Environmental Management at the Fujitsu Group

The Fujitsu Group is well aware of its mission as a global ICT organization. We are dedicated to helping to realize a sustainable society together with our customers and society as we seek more ways to reduce our impact on the environment.

Leveraging the power of ICT to achieve sustainable growth and help to solve social and environmental issues

Since its inception in 1935, the Fujitsu Group has advanced consideration for the environment from a medium-to-long term perspective based on the principle of "operating in harmony with nature." Among the Corporate Values we have put forth in the FUJITSU Way, we state that we will strive to "protect the environment and contribute to society." Contributing to global sustainability is one of the Fujitsu Group's social responsibilities, and a reason for its existence.

ICT makes it possible to use resources and energy more efficiently and it can also play an important role in solving complex social and environmental issues. By expanding its business through ICT-based innovation and solutions that solve customers' problems, the Fujitsu Group can contribute to the realization of a prosperous, sustainable society.

Advancing efforts to lower the Fujitsu Group's own environmental burden is also important. Minimizing the amounts of energy and resources used in the life cycles of products and services will make us more competitive. Diligently working to achieve energy savings in our business activities will also result in lower costs. Doing these things is critical for securing business advantage for the Fujitsu Group.

It is based on these ideas that the Fujitsu Group, by increasing the deployment of ICT throughout society, will expand its contributions in solving environmental challenges together with customers and society. We will also do everything reasonably possible to lower the environmental burden of our business activities and will formulate environmental action plans laying out specific targets toward that end.

Principal FY 2012 Environmental Management Results

	Green ICT Contributions to CO_2 Emission Reductions	Total GHG Emissions
FY 2012 targets	15 million tons or more	6% reduction compared with FY 1990
FY 2012 results	15.61 million tons (Total for FY 2009-2012)	1.01 million tons (24.4% reduction compared with FY 1990)

Evolution fo the Fujitsu Group Environmental Action Plan

Stages I – V (FY1995 to 2009)	Stage VI (FY 2010 to 2012)	Stage VII (FY 2013 to 2015)
Focus on the Fujitsu Group's own consideration for the environment	Focus on environmental management along three axes - Contributions to customers and society as a whole, redoubling of efforts to lower the Fujitsu Group's own environmental burden, and conservation of biodiversity	Focus on expanding contributions to customers and society as a whole

- Fujitsu Group Environmental Action Plan (Stage VII)

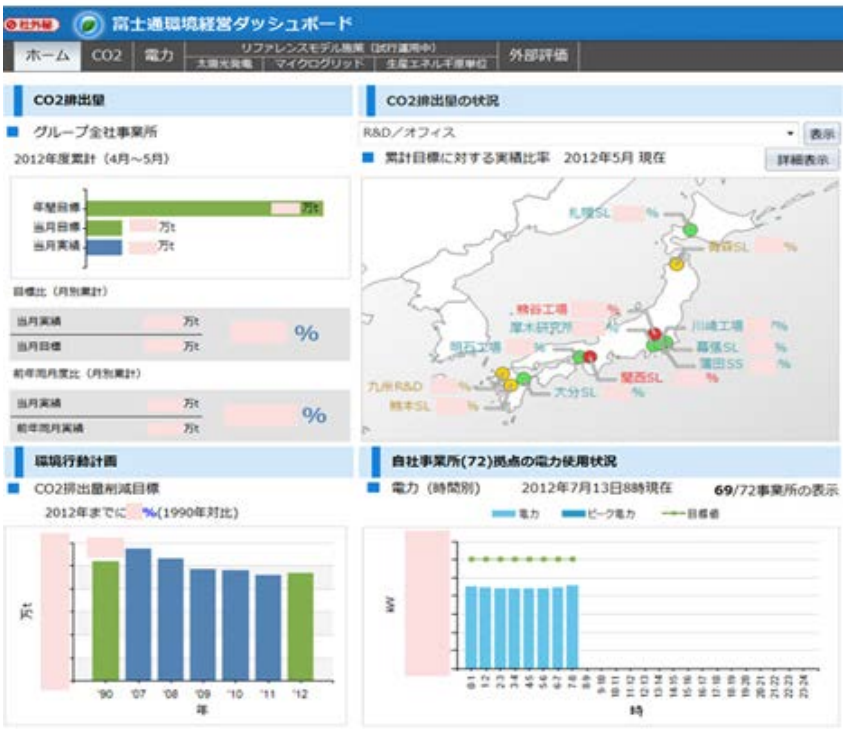
Reinforcing Environmental Management by Utilizing ICT

In order to make our environmental management even smarter, the Fujitsu Group has constructed, and is using, the Environmental Management Dashboard - a tool that gathers and analyzes various environmental data in real time, and presents it on a central information screen.

The dashboard can show data ranging from the entire Fujitsu Group to individual business sites, departments, buildings and floors. Users can access data for the types and amounts of energy used, total GHG emissions, GHG emissions per employee or unit of floor area, year-on-year comparisons broken down by month, and various other information on a real-time basis in visual representations. Examples of other capabilities are monthly performance reports in relation to targets and an alert function. Information on the dashboard provides executives, divisional managers, on-site managers, and others with information suited to their roles and objectives. The dashboard supports decision-making at all levels, from upper management to individual employees taking action to pursue their own autonomous initiatives to protect the environment.

The Fujitsu Group is providing knowledge gained from its own use of the Environmental Management Dashboard to customers as an environmental reference model that they are incorporating into their own environmental management.

A sample Environmental Management Dashboard screen display



- Providing Environmental Solutions

Fujitsu Group Environmental Policy

The Fujitsu Group has established the Fujitsu Group Environmental Policy based on the principles and guidelines set forth in the FUJITSU Way.

- Fujitsu Group Environmental Policy

Environmental Concept "Green Policy 21"

Green Policy 21 has been established to instill in all Fujitsu Group employees the ideas underlying the Group's environmental activities, and to promote the practice of these ideas in daily work.

- Environmental Concept "Green Policy 21"

Medium-Term Environmental Vision "Green Policy 2020"

The roles the Fujitsu Group should play and the directions it should follow in the years leading up to 2020 are laid out in the Group's Green Policy 2020 medium-term environmental vision. In working to achieve the three objectives set forth under Green Policy 2020 - Benefiting customers and society, pursuing internal reforms, and preserving biodiversity - we will create technologies and solutions, and collaborate with various actors while changing the Fujitsu Group itself into a low-carbon company to realize a low-carbon, prosperous society.

- Medium-Term Environmental Vision "Green Policy 2020"

The Green Policy Innovation Logo

The Fujitsu Group started its Green ICT project, called Green Policy Innovation, in December 2007. We began using the Green Policy Innovation Logo in November 2008 so that customers can easily identify products and services that are part of this project.

The Green Policy Innovation Logo

Only products that meet specific requirements may display this symbol. One category is "Green" products that meet our strict environmental criteria for recycling, energy conservation, environmentally responsible materials and other criteria. Another is "Super Green" products, which meet the highest levels of environmental criteria among all Fujitsu Group products. We also use this symbol for Environmental Solutions which can lower customers' CO2 emissions by at least 15%.

Environmental Emblem

This Environmental Emblem symbolizing the stance of the Fujitsu Group with respect to the environment was unveiled in November 1994. The emblem consists of the Earth, a pair of eyes, and an infinity symbol, which is used as part of the Fujitsu Logo. The meaning is that the Fujitsu Group will always conduct its business caring for the Earth.

The Environmental Emblem can be found, among other places, in Fujitsu Group Sustainability Reports and in association with Group environmental and social contribution activities.

Environmental Emblem

First ICT Services Company to Garner "Eco-First" Credentials

In September 2010, Fujitsu became the first ICT services company to be certified under Japan's Ministry of the Environment's "Eco-First Program." Under the program, industry-leading companies pledge to fulfill their environmental commitments to the Minister of the Environment in areas such as countering climate change and conserving biodiversity as a way to further promote their environmental protection initiatives.

First ICT Services Company to Receive "Eco-First" Credentials

Looking Back on FY 2012

The Fujitsu Group practices environmental management along two dimensions, i.e. making environmental contributions to customers and society, and pursuing reductions in our own environmental impact.

Corporate Executive Advisor (Environmental Strategy) Atsuhisa Takahashi

Head of Unit, Corporate Environmental Strategy Unit Minoru Takeno

For the Fujitsu Group Environmental Protection Program (Stage VI), which covered the three years beginning with FY 2010, we achieved all of our targets, including four we revised upward. In two examples of our achievements as of the end of FY 2012, we contributed to a cumulative 15.61 million tons of CO_2 emission reductions by customers and society from the beginning of FY 2009, and reduced total GHG emissions by 24.4% compared to FY 1990.

In FY 2012, we began to incubate an expanded range of environmentally focused business services. In one example, we began offering services based on our Environmental Management Dashboard, which visually represents, and forecasts, energy use volumes. We also began providing a cloud service usage environment to organizations working to conserve biodiversity, and engaged in other forms of cooperation with stakeholders and society to further promote protection of the global environment.

From FY 2013, we have embarked on efforts to expand contributions to the environment by doing even more to promote the use and application of ICT in society as a whole in ways consistent with our recently formulated Fujitsu Group Environmental Action Plan (Stage VII). Environmental initiatives cannot be successfully undertaken by a single company working in isolation. Through an even greater level of dialogue with our stakeholders, we will strive to promote the use of ICT for green innovation.

Targets and Results for the Fujitsu Group Environmental Protection Program (Stage VI)

Action Plan and Targets for the Period from FY 2010 through 2012

In April 2010, we created the Fujitsu Group Environmental Protection Program (Stage VI) to run from FY 2010 to the fiscal year ending March 31, 2013 (FY 2012).

The program is based on the three targets established in Green Policy 2020 and defines six key areas: strengthening advanced green ICT R&D, improving the environmental value of products and services and strengthening the development and provision of green ICT, strengthening efforts to reduce the environmental burden of the Group itself, strengthening our foundation for environmental management, promoting activities that make environmental contributions to society, and promoting activities that conserve biodiversity. Moreover, we have established a further 18 items to serve as specific program targets.

All Fujitsu Group Environmental Protection Program (Stage VI) Targets Achieved

In FY 2012, the final year of Fujitsu Group Environmental Protection Program (Stage VI), we achieved all of the fiscal year targets, thereby, also achieving all of the targets for the three years covered by the program. Among those were targets revised upward for FY 2011; namely, advanced green ICT R&D, environmental efficiency factors, renewable energy, and CO2 reduction in distribution and transportation.

Benefitting customers and society

Strengthening advanced green ICT R&D

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Strengthening advanced green ICT R&D				
Develop technologies for next-generation datacenters and networking that will at least double overall efficiency of ICT products by the end of FY 2012.	1.3 times	1.5 times	Over 2 times	Over 2 times
By the end of FY 2012, more than 70% of all technology developed will be solutions for reducing burden on the environment.	58%	61%	70%	73%

Improving environmental value of products and services, and enhancing development and delivery of green ICT

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Develop and deliver green ICT to contribute to customers and society				
Provide green ICT that will reduce cumulative CO2 emissions by 15 million tons or more over the FY 2009-12 period.	5.60 million tons	9.98 million tons	15 million tons or more	15.61 million tons
Develop and provide eco-friendly products (Super Green products)				
With respect to newly developed green products in all departments, Super Green products that contribute to reduced environmental footprints through low energy and resource demands must comprise 30% by end of FY 2012.	17%	33%	30% or more	39%
Develop and provide eco-friendly products (environmental efficiency factors)				
With respect to newly developed green products in all departments, the environmental efficiency must be raised to 4.0 times FY 2008 value by end of FY 2012.*1	Raise to 3.2	Raise to 4.1	Raise to 4.0	Raise to 4.6
Promote product recycling				
Sustain 90% resource reuse rate of business ICT equipment globally at Fujitsu recycling centers.	93.3%	94.1%	Sustain 90%	94.3%
Develop and provide environmental solutions				
Promote development and provision of environmental solutions in all areas, including industry, transport, business, households, and energy conversion sectors.	Departmental and regional coverage rate: 78%	Departmental and regional coverage rate: 89%	Departmental and regional coverage rate: 100%	Departmental and regional coverage rate: 100%
Expand provision of environmental solutions in major regions, including Japan, Europe, the Americas, and Asia-Pacific.				

Pursuing internal reforms

Enhancing efforts to reduce the Fujitsu Group's environmental footprint

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Reduce greenhouse gas emissions				
Reduce total greenhouse gas emissions associated with manufacturing globally to 6% below FY 1990 levels by end of FY 2012 (CO2: 5% reduction, other greenhouse gases: 20% reduction).	11.7% reduction	18.2% reduction	6% reduction	24.4% reduction
Reduce greenhouse gas emissions (renewable energy)				
Increase use of renewable energy sources to 10 times FY 2007 levels by end of FY 2012.*1	4.8 times	11 times	10 times	11.9 times
Reduce CO2 in transport and distribution				
Reduce CO2 emissions from domestic transport to 15% below FY 2008 levels by end of FY 2012.*1	18% reduction	24% reduction	15% reduction	32% reduction
Promote business partners' greenhouse gas reduction				
Promote procurement from business partners that limit or reduce greenhouse gas emissions.	62.7%	98.4%	100%	100%
Factory improvements (chemicals)				
Reduce output of priority chemicals to 10% below FY 2007 levels by end of FY 2012.	48% reduction	60% reduction	10% reduction	62% reduction
Factory improvements (waste)				
Reduce waste generation to 20% below FY 2007 levels by end of FY 2012.	20.1% reduction	27% reduction	20% reduction	29.6% reduction
Maintain zero waste emissions at factories in Japan.	Status maintained	Status maintained	Status maintained	Status maintained
Office improvements				
Achieve four-star rating or better under the Green Office plan for every office by end of FY 2012.	Japan: Trials using new standard	Japan: 80%	Japan: 100%	Japan: 100%
	Internationally: Field survey (completed)	Internationally: completed draft evaluation standards	Internationally: Trial implementation	Internationally: Trial implementation

Strengthening environmental governance

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Continuously improve globally integrated environmental management systems				
Promote further ICT deployment for environmental management, build smart environmental management systems.	Trial implementation	Block application rate: 60%	Block application rate: 75%	Block application rate: 100%
To improve environmental performance, by end of FY 2012 we intend to apply a framework of assessments for the extent of target achievement and a compliance of 100% in regard to the Group's main domestic production companies.	Performance assessment procedures established	Trial implementation	Expand as far as domestic manufacturing group companies	Apply to all 23 covered business sites
Promote environmental management through communications with stakeholders				
Promote environmental communication at all levels to improve environmental management	Both internal and external information dissemination improved	Both internal and external information dissemination improved	Improved communication of environmental information	Both internal and external information dissemination improved

Promoting environmental contributions to society

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Further elevate the environmental awareness of employees through environmental and social contribution activities				
Construct the "Act-Local-System" for sharing information on social contribution activities by the end of FY 2010, and share information on environmental and social activities underway at business sites across the globe.	Network construction completed	Japan network operating. Overseas network operating	Japan network operating. Overseas network operating	Japan network operating. Overseas network operating
Continue environmental and social activities underway at business sites across the globe, and use the "Act-Local-System" to engage in activities that are more oriented toward local communities.	Japan: Implemented at all business sites	Japan: Implemented at all business sites	Japan: 1x/year	Japan: Implemented at all business sites
	Internationally: Implemented at 54% of business sites	Internationally: Implemented at 65% of business sites	Internationally: 1x/3 years	Internationally: Implemented at all business sites as of the end of FY 2012

Preserving biodiversity

Promoting efforts to preserve biodiversity

Category	Performance (FY 2010)	Performance (FY 2011)	Targets (FY 2012)	Performance (FY 2012)
Reduce impact of company's operations on biodiversity				
Develop numerical indicators to measure impact of operations on biodiversity and build system to expand contribution of ICT to reducing that impact.	Completion of numerical indicator development	4.6% reduction in level of impact (in main business areas) compared to FY 2009 as evaluated by BD integration index	3% reduction in level of impact (in main business areas) compared to FY 2009 as evaluated by BD integration index	9.6% reduction in level of impact (in main business areas) compared to FY 2009 as evaluated by BD integration index
Promote procurement from business partners that work to preserve biodiversity.	60.9%	99.2%	100%	100%
Contribute to community-building that conserves biodiversity				
Build case studies that contribute to biodiversity through ICT in all major offices by end of FY 2012.	Survey implementation	Pilot project based on survey results	Development at main business sites	Development at main business sites
Conduct biodiversity preservation/education programs in all offices by end of FY 2012.	Japan: Implemented at all business sites	Japan: Implemented at all business sites	Japan: Once a year	Japan: Implemented at all business sites
	Internationally: Implemented at 30% of business sites	Internationally: Implemented at 41% of business sites	Internationally: Once every three years	Internationally: Already implemented at all business sites as of the end of FY 2012

*1:
Target revised upward.

Fujitsu Group Environmental Action Plan (Stage VII)

Setting Up an Action Plan and Targets for the Period from April 2013 through March 2016

Fujitsu today announced the Fujitsu Group Environmental Action Plan, Stage VII, which sets new environmental goals for fiscal 2013 through fiscal 2015 (April 1, 2013 - March 31, 2016).

Under the plan, the Fujitsu Group seeks to expand its contribution to addressing environmental challenges for both customers and society by further promoting the deployment of ICT throughout society as a whole.

In taking a leadership role in actively pursuing our goals across its entire global value chain with customers, partners and suppliers, the Fujitsu Group strives to bring about a sustainable, prosperous society, which is at the heart of the company's corporate philosophy.

The Intention of Fujitsu

Our world faces many challenges relating to population growth. These include the security of supply of energy, other resources and food, climate change, the increasing frequency of natural disasters, and loss of biodiversity. These social and environmental issues are deeply interconnected, and they cannot be managed in isolation. Society expects businesses to proactively take actions to address these challenges.

Deploying information and communications technology (ICT) in an intelligent manner can improve the efficient use of energy and other natural resources and reduce greenhouse gas emissions. ICT can also assist society preparing for and responding to natural disasters. Fujitsu believes ICT has a major role to play in helping society address the world's environmental challenges. Beyond meeting today's demands, ICT has the power to connect people, enable sharing of knowledge and experience, and shape a safer, sustainable, and more prosperous tomorrow.

Through our business activities, Fujitsu will continue to respond to these social and environmental challenges, by increasing the deployment of ICT sustainability solutions throughout society and developing new innovative technologies. As a leading ICT company, we will continue working together with our stakeholders in the global value chain including our customers, partners and suppliers to shape a sustainable and prosperous society.

