Establishment of Global Recycle Network

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In 1997, Fujitsu established the Fujitsu Recycle System (FRS) in Japan as the first nationwide recycling system in the industry and since then has taken the initiative in take-back and recycling of end-of-use IT (Information Technology) products. By utilizing the know-how gained through these activities, Fujitsu has diligently started to take-back and recycle the end-of-use IT products it has marketed overseas so the entire Group can exercise extended producer responsibility with a global perspective. In Europe, Fujitsu began considering the establishment of a recycle system to comply with the European Union (EU) recycle directive on Waste Electrical and Electronic Equipment (WEEE), which became effective in February 2003. Each EU member country has been transposing the WEEE directive into their national laws. Fujitsu and Fujitsu Group companies in Europe have started to work on the establishment of a European recycle system through mutual collaboration. Because of the strong demands to recycle end-of-use IT products in North America and Asia, Fujitsu is also studying the establishment of recycle systems in these areas. In the future, regional recycle systems should not only function independently but also be closely coordinated and developed into a Global Recycle Network (GRN) to share recycling know-how and information and circulate resources and products using recycle logistics based on international rules. This paper describes the establishment of the recycle systems and the concept for establishing a GRN.

1. Introduction

1.1 Background

To meet the goal of promoting the circulation, proper treatment, and management of the earth's limited resources for further utilization, the Fujitsu Group is working positively with concerted efforts to take back and recycle end-of-use IT products.

With the globalization of the market economy, a huge number of Fujitsu Group products are being sold and used around the world. It is therefore the Group's top priority to take back and reuse the resources contained in end-of-use IT products.

Take-back and resource reuse will also help reduce the environmental burden, circulate resources, and promote proper resource treatments so Fujitsu can help realize a cyclical society and help achieve sustainable management to meet its corporate social responsibilities with a global perspective.

1.2 Promotion of take-back and resource reuse of end-of-use IT products

Against this background and by recognizing the importance of borderless end-of-use product take-back and resources reuse, Fujitsu has started to establish recycle systems in major overseas areas. Fujitsu is also establishing the Global Recycle Network (GRN) to enable networking of these systems to handle take-back and resources reuse of end-of-use IT products with a global perspective.

This paper describes the establishment of recycle systems in major areas and the GRN, which expresses a wider view beyond these areas.

2. Stages for establishing GRN

The GRN will be established in two stages:

1) Stage 1 (fiscal 2004 to 2006): Establishment of recycle systems

Recycle systems that take international economic blocs and the Fujitsu Group's overseas business into consideration will be established in major areas overseas.

The Fujitsu Group will first expand its recycle systems in Europe, where the EU Directive for recycling Waste Electrical and Electronic Equipment (WEEE)[1] became effective in February 2003. Next, we will expand the systems in North America and Asia, where the demand for recycling is rapidly increasing.

2) Stage 2 (fiscal 2007 and beyond): Establishment of GRN

Recycle systems will function correctly and independently, know-how and information accumulated in each system will be effectively shared, and the systems will benefit each other through an interlinking network that will, for example, improve the quality of recycling and reduce the cost of processing recycled resources. Therefore, the promotion of networking will be an important part of Stage 2.

Also, recycle logistics such as the circulation of resources and products within each area and between areas requiring resources will be planned based on internationally recognized rules.

During these stages, it will be necessary to consider the Fujitsu Group's overseas business, national environmental policies and laws, international treaties (e.g., the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal), and furthermore, environmental burden reduction through Life Cycle Assessment (LCA) and logistics.

3. Establishment of recycle systems (Stage 1)

As mentioned earlier, the Fujitsu Group is engaged in business all over the world.

Based on the business scale, the Group mainly carries out its overseas business in three blocs:

1) The European economic bloc,
2) the North American economic bloc, and
3) the Asian economic bloc.

Considering resources and information movement in terms of recycling, recycling activities are fairly closed in these economic blocs for the time being.

Therefore, the Fujitsu Group is establishing recycle systems in these three blocs.

Figure 1 shows the image of the recycle system, which will be established through collaboration with Group companies in each area.

