Promoting Development of Super Green Products

● Satoshi Oikawa

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The Fujitsu Group has begun activities for the development of "Super Green Products" as part of the new 4th Fujitsu Group Environment Action Plan, which was established in 2004. The Group has been promoting the development of Green Products, which are designed with greater consideration for the environment, since 1998. The goal of these new activities is to take environmental protection a step further by developing Super Green Products with world-leading, environment-friendly characteristics. In this paper, we introduce the Fujitsu Group's development activities regarding Super Green Products and describe some of the products.

1. Introduction

In recent years, European countries have strengthened their environmental regulations for various products, for example, through the Waste Electrical and Electronic Equipment (WEEE) Directive, the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive, and the Energy-using Products (EuP) Proposal. Similar trends have also become visible in Asia and North America. In 1998, Japan introduced one of the world's most advanced energy conservation policies with the amendment of the Law Concerning the Rational Use of Energy. In 2000, with the amendment of the Recycling Law, the concept of the Three Rs (Reduce, Reuse, Recycle) was incorporated into product development.

Environmental awareness among consumers, companies, and local governments increased, and in 2001, the "Law on Promoting Green Purchasing" was established. Now, there is an accelerated demand for product manufacturers to develop and provide even more environment-friendly products.

In response to these demands, the Fujitsu Group began new activities in 2004 based on a new concept of developing "Super Green Products" and has been gradually offering products that have more advanced environment-friendly features over their lifecycle of material procurement, production, distribution, use, and disposal/recycling.

In this paper, we introduce the Fujitsu Group's development activities, targeting Super Green Products, and also describe some of these products.

2. Environmental activities related to IT products

2.1 Environment Action Plan

To put the Fujitsu Group Environment Policies into practice, we have established the Fujitsu Group Environmental Action Plan, which defines environmental activities from a mid- to long-term perspective (**Figure 1**).[1)]

From 1993 to 2000, the company undertook activities mainly in production plants and laid the foundations for environmental management.

Figure 1
Transformations in Environmental Action Plans.

In the 3rd Environment Action Plan, which covered the period from 2001 to 2003, the plan was expanded to encompass the entire Fujitsu Group and a Product Development Action Plan was added to make all new products Green Products by the end of 2003. Through these activities, Fujitsu achieved its goal of developing and offering Green Products in a total of 302 product groups.

In the 4th Environment Action Plan, which began in 2004, the focus of product development is to offer more advanced environment-friendly features based on the concept of Green Products and offer products that contribute to business. We therefore began activities based on the concept of developing Super Green Products, which are top products in terms of environmental friendliness. Through these activities, we aim to provide Super Green Products having the most advanced environment-friendly features in the main product groups of all business divisions by the end of 2006.

2.2 Green Product development

The term "Green Products" refers to a certification system for products that have been evaluated in the design and development stages based on environmental requirements for Green Product Regulations as stipulated by the Fujitsu Group. Only products that meet all of the relevant requirements are certified as Green Products (**Figure 2**).

Products certified as Green Products display the Fujitsu Group's "Environmental Symbol Mark" on the product pamphlet and packaging.

These systems and regulations were started in 1998, and since then Fujitsu has been working continuously to improve these standards and environmental requirements based on laws and regulations in Japan and around the world, trends in environmental labeling, and trends in the market as a whole.

We will now give a brief description of Green Product development in the area of PCs, which were the first Fujitsu Group products for which environmental considerations were formally implemented (**Figure 3**).

Fujitsu developed a method of recycling magnesium alloys and was the first manufacturer to use such a method to recycle the magnesium of its notebook PCs. These PCs incorporate plastics that are made from corn and other vegetable materials. The halogen-free resin cabinets and packing boxes use soy ink, which contains only