Target items

Our Society

Contribution to Society by ICT: Reduce Greenhouse Gas Emissions

- Reduce greenhouse gas emissions for our customer and society over 26million tons.*1

Contribution to Society by ICT: Increase Solutions

- Increase the deployment of sustainability solutions.

Design and Deliver Eco-efficient Products: Energy Efficiency

- Achieve top-level energy efficiency*2 of more than 50% of the newly developed products.

Design and Deliver Eco-efficient Products: Resource Efficiency

- Increase resource efficiency of newly developed products by 20% compared to 2011.

Leading Edge R&D

- Develop innovative technologies that enable solutions and products to reduce the environmental load.

Corporate Citizenship: Social Challenges

- Support initiatives that address the complex social and environmental challenges, e.g. biodiversity conservation.

Corporate Citizenship: Social Activities

- With society, support our employees to volunteer social activities.

Our Business

Efficient Business Operations: Reduce Greenhouse Gas Emissions

- Reduce greenhouse gas emissions in our business facilities by 20 % compared to 1990.

Efficient Business Operations: Energy Intensity

- Improve energy intensity in our business facilities over 1% each year.

Efficient Business Operations: Data Centers

- Improve environmental performance of our major data centers.

Efficient Supply Chain: Logistics

- Reduce CO_2 emissions*3 per sales from logistics over 4% compared to 2011.

Efficient Supply Chain: Procurement

- Expand activities of reducing CO_2 emissions to all types of suppliers.

Efficient Use of Resources: Renewable Energy

- Increase generation capacity and procurement of renewable energy.

Efficient Use of Resources: Water

- Continue efforts for efficient use of water, e.g. water recycling and water saving.

Continuous targets*4

Reduced Environmental Impact: Chemicals

- Reduce chemical emissions to less than the average level of 2009-2011 (PRTR: 21t, VOC: 258t).

Reduced Environmental Impact: Waste

- Reduce the amount of waste to less than average level of 2007-2011 (amount of waste: 31,134t).
- Keep Zero Emission in factories in Japan.

Reduced Environmental Impact: Recycling

- Maintain over 90% resource reuse rate of business ICT equipment at Fujitsu recycling centers.

*1 26million tons:
Calculate the numeric target by multiplying annual sales of each solution category by a conversion factor of CO_2e savings per sales which is based on around 300 case studies of Environmentally Conscious Solutions in Japan.

*2 Achieve top-level energy efficiency:
Achieve more than 25% of market benchmark in energy efficiency such as top-runner products (first in the world or industry, top of the world or industry)

*3 Reduce CO_2 emissions:

Calculate emissions of CO_2 equivalence from energy consumption

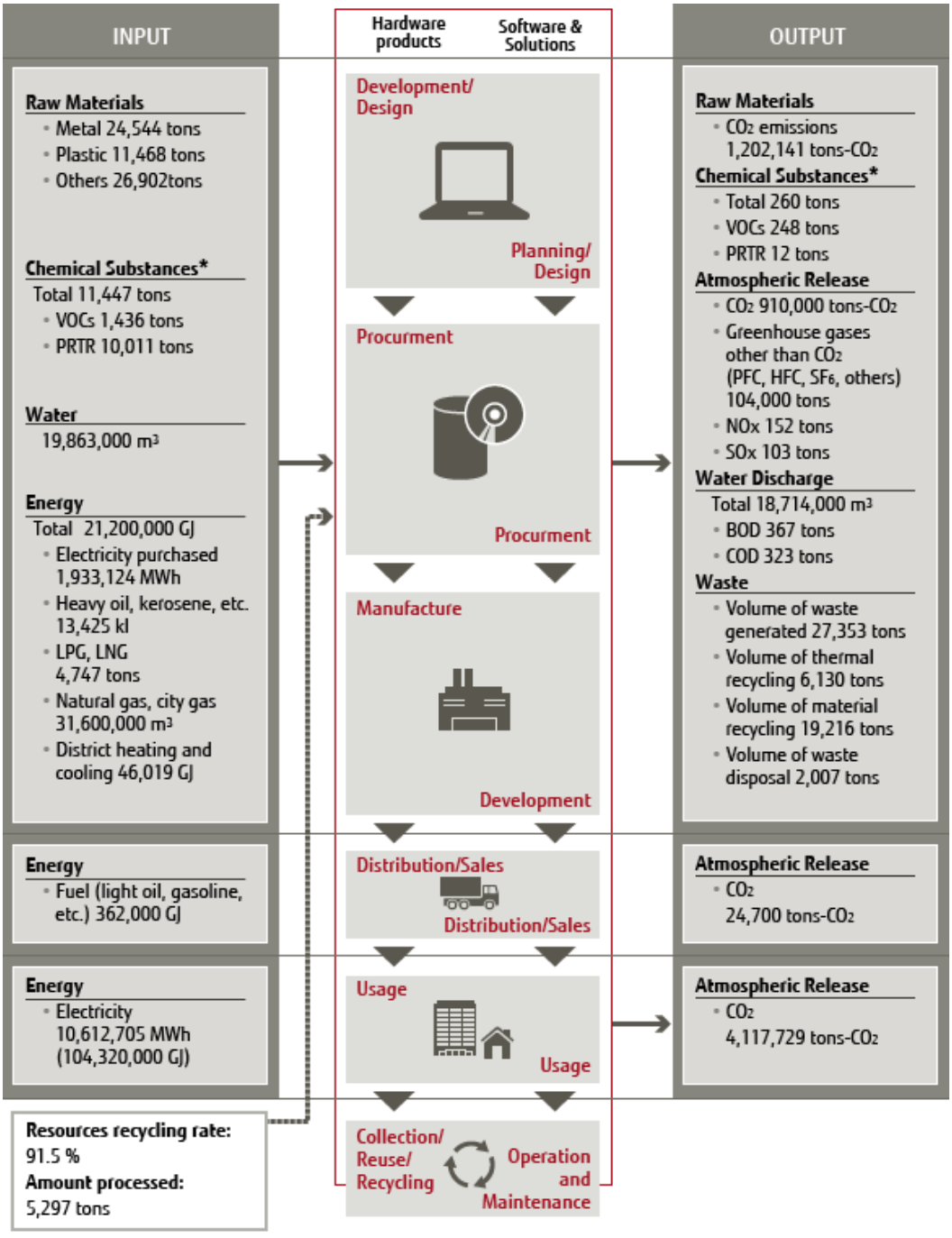
*4 Continuous targets:

Targets to be achieved through business activity because already achieved high level performance.

Operating Activities and Environmental Load (FY2012)

We promote environmentally friendly business activities through overall quantitative assessment of our environmental burden.

FY 2012 Performance



*Substances that qualify as both a PRTR targeted chemical and a VOC are included under "VOCs" only.

FY 2012 Environmental Accounting Results

To promote environmental management, the Fujitsu Group introduced environmental accounting in FY 1998. We evaluate the efficiency of our environmental protection activities by monitoring the required costs and benefits of these activities. Through this process, we have clarified issues and promoted sharing of the results.

Purpose of Introducing an Environmental Accounting System

- To clarify our corporate stance through disclosure of information to stakeholders
- To implement long-term, continuous environmental measures
- To raise the efficiency of investment in environmental protection measures
- To energize environmental protection activities

Basic Environmental Accounting Elements

- Applicable period
  April 1, 2012 to March 31, 2013
- Accounting coverage
  Fujitsu and its major consolidated subsidiaries worldwide *1
- Calculation basis for environmental protection costs
  - **Accounting method for depreciation and amortization**: Depreciation and amortization expenses for investments are included in expenses using straight line depreciation (with no residual value) based on a useful life of 5 years. The useful life of 5 years was chosen based on the average length of the actual period from the introduction of environmental facilities to the implementation of repairs and upgrades.
  - **Basis for recording composite costs**: In regard to composite costs in which environmental protection costs are coupled with other costs, the Fujitsu Group records only the portion corresponding to environmental protection in conformance with the Environmental Accounting Guidelines 2005 issued by the Japanese Ministry of Environment.
- Calculation basis for the economic benefits of environmental protection measures
  - **Scope of benefits in environmental accounting**: The Fujitsu Group records the actual benefits and estimated benefits (risk avoidance benefit and deemed benefit) of reducing environmental impact related to the following items.
    - Benefit of reducing the environmental impact related to resource usage in business activities
    - Benefit of reducing the environmental impact related to environmental loads and waste emissions resulting from business activities
    - Benefit of reducing the environmental impact related to goods and services produced by business activities
    - Benefit of reducing the environmental impact related to transportation and other activities
  - **Investment benefit materialization period and basis**: The accounting period for actual economic benefits has been aligned with the depreciation and amortization period for investments (60 months). However, the accounting period for economic benefits derived from reducing personnel costs related to the environmental management system is 12 months, in line with the main thrust of the environmental management system, which is reviewed every year. With regard to estimated economic benefits, the accounting period for economic benefits derived from capital investment is the same as the depreciation and amortization period (60 months) for actual economic benefits. Benefits corresponding to a given fiscal year, such as the amount of contribution to environmental protection and the avoidance of operational losses, are recorded only for that fiscal year. The basis for accounting for economic benefits is as follows.

- Contribution of environmental protection activities to added value derived from production activities
  The Fujitsu Group recognizes support provided by environmental protection activities to production activities as an economic benefit. Accordingly, the amount of contribution is determined by multiplying the added value derived from production activities by the ratio of the maintenance and operation cost for environmental protection facilities to the total facility cost of each site.
  Contribution = Added value x Maintenance and operation cost for environmental protection facilities / total facility cost
- Avoidance of operational loss at business sites due to non-compliance with laws and regulations
  The Fujitsu Group recognizes the avoidance of operational loss as the amount of loss that is avoided in the event of the materialization of risk arising from neglect to make upfront investments needed to comply with laws and regulations. The number of operational loss days is determined based on the size of investment related to the environment, but shall not exceed three days.
  Benefit = Added value / Operational days x Operational loss days
- Benefit of public relations activities
  This benefit is calculated by converting publicity efforts related to environmental protection activities in newspapers, magazines and TV into an advertising cost.
  Benefit=Advertising cost of newspapers, magazines and TV x Number of advertisements ran and programs broadcast
- R&D benefit
  The Fujitsu Group calculates the amount of additional earnings resulting from the contribution of R&D achievements for environmental protection purposes, such as Super Green Products and environmental solutions.

*1 Fujitsu's major consolidated subsidiaries worldwide:
FUJITSU ISOTEC LIMITED, FUJITSU IT PRODUCTS LIMITED, Fujitsu I-Network Systems Limited, Fujitsu Interconnect Technologies Limited, Fujitsu VLSI Limited, Ecolity Service Limited, FDK CORPORATION, FUJITSU OPTICAL COMPONENTS LIMITED, FUJITSU KASEI LIMIED, Fujitsu Laboratories Limited, FUJITSU COMPONENT LIMITED, Shimane Fujitsu Limited, FUJITSU PERIPHERALS LIMITED, SHINKO ELECTRIC INDUSTRIES CO., LTD., FUJITSU SEMICONDUCTOR LIMITED, Fujitsu Semiconductor Technology Inc., Fujitsu Telecom Networks Limited, Fujitsu Ten Limited, TOCHIGI FUJITSU TEN LIMITED, TRANSTRON Inc., PFU Limited, FUJITSU FRONTECH LIMITED, Fujitsu Mobile-phone Products Limited, Fujitsu Wireless Systems Limited, Fujitsu Computer Products of Vietnam, Inc., Fujitsu Network Communications, Inc., Fujitsu Telecommunications Europe Limited, FUJITSU TECHNOLOGY SOLUTIONS (HOLDING) B.V.

The Fujitsu Group also aggregates data on R&D costs and benefits related to environmental solutions from subsidiaries other than those shown above. However, the data is aggregated solely for environmental solution costs and benefits, so the relevant subsidiaries are not included in the scope of disclosure for major consolidated subsidiaries.

Fiscal 2012 Environmental Accounting Results

Breakdown of Results (Investment and costs) [billion yen]

Fiscal 2012 Environmental Accounting Results - Breakdown of Results (Capital investment, costs, economic benefits)

Item		Main areas covered	Capital investment (billion yen)	Costs (billion yen)	Economic benefits (billion yen)
Business area costs/benefits	Pollution prevention costs/benefits	Air/water pollution prevention, etc.	0.40(-0.39)	4.29(-0.45)	6.71(-0.40)
	Global environmental conservation costs/benefits	Global warming prevention, saving energy, etc.	0.86(-0.90)	3.11(-0.02)	1.77(+0.05)
	Resource circulation costs/benefits	Waste disposal, efficient utilization of resources, etc.	0.05(-0.04)	2.53(-0.29)	10.95(-0.10)
Upstream/downstream costs/benefits		Collection, recycling, reuse, and proper disposal of products, etc.	0.00(-0.02)	0.83(-0.09)	0.46(-0.04)
Administration costs/benefits		Provision and operation of environmental management systems, environmental education of employees, etc.	0.12(-0.50)	3.26(-1.01)	0.49(-1.05)
R&D costs/benefits		R&D on products and solutions that contribute to environmental protection, etc.	0.52(+0.17)	24.07(+3.13)	52.11(+2.97)
Social activity costs		Donations to, and support for, environmental groups, etc.	0.00(±0.00)	0.03(±0.00)	-
Environmental remediation costs/benefits		Restoration and other measures related to soil and groundwater contamination, etc.	0.04(±0.00)	0.15(+0.02)	0.40(+0.20)
Total			1.99(-1.67)	38.26(+1.27)	72.89(+1.64)

- Numbers in parentheses indicate increases or decreases in comparison with the previous year.
- Due to rounding, figures in columns may not add up to the totals shown.
- Items shown as "0.00" include items for which the value was smaller than the display units used.

Costs and Economic Benefits in FY 2012

The results of this accounting for FY 2012 showed costs of 38.26 billion yen (a 3.4% increase from the previous year) and the economic benefits were 72.89 billion yen (a 2.3% increase from the previous year). Thus both costs and benefits increased. Also, our capital investment was 2.00 billion yen (a 45.4% decrease from the previous year).

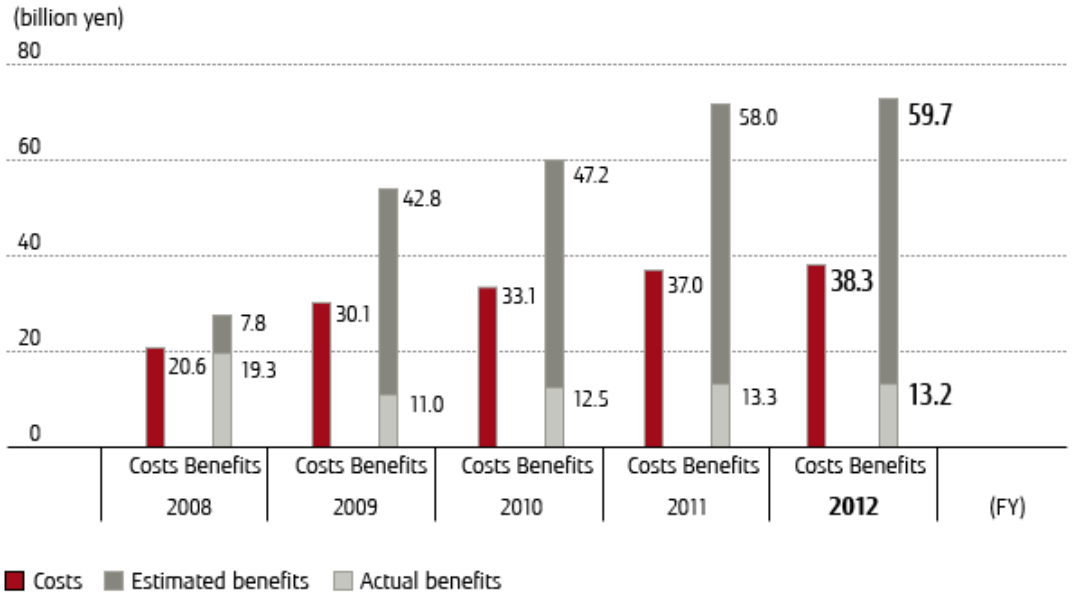
Reasons for Changes in Costs and Economic Benefits

Costs increased by about 1.3 billion yen compared to the previous year. Decreases of about 0.5 billion yen in pollution prevention costs, about 0.3 billion yen in resource circulation costs, and about 1.0 billion yen in administration costs were recorded, but were outweighed by an increase of 3.1 billion yen in R&D costs. Pollution prevention costs and resource circulation costs fell because businesses were sold off and activity declined in related businesses. The decline in administration costs resulted from a review of applicable cost items for environmental advertising. R&D costs, meanwhile, grew considerably as a result of the Fujitsu Group's drive to come up with products and solutions that contribute to environmental protection for the benefit of customers and society.

Economic benefits increased by about 1.6 billion yen compared to the previous year. Decreases of about 0.3 billion yen in pollution prevention benefits, about 0.2 billion yen in resource circulation benefits, and about 1.0 billion yen in administration benefits were recorded, but were more than offset by an increase of about 3.0 billion in R&D benefits. The decline in pollution prevention benefits resulted from a decrease in new pollution-control-related capital expenditures at manufacturing plants and a resulting decrease in operating loss risk avoidance benefits. Resource circulation benefits fell because of lower gains on sales of unnecessary goods at manufacturing plants. Administration benefits fell because of lower environmental advertising costs, following a review of applicable cost items for environmental advertising, and resulting lower estimated benefits from that environmental advertising. As for R&D benefits, our ability to continuously provide products and solutions that contribute to environmental protection for the benefit of customers and society resulted in an increase in economic benefits determined via our proprietary estimation method.

R&D costs and benefits, therefore, both grew steadily in FY 2012. In the future, we will continue to refine environmental management by evaluating our environmental protection activities using environmental accounting.