3.1 Recycle system

Figure 2 shows a recycle system in more detail.

Products manufactured in a country or imported from another country become end-of-use products after several years. The term "recycle system" in this paper means a scheme for a series of recycling processes in cooperation with local logistics partners and recycle partners (enclosed by dotted line in Figure 2). The processes of this series are as follows:

1) Take-back of end-of-use products from customers and appointed collection points,
2) judgment of products and units to see if they are reusable, and
3) based on this judgment, either reuse of products and materials or thermal energy recovery and landfill.

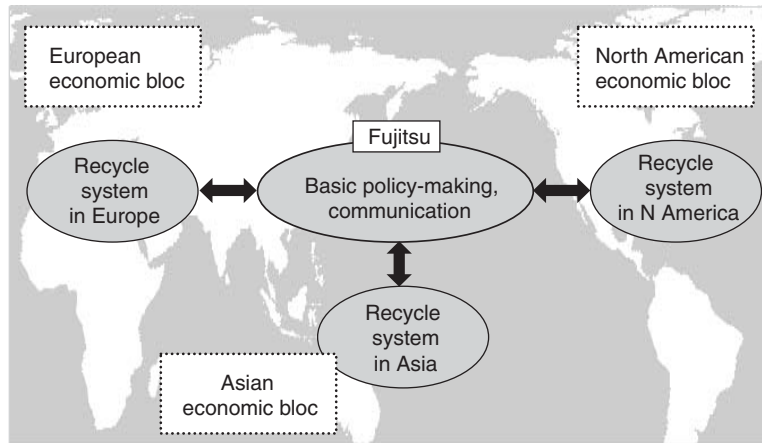There may also be cases in which a recycle system extends into another country.
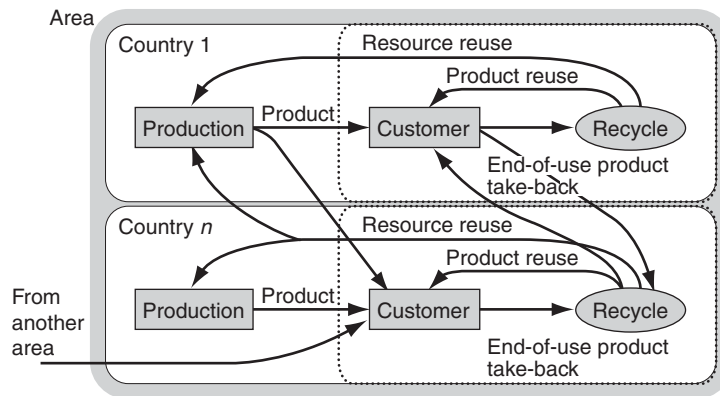
Figure 1
Image of recycle systems.

Figure 2
Recycle system.

3.2 Establishment of a recycle system in Europe

1) **European Union (EU) policy toward environmental compliance**

In July 2002, the European Parliament and the Council adopted the Sixth Community Environment Action Programme (Environment 2010: Our Future, Our Choice), which showed the basic direction of the Commission's environmental policy for 2001 to 2010, focusing on environmentally conscious sustainable economic development.

In this programme, as with market integration, the EU is expressing its intention to make environmental compliance a common continent-wide issue under a single, harmonious direction.

One of the important environmental issues to be tackled in the programme, "Sustainable use and management of resources; Waste recycling," is to encourage reductions in waste and the promotion of reuse and recycling.

Based on this Action Programme, the EU enacted the WEEE recycle directive in February 2003 and requested member countries to transpose the directive into their national law by August 2004 and comply with take-back obligations starting from August 2005. However, most countries did not meet the transposition deadline.

2) Impact on Fujitsu Group companies and issues

Each EU member country is transposing the WEEE directive into their national law, and although these laws vary, the concept will be the same among each member country.

In Europe, certain Fujitsu Group companies are operating in the same country independently, which makes it essential for all Group companies to develop a recycling system that covers their products. An even bigger requirement is to develop a recycle system easily and efficiently by, for example, jointly using the recycle infrastructure and logistics networks in each country.

