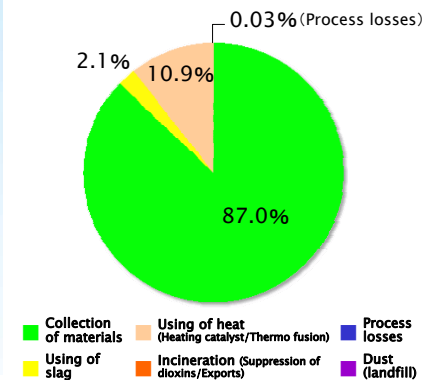
Processing System for 100% Recycling



Conventional Recycling



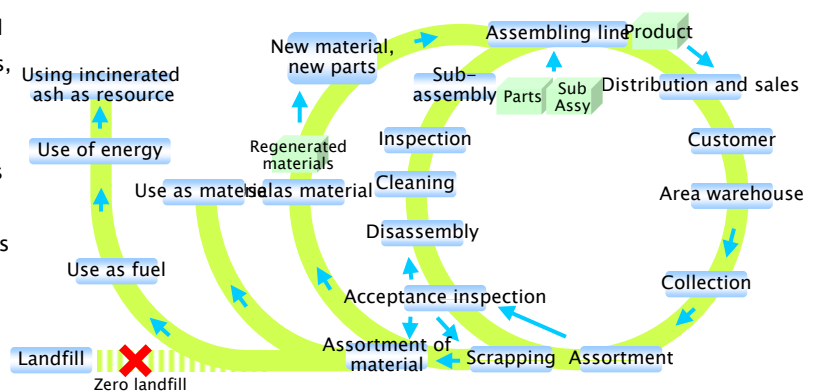
Processing System for 100% Recycling



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.