Trends in Costs and Economic Benefits



The History of Fujitsu's Environmental Activities

The History of Fujitsu's Environmental Activities

1935	Park-style design adopted for new Kawasaki Plant at suggestion of Fujitsu's founder, Manjiro Yoshimura.
1938	Kawasaki Plant completed.
1972	Environmental control sections established at each plant.
1987	Ozone Layer Protection Committee established.
1989	Environmental Committee established.
1990	Environmental management evaluation system implemented.
1991	Environmental Engineering Promotion Center established.
1992	Fujitsu's Commitment to the Environment formulated. Use of CFCs and carbon tetrachloride for cleaning eliminated. Energy Saving Committee established.
1993	Product Recycling Committee established. Waste Control Committee established. Fujitsu Environmental Protection Program (Stage I) formulated. Product Environmental Assessment Guidelines formulated. Domestic Affiliated Companies' Environmental Protection Council established. Environmental Information Service (FJ-CUG) inaugurated.
1994	First issue of Eco-Plaza environmental bulletin published. Use of 1,1,1-trichloroethane eliminated. 1st Fujitsu Group Environmental Technology Exhibition held. Fujitsu Environmental Emblem designed. Overseas Environmental Information Network began operations.
1995	Environmental Management System Committee established. Recycling system established and implemented. Fujitsu Group Worldwide Environmental Protection Council established.
1996	Fujitsu Environmental Protection Program (Stage II) formulated. Environmental Engineering Center homepage placed on intranet. Chemical Emissions Reduction Committee established. First Environmental Report published.
1997	Environmental homepage established on Fujitsu website. All domestic manufacturing sites certified ISO14001 compliant.
1998	Reforestation activities started in Thailand. Green Product program launched.
1999	Environmental accounting introduced. Reforestation activities started in Vietnam.

2000	Four development and service sites in Japan certified ISO14001 compliant. Corporate Environmental Affairs Unit established. Desktop PC awarded Eco-mark for first time.
2001	Fujitsu Environmental Protection Program (Stage III) formulated. Calendar using paper from sustainable forest published. Reforestation activities started in Malaysia.
2002	A world's first: Tin-zinc-aluminum lead-free solder developed. A world's first: Biodegradable plastic parts with lower environmental load employed in notebook computers. Fujitsu Group Environmental Policy established. A world's first: Magnesium alloy recycled in-house applied in notebook computers.
2003	Support for reforestation activities employing Rhythm Forest reforestation network game initiated. Zero waste emission achieved by all 13 plants in Japan.
2004	ISO14001 integrated certification acquired by all Fujitsu Limited sites, among largest systems in Japan. 100% Green Product ratio achieved for all newly developed products. Fujitsu Group Environmental Protection Program (Stage IV) formulated.
2005	ISO14001 certification acquired by all Group companies in Japan. Supply of Super Green Products began.
2006	ISO14001 globally integrated certification acquired, including overseas Group companies. Established global environmental management framework for the Group as a whole.
2007	Fujitsu Group Environmental Protection Program (Stage V) formulated. Green Policy Innovation project, which reduces our customers' environmental load through green ICT, started.
2008	Green Policy 2020 medium-term environmental vision formulated.
2009	Biodiversity Action Principles formulated.
2010	Fujitsu Group Environmental Protection Program (Stage VI) formulated.
2011	Environmental Management Dashboard operations began full-scale.
2012	Further empowered the Environmental Committee and established the Environmental Management Committee chaired by the Company's President.
2013	Formulated the Fujitsu Group Environmental Action Plan (Stage VII).

Factories that have already spent many years reducing their energy consumption find it difficult to propose and implement additional improvement measures. One reason for this is energy management that is still in need of refinement.

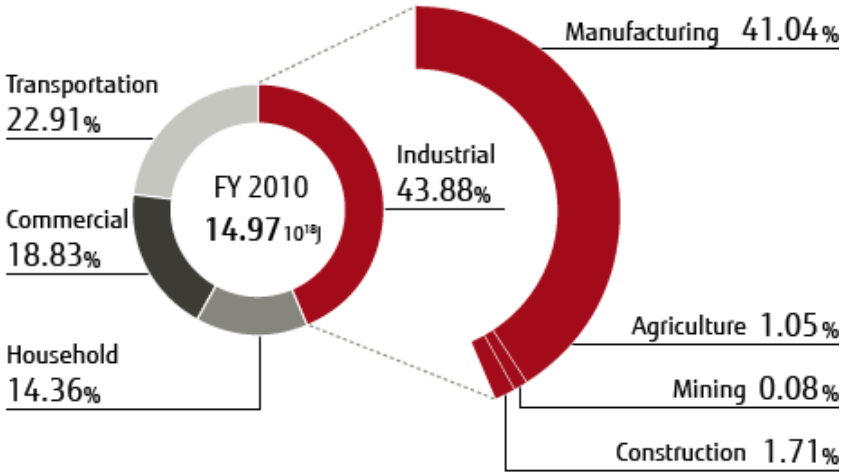
Fujitsu Isotec Limited (FIT) has determined how much energy it uses all the way down to the level of individual production processes, and begun to implement energy-saving measures tailored to conditions for individual production processes.

Current Status of Energy Conservation in Manufacturing Industries

The impetus for Japan's energy conservation policies can be traced back to the two oil shocks the country suffered in the 1970s. These two events, which had enormous economic impacts, brought to light the importance of conserving energy and created conditions for the advancement of energy-conservation policies*1. As a result, by the end of the 1980s, the industrial sector was leading major improvements in energy efficiency. Nevertheless, it still accounted for over 40% of energy consumption. Manufacturing industries*2, which account for more than 90% of industrial energy consumption, are still being encouraged to do more to save energy.

In recent years, however, companies have begun to say that limits are being approached in energy conservation effectiveness and openly wondering what else they can do. Indeed, with energy consumption per base unit basically unchanged since the 1980s, energy conservation efforts have reached their limits.

Energy Consumption by Sector



Source: "Energy White Paper 2012," published by the Japanese Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy

*1 Advancement of energy-conservation policies:
Refer to "Energy-Related Problems and Responses," published by the Japanese Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy

*2 Manufacturing industries:
Refer to the "Energy White Paper 2012," published by the Japanese Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy

Using ICT to Make Factory Energy Consumption "Visible" in Detail

Energy Management at Manufacturing Facilities Facing a New Problem

Fujitsu Isotec Limited (FIT), which manufacturers and recycles personal computers and servers in Date City, Fukushima Prefecture, has implemented various energy-conservation measures under Fujitsu Group Environmental Action Plans. Through the gradual adoption of energy-conservation measures, including solar panels, greenery to insulate walls, LED lighting, and high-efficiency heat pumps for air-conditioning, FIT has steadily reduced the overall energy consumption of its manufacturing facilities.

Nevertheless, it found itself facing a new problem. It realized that it was looking only at overall energy consumption and had neither accurate information on how much energy it was using in real time, nor any idea of the amount of energy consumed at particular times by particular areas of its operations. That meant it could not propose or implement energy conservation measures tailored to particular energy uses.

Solar power generation

LED lighting

Greenery to insulate walls

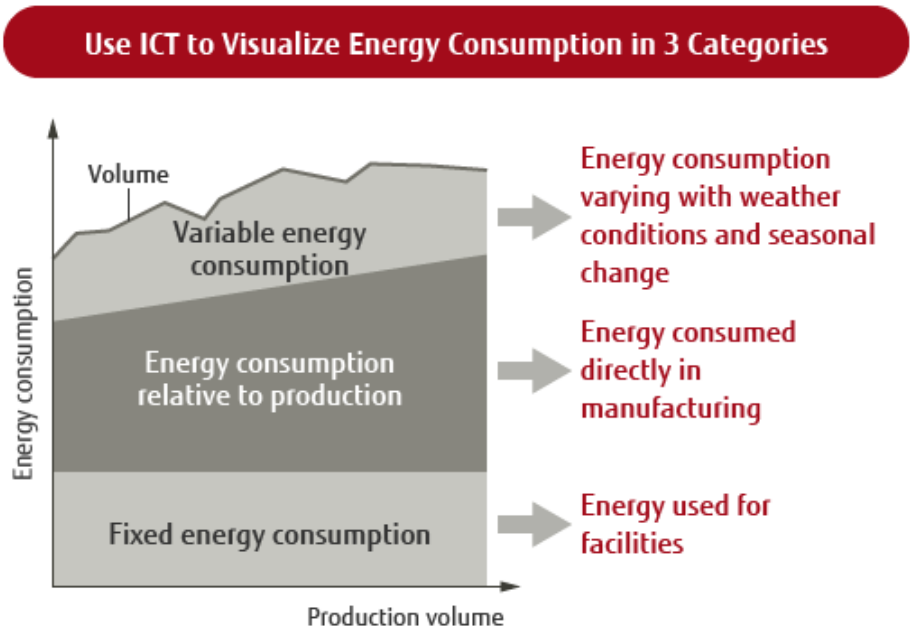
High-efficiency heat pumps

Detailed Visualization with the Environmental Management Dashboard

In April 2012, therefore, FIT adopted the Environmental Management Dashboard, developed by Fujitsu as a tool for accurately identifying energy usage by specific areas of a business' operations. With sensors installed in its manufacturing facilities, FIT was able to see visual representations of detailed energy consumption data gathered from throughout its operations via a network.

As a result, FIT can now manage its overall manufacturing facility energy consumption in terms of three categories – energy consumed directly in manufacturing (energy consumption relative to production volume), energy used for lighting, air conditioning, and other facilities (fixed energy consumption), and energy used for air conditioning and other purposes that vary depending on weather conditions and seasonal changes (variable energy consumption).

Production-Related Energy Management Moving Forward



VOICE

We will use the Environmental Management Dashboard to determine our next moves.
Kazuto Ara, General Affairs Division Manager, Fujitsu Isotec Limited

We were finding it difficult to identify areas in which to invest for additional energy savings, and unable to move forward in this sense. With the Environmental Management Dashboard, we can determine in real time how much energy we are consuming by production process, and immediately identify anomalies and waste.

Even though we have not yet taken full advantage of everything the dashboard has to offer, I already see it as a tool that exceeds common sense in pointing the way to what we should do next.

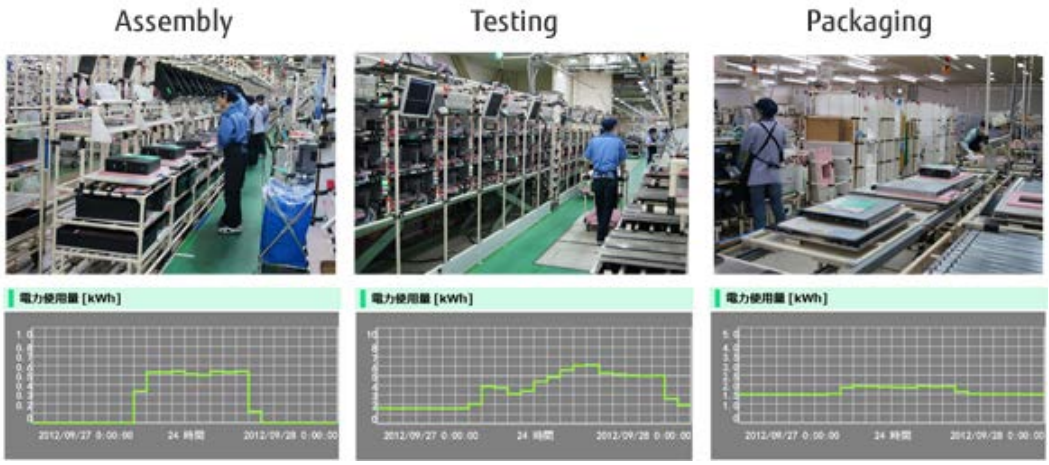
Managing Energy Relative to Production Resulting in New Process-Level Awareness

Energy consumption relative to production, a measure of energy consumed directly for production activities, provides a clear visual representation of energy consumed by production line, production process (assembly, testing, and packaging), and product.

Visualization by production line

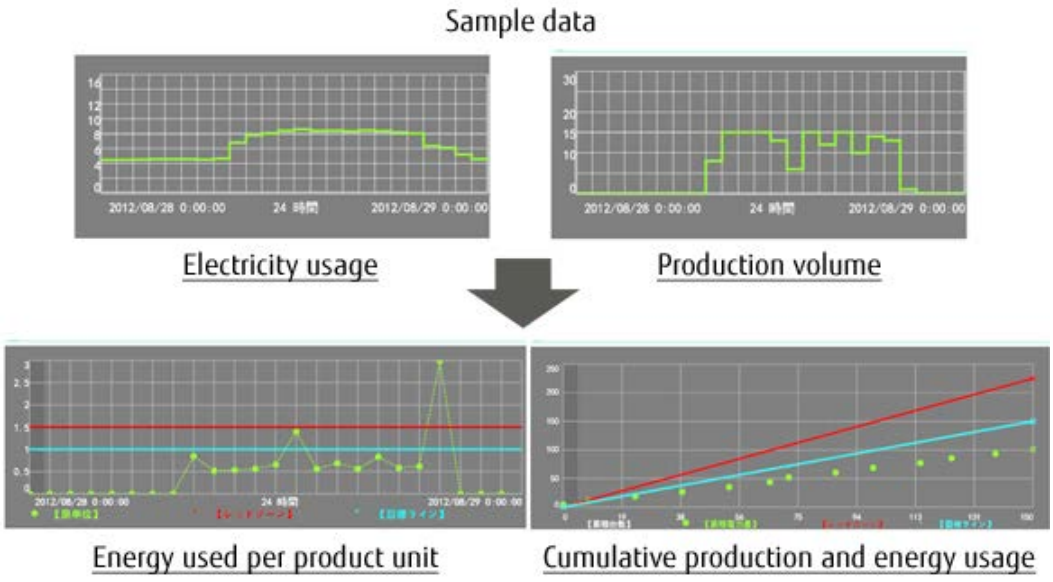
This has enabled us to clearly know energy consumption by area and identify impracticalities, waste, and abnormalities, none of which was possible when managing energy consumption at an overall level. For example, we learned that electricity was being used during certain times in the assembly process, even though products were not being made; that electricity was being used in the testing process even on weekends, when there were no production activities; and that standby electricity consumption, which we thought was fixed, dropped during certain times. Awareness of these facts gave rise to additional energy-saving measures.

Making Energy Consumption Visible by Production Process



In addition, making production-related energy consumption "visible" in real time by product has made it possible to monitor energy usage on a unit basis and made it easier to both identify the causes of energy usage on anomalies and confirm the effectiveness of improvements.

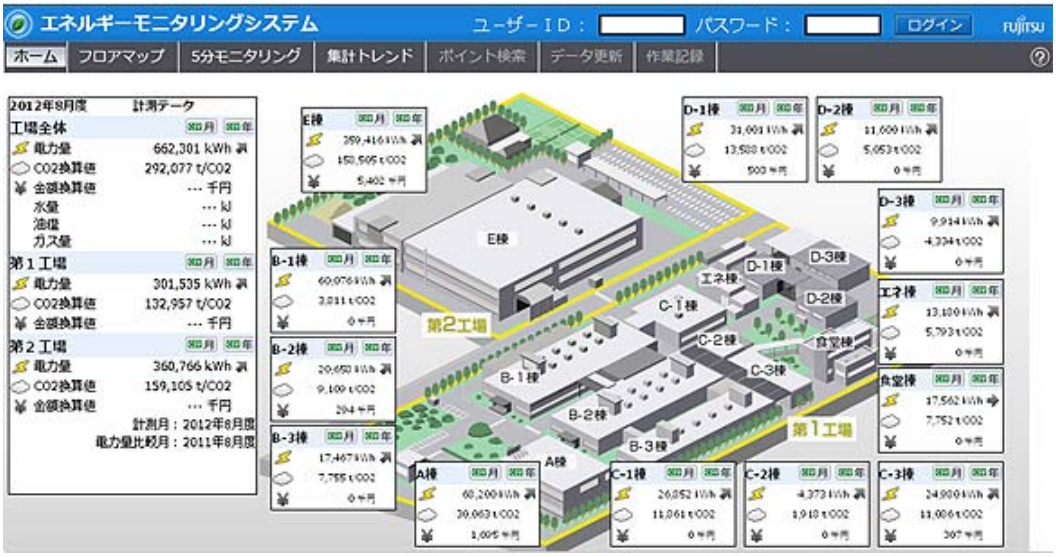
Making Energy Usage per Product Unit "Visible"



Real-Time Display of Fixed Energy Consumption Making Employees Aware of Energy Consumption

Facility-related fixed energy consumption made "visible" for plants, buildings, and units of floor space, can be checked by employees through the personal computers on their desks. The ability to check even indirect energy consumption, which is not related to production, allows employees to be aware of the amount of electricity consumed by the unit in which they work, and pay more attention to energy usage.

Making Energy Consumption "Visible" by Plant and Building



VOICE

We are accumulating know-how and helping to improve the Fujitsu Group's environmental management.
Masaichi Tochimoto, President, Fujitsu Isotec Limited

Since our adoption of the Environmental Management Dashboard, units participating in our regular Environmental Committee meetings have begun to actively report new situations that have come to their attention. At present, only a few of these discoveries have resulted in new actions, but I would like to see us implement new, effective measures by continuing along this path and having everyone participate in energy management.

In addition, while continuously working to save energy in our own operations, we will accumulate energy-saving knowledge for plant and office settings, and use it to help strengthen the Fujitsu Group's environmental management.

FIT's energy management efforts using the Environmental Management Dashboard have only just begun. FIT, however, is embarking on an effort to involve all employees at every level of its organization, from top management down, in energy management.

Going forward, FIT will establish energy-conservation objectives tailored to its operations, and analyze the status of its energy usage, to uncover waste and make its operations more energy-efficient.

The rapid industrialization of developing countries has resulted in significant environmental problems such as water and air pollution. To help solve these problems in developing countries, we apply expertise and know-how used in overcoming pollution here in Japan.

By providing Japanese know-how and cutting-edge technology, Fujitsu is helping to improve the environmental conditions in Saudi Arabia's industrial cities. These efforts are being undertaken through multi-layer collaborations with governments, academia, and various enterprises.

Air and Water Pollution: Urgent Problems

In recent years, Saudi Arabia, which has the world's largest oil reserves, has been aggressively pursuing industrial diversification and industrial city development through national policies. The Saudi Industrial Property Authority (MODON) is charged with the mission of advancing economic development and solving social problems through the operations of industrial cities. MODON has already created 20 industrial cities and is planning to increase the total to 40, covering a total area of approximately 150,000 hectares, by FY 2015.


Field survey in Saudi Arabia

Environmental issues, such as air and water pollution, which often accompany rapid industrialization and urbanization, have become an urgent challenge in Saudi Arabia's industrial cities, where Fujitsu has performed on-site measurements, and detected serious levels of air pollution (SOx and NOx),and water pollution (COD).