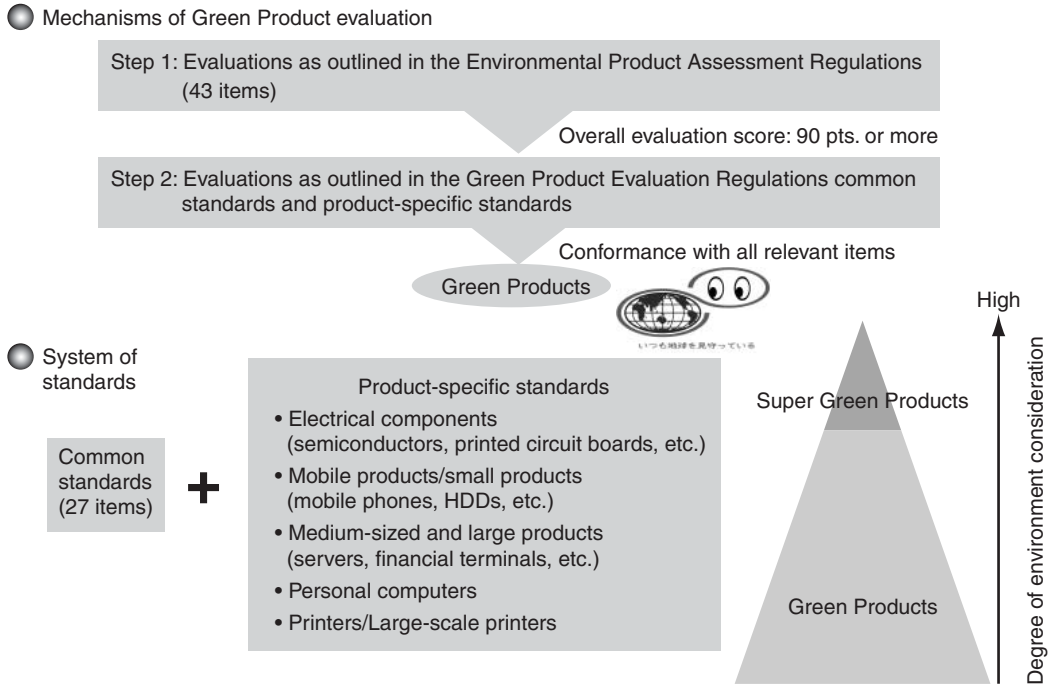


Figure 2
Green Products and Super Green Products.

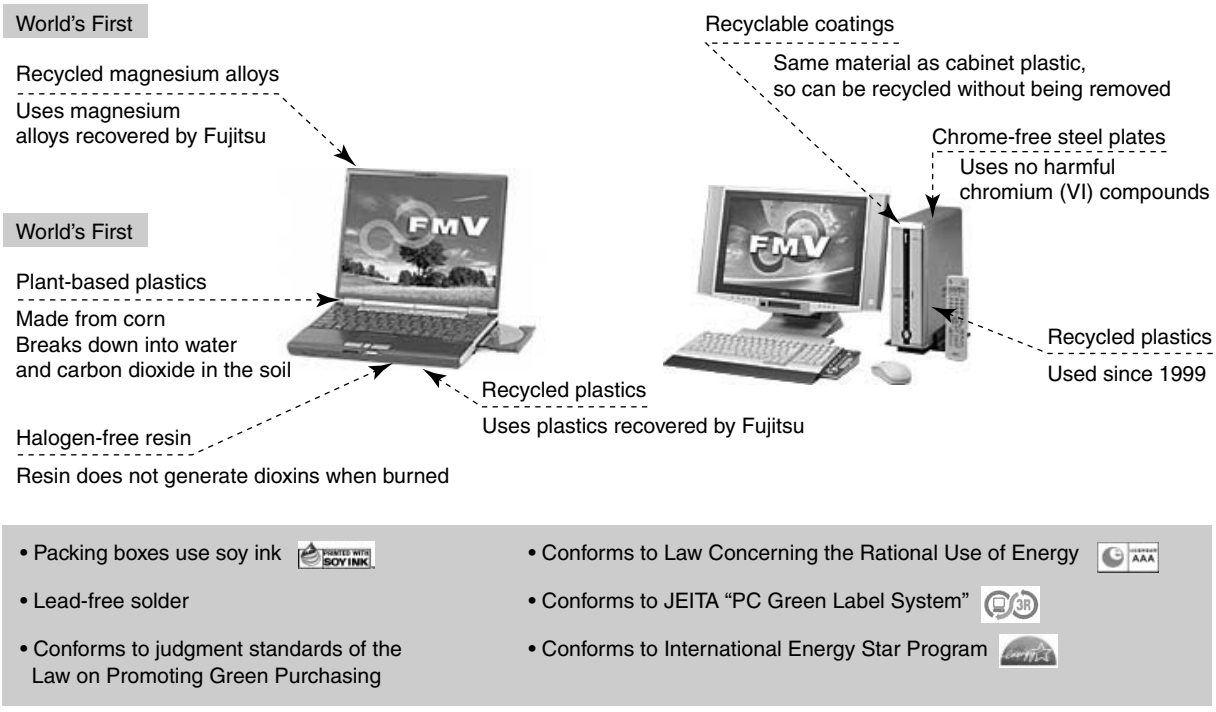


Figure 3
Examples of environmental efforts for PC products.