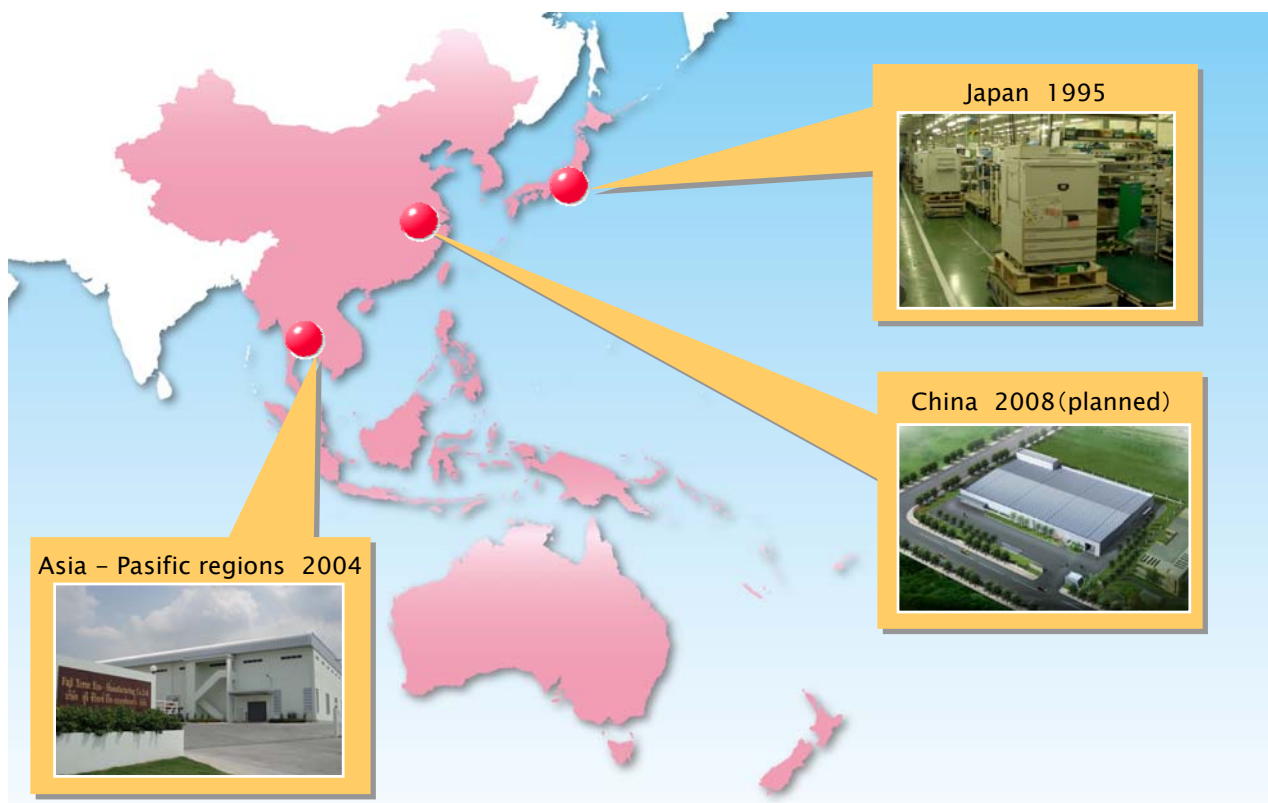
【Closed Loop System for Cartridge】



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. In December 2004, an integrated recycling system was started to collect used products and cartridges from the AP region at the base in Thailand. Those products and cartridges were disassembled and assorted thoroughly in the own factory. Almost at the same time, construction of a system was started in China. In 2008, operation of a integrated recycling system will be started to collect used products and cartridges from whole of China, disassemble and assort them thoroughly aiming at “zero landfill”, “no pollution” and “zero illegal dumping”. *Excluding Hong Kong, Macao and Taiwan.



Basic Principle of International Resource Recycling System Construction

When constructing an international resource recycling network, we established “Basic policy to build up an international resource recycling system” in addition to the former company product recycle policy, “Promote the reuse of resources aiming at zero landfill” so that related stake holders can cooperate with us without anxiety,

【 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

Integrated Recycling System in Asia & Pacific Regions

The international resource recycling system in the Asia and Pacific regions started activities for the construction in 2001 to realize assurance of consecutive recycle quality and improved efficiency, as a resource recycle network crossing the borders to collect used products centrally to Thailand. Four basic principles were established to avoid environmental loads at the integrated base in the importing country.

【 Four Basic Principles 】

- (1) Collection of used products under manufacturer's responsibility prevents illegal disposal.
- (2) Not to import wastes
- (3) Not to incur environmental impacts on importing country
- (4) Return of merits to importing country

The international resource recycling system in the Asia and Pacific regions started operation in December 2004. Marketing companies in 9 countries and region* in the Asia and Pacific regions collect used products by themselves and convey them to the integrated recycle plant established in Thailand by Fuji Xerox in compliance with the "Logistics guideline" setting forth procedures and shipment specifications. In the plant, those used products are thoroughly disassembled and assorted into about 70 categories of components and materials and highly reliable recycle partners collect resources from them.

Cartridges are disassembled down to the component level. Only parts meeting our quality standards are reused to produce new cartridges, which are assured the same quality as new ones and delivered to customers in the Asia and Pacific regions again.