Pulling Together Japanese Expertise and Know-How

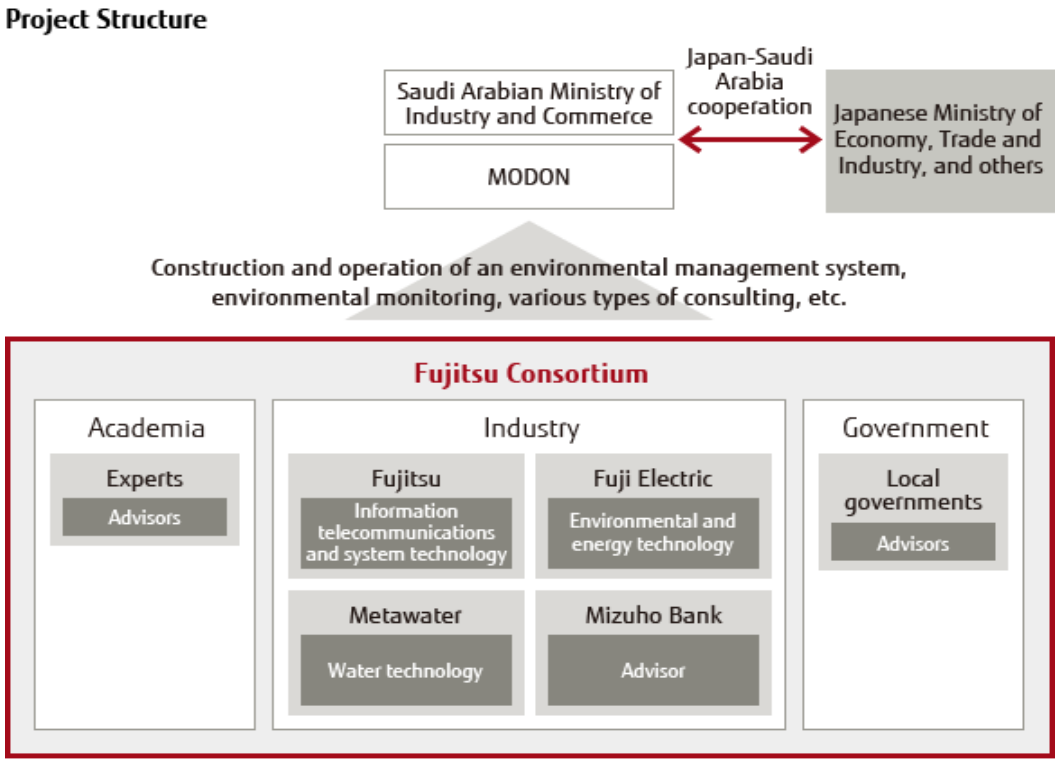
Through analysis of enormous volumes of data, ICT enables not only the solving of problems but also creation of new values for a prosperous society. Fujitsu is utilizing the power of ICT to help solve environmental problems and create a sustainable society in Saudi Arabia.

Fujitsu and MODON have been engaged in a detailed dialogue concerning approaches for environmental improvements in Saudi Arabia's industrial cities. The history of these discussions is summarized below.

Dialogue History

Date	Content
September 2011	Fujitsu Arabia signed a "memorandum of understanding" (MOU) with MODON to collaborate in the development of eco-friendly industrial cities.
October 2011	Fujitsu's proposal for using cutting-edge IT and environmental technology to make industrial areas eco-friendly was adopted by the Japanese Ministry of Economy, Trade and Industry as an FY 2011 "Feasibility Study for the Overseas Development of Smart Communities." With the government's support, the project is expected to become a model case for the export of infrastructure systems through public-private collaboration.
December 2011 and January 2012	Detailed local surveys and measurements were conducted on two occasions.
February 2012	With the Japanese Minister of Economy, Trade and Industry and the Saudi Arabian Minister of Industry and Commerce present, Fujitsu and MODON entered into their second MOU, at a Japan-Saudi Arabia industrial cooperation forum.
November 2012	An environmental symposium was held in Saudi Arabia to help raise environmental awareness.

To improve the environment in Saudi Arabia, Fujitsu has formed a consortium with Fuji Electric Co. Ltd., Metawater Co. Ltd., and Mizuho Bank, Ltd. In addition, we are encouraging cooperation from local governments that have experience in overcoming pollution problems, and from researchers and other experts, to make this endeavor an "All Japan" effort to apply Japanese expertise and technology.



Using ICT to Centrally Manage Industrial City Environmental Information

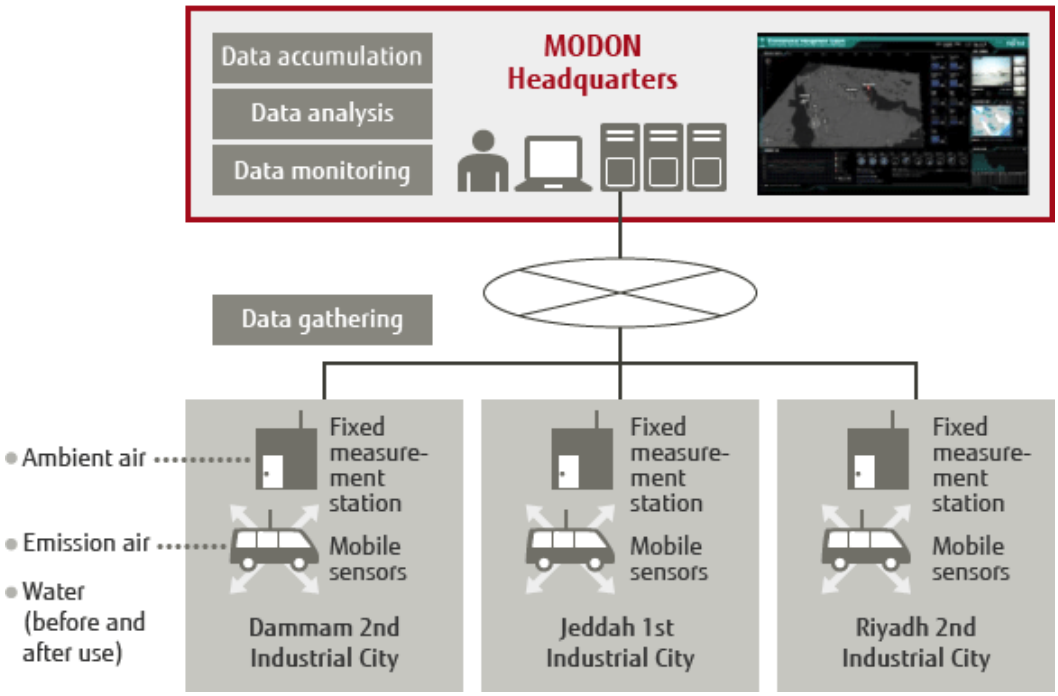
In March 2013, MODON and Fujitsu signed a contract for the development and operation of environmental management systems in Saudi Arabia's industrial cities. Under this agreement, Fujitsu and MODON will work together to build a monitoring system that employs air and water quality sensors to constantly monitor environmental pollution. The new system will be installed in the Dammam 2nd Industrial City in Saudi Arabia's Eastern Province, the Riyadh 2nd Industrial City in the Saudi capital, and the Jeddah 1st Industrial City in the western province of Mecca.

Signing ceremony

These systems will use fixed measurement stations to continuously gather air-quality data and mobile sensors to gather data on industrial and other atmospheric emissions, and effects on the water supply. Measurement data will be centrally managed at MODON, and the creation of visual representations on 3D maps will be used to promote efficient, integrated monitoring.

Once the systems have been constructed, Fujitsu will operate them, monitor environmental conditions, and provide various types of consulting services using measurement data to make environmental improvements.

Environmental Management System Overview



Toward the Realization of Eco-Industrial Cities

Environmental data gathered and analyzed by environmental management systems will be used to evaluate achievement of environmental standards and to make decisions on environmental policies for making improvements. In addition, these data, by making it possible to quickly respond to air and water pollution incidents, will help to minimize damage and promote safety and security in the daily lives of local residents.

It is expected that environmental data will also be used to develop environmental strategies and systems, as in the cases of the construction of a sustainable environmental management model and the development of eco-city master plans for Saudi Arabia.

Going forward, Fujitsu will continue to use Japanese expertise, technology, and the power of ICT, to help improve the environment in Saudi Arabia.

Fujitsu Group's Green ICT Helping Achieve a Low-Carbon, Prosperous Future

Through its advanced environmental solutions, services, and products, the Fujitsu Group's green ICT is helping to reduce the environmental burden generated by all aspects of our daily lives and by society. We are continuously widening the scope of our efforts in this field so we can help more countries and regions and more people.

Environmental and Energy Management

Reducing Electricity Consumption through an Energy Management System (Japan)

YKK's Kurobe plant installed a factory energy management system (FEMS) that, by making energy consumption "visible" in real time, helped them to not only achieve energy savings but improve production quality and productivity as well.

- Fujitsu and YKK Jointly Develop Factory Energy Management System (FEMS) [Press release]

Solutions for Saving Electricity and Other forms of Energy [in Japanese]
By helping to save electricity and energy in customers' offices, we are reducing the environmental burden, but we are also contributing greatly to cost reductions (for people, goods, transportation, etc.).

Related Solution »

Office and Buildings

Achieving Battery-less Electronic Devices and Wireless Sensor Units (Japan)

For homes and commercial buildings, we have developed energy management sensor units that require no battery or battery replacement and greatly extend the life of batteries for portable devices.

- Fujitsu Semiconductor Releases Two New Energy Harvesting Power Management IC Products, Contributing to a Low Carbon Society [Press release]

Energy harvesting
The use of technology to "harvest" energy by converting light, vibration, and other microsources of potential energy all around us into electricity.

Factories

Helping to Lower Resource Usage (Japan)

Mitsubishi Heavy Industries' aircraft design and development operations reduced the amount of resources it uses by cutting the number of prototypes it makes in designing and developing aircraft. It also reduced its electricity consumption by consolidating server functions.

The "Engineering Cloud" Next-Generation Manufacturing Environment [in Japanese]
The Engineering Cloud makes it possible to comfortably use 3D CAD applications on a standard PC – no dedicated workstation required – and to share information across multiple business sites.

Related Solution »

Regional and Governmental Bodies

Major Reduction in Office Space and a 45% Cut in CO2 Emissions (Japan)

When the government offices of Nakano Ward in Tokyo introduced a new information system, they realized greater efficiency in both their work and use of office space. They also cut their CO2 emissions by about 45%.

IPKNOWLEDGE Internal Information System [in Japanese]
Consolidating office support systems certainly benefits operational efficiency but it also promotes highly efficient and transparent administrative and local government operation.

Related Solution »

Education

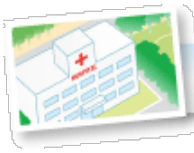
46% Reduction in Electricity Consumption through Virtualization (Japan)

Kansai University consolidated servers and adopted cloud services, and slashed its electricity consumption by 46% and cut total ICT costs by around 30%.

- Fujitsu Cloud Solution Enhances Kansai University's Educational Research System Platform [Press release]

Virtualization Technology and Organic Storage Services II [in Japanese]
Our virtualization technology and cloud-based file server services contribute to the optimization and more efficient use of ICT resources, and tighter security.

Related Solution »



Medical

Supporting the Transition to Paperless Operations at a Medical Institution (Finland)

Finland introduced a system allowing all of the country's medical institutions to share information on patients' medical and prescription histories, making paper-based management a thing of the past.

Electronic medical record network
This system makes it possible for people to receive appropriate medical services based on their medical histories, even at medical institutions they are visiting for the first time.

Helping to Improve the Quality of Medical Care and Reduce CO2 Emissions (Laos)

With less need to transport patients by aircraft and have physicians travel long distances, the Laotian Ministry of Health cut CO2 emissions by around 16.5 tons per year.

Remote medical consultation system
With this system, doctors in different locations can discuss medical options while viewing patient data monitors.

Related Solution »

Department Stores and Supermarkets

Major Reduction in POS Electricity Consumption (Japan)

A fashion retailer with 150 POS units eliminated its nighttime data transmissions and paper journals, and cut its CO2 emissions by about 45%.

"TeamStore/S" POS Systems for Specialty and Other Retailers [in Japanese]
This system not only offers intuitive, easy-to-understand operation; it also responds to safety and security needs and is environmentally friendly.

Related Solution »

Financial Institutions

40% Reduction in CO2 Emissions through a System Upgrade (Japan)

Hokuriku Bank reduced the amount of space it needs to maintain, operate, and manage its ICT equipment, saved on energy needed for air conditioning, and cut its annual CO2 emissions by 119 tons - about 40%.

Virtualization technology
We support efficient use of computer resources at all our business' locations by consolidating servers previously located at each site and installing virtual desktops.

Related Solution »

Households

Contributing Residents to Save Energy and Water

The installation of network infrastructure made it easy for a building's tenants to monitor and manage their energy and water usage.

- Case Study - Lend Lease

SSPF (Smart Sensing Platform) [in Japanese]
We have made it easy to build energy management systems for residential and commercial structures.

Networks

Helping an Airport Conserve Energy (U.K.)

We provided a high-availability network to BAA Airport Limited, an airport management company, and helped London's Heathrow Airport save energy.

- BAA Selects Fujitsu For Critical Network Integration Project At New Heathrow Airport Terminal [Press release]

Network construction
Design and construction of a network connecting the boarding, security, and all other airport terminal systems.

Related Solution »

Datacenters

30% Reduction in Electricity Consumption (Singapore)

Singapore's National Institute of Education, through measures like server consolidation, cut its electricity consumption by 30%, and its annual electricity expense by $60,000.

- Case Study - National Institute of Education, Singapore [340KB]

Virtualization technology
Technology that optimizes datacenter usage and increases operating efficiency.

Related Solution »

Transportation and Shipping

Using Vehicle Location Data to Cut CO2 Emissions by up to 30%

Using a navigation function to determine the shortest route to a destination holds fuel consumption down and has reduced CO2 emissions by up to 30%.

"SPATIOWL" Cloud Service Using Location Data [in Japanese]
Consolidates a massive volume of vehicle location and other data on an ICT database and applies it to optimize the use of transportation resources.

Related Solution »

Smart Cities

Contributing to Environmentally Friendly Urban Development (Japan)

The Aizuwakamatsu area of Fukushima Prefecture, by introducing renewable energy, has taken an important step in developing an environmentally friendly, low-carbon society; revitalizing the local economy; creating new industry, and building a community robust against disasters.

- Fujitsu, Aizu Wakamatsu City and Tohoku Electric Power Launch Smart Community Project in Japan's Aizu Wakamatsu Region [Press release]

Application of renewable energy
Support for the introduction and use of electricity generation from solar, wind, wood biomass, and other forms of renewable energy.

Related Solution »

Agriculture

Using ICT to Reduce Applications of Agricultural Chemicals (Japan)

A vineyard and winery in Yamanashi Prefecture, by gathering temperature data in real time, succeeded in reducing the number of times it applies agricultural chemicals by 17, and cut its expenses by 300,000 yen.

Multi-sensing network
A network that measures and provides video data on weather conditions, and remotely collects measurement data, without entailing communications costs.

Related Solution »

Forestry

Helping to Conserve Biodiversity through the Appropriate Management of Forest Resources (Japan)

We made it possible to quickly and economically survey the status of invasive plant species threatening ecosystems, and examine the distribution of multiple tree species.

- Fujitsu Contributes to Conserving Biodiversity with Hyperspectral Imaging Analysis [Press release]

Forest species categorization service
This service can accurately identify cedar, cypress, and other tree species by analyzing aerial photographic data.

From Space

Helping to Stop Global Warming by Measuring GHGs

We are participating in a project that is taking high-precision measurements of CO2 and methane concentration distributions from space and using them as basic data for initiatives to fight global warming.

"Ibuki" (GOSAT) observation data processing system
We have developed a data processing system for identifying concentrations of greenhouse gases, and an algorithm for producing related calculations.

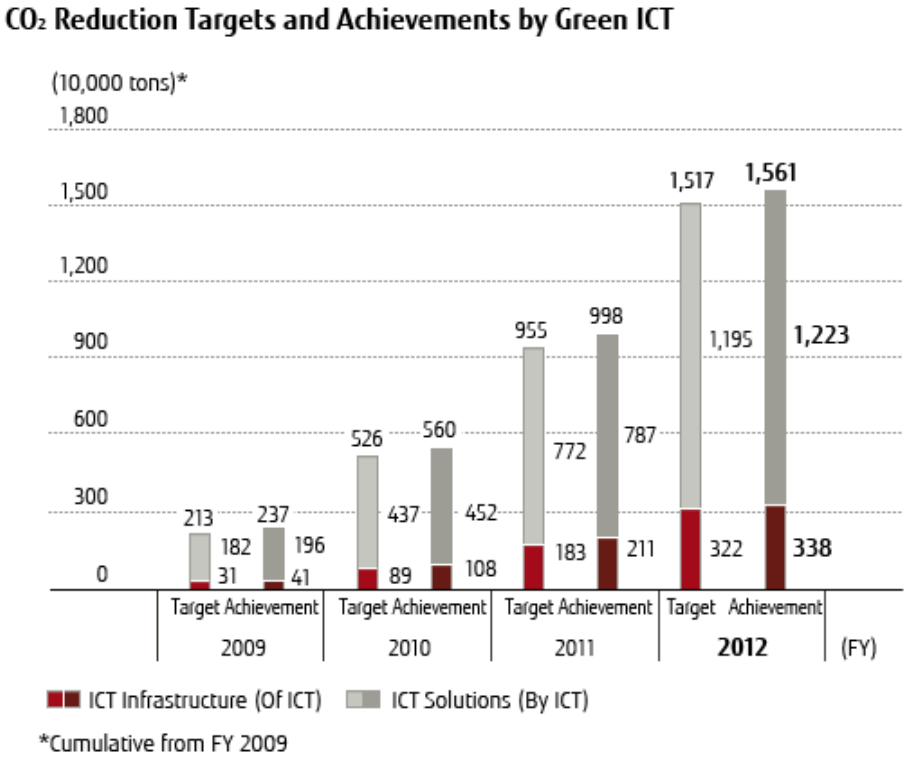
Related Solution »

- Green Policy Innovation: Contribute to reducing the environmental Burden of customers and society
- Fujitsu Group's Green ICT Helping Achieve a Low-Carbon, Prosperous Future: Case Study Archives

Green ICT-Achievements in Reducing CO2 Emissions

Since FY 2007, the Fujitsu Group has been promoting Green Policy Innovation, a project for helping to reduce the environmental burden on customers and society, through Green ICT. The project's global objective is to cut CO2 emissions by more than 15 million tons over a four-year period from FY 2009 to FY 2012.

FY 2012 was the last year of the Green Policy Innovation project and over the four years beginning with FY 2009, we contributed to cumulative CO2 reductions of 3.38 million tons by providing ICT infrastructure products and 12.23 million tons by providing ICT solutions. With the total of 15.61 million tons, we succeeded in achieving our objective for the Green Policy Innovation project.