Lastly, if this recycle system does not function as expected, the European business of the Fujitsu Group will suffer a serious negative impact.

3) Fujitsu Group's approach to establishing recycle systems

Because most Fujitsu Group companies in Europe are doing business on a B2B (Business-to-Business) basis, some of the Group companies are already taking back and recycling end-of-use IT products from customers.

By making use of these experiences, Fujitsu and Fujitsu Group companies have taken actions to realize recycle systems in each country by effectively and in a timely manner strengthening their international cooperation as a group and studying the activities of trade organizations in European IT markets from a broad perspective.

Even before the WEEE directive became effective, the Remarketing & Recycling Center of Fujitsu Siemens Computers GmbH (FSC) in Paderborn, Germany was in operation, and it is now processing about 3500 to 4000 tons of end-of-use IT products annually.

The accumulated know-how and experience gained at this center over the years have also been utilized to establish recycle systems in other countries.

Also, regarding cooperation with government organizations, Fujitsu Services Ltd. (FS) in the

UK is co-operating, through its involvement with trade organizations such as the Industry Council for Electronic Equipment Recycling (ICER), on several stakeholder committees set up by the Department of Trade and Industry (DTI) to work on the transposition of the WEEE Directive into national law and an equitable take-back scheme.

Figure 3 shows the matrix for realizing a recycle system. Each company manages recycle implementation data and the status of each country (dotted lines), and countrywide recycle systems have been targeted for joint use of the recycle infrastructure (logistics, recycle partners, etc.) within each country. This makes it possible to reduce recycling costs and improve treatment efficiency (horizontal bars in Figure 3).

4) Concrete measures

Fujitsu and Fujitsu Group companies in Europe jointly started preparatory work in July 2003 and set a target for establishing the recycle system in March 2005 on the assumption that the directive would be transposed into the laws of each country by August 2004.

The most important requirements when establishing the recycle system in Europe are:
- An effective cooperation scheme and an awareness of the importance of recycling among Group companies,
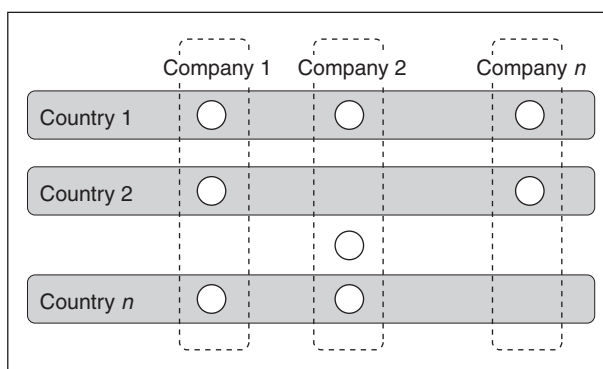- effective information exchange, and
- prompt decision-making.

Figure 3
Matrix for realizing a recycle system.

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To meet these requirements and establish a basic policy for the recycle system, the Fujitsu Group companies in Europe must quickly organize a cooperation promotion scheme among its companies so they can share issues and know-how.

Fujitsu and the Fujitsu Group companies in Europe also agreed to organize an information exchange network and face-to-face meetings among themselves. The following activities have been started between Fujitsu and the Group companies and between the Group companies:

1) Information exchange network

Based on the premise that communication should be transparent, an information exchange network has been created to:

• Transfer the Fujitsu Group Environmental Policy to all Group companies as a common policy,

• share information such as national transposition status and the stances of industry organizations,

• propose the use of a recycle infrastructure (logistics, recycle partners, etc.) to be shared, and

• indicate issues that require consultations and enable knowledgeable people to answer questions and make recommendations.

Moreover, Fujitsu Japan is not only studying the exchange of information but also the systematic management of information as a knowledge database and regular distribution of information to all Group companies in Europe. As a result, when new green directives and laws other than the WEEE recycle directive are being addressed in the future, the Fujitsu Group will be able to effectively and efficiently cope with these new issues.