small amounts of volatile organic compounds (VOCs). Fujitsu's notebook PCs were the first in the industry to acquire environmental labeling through third-party certification (EcoLeaf Environmental Label), and Fujitsu was the first to provide information regarding the impact of notebook PCs on the environment.

Since 1998, Fujitsu's desktop PCs have used a recyclable coating made from the same material as the plastic cabinet, so the cabinet can be recycled without removing the coating film. Steel plates are made from chrome-free steel that contains no harmful chromium (VI) compounds. Other environmental features of these PCs include the use of recyclable plastics and lead-free solder.

It is still necessary to carry these technologies over to other products, develop new related technologies, and tie these activities into the promotion of even more environment-friendly designs.

3. Super Green Product development

Super Green Products incorporate all of the environment-friendly development and design elements applied to the Fujitsu Group's Green Products. At the same time, however, Super Green Products and systems must offer even more advanced features in terms of consideration for the environment. Super Green Products are subject to the same in-house certification system as Green Products.

The next section explains the goals of these activities and gives some definitions of Super Green Products.

3.1 Goals of activities

The goal of the Environmental Action Plan for product development is to provide Super Green Products that offer the most advanced environment-friendly features from the main product groups of all business divisions by the end of 2006.

"All business divisions" means that these activities will encompass all business divisions that are developing products in the Fujitsu Group.

The goal of Super Green Product development is to promote the use of environment-friendly elemental technologies mainly in the design and development divisions, which are the starting points for production, and to tie these technologies into stronger development of environment-friendly products that contribute to business. This applies to the development of all products and systems, including semiconductors, electronic components, and hardware for all new information and communication devices developed from 2004.

To provide backup for product development, the research divisions will also develop new materials and technologies that will contribute to the environment. We will also strengthen ties with the PR and advertising divisions and expand the business-oriented aspects of these activities.

3.2 Definitions

Super Green Products and systems made from them must have even less of an environmental burden than Green Products. They must also offer business merits and comply with the following high-level environmental standards:

1) They must demonstrate the most advanced level of environmental consideration in any of several environment-related categories, including energy conservation, 3R design/technologies, and contained chemical substances. They must also offer outstanding performance in these areas in comparison to other products offered by Fujitsu, its competitors, and the industry as a whole.
2) They must incorporate materials and technologies that help protect the environment and are unprecedented worldwide in terms of environment friendliness.
3) Products must have received an award or certification from an outside organization or third party for environmental efforts or environmental technologies.

3.3 Promotion organizations

All product development divisions in the Fujitsu Group are currently in the process of proposing and implementing Super Green Product development plans. Numerous Green Product Committees promote these activities with a focus on specific related issues. These committees, which are comprised of representatives from each product division, also promote horizontal development of the technologies applied by each division.

Specific plans were made for the development of about 20 Super Green Products during 2004. These products will be announced and released as they become available.

3.4 Examples of recent achievements

3.4.1 Personal computers

Fujitsu has certified its FMV-BIBLO NB series of notebook PCs as Super Green Products. The bodies of these PCs are made from environment-friendly plant-based plastics. The environmental features of these plastics are described below.

1) Application of environment-friendly materials

Fujitsu's notebook PCs use new plant-based plastics that we have developed. These plastics have a low environmental burden when they are burned (**Figure 4**) and overcome the problems of previous plant-based plastics that we investigated; namely, low flame resistance, low heat resistance, and low moldability (**Figure 5**). Some of the physical features of these plastics are:

- A flammability rating better than UL94V-1.
- Can be manufactured at more than three times the rate of traditional polylactic-acid plant-based plastics.
- A maximum-temperature improvement of more than 20℃ compared to conventional materials.
- Deterioration after temperature and humidity treatment is comparable to that of current materials.