Leading-Edge Green ICT R&D

We are concerned with reducing environmental burdens from the initial policy formulation stages in our leading-edge R&D, and are continuously creating technologies that contribute to saving energy and the use of next-generation sources of energy.

Basic Approach

Promote the Development of Products and Services that Contribute to Lower Environmental Burdens

To achieve the goal of reducing CO2 emissions by about 30 million tons a year in Japan by 2020, as proposed in our medium-term environmental vision Green Policy 2020, we need to develop revolutionary leading-edge technologies that are even more effective at reducing environmental impact.

Fujitsu Laboratories Ltd., which handles the Fujitsu Group's leading-edge green ICT R&D, has introduced the slogan "Further strengthen leading-edge green ICT R&D and contribute even more to Fujitsu Group business," and is pushing forward with R&D on technologies that can help lower environmental burdens. Based on the concept of Green R&D, we are establishing and implementing policies from an environmental standpoint in all development work, from materials and devices through to facilities, systems and solutions.

Basic Approach to R&D

Promoting the development of revolutionary leading-edge technologies with green ICT as a priority area

- Rendering visible the low-carbon benefits across the entire value chain
- Low-carbon technologies for ubiquitous equipment
- Energy-saving technologies for datacenters and networks
- Environmental solution technologies

Synergies between overall technology development and open innovation

- Consolidation of elemental technologies from materials and devices to solutions
- Global technology collaborations

Initiatives in FY 2012

Quantitatively Evaluating CO2 Emission Reduction Benefits from the R&D Stage

To accelerate our environmentally-oriented R&D, for all of our leading-edge technologies being developed, since FY 2010 Fujitsu Laboratories has been promoting initiatives to quantitatively evaluate the benefits of reduced CO2 emissions (i.e. environmental contribution) at the usage stage of products and services leveraging those technologies. These initiatives are implemented across all units in our laboratories, enabling researchers to evaluate the environmental impact of their technologies, thus clarifying R&D factors that should be focused on from an environmental perspective. Furthermore, by including "environmental impact" as an additional aspect for the technology-evaluation axes of "performance/ functionality/quality" and "cost" that had been primarily used to evaluate technologies thus far, well-balanced R&D of leading-edge technologies developed across these 3 axes is enabled.

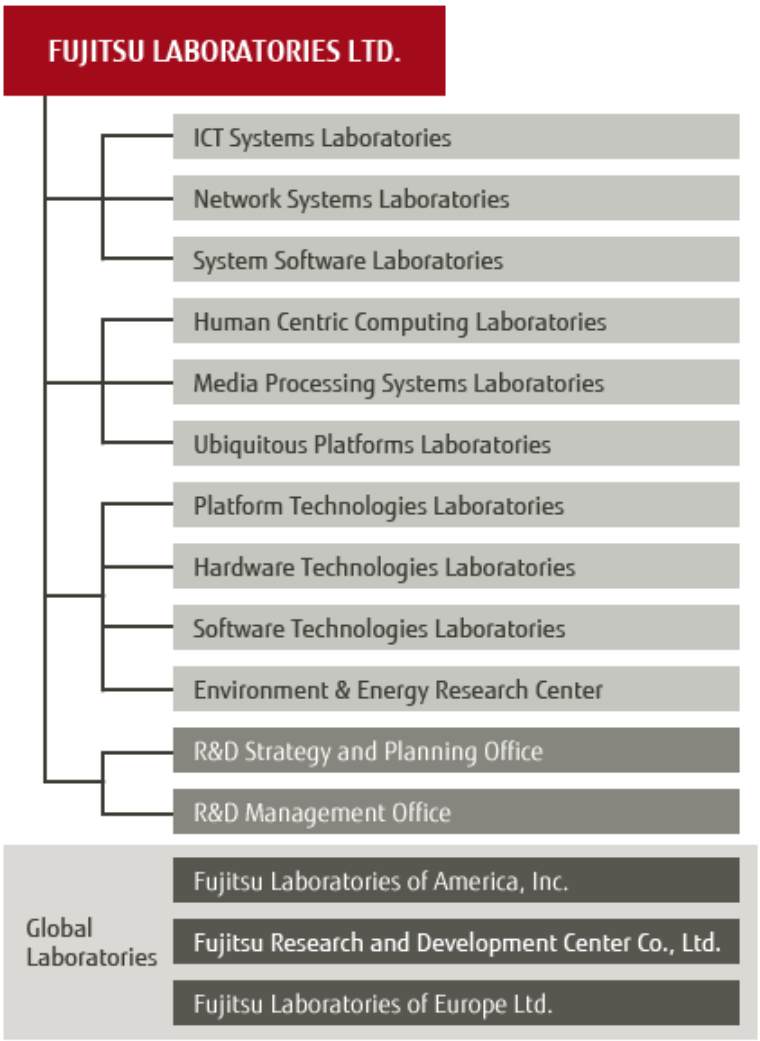
The Fujitsu Group Environmental Protection Program (Stage VI), which covers the period FY 2010 to FY 2012, sets forth "Strengthening leading-edge green ICT R&D" as a priority, and divides this into two areas with specific targets: next-generation datacenters and networks, and solutions.

The target for the next-generation datacenter and network area is developing technologies that can double the overall efficiency*1 of ICT equipment*2 by the end of FY 2012 (April 2012 - March 2013). The target for the solutions area, also by the end of FY 2012, is to increase by at least 70% the development ratio*3 for technologies that improves the effective reduction of environmental burdens.

In FY 2012, we achieved the FY 2012 target of developing technologies that can increase ICT equipment efficiency by at least 2.0 times. We did this by developing technologies in the area of next-generation datacenters and networks. These include a high-capacity power supply technology for servers that is capable of 94.8% conversion efficiency and technology that increases the efficiency of fiber optic network resource usage, enabling up to 40% greater communications capacity. We also met our FY 2012 target in the solutions area, where we were able to achieve a development ratio of 73% for technologies that improve the effective reduction of environmental burdens, and thus met our target of 70% for the fiscal year.

While further increasing the environmental contribution of our leading-edge technologies, Fujitsu Laboratories will aim to expand applications to areas such as complete systems, including those in which the individual technologies, operations and management work together.

Organization of Fujitsu Laboratories Ltd. (As of May 2013)



*1 Overall efficiency:
Efficiency of electricity consumption

*2 Efficiency of ICT equipment:
This refers to the total efficiency of various "efficient-ICT equipment" combined, with such equipment made efficient by individual technologies developed.

*3 Development ratio:
Development ratio of technologies that improve the effective reduction of environmental burden = (Technologies that improve the effective reduction of environmental burden / All technologies developed) x 100

Case Study

Energy-Saving A/C Fan Control Technology for Container Datacenters

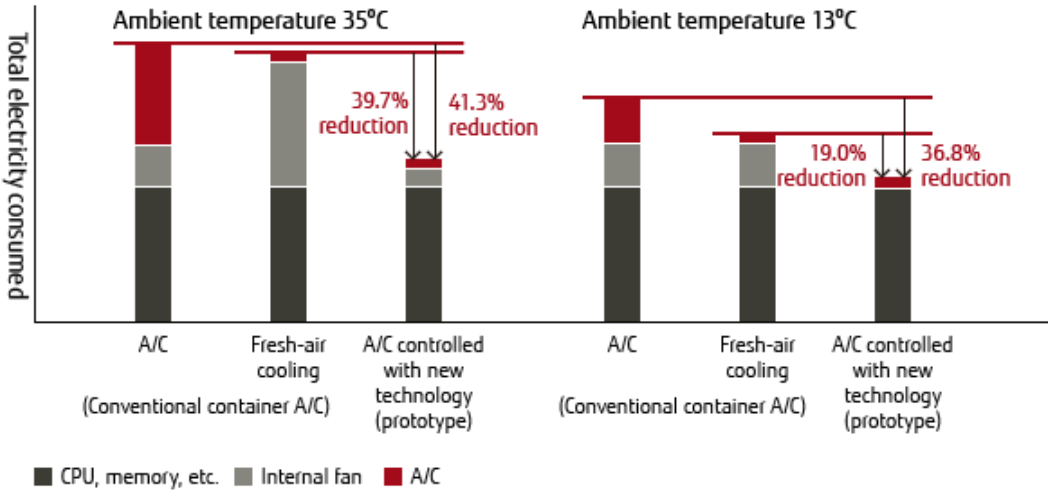
In April 2012, Fujitsu Laboratories Ltd. announced the development of energy-saving system control technology that uses server information to control air-conditioner fans for datacenters.

Prototype container datacenter

Using servers that lack internal fans and using only container air-conditioning fans for cooling is an effective way to cut the electricity consumption of container datacenters. Air-conditioning systems in conventional datacenters, however, operate without detecting the temperatures of individual servers and their CPUs. This wastes electricity on excessive cooling and can result in performance declines due to inadequately cooled CPUs.

The technology newly developed by Fujitsu controls container air-conditioning fans based on assessments of CPU temperatures relative to ambient temperature, and electricity consumption data for servers. This maintains appropriate server operations and minimizes the datacenter's overall electricity consumption. In prototype testing, energy consumption was reduced by up to approximately 40% compared to a conventional container datacenter consisting of servers with internal fans (See the figure below.) Fujitsu Laboratories is performing verification testing of this technology with plans for applying it in the operating and management systems of datacenters planned for introduction in FY 2013.

Energy-Saving Performance of Fujitsu's Energy-Saving System Control Technology



- Fujitsu Develops Power Saving System Control Technology for Container Data Centers [Press Release]

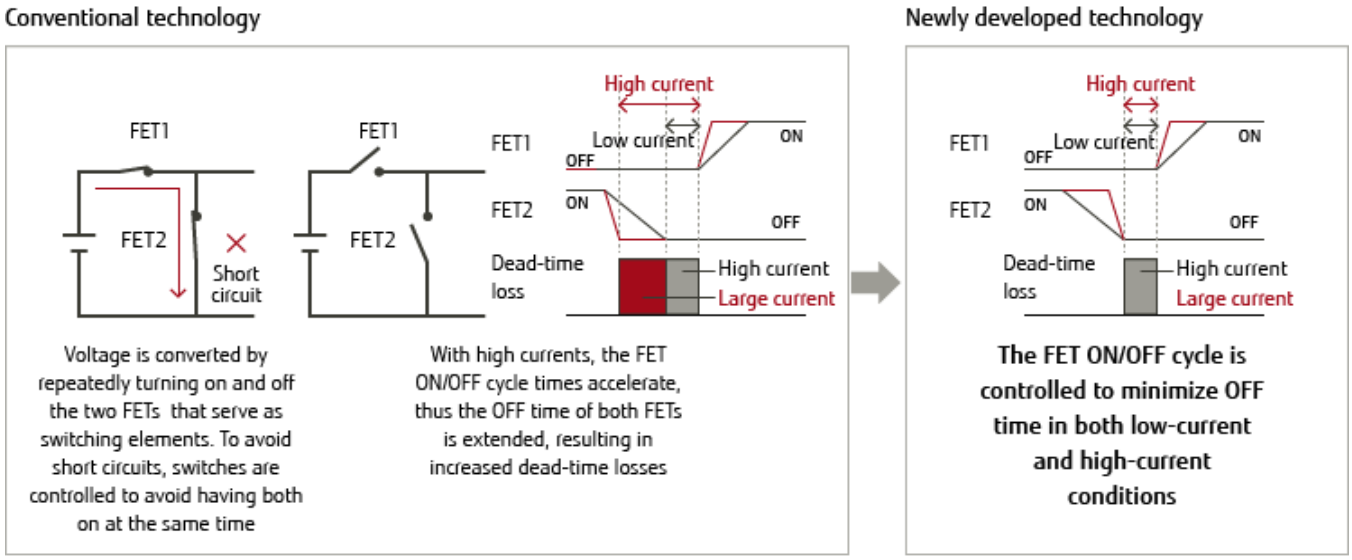
Case Study

High-Output Server Power Supply Unit with the World's Highest Conversion Efficiency

In April 2012, Fujitsu Laboratories Limited announced the development of a new high-output power supply unit that provides high-performance servers with 2.3 kW of power and, at 94.8%, the world's highest conversion efficiency rate. This technology reduces server electricity consumption and contributes greatly to energy efficiency for datacenters.

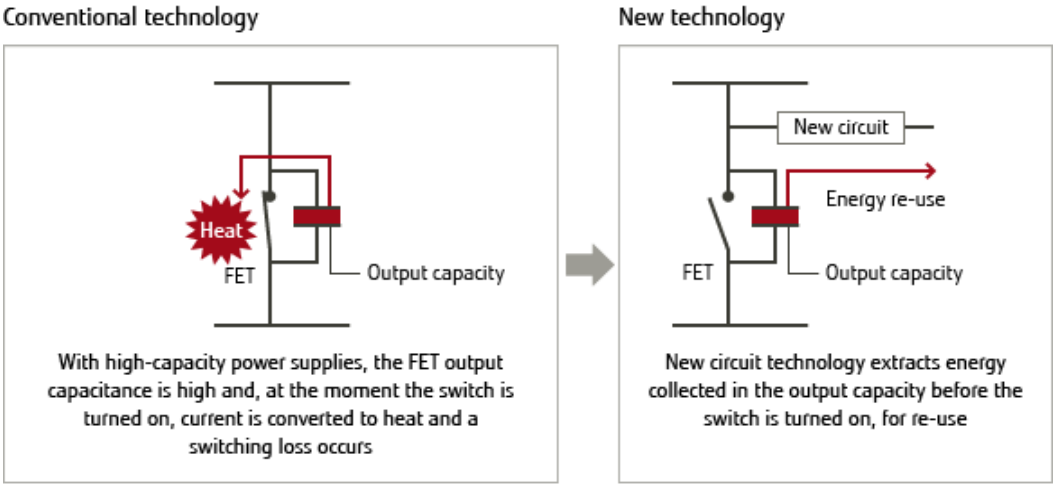
Power supply units that provide power to servers convert AC power to DC power, losing some power in the process. In reducing the overall power consumption of servers, therefore, it is important to increase the power conversion efficiency rate. Fujitsu has reduced power losses by using digital control technology and newly developed circuit technology. Efforts to achieve even greater efficiency, and evaluate reliability and stability, will move forward with plans to include this power supply unit in 2014 server products.

Digital Control Technology that Alleviates Dead-time Loss in Voltage Conversion



FET: Field Effect Transistor

New Circuit Technology for Reducing Switching Loss at the Moment the FET is Switched On



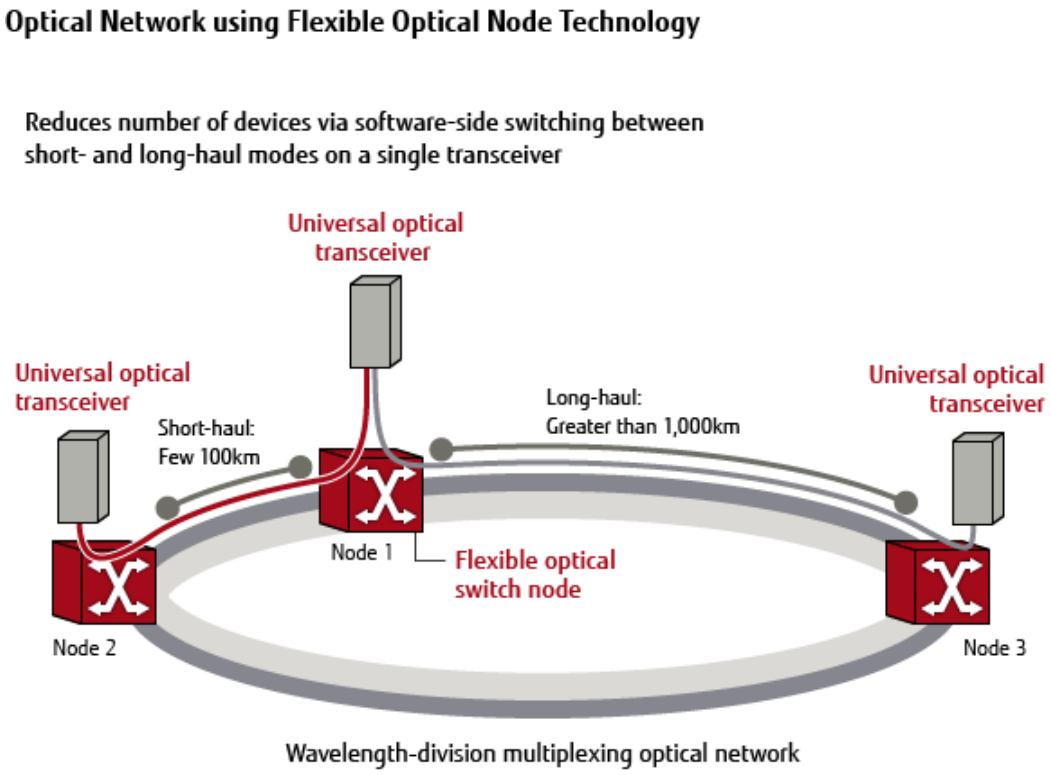
- Fujitsu Develops a 2.3kW High-capacity Power Supply Unit for Servers Offering a World-leading Conversion Efficiency Rate of 94.8% [Press Release]

Case Study

World's First Technology for Increasing Utilization Efficiency for Optical Network Resources without Disrupting Service

Fujitsu Laboratories Ltd, Fujitsu Laboratories of America, Inc., and Fujitsu Limited announced in September 2012 the development of the world's first technology for future long-haul and metropolitan optical networks that can dynamically alter the architecture of optical network resources and enhance utilization efficiency without disrupting service.

Development efforts have resulted in two new technologies. One is "flexible optical node" technology that is not subject to optical signal wavelength, modulation scheme, or route limitations. The other is "spectrum defragmentation" technology that uses portable optical nodes to increase the utilization efficiency of in-service optical network resources. These technologies enable the lowering of power consumption through the use of fewer network devices, and improve network communications capacity by up to 40%.