2) European Environmental Meeting

In addition to the information exchange network, it was agreed that the persons in charge of environmental compliance in each Group company in Europe should have biannual, face-to-face meetings called European Environmental Meetings with each other to share information about
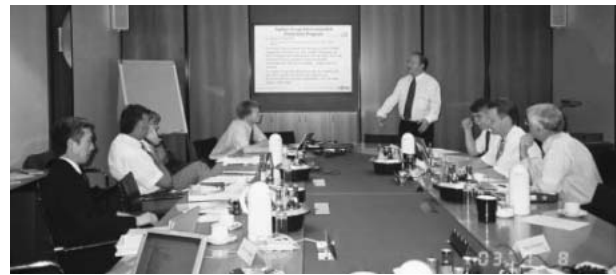

Figure 4
European Environmental Meeting.

issues and the progress toward realizing recycle systems and to exchange opinions. They also agreed to hold rotation meetings.

So far, there have been four European Environmental Meetings: one each in Germany, the Netherlands, Spain, and the UK. The participants have used these meetings to clarify purposes, organize promotion schemes, and share issues in order to fulfill Fujitsu's recycle responsibilities as a manufacturer.

Figure 4 shows a photograph taken at one of the European Environmental Meetings.

For countries that have yet to transpose the WEEE directive, Fujitsu plans to establish a framework of recycle systems based on the concept of the WEEE directive in those countries. Then, details of system requirements will be fed back to the framework when they become clear in those countries.

3.3 Establishment of recycle systems in North America and Asia

By drawing on the experience gained through the establishment of Fujitsu Recycle System (FRS) in Japan and the recycle system in Europe, the Fujitsu Group will work positively to establish recycle systems in North America and Asia by the target date of March 2007.

Concretely, major Group marketing companies doing business in these areas have been asked whether there are any recycle systems, recycle action programs within their companies, laws or regulations that Group companies need to be

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aware of, and recycle partners that are available.

Based on the responses to these questions and reviews of the preparatory status of regulations and infrastructures, the Group will promote the establishment of recycle systems tailored to the circumstances of each country.

1) North America

In the US and Canada, each state and province promotes environmental compliance and enacts WEEE recycle regulations, for example:

• The State of California enacted the Electronics Waste Recycling Act: SB50 (SB20 follow-up), which covers the recycling of displays.[2]

• The Province of Ontario enacted WEEE recycle regulation.

In addition to these independent requirements, we need to consider one more requirement to cover the whole country. In summary:

• The first requirement is to develop recycle systems for each state in line with those state's laws. In some states the state government is responsible for establishing a recycle system, and in other states the responsibility falls on manufacturers.

• The second requirement is to develop a recycle system that covers all states with the same conditions.

The decision of whether to implement a pan-country system or state-dedicated ones relates to business strategy, the characteristics of the products in question, and the laws of the state.

Therefore, by investigating the regulations of each state, product categories, business scales, and marketing channels, Fujitsu Group companies will conduct feasibility studies to establish two types of recycle systems: a pan-country recycle system that covers all states and recycle systems for each state.

2) Asia

The Republic of Korea and Taiwan have taken initiatives to recycle end-of-use household appliances, including personal computers (PCs). Fujitsu Group companies in these countries are following this scheme and recycling PCs.

By verifying the validity of the schemes of these countries, Fujitsu and the Group companies will study product diversification.

In the People's Republic of China, which has grown into a major manufacturer of IT products, the demand for recycling of electronic end-of-use products is increasing. Fujitsu will review its products and market channels in the People's Republic of China. Then, we will closely study the trends and relevant legislation and — as we intend to do in North America — we will develop a suitable and significant recycle system.

4. Concept for establishing GRN (Stage 2)

As previously mentioned, it is reasonable to require the recycle systems of Europe, North America, and Asia to function well individually. However, it is much more important that they closely coordinate with each other within the GRN so they can mutually benefit each other and thereby help improve customer satisfaction. Fujitsu therefore has a corporate responsibility to promote the circulation, proper treatment, and management of the limited resources.

The realization of this network requires a change from the current local mind-set to a global one; and with this new mind-set, Fujitsu and Fujitsu Group companies will establish GRN.