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

Involved areas in Asia and Pacific regions



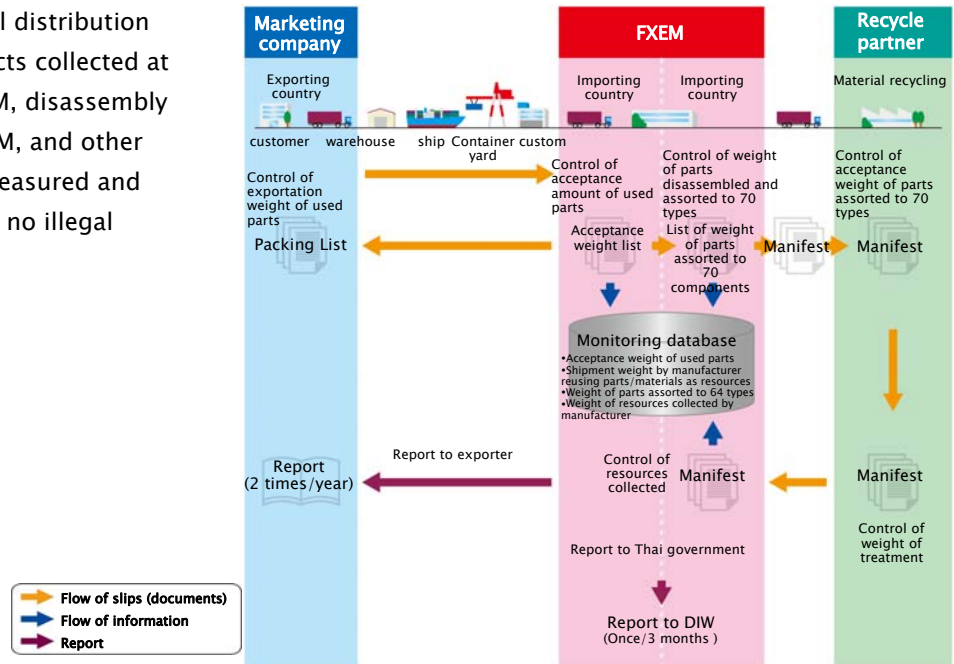
International Resource Recycling System in Asia-Pacific Region

Activities according to 4 basic Principles

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

At important points of physical distribution process to convey used products collected at 9 countries and region to FXEM, disassembly and separation process at FXEM, and other recycle processes, weight is measured and data is verified to confirm that no illegal disposal takes place.

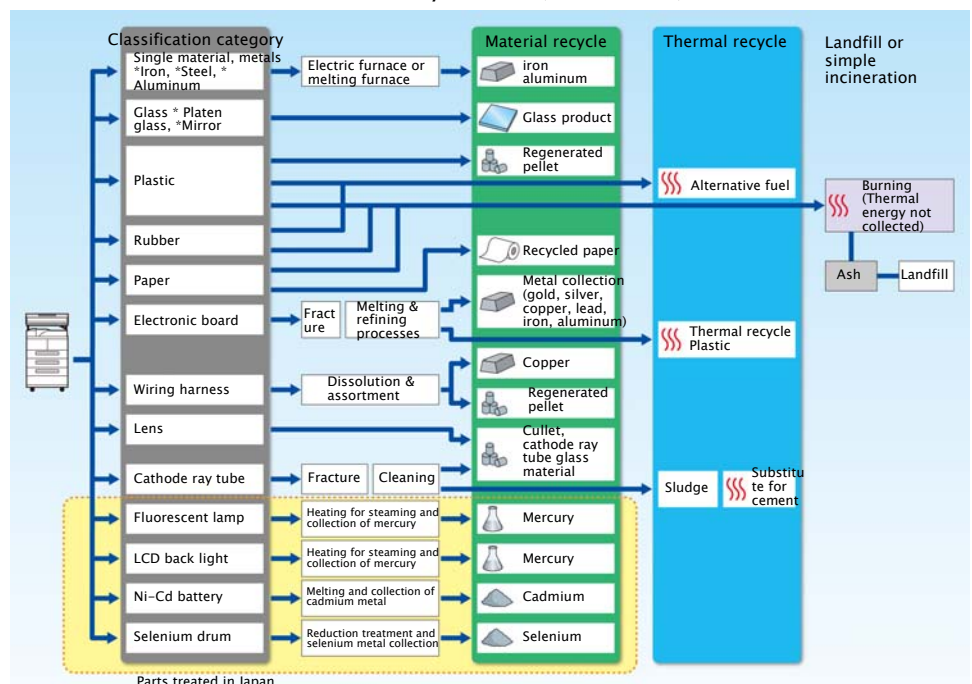
Tracking system for international resource recycling system in Asia-Pacific region