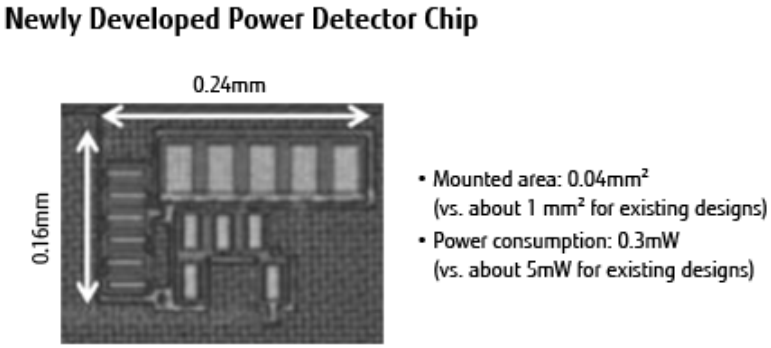
- Fujitsu Develops World's First Technology to Increase Efficiency of In-Service Optical Network Resources [Press Release]

Case Study

Compact, Low-Power Power Detector for Smartphones and Other Mobile Terminals

Fujitsu Laboratories Limited announced in September 2012 the development of a compact, low-power CMOS power detector for use in smartphones and other mobile terminals.

By using a diode-based power detector with a new technology for temperature compensation, the new CMOS power detector enables high-precision power detection without the use of a large amplifier. Requiring only 1/25th the mounted area of conventional detectors and less than 1/10th the power, the new product contributes to efforts to make mobile terminals smaller, less expensive, and more energy efficient. Going forward, this technology will be used to further improve detection precision.



- Fujitsu Develops World's First On-chip CMOS Power Detector with Temperature Compensation [Press Release]

- Leading-Edge Green ICT R&D : Case Study Archives

Fujitsu Group Environmental Action Plan Stage VII

Development of Innovative Technologies that Can Help to Lower the Environmental Burden of Solutions and Products

The amount of information flowing across the Internet is continually growing, and it is anticipated that there will be a rise in the amount of electricity consumed by ICT devices and related solutions and services, which support increasingly information-dependent social infrastructure. In addition, considering the growth of emerging economies and the re-examination of dependence on various energy resources, with a renewed awareness in the wake of the Great East Japan Earthquake, there is a pressing need to realize a sustainable, low-carbon society.

With R&D priorities in the domains of Ubiquitous Innovation, Social Innovation, IC Innovation, and Manufacturing Innovation, by developing environmentally valuable innovative technologies and through the provision and use of solutions, services, and products, Fujitsu Laboratories is contributing to the realization of an environmentally conscious, prosperous society.

FY 2013 Initiatives

In FY 2013, Fujitsu Laboratories Ltd. is continuing initiatives aimed at quantitatively evaluating the CO2 reduction impacts of technologies under development. It is also considering benchmarks that would enable novel measurements of resource efficiency in the case of technologies for which the calculation of CO2 equivalents is impractical.

This recurring cycle, in which objective evaluations of advanced technology are performed and results are then fed back to R&D units by the Leading-Edge Green R&D Committee, is the vehicle through which the environmental value of research results is continuously enhanced and innovative technologies offering high environmentally valuable are developed. We use press releases and other media to actively disseminate information on the innovative technologies we develop and help to lower the environmental burden of society by turning these technologies into products.

Eco-Friendly Products

We promote eco-friendly design in our products to lower their environmental impact throughout their whole life cycles.

Eco-Friendly Product Development

The Fujitsu Group has adopted a unified Group-wide approach to eco-design for newly designed products and works to improve environmental performance throughout the product life cycle. We have been implementing our own environmental assessments for all of our products since 1993, and strive to develop eco-friendly products that reflect environmental considerations in such areas as energy saving, 3R design*1, non-use of hazardous chemical substances, packaging materials, and information disclosure.

*1 3R design:
Design based on the principles of reduce, reuse and recycle

Development of Green and Super Green Products

The Fujitsu Group has established its Procedure for Product Environmental Green Assessment to further the development of environmentally conscious products. Products that meet these standards are designated as Green Products. We are constantly upgrading our Green Product Evaluation Standards in an effort to strengthen and improve the efficiency of our Green Product development.

To pursue the design of environmentally conscious products at a global level, we comply with the international IEC 62075 standard*2 and our own Eco Design Standard*3, which we established in 2011 to incorporate environmental and other market demands. Fujitsu PCs and servers are designed in Japan and Europe, based on these standards, and sold globally.

In developing new products, we work to create "Super Green Products." Super Green Products are those that meet the required conditions for Green Products and are also top-class in terms of low energy consumption and/or 3R design technology, non-use of hazardous substances, packaging materials and use of eco-friendly materials and technologies. Super Green Products are products or systems recognized as having environmental characteristics superior to those of others we supply or that are available on the market. In FY 2010, the definition of Super Green Products was revised to include the stricter requirement of "being in the top level in both energy saving and other parameters (such as resource saving)."

In FY 2012, another 12 products were recognized as being Super Green Products. Since we began this scheme in FY2010, the number of Super Green Products has steadily increased and for the updated 2012 total, 39% of our Green Products were also Super Green Products, meaning we had achieved the target set in Fujitsu Group Environmental Action Plan (StageVI).

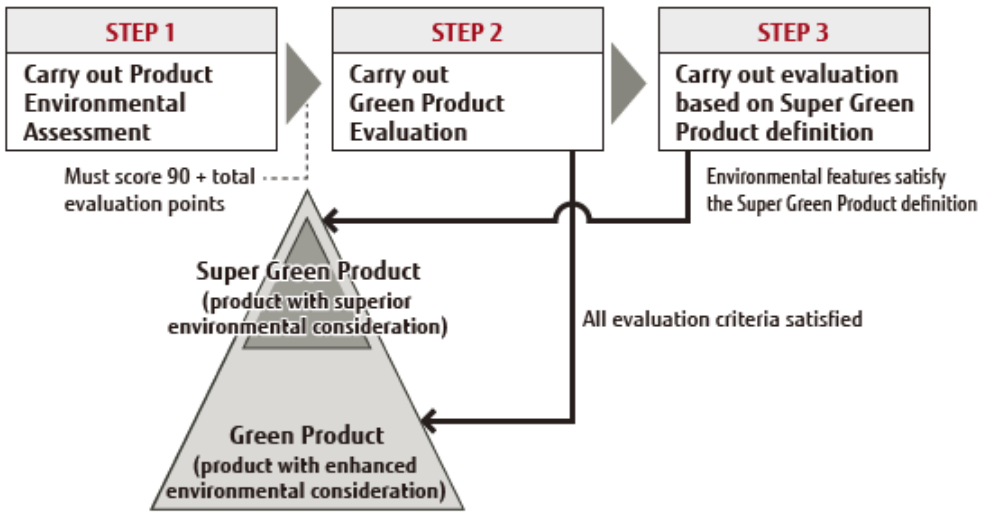
*2 IEC 62075:
Standard on "Audio/video, information and communication technology equipment-Environmentally conscious design." This standard was published in 2008 and established as JIS C 9914 in 2010 in Japan.

*3 Covered products:
Personal computers, servers, and storage systems.

Evolution of Environmentally Conscious Design

Period	Environmental Action Plan Targets and Measures	Regulation Formulation
Environmental Protection Program (Stage I) (FY 1993 - FY 1995)	• Improve product recyclability by 50% compared to FY 1992	Guideline for Product Environmental Assessment
Environmental Protection Program (Stage II) (FY 1996 - FY 2000)	• Product recycling measures • Advancement of Green Product development	Procedure for Green Product Evaluation Procedure for LCA
Environmental Protection Program (Stage III) (FY 2001 - FY 2003)	• Make all newly developed products Green Products	Procedure for OEM Product Environmental Evaluation
Environmental Protection Program (Stage IV) (FY 2004 - FY 2006)	• Offer Super Green products from the main product groups of all business units	Procedure for Product Environmental Green Assessment Procedure for Super Green Product Operation
Environmental Protection Program (Stage V) (FY 2007 - FY 2009)	• From all business units, provide newly developed products 50% or more of which are Super Green • Achieve environmentally efficiency factor of 2	Procedure for Environmental Efficiency Factor Evaluation
Environmental Protection Program (Stage VI) (FY 2010 - FY 2012)	• From all business units, provide newly developed products 30% or more of which are Super Green • Achieve environmentally efficiency factor of 4.0	Eco Design Standard
Environmental Action Plan (Stage VII) (FY 2013 - FY 2015)	• Make 50% of all new products top-level performers in terms of energy efficiency • Improve resource efficiency for new products by 20% compared to FY 2011	-

Mechanism for Green and Super Green Product Evaluation



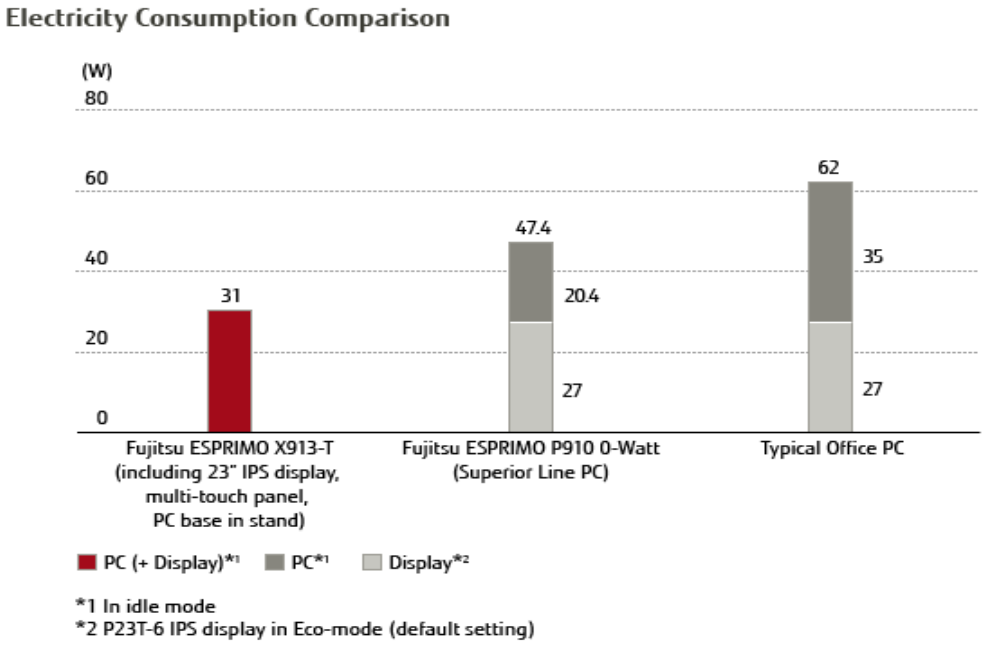
Case Study

Fujitsu ESPRIMO X913-T - stylish front-end device PC features space-saving design and the latest power-saving technology

From the earliest stage of development the Fujitsu ESPRIMO X913-T has incorporated energy conservation concepts in its design. The seamless frame, slim-panel and the adjustable stand with an integrated base unit reduce the number of parts and the overall material consumption. Best possible compliance with international standards is achieved with certifications like EPEAT and ENERGY STAR®.

ESPRIMO X913-T

A 90% efficient onboard power supply is integrated into the base unit of the Fujitsu ESPRIMO X913-T. It is designed according to the 80 PLUS Gold certification and performs even under low loads (10% load) with an energy efficiency of 87%. This leads to highest energy savings to cut customers' costs and reduces the cabling to a minimum.
Further energy savings can be addressed using the presence sensor in the optional multifunction module. The ultrasound presence sensor detects the movement and body outline of anyone sitting within the sensor's range. When the user leaves his PC different settings can be chosen to achieve maximum energy savings. This leads to energy savings of up to 50% versus a typical office PC:



VOICE

Fujitsu Technology Solutions ESPRIMO X913-T System Developer
Wilhelm Neukam

Supplied with or without a touch panel, depending on the customer's desires, the newly developed Esprimo X series products manifest the Fujitsu brand promise of "Shaping tomorrow with you." This new series responds to customers' needs for environmentally conscious products and demonstrates once again Fujitsu's leadership at the forefront of ICT products.

Case Study

Fujitsu PRIMERGY TX120 S3p
The World's Most Energy-Efficient Tower Server

Fujitsu's PRIMERGY servers deliver the ultimate in productivity, cost performance, and flexibility, and simultaneously lower environmental burden while supporting increases in datacenter efficiency and energy cost reductions, for organizations of all sizes. The PRIMERGY TX120 S3p, introduced in May 2012, features a power supply with a high, 90%, conversion efficiency rating and patented 0-Watt technology that completely eliminates losses in off mode. Power consumption savings, in other words, are achieved not only when the server is being used but also when it's not. At over 6,100 overall ssj_ops/watt, the PRIMERGY TX120 S3p leads the world on the SPECpower_ssj®2008*4 benchmark for server energy efficiency.

PRIMERGY TX120 S3p

With its ultra-compact form factor, the PRIMERGY TX120 S3p requires very little space. It also weighs less than half a conventionally sized server and is made with far fewer resources. Its super-quiet system means this server can be used in office environments and even on desks. And its use of a halogen-free motherboard is just one more example of our commitment to doing ever we can to lower environmental burden.

*4 SPECpower_ssj®2008:
An industry-standard benchmark developed by Standard Performance Evaluation Corporation (SPEC®) to evaluate the energy efficiency of volume server class computers.

VOICE

Fujitsu Technology Solutions, Senior Director of Product Management for Servers
Uwe Romppel

For datacenters and offices, it is not enough for servers to be friendly to the environment. Whether in a small office, or large-scale datacenter, the ICT platform must be suited to the customer's needs. An appropriate level of performance and the highest levels of energy efficiency are absolute requirements; but there are also cases in which compact design and minimal noise are key concerns. PRIMERGY servers are solutions that deliver the computing power businesses demand and do so with the industry's highest levels of customizability.

Case Study

Smartphones Friendly to the Environment and People

ARROWS series smartphones, as the first smartphones in the Japanese market to offer a quad-core processor (F-10D and ISW13F), full-HD LCD (F-02E) and Softbank 4G compatibility (201F), and the world's first smartphone to offer Raku-Raku touch panel technology (F-12D), are constantly rising to the challenge of applying cutting-edge technologies. In the series' tablet computers (F-05E), we combined energy-saving technologies and a high-capacity battery to achieve battery life among the best in the industry. Also, with our proprietary "Human-Centric Engine" technologies for improving the user's visual, audio, and touch experience, tight security, and other features that realize ultimate ease-of-use, as well as water-resistance built into every model, we offer usability for a wide range of users in a range of different environments.

ARROWS Series

In developing these products, compliance with the RoHS Directive and other chemical substance restrictions is a given. We also, however, use Virtual Product Simulator (VPS) environments relying mainly on 3D-CAD systems to minimize resource usage in prototypes; display materials used in components, in order to facilitate recycling; take steps like reusing components in repairs; and work in other ways, as well, to use fewer resource in all product-related processes. As a result, all of our ARROWS series smartphones have been certified as Super Green products. Going forward, we aim to take these initiatives to an even higher level and further improve energy-efficiency performance to offer smartphones that are even friendlier to the environment and people.

VOICE

Mobile Phones Unit, Mobile Phones Division, Director of Engineering Dept.1
Masato Hori

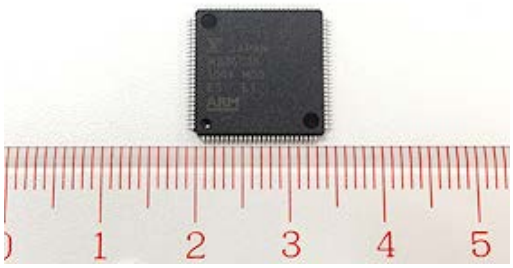
In striving to create the world's most convenient smartphones - products that customers will find a joy to use - we are constantly aware of the 3Rs and work to minimize resource usage, even as we reach for new heights in functionality and performance. Developing smartphones that are attractive and friendly to both the environment and people is our ongong mission.

Case Study

MB86C36 LSI Cuts Power Consumption in Standby by up to 97%

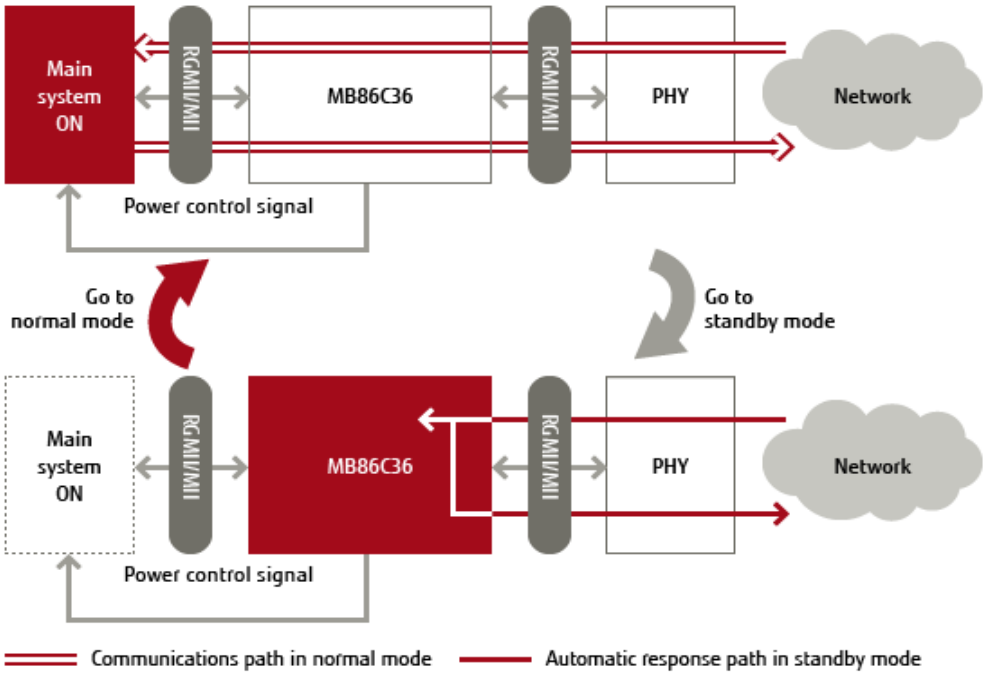
Amid ongoing worldwide efforts to lower environmental burden, reduction targets for power consumption by multifunction printers, conventional printers, routers, and other devices with network functionality are constantly being raised.

The MB86C36 is a network-answering proxy LSI that sits between a device's main system (CPU) and network interface. It maintains network connectivity by receiving network connections from external devices and automatically responding to them even when the CPU is in standby or powered off. This makes it possible to turn off power to the main system when the device is in standby and reduced power consumption by up to 97%.



MB86C36

What Happens in Standby



VOICE

Fujitsu Semiconductor Limited, MCU Business Division, MCU Development Department
Hiroyoshi Yamashita

Concentrating on minimizing power consumption not only at the LSI level but also at the system level, we have succeeded in greatly reducing overall power consumption. By providing the MB86C36 to as many customers as possible, we will help to reduce overall system power consumption and help to lower environmental burden.