Figure 5 shows the image of the Global Recycle Network (GRN).

4.1 Steps to establish GRN

The following steps will be taken:

1) Step 1: An information exchange network will be created to mutually and effectively utilize know-how accumulated through the establishment of the recycle systems in each area. The goals to be realized are:

• Improvement of each recycle system by mutual sharing and appropriate supply of recycling know-how and information.

• Upgrading and consistency of product recycling information supplied to recycle

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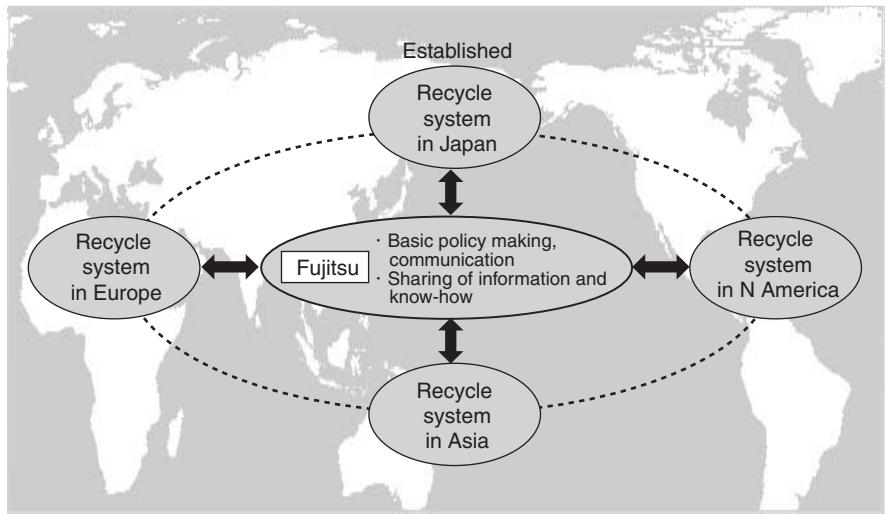
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Figure 5
Image of Global Recycle Network (GRN).

partners in each area.

- Correct understanding of recycle performance data within the Fujitsu Group.
- Enhancement of transparency of Fujitsu's environmental governance.
- Enhancement of the Fujitsu Brand Image through recycling with a global perspective.
- Information feedback to product designers to improve recyclability.
2) Step 2: A system for transboundary movement of resources across borders should be brought into view in consideration of international treaties, national laws, and regulations.
  The targets are:
- Early exchange of information about transboundary movement laws and regulations for end-of-use products and resources.
- Recycle efficiency improvement and cost reduction through recycle logistics between each area.
- Efficient circulation of resources in each recycle system and mutual supplementation of resources among recycle systems.

4.2 Role sharing by Fujitsu and Fujitsu Group companies for establishment of GRN

The establishment of GRN will be promoted through the following roles:

1) Role of Fujitsu

To think about and promote environmental compliance with a global mind-set:

- To foster a global environmental compliance culture of "Environmental protection with IT technology and creative ability" based on the Fujitsu Group's environmental policies and Fujitsu's Environmental Protection Program.
- Integration of know-how and information.
- Support for improving the working environment to enable environmental compliance activities in each Fujitsu Group company.

2) Role of Fujitsu Group companies

To establish an effective recycle system in line with local situations and infrastructures based on the environmental compliance culture of the Fujitsu Group:

- Establish and operate simple and effective organizations.
- Foster awareness of each country's environmental policies, laws, and customer demands for environmental compliance.

- Develop infrastructure components such as recycle partners and logistics partners in consideration of local circumstances.

This role sharing and flexibility will be linked to the establishment of the recycle systems and GRN.

4.3 Milestone toward realizing GRN

In May 2004, 10 more countries became EU members, and it will become important to implement WEEE recycling measures for these new members.

Also, the recycle system for Oceania will be expanded. **Figure 6** shows the main milestones for realizing the GRN.