2) Reduced oil consumption and less CO_2

These plastics also help conserve oil resources because they are 50% made from natural materials, for example, plant-derived materials. Also, we have calculated that when these materi-

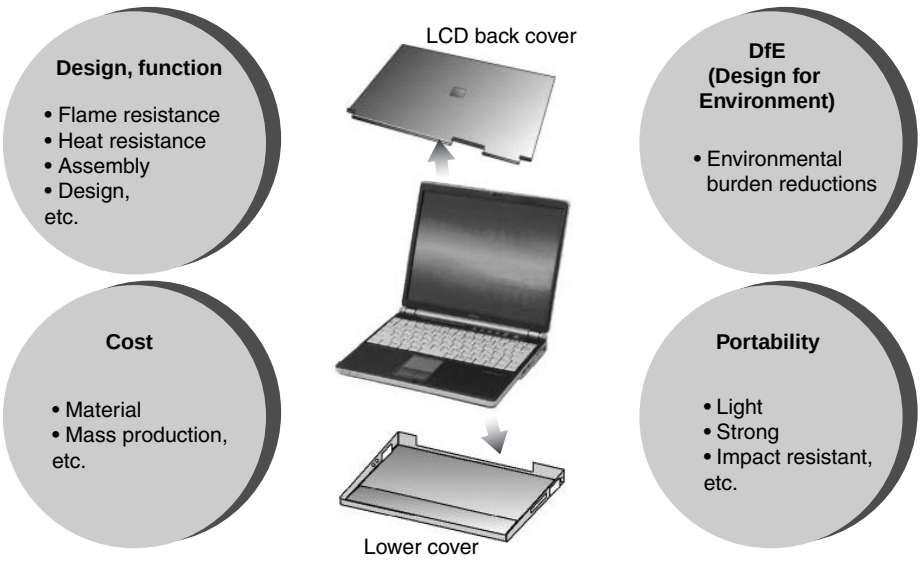


Figure 4
Low environmental burden notebook PCs.

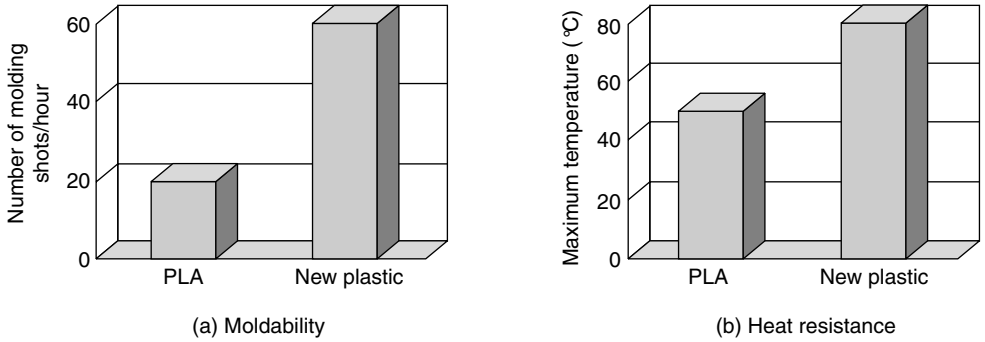


Figure 5
Comparison of new plant-based plastic and polylactic acid (PLA) plant-based plastic.

als are applied to notebook PCs, they can cut CO_2 emissions by 15% over the products' lifecycle compared with traditional oil-derived resins.

3.4.2 Magneto-optical disk drive

The DynaMO1300 LT (hereafter DMO13LT) magneto-optical disk drive (MO drive) is a battery-operated disk for easy storage of photo data from digital cameras that has been certified as a Super Green Product.

The following is a brief description of this product's environmental features.

1) Design minimizes use of resources

To simplify insertion and removal of the MO disk, the top cover opens upward and guides the MO disk. This design also contributes to a 45% reduction in body weight compared to the earlier model (220 g versus 400 g for the DynaMO1300U2 Pocket), making the DMO13LT the world's smallest and lightest MO drive according to a Fujitsu survey.

2) Helping to prevent global warming

MO drives are transported from overseas production bases to sales bases by air. Fujitsu has made a change from transporting these drives on pallets made of wood (14.6 kg/pallet) to pallets made of paper (7.5 kg/pallet). This reduction in weight provides an 11% reduction in CO_2 emissions per transport hour for each product compared to the previous model (DynaMO1300U2 Pocket) (calculation by Fujitsu).