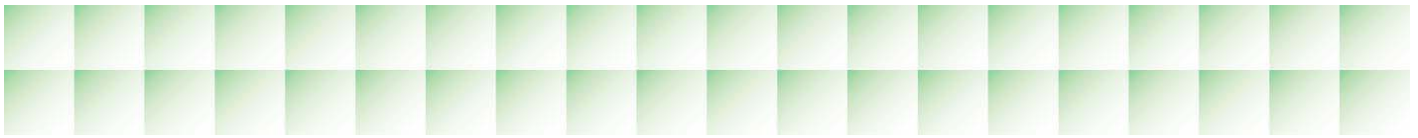


Basic principle 2 Not to import wastes

Used products collected in 9 countries and region are disassembled and thoroughly assorted into about 70 categories of components and materials in FXEM. Recycle partners with high techniques and reliability regenerate assorted parts as resources. Parts which cannot be properly treated in Thailand are transported and treated in Japan.

Material recycle flow (model case)





Basic principle 3 Not to incur environment impact on importing country

We intend to pay attention to environment, occupational health and safety in all cycles from generation of used products to their collection as resources.

To this end, FXEM established the environment, occupational health and safety policy at the initial stage of incorporation and has controlled the environment, occupational health and safety from the start of its operation. As a result, in September 2005, it acquired certificate of ISO14001-2004. Improvements have been continued to save energy and reduce wastes in the office based on the environmental impact evaluation. When selecting a recycle partner we attach the importance to the commitment of the partner to environmental conservation. Furthermore, environment researches are conducted by periodical visits to the partner.

Certificate of registration issued by BSI



Environment/labor safety and health 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 country

We consider it necessary to provide merits to importing country in order to continue the integrated-recycling system in the Asia and Pacific regions.

Based on the treatment for resources aiming at zero landfill, used products are regenerated as resources by recycle partners in Thailand and used as materials in Thailand. 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” and “product eco data” showing LCA evaluation results.

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

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 for the exterior, or exterior parts should be able to be reused as regenerated plastic for the exterior parts of own products.
	Plastic regenerated from own products collected from the market should be used for the interior, or interior/exterior parts should be able to be reused as regenerated plastic for the interior parts of own products.
	Parts which can be reused again or used as resource for the own products should be more than 50% by mass.
	Cartridges should be regenerated or there should be a plan for regeneration of cartridges.
	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 “production assembling process” should be centrally controlled and from acceptance of collected products to assembly of new purchased parts and regenerated parts should be carried out in “integrated production processes” which are considered to be a consecutive production line.
Semi-mandatory standard	Hazardous substances specified by the company self regulation should not be used in company manufacturing processes.
Design allowing reuse in next generation	
Mandatory standard	Design should be in compliance with the recycle design guideline common to Xerox groups in the world (commonalization, standardization, use of recyclable materials, simplification of disassembly and reassembly, elimination of necessity of adjustment, possibility to replace single parts, easier replacement and cleaning, etc.).
	Eleven hazardous substances as specified by the company self regulation should not be contained in parts (sving clause is available for 3 substances).
Semi-mandatory standard	The energy saving law should be strictly observed.

Product Eco Data

“Product eco data” showing information on reduction of environmental loads achieved by reuse of parts in the product life cycle of production – sales – service – collection and reuse is disclosed. Items of product eco data which are open to the public are selected by questionnaire to customers on the environment information for products, from environmental loads to which customers attach importance, and items to which customers require manufacturers to give consideration.



Product eco data disclosure items

	Manufacturing stage	Service stage	After-service stage
Energy consumption information Discharged CO2 information	Energy consumption Discharged CO2 quantity Effect of recycle and parts reuse	Energy consumption Discharged CO2 quantity	Energy consumption Discharged CO2 quantity Effect of recycle and parts reuse
Material/resource use information	Material and resource consumption Effect of recycle and parts reuse	Material and resource consumption	Quantity of collectable materials Effect of recycle and parts reuse
Information on substances of suspected environmental impact	Substances of suspected environmental impact		Final treatment of substances of suspected environmental impact

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- Information in this report is as of October 2007.