5. Concerns

To establish and operate the GRN, there are some concerns that should be clarified in advance. For example:

1) Ensuring the security of data and information in transboundary logistics and customer dealings.
2) International treaties, national policies, and international standards about transboundary movement of goods.
3) Importance of transboundary movement of goods and its effect on the environmental burden.

4) Relationships between LCAs and recycle systems.
5) Methods for managing and exchanging information and know-how between recycle systems.
6) Global alliances with recycle and logistics partners.

6. Conclusion

The Fujitsu Group fully understands that it is not only our mission but also a challenge for every country to reduce the environmental burden and utilize natural resources so they can be handed down to the next generation.

To achieve this goal, Fujitsu has established FRS in Japan and the Fujitsu Group has started to expand its recycle system into Europe.

To realize, with a global perspective, co-existence and co-prosperity with the international community, the individual recycle systems will be made to function as a network by expanding them into North America and Asia.

Moreover, to realize GRN, the following will be accomplished:

1) Mutual and effective use of know-how accumulated through the establishment and implementation of recycle systems in each area and
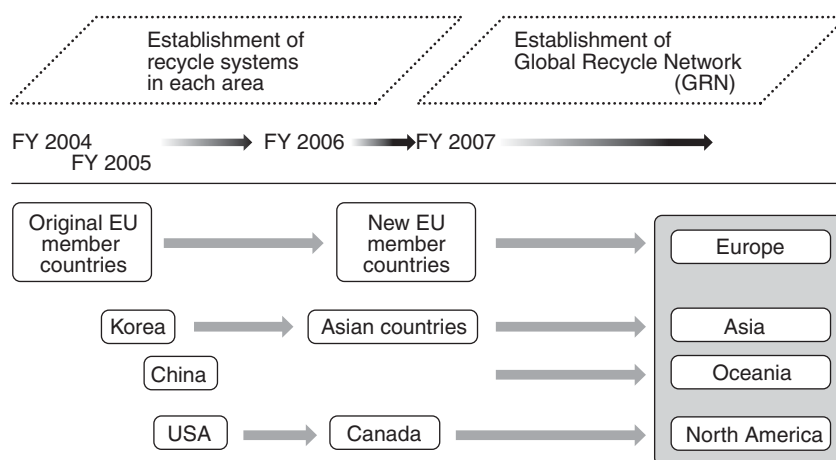

Figure 6
Milestones for Global Recycle Network (GRN).

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2) transboundary movement of resources (recycle logistics) after taking various laws and regulations into consideration.

In addition to assessments of trends in international treaties and national environmental policies, there may be some unforeseeable tasks that need to be executed. These tasks should be studied and executed in the future.

Fujitsu and the Fujitsu Group companies will collaborate with each other to establish recycle systems suited to each country and effectively implement GRN by taking local recycle infrastructures and other internationally recognized conditions into consideration.

References

1) EU Directive for recycling Waste Electrical and Electronic Equipment (WEEE).
   http://europa.eu.int/scadplus/leg/en/lvb/l21210.htm
2) State of California, Electronic Waste Recycling Act.
   http://www.ciwmb.ca.gov/Electronics/Act2003/

Osamu Kanzawa received the B.E. degree in Electronics Engineering from Yamanashi University, Yamanashi, Japan in 1970. He joined Fujitsu Ltd., Kawasaki, Japan, where he has been engaged in development of terminal equipment, supporting engineering outside of Japan, and system engineering for IC card applications. He is currently involved in the promotion of overseas environmental compliance programs.

Makoto Takahashi graduated from Yonezawa Technical High-School, Yamagata; the Mechanical Engineering course at Fujitsu Technical College; and Sanno College in 1967, 1971, and 1984, respectively. He joined Fujitsu Ltd., Kawasaki, Japan in 1967, where he has been engaged in developing production and manufacturing technology (especially HDD manufacturing deployment in Asia from 1993), Green Products that entrench promotion of environmental aspects (from 1999), and domestic and overseas IT-product recycle system establishment and implementation (from 2002). He is currently engaged in Environmental Management System (EMS) audit at Japan Audit and Certification Organization for Environment and Quality (JACO) as external assignment (from June 2005).