3) Type III labeling

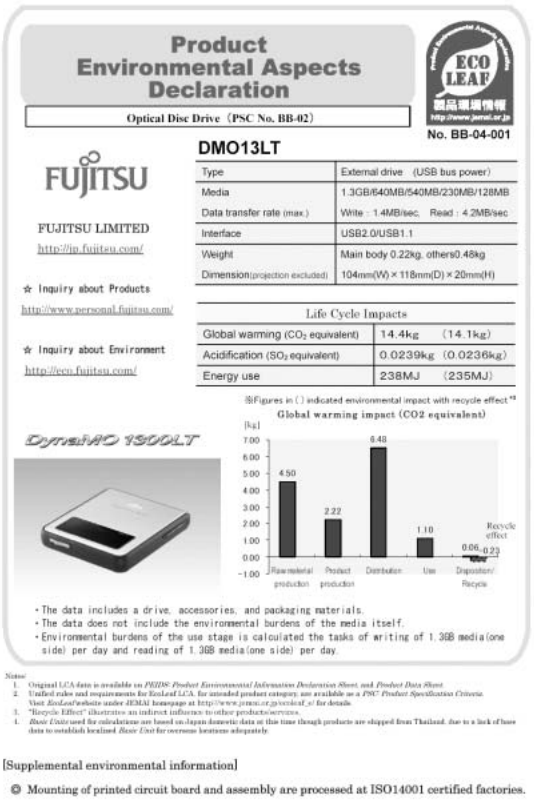
The DMO13LT is the first MO drive in the industry to acquire "Ecoleaf Environmental Labeling,"[2] (**Figure 6**) which is a type III environmental label certified by the Japan Environmental Management Association for Industry (JEMAI). Fujitsu is using Websites and exhibitions to actively disclose information about the environmental impact of this product throughout its lifecycle. An example of an Ecoleaf certified product is shown in **Figure 7**.

3.4.3 IPCOM S Series Network Server

The IPCOM S series,[3] which supports broadband networks and other corporate systems, has also been certified as a Super Green Product. The following is a brief description of the environmental features offered by this product.

1) Design minimizes use of resources

The IPCOM S series integrates the functions of various Internet devices required for corporate systems that were previously installed separately (e.g., routers, L2 switches, firewalls, and SSL accelerators). In this way, the installation space and number of connection cables have been reduced by 1/3 compared to conventional configurations, enabling a reduction in material use equivalent to about a 30% reduction in CO_2 emissions (calculation by Fujitsu) (Figure 7).



Product Environmental Aspects Declaration

Optical Disc Drive (PSC No. BB-02)

No. BB-04-001

DMO13LT

Type	External drive (USB bus power)
Media	1.3GB/640MB/540MB/230MB/128MB
Data transfer rate (max.)	Write : 1.4MB/sec. Read : 4.2MB/sec
Interface	USB2.0/USB1.1
Weight	Main body 0.22kg, others0.48kg
Dimension(projection excluded)	104mm(W)×118mm(D)×20mm(H)

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http://eco.fujitsu.com/

Life Cycle Impacts	
Global warming (CO_2 equivalent)	14.4kg (14.1kg)
Acidification (SO_2 equivalent)	0.0239kg (0.0236kg)
Energy use	238MJ (235MJ)

※Figures in ( ) indicated environmental impact with recycle effect *3

Global warming impact (CO2 equivalent)

[kg]

7.00 6.00 5.00 4.00 3.00 2.00 1.00 0.00 -1.00

4.50 2.22 6.48 1.10 0.06 -0.23

Recycle effect

Raw material production / Product production / Distribution / Use / Disposition/ Recycle

DynaMO 1300LT

- The data includes a drive, accessories, and packaging materials.
- The data does not include the environmental burdens of the media itself.
- Environmental burdens of the use stage is calculated the tasks of writing of 1.3GB media(one side) per day and reading of 1.3GB media(one side) per day.

Notes:

1. Original LCA data is available on *PRIDE Product Environmental Information Declaration Sheet*, and *Product Data Sheet*.
2. Unified rules and requirements for EcoLeaf LCA, for intended product category, are available as a *PSC Product Specification Criteria*. Visit *EcoLeaf* website under *JEMAI* homepage at http://www.jemai.or.jp/ecoleaf_e/ for details.
3. "Recycle Effect" illustrates an indirect influence to other products/services.
4. *Basic Units* used for calculations are based on Japan domestic data at this time though products are shipped from Thailand, due to a lack of base data to establish localized *Basic Unit* for overseas locations adequately.