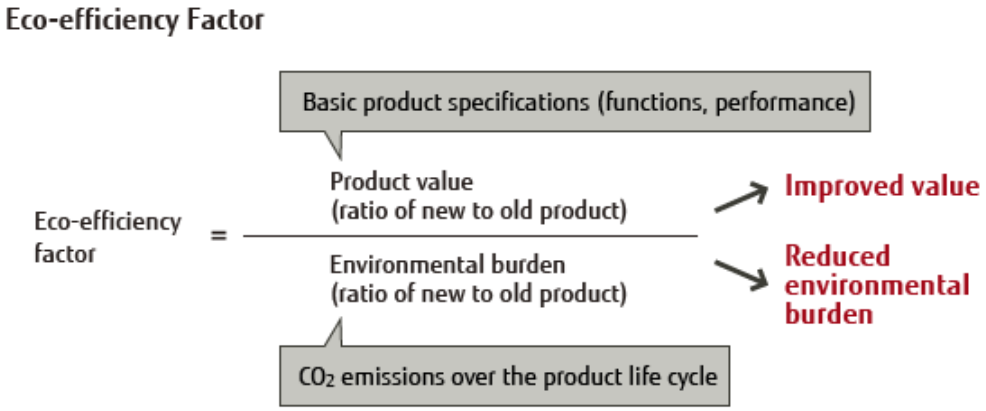
- Eco-Friendly Products : Case Study Archives

Using the Eco-Efficiency Factor to Reduce Product Environmental Burden

The Fujitsu Group introduced the eco-efficiency factor*5, which simultaneously evaluates both environmental burden reductions and product value increases for newly developed Green Products in FY 2007. In the Fujitsu Group Environmental Protection Program (Stage VI), which covers FY2010-2012, we changed the base fiscal year for products from FY 2005 to FY 2008 and continued these activities. In FY 2011, we also revised our targets upwards based on actual results as of the end of FY 2010.

In FY 2012, we exceeded our newly established Fujitsu Group Environmental Protection Program (Stage VI) target of 4.0, with an actual result of 4.6. Product lines primarily responsible for contributing to these results included our mobile phones, mission critical IA servers, and photonics solutions. These improvements were achieved in part through improvements in transmission speeds and data processing capabilities, and through reductions in product weight and energy consumption.

*5 Eco-efficiency factor:
A method for comparing old and new products that quantitatively incorporates improvements in both product environmental burden and value (functionality and performance). This is an environmental index that promotes the creation of products that can provide even higher values with even lower environmental burden.



Carrying Out Life Cycle Assessment (LCA)

The Fujitsu Group has made it obligatory to perform LCAs for all its Green Products. Calculation standards have been formulated for each product family, and the Group uses its own database*6 to evaluate the environmental burdens of its products.

We perform LCAs to determine which parts of a product's life cycle account for the greatest proportion of the environmental burden, so that we can effectively design environmentally friendly products. We also apply the expertise developed through our LCA activities to calculate the eco-efficiency factor, and are actively using this as a tool for communicating with our customers.

*6 Own database:
Our own unique database of unit values, created by Fujitsu Laboratories based on input-output tables.

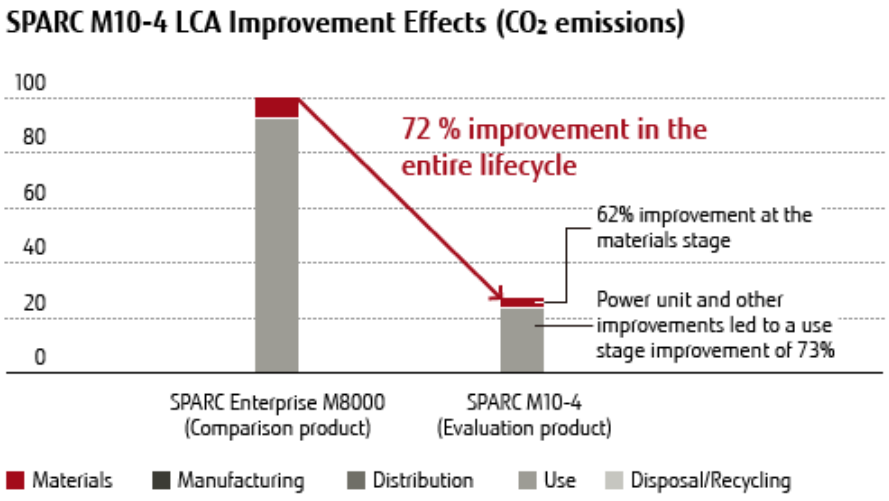
Case Study

SPARC M10-4 UNIX Server Cuts Life-Cycle CO2 Emissions 72%

SPARC M10-4

The SPARC M10-4 UNIX server, equipped with the SPARC64 X 16-core SoC (System on Chip) processor, greatly reduces the numbers of components on the printed board unit. It also represents success in greatly reducing power consumption during use - something achieved by incorporating Fujitsu's own high-efficiency power unit and other design improvements. In addition, the SPARC M10-4 uses a compact chassis made possible by Liquid Loop Cooling - the latest cooling technology - backplane-less straight cooling, as well as other packaging technologies. And, its entire-life-cycle CO2 emissions, compared with earlier products with the same maximum number of processor cores*7, have been reduced by up to 72%. Based on these and other initiatives, the SPARC M10-4 has been certified as a Super Green product.

*7 Comparison product:
SPARC Enterprise M8000 (Introduced in December 2010)



- SPARC M1 Environmental Considerations (Product site)(in Japanese)
- Liquid Loop Cooling (in Japanese)

Promoting 3R Design

Gaining experience in dismantling

Through its product environmental assessments and Green Product evaluations, the Fujitsu Group is working to apply a wide variety of 3R-friendly technologies that conserve resources and improve recyclability. Technologies being incorporated into our products that are effective in conserving resources include ways to reduce the number of parts and cables, to save space through improved performance and more highly integrated design, and digitization of manuals and other documentation.

We are also working to improve recycling rates by utilizing recyclable parts from the product design stage; and, by establishing recycle scheme, we promote the recovery and recycling of used ICT equipment. For example, usable parts are separated and extracted from products returned from leasing, and after checks to verify they are of the same quality as new parts, are either reused as parts in new products or as spare parts for maintenance.

Since 2010, we have held twice-yearly tours of Fujitsu recycling centers for designers throughout the Fujitsu Group, in an initiative to improve the recyclability of our products. During these tours, designers gain experience in dismantling post-consumer products, and recycling professionals provide feedback to designers through case studies showing factors that make dismantling difficult and by encouraging an exchange of views.

Going forward, we plan to draw up a design guideline containing case studies that Fujitsu recycling centers have accumulated showing factors that make dismantling difficult. Through this approach, we aim to encourage design from the product development stage that takes into consideration the ease of post-use dismantling.

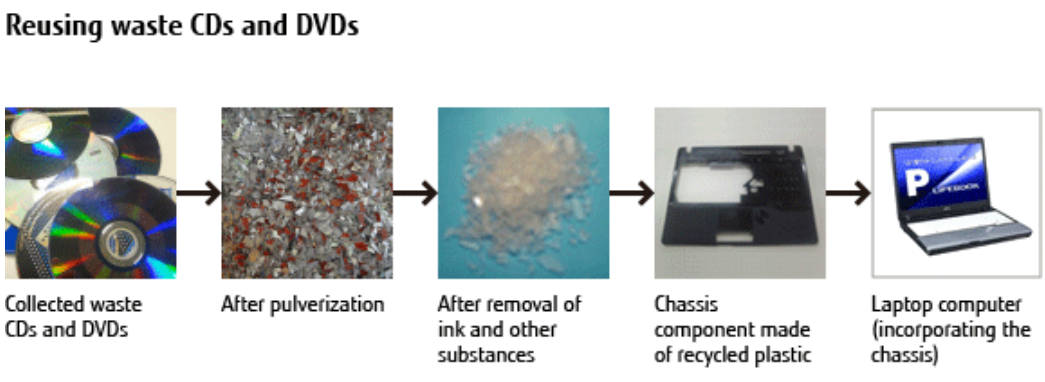
Case Study

Reusing waste CDs and DVDs

The Fujitsu Group has established a recycling system in which waste CDs and DVDs are collected at Group recycling centers and the plastic recycled from them is reused in our products. This is the first example in the industry, and we have started production under this system with LIFEBOOK P772/E, a laptop released in the summer of 2012 for business customers.

Plastic from waste products is actually a mix of various types of plastic. That is why the quality of recycled plastic is not enough to use in products. In addition, using recycled plastic makes it difficult to comply with the RoHS Directive and other regulations because of the risk that it might contain heavy metals or other impurities. To overcome these problems, we noticed that our recycling centers have collected large amounts of waste CDs and DVDs, which are made of pure materials, and we made it possible to use these recycled materials in the manufacture of laptops, under quality control based on a chemical substance risk-management database created by Fujitsu Laboratories Ltd.

It is expected that this recycling system will make it possible to reduce the use of virgin plastic by 10 tons or more per year, and cut CO2 emission by about 15%, both in comparison to a conventional laptop manufacturing process. Looking ahead, we aim to build a recycling system that can handle waste plastic from sources other than CDs and DVDs, and expand the use of recycled material in our products to further reduce our resource consumption and environmental burden.



Eco-Friendly Packaging

Fujitsu is working on a variety of methods for reducing its use of packaging and cushioning materials. Conventionally, a notebook computer is shipped individually packed in a cardboard box, but now, by packing several products in a single returnable container, we have reduced shipping space and cardboard waste. For larger products, we have replaced conventional cushion foam with returnable air packs. With this new packagingstyle, we are repeatedly using packaging materials, and can use the same materials for various products. Greater efficiency in the use of packaging materials has reduced the amount of cushioning materials and wasteper shipment, thereby, significantly reducing CO2 emissions. We also use vegetable oil inks, which are lower involatile organic compounds (VOCs), a known atmospheric pollutant, to print the boxes used for packaging PCs and other equipment.

ICT Database System for Management of the Environmentally Conscious Product Design

We use ICT systems for the preparation and registration of Product Environmental Green Assessments and LCAs. We use these systems to centrally manage information on aspects of environmentally conscious design related to legal and regulatory compliance; materials and chemical content of purchased components; efforts to make products smaller, lighter, or more energy efficient; ease of recycling and dismantling.

Fujitsu Group Environmental Action Plan (Stage VII) Product Targets

For ICT equipment, the Fujitsu Group has positioned energy efficiency and resource efficiency as two critical themes of the Fujitsu Group Environmental Action Plan (Stage VII). As we move forward with efforts to develop environmentally conscious products, our goals in these areas are to "achieve top-level energy efficiency*8 for 50% of newly developed products" and "increase resource efficiency of newly developed products by 20% compared to 2011."

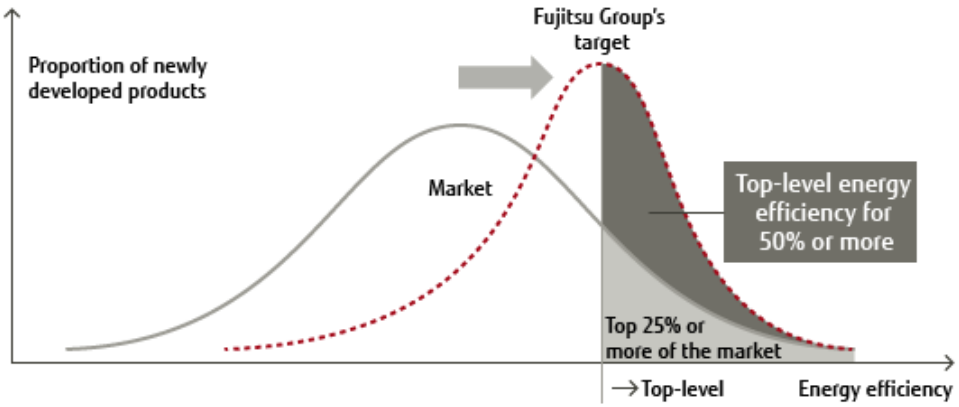
*8 Top-level:
Achieve more than 25% of market benchmark in energy efficiency such as top-runner products (first in the world or industry, top of the world or industry).

Development of Products Leading the Way in Energy Efficiency

The Fujitsu Group in developing new products over the FY 2013-2015 period will contribute to the lowering of environmental burden when products are in use. We will do this by continuously expanding the number of our products that are top-level performers in terms of energy efficiency.

We have established standards for recognizing top-level energy efficiency - in comparison to either the market or past products - by product group. Our aim is to clear these standards for 50% or more of the product series we develop over the three years ending with FY 2015. Products that clear their respective standards will be recognized as "Top-level Energy Efficiency Products." In setting target standards, we e emphasized comparability and transparency, and adopted standards that were as open as possible to public awareness.

Development of Top-Level Energy Efficiency Products



Improving the Resource Efficiency of New Products

The Fujitsu Group believes it is important to improve the efficiency of resource usage and pursue product development that uses the least amount of resources possible. We, therefore, have redefined "resource efficiency" as an indicator for quantitatively evaluating the extent to which environmental burden, due to the use of resources in products and the disposal of products, has been lowered. The specific goal we aim to achieve by FY 2015 is to increase resource efficiency per product newly developed by Fujitsu*9 by 20% compared to FY 2011.

Resource efficiency is evaluated by dividing the value of a product, by the environmental burden (in terms of use and disposal) of the elements (resources) comprising the product (Refer to the diagram below.) As we pursue development focused on reducing resource usage, we will continue to consider the roles product value, resource burden coefficient, and resource disposal volume in improving our resource efficiency indicator.

*9 Products newly developed by Fujitsu:
Excludes products for which resource efficiency would be determined by customer specifications or standards.

Calculating Resource Efficiency

$$\text{Resource efficiency} = \frac{\text{Product value}}{\text{Environmental burden from resource usage} + \text{Environmental burden from resource disposal}}$$

$$\text{Environmental burden from resource usage} = \Sigma\,(\text{Resource burden coefficient} \times \text{Resource usage volume})$$

$$\text{Environmental burden from resource disposal} = \Sigma\,(\text{Resource burden coefficient} \times \text{Resource disposal volume})$$

Product value	To place emphasis on the valuation of reductions in environmental burden due to resource usage and disposal, product value is limited to those that related to resource usage and is set on a per-product basis. (Example of factor not considered: CPU performance improvement)
Resource burden coefficient	Environmental burden weighting coefficient that is specific to a particular resource and considers factors like exhaustibility, scarcity, and environmental impact from mining and disposal. Activities will begin with this figure set to a value of "1" for all resources.
Resource usage volume	Mass of each resource used in the product.
Resource disposal volume	Mass of each resource disposed of (not reused) in connection with a post-use product. Activities will begin with this figure set to a value of "0."

Reducing Chemical Substances in Products

We cooperate with our business partners in striving for strict management of chemical substances whose use is restricted by laws and regulations in Japan and overseas, as well as of other potentially harmful substances.

Management of Legally Prohibited and Regulated Chemical Substances in Products

The Fujitsu Group designates substances that are harmful to people and the environment and whose use is either prohibited or regulated by law as "Fujitsu Group Specified Banned Substances." We use both Japanese and overseas regulations to determine what substances to include on this list. The "Fujitsu Group Specified Banned Substances" list is comprised of two categories – one for substances commonly prohibited throughout the world and another for substances prohibited in certain countries or regions.

- Fujitsu Group Specified Banned Substances [145KB]
- Fujitsu Group Specified Reportable Substances [150KB]
- Fujitsu Group Specified Controlled Substances [65KB]

We have also established a Fujitsu Group Green Procurement Direction and strengthened control of the chemicals in our products by taking the initiative in directing our suppliers to construct chemical management systems (CMSs). By excluding banned substances through green procurement activities, we are providing products free of Fujitsu Group Specified Banned Substances.

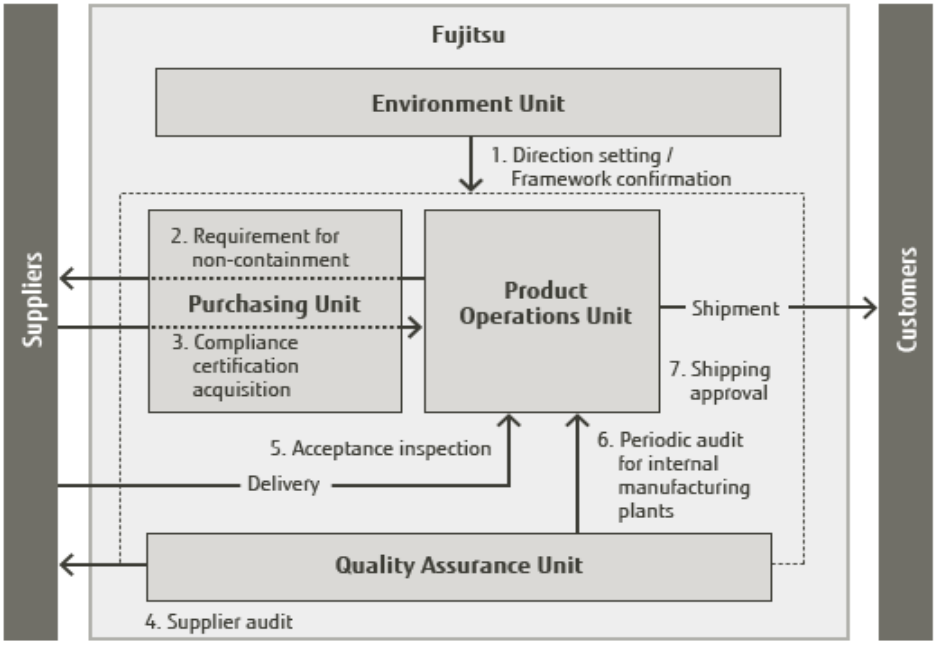
- Green Procurement

In response to regulations such as the RoHS Directive*1, we have taken systematic action covering the entire supply chain by constructing a system headed by our product business division and including our quality assurance, purchasing, and environmental divisions, to manage chemical substances from design through to delivery. In FY 2012, we revised our internal systems to comply with the CE marking*2 requirements of the revised RoHS Directive. We changed them from the previous configuration, based on internal standards, to systems suited to standards consistent with the RoHS Directive. As a result, we were in compliance with the revised RoHS Directive, including CE marking provisions, when the revised directive came into effect.

*1 RoHS Directive:
Restriction of the use of certain hazardous substances in electrical and electric equipment

*2 CE marking:
Mark that is applied to products to show they are in compliance with the safety requirements of EU (EC) directives.

Framework for RoHS Directive Compliance



Controlling Substances of Concern

The Fujitsu Group sees the minimization of risk associated with specified chemical substances as a high priority for protecting the safety of customers. Therefore, when we have concerns about the harmfulness of substances, we designate them as Fujitsu Group Specified Controlled Substances or Fujitsu Group Specified Reportable Substances, even if they have not been scientifically shown to be harmful. Based on the principle of prevention, we manage our use of chemical substances in a way that allows us to ban their use immediately if it becomes clear they are harmful.

The Fujitsu Group Specified Reportable Substances list includes substances that are REACH regulation*3 candidate substances*4, and we collect information on substance amounts from suppliers and then manage these quantities on a per-product basis. Moreover, the Specified Controlled Substances list also includes data from suppliers on amounts for substances that may not be restricted by every country's regulations, but which we consider to be of concern.

As far as PVC is concerned, we not only control the amounts included in our products but also require in our Green Procurement Direction that it be used as little as possible, and restrict its use in everything except sheathing for cables and insulating materials for electronic components.

*3 REACH regulation:
Regulation concerning the Registration, Evaluation, Authorization, and Restriction of Chemicals

*4 REACH candidate substances for Authorization:
Selected chemical substances with properties (carcinogenicity, mutagenicity, reproductive toxicity, etc.) regulated by REACH. If these substances are present in products, data on the amounts must be displayed.

Case Study

The ESPRIMO Q920, with Halogen-Free Parts

The ESPRIMO Q920, with its compact design incorporating an onboard power supply, is an extremely energy-efficient desktop computer.

It is also, however, distinguished by the reduced level of chemical substances that go into its manufacture. It uses a halogen-free mainboard – technology Fujitsu has been actively developing over the years – cable insulation and plastic fan parts that include no PVC, and other parts made from materials we have worked to ensure are environmentally conscious. We even offer customers the option of using a PVC-free power cable.

ESPRIMO Q920

Contributing to Creating Mechanisms for Chemical Substance Management

In the Fujitsu Group, we see efforts towards chemical substance management as an issue for the whole supply chain and so participate in activities such as the Joint Article Management Promotion consortium (JAMP) to contribute to the design, construction and widespread adoption of mechanisms that can transmit information effectively.

Among these industry groups, we were involved from the planning stages with the input format and entry support tools for the AIS (article information sheet), which is an included chemical substance information transmission sheet, and also participated in creating guidelines for appropriate management of included chemical substances and in practical education for business partners to promote the use of AIS throughout the industry. Furthermore, we are energetically engaging in activities promoting the use of the JAMP information distribution infrastructure (JAMP-IT), which supports information exchange requests from multiple companies to create an environment for the smooth transmission of information.

The Fujitsu Group, through its AIS usage, is identifying and managing information on whether and how particular chemical substances are being used in particular products. These substances include not only those covered by REACH regulations but also substances that have been put on the Fujitsu Group Specified Controlled Substances list because there are concerns they may be harmful. Moving forward, we aim to help minimize the significant adverse impact of chemical substances on people and the environment by finding alternatives for procured products containing chemical substances recognized as harmful based on AIS data on chemical substances included in procured products.

Using ICT to Control the Chemicals in Our Products

From requesting surveys by outside organizations through to gathering information by our own efforts, the Fujitsu Group maintains an integrated system for managing the information on the chemicals contained in the components and materials it purchases from its suppliers throughout its supply chain. Further, we use the large volumes of chemical-related data we collect to calculate amounts on a per-product basis, pinpointing the amounts of designated chemicals at the product level and managing them accordingly.

The Group also offers an environmental business solution called PLEMIA/ECODUCE, a software package that utilizes this in-house expertise.

- The PLEMIA/ECODUCE website (in Japanese)

Product Recycling

We are advancing collection and recycling of end-of-life ICT products from a global perspective to help create a recycling-minded society.

Recycling Activities that Conform to the Concept of Producer Responsibility

In accordance with the concept of Extended Producer Responsibility (EPR*1), under which the producer's responsibility for its products is not limited to the product design and manufacturing stages but extends to the disposal and recycling stages as well, the Fujitsu Group carries out recycling programs that comply with the waste disposal and recycling laws and regulations of the various countries in which it operates. We also try to do as much collection, reuse and recycling as we can even in countries where recycling is not obligatory, in line with the concept of Individual Producer Responsibility (IPR), which sees each producer as responsible for its own products.

IPR is a major challenge for the Fujitsu Group in expanding its business globally, but we believe that responding to this challenge and that of EPR in collaboration with industry associations and governments will enable us to help create a recycling-minded society in which the requirements and demands of all stakeholders are met.

*1 EPR:
Extended Producer Responsibility. This concept was made explicit in Japan's Fundamental Law for Establishing a Sound Material-Cycle Society enacted in June 2000.

Targets and Achievements in Stage VI of the Environmental Protection Program

Targeting a sustained 90% resource reuse rate*2 of business ICT equipment globally at Fujitsu recycling centers, in FY 2012 we achieved a rate of 94.3% (91.5% within Japan and 99.2% overseas). This target remains in effect in the Fujitsu Group Environmental Action Plan(Stage VII).

*2 Resource reuse rate:
The ratio of the amount (by weight) of recycled parts and resources to the amount of end-of-life business ICT products processed.

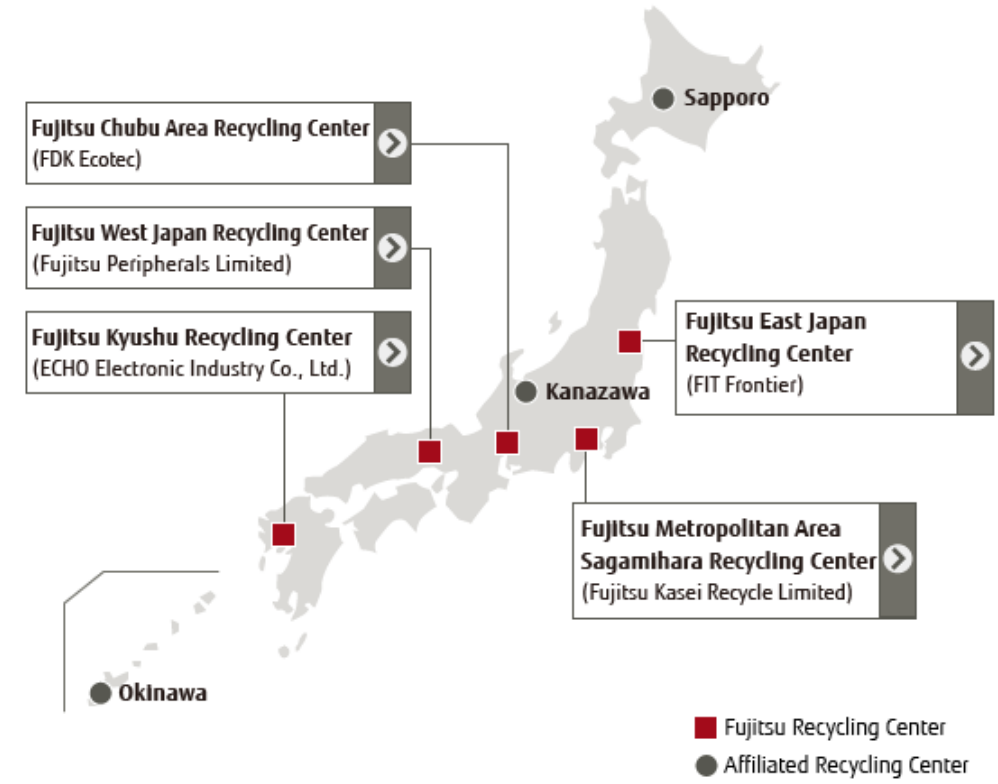
Promoting product recycling efforts in Japan

As an enterprise with official designation for wide-area industrial waste disposal in Japan, Fujitsu engages in various kinds of contracts for accepting industrial waste for appropriate processing.

We have established Fujitsu recycling centers throughout Japan to create a nationwide recycling system. This system provides for rigorous traceability and security, and achieves a high resource reuse rate. By providing this safe and secure service, we are fully discharging our Extended Producer Responsibility (EPR).

Wide Area Industrial Waste Disposal Certificate

Fujitsu Recycling Centers Throughout Japan



Achievements in Collecting and Recycling End-of-Life ICT Products

Although the volume of materials collected is declining due to progress in miniaturization and reduced product weights, we processed 5,297 tons of recycled ICT products from corporate customers (used ICT products for business applications) in FY 2012, and achieved a resource reuse rate of 91.5%. Also, we have now collected a total of 85,381 end-of-life PCs from individual customers.

Trends in Resource Reuse Rate of End-of-Life Business ICT Products

FY	2009	2010	2011	2012
Resource reuse rate	90.8%	90.6%	90.9%	91.5%

Providing Product Recycling Information

In order to properly dispose of end-of-life ICT products, since FY 2004 Fujitsu has been operating a digital management system for its product disassembly manual.

Through this system, Fujitsu recycling centers can download from our website, as animated disassembly manuals, all the information they need to recycle products. The system also provides instructions on how to deal with items containing restricted chemical substances and plastic materials, and with products that contain customer data.

Promoting Recycling

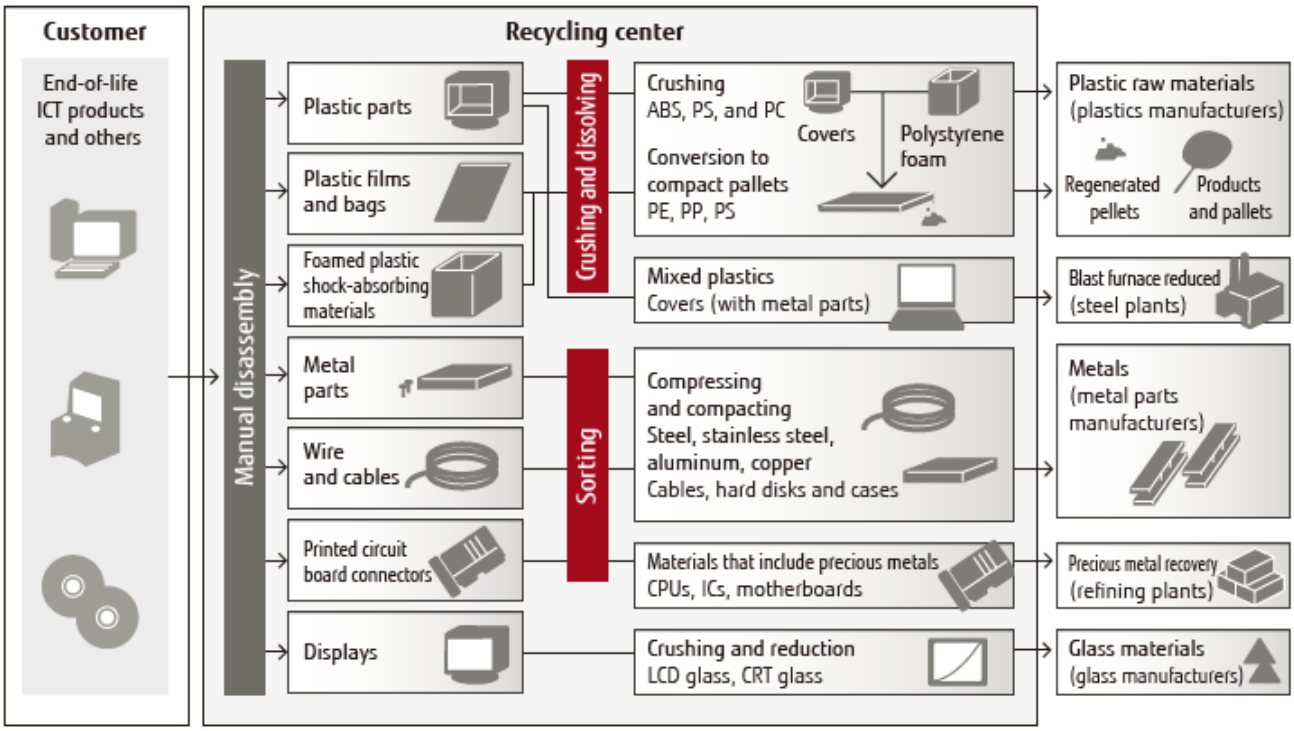
Experienced workers carefully disassemble collected products by hand and separate the materials into categories such as steel, copper, aluminum, precious metals, glass and 20 different types of plastic. They also strive to raise their manual disassembly standards through the use of animated disassembly manuals. Materials recognition equipment has been introduced for plastics that are difficult to discriminate, so as to allow the complete segregation of different types of plastic. In addition to minimizing the quantity of waste materials in this way, we are continually trying to recycle resources that can be reused to make products.

Plastic material identification equipment

Ballpoint pens and folders made from recycled plastic

Also, to keep our customers informed of these initiatives, we distribute ballpoint pens and folders made from recycled plastic at exhibitions and other events, as well as demonstrating PCs being manually disassembled.

Fujitsu Integrated Recycling Process



Developing a Traceability System

We developed an integrated recycling information management system and since FY 2007 have adopted it at the Fujitsu recycling centers.

Using this system prevents theft and illegal dumping by attaching barcodes to customers' ICT products and managing data on the history of the recycling process from acceptance at the recycling center through disassembly and destruction of the hard disks on a per-customer basis.

Integrated Information Management System for Recycling

Operation of Security Systems

A high level of security is maintained at Fujitsu Recycling Centers by using infrared cameras to monitor automatically for intruders and check the storage status of the accepted products.

Security system

Security camera monitoring system

Providing services to customers

We provide recycling services for our customers.

- ICT product disposal and recycling (in Japanese)

Promoting Product Recycling Overseas

The Fujitsu Group recycles products in EMEA (Europe, Middle East, Africa), the Americas (the United States, Canada, and Brazil) and Asia (Singapore, the Philippines, Australia, Hong Kong, Taiwan, and South Korea).

In addition, through its partner companies, Fujitsu Technology Solutions (Holding) B.V. (FTS) recycles waste ICT products for corporate and individual customers in 27 countries in the EU, as well as in Norway and Switzerland. In addition, since 1988 at Paderborn, the Group's own recycling center in Germany, we have been contributing to the reuse of waste resources by disassembling products by hand so we can precisely classify and then appropriately recycle the materials. In FY2012, we processed 2,901 tons of waste ICT products and achieved a resource reuse rate of 99.2%.

Also at other overseas sites we have linked up with local recycling partner companies and promoted the recycling of ICT products.

- **Singapore: Fujitsu PC Asia Pacific Pte. Ltd. (FPCA)** (from 2007)
- **Brazil: Fujitsu do Brazil Ltda. (FBR)** (from 2010)
- **Australia: Fujitsu Australia Ltd. (FAL)** (from 2006)
- **South Korea: Fujitsu Korea Ltd. (FKL)** (from 2003)

Environmental Labeling and Information Disclosure

We will actively disclose environmental information about our products to customers.

Disclosure of Environmental Information on Products

We actively disclose environmental information on our products, both via the Internet and in the form of environmental labels.

Since the end of FY 2006, we have registered notebook PCs under the EPEAT (Electronic Products Environmental Assessment Tool) system, which encourages the purchase of green PCs and is used chiefly by US government bodies. In Japan, we disclose on the website given below information on products that conform to the International Energy Star Program in Japan or the PC Green Label Specification, as well as products registered under the EcoLeaf Program or certified under the Eco Mark program.

- EPEAT website: Information on the US Institute of Electrical and Electronics Engineers' (IEEE) EPEAT standard.
- International ENERGY STAR Program website: Information on products conforming with the International ENERGY STAR Program in Japan
- List of PC Green Label System-compliant products (In Japanese): Information about Fujitsu Products in compliance with the PC Green Label System formulated by Japan's PC3R Promotion Association
- List of registered EcoLeaf label products (In Japanese): Information about Fujitsu products that have obtained the "EcoLeaf" label developed by the Japan Environmental Management Association for Industry.
- List of products with Eco Mark certification (In Japanese): A list of Fujitsu products that are certified with the Eco Mark distinction developed by the Japan Environment Association

Environmental Labeling

The main environmental labels displayed by the Fujitsu Group.

The main environmental labels displayed by the Fujitsu Group

International Energy Star program The International Energy Star Program label is displayed on computers (PCs, workstations), displays, printers, and scanners registered with the program. • International Energy Star Program	
Energy Efficiency Labeling System This label is displayed on products meeting standards prescribed by Japan's Act on the Rational Use of Energy. • Energy Efficiency Labeling System [171KB]	
PC Green Label System For PCs, Fujitsu displays this mark on products meeting standards stipulated by the PC3R Promotion Association. • PC3R Promotion Association	
EcoLeaf Environmental Label (Japan Environmental Management Association for Industry) In May 2003, Fujitsu notebook PCs were the first in Japan to be certified under this label. • Japan Environmental Management Association EcoLeaf Environmental Label [176KB]	No. XX-05-001
Eco Mark (Certified by the Japan Environment Association) In January 2001, Fujitsu desktop PCs became the first in Japan to receive certification. At present, certifications have been obtained for both PCs and printers. • Japan Environment Association Eco Mark	
Green Policy Innovation Logo The Fujitsu Group's own environmental label. The Group displays this logo on Green and Super Green products, which are especially eco-friendly. • Green Policy Innovation logo	

Solutions that Benefit the Environment

By stepping up the certification of Environmentally Conscious Solutions, we are working globally to provide solutions that reduce the environmental burdens of our customers and society.

Our Approach

To reduce the amount of greenhouse gas emissions on a global scale, efforts will be needed not only to reduce power consumption and to develop environmental technologies, but to profoundly alter the way people live and work. ICT is indispensable to achieving these innovations, and it will be critically important to take full advantage of such ICT in the future.

The Fujitsu Group sees ICT as a way to reduce environmental burden – what we think of as "Green by ICT" – and is, therefore, committed to help lowering the environmental burden of society as a whole by moving forward with the provision of cutting-edge green ICT on a global basis.

Initiatives in FY 2012

Advancing Recommendations for Resource Savings in addition to Electricity Conservation, Energy Savings and CO2 Emissions Reductions

In FY 2012, we responded to changing customer needs by adding "ICT-based reductions in resource usage" to "CO2 emissions reduction" and "ICT-based electricity conservation and energy savings" as ICT solutions we offer to our customers.

Increasing the Certification of Environmentally Conscious Solutions

While the adoption of ICT solutions entails power consumption to operate servers and computers, such solutions can also reduce the impact on the environment by eliminating