[Supplemental environmental information]

◎ Mounting of printed circuit board and assembly are processed at ISO14001 certified factories.

ECO LEAF 製品環境情報 http://www.jemai.or.jp

http://www.jemai.or.jp/english/index.cfm

Figure 6
EcoLeaf Environmental Labeling.
(For an enlargement of this figure, see:
http://www.jemai.or.jp/english/ecoleaf/pdf/BB_04_001_e.pdf)

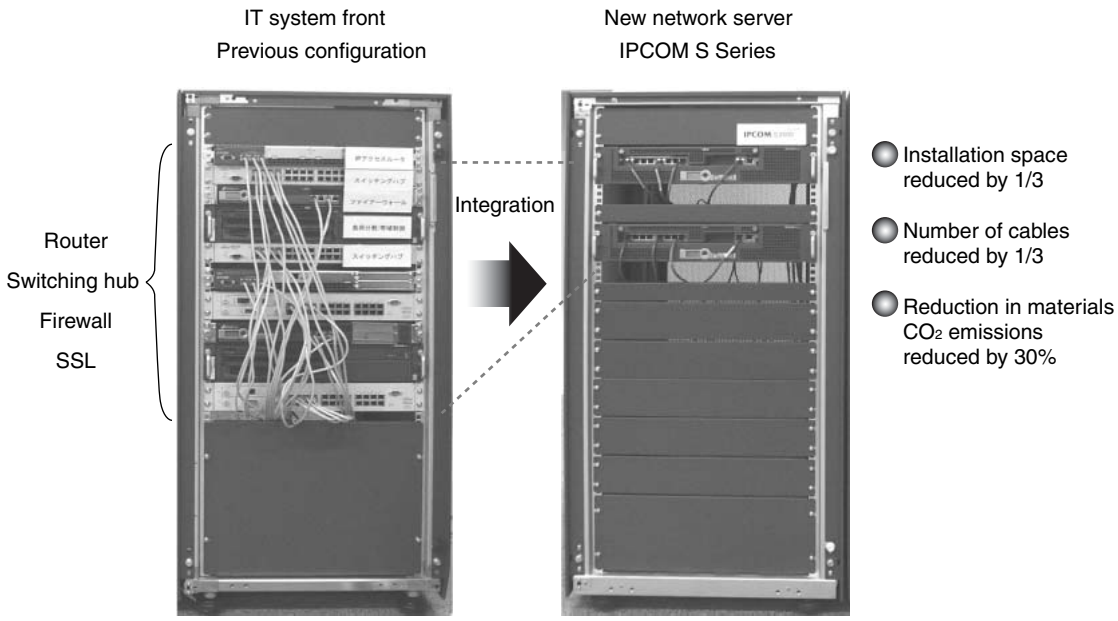

Figure 7
Example of Ecoleaf certified product.

2) Contribution to prevention of global warming

The IPCOM S consumes 40% less electricity than the collection of separate products that provide equivalent functions. Therefore, in terms of CO_2 emissions caused by electricity generation, the IPCOM S series has a 40% lower environmental impact. Over a one-year period, this amounts to a reduction of about 5000 kg of CO_2 (about 7000 kg of CO_2/year for the IPCOM S versus about 12000 kg total for the separate products).

4. Conclusion

In this paper, we introduced some of Fujitsu's development activities related to Super Green Products, which is one of the goals of the activities outlined in the 4th Environmental Action Plan. This plan was implemented in 2004 and targets environmental activities relevant to the products of the Fujitsu Group. These activities have been undertaken mainly by product development divisions in collaboration with related divisions encompassing the entire product life cycle, including materials procurement, production, distribution, sales, and disposal/recycling. Through these activities, we are creating products that have the highest level of environment friendliness in the industry worldwide. We will increase the business merits of these activities by actively publishing related results and strengthening communications with stakeholders and will use these results to help develop the Eco-market.

References

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Satoshi Oikawa graduated from the Mechanical Engineering department of Toin-gakuen Technical College, Kanagawa, Japan in 1987. He joined Fujitsu Ltd., Kawasaki, Japan in 1987, where he has been engaged in promoting eco-design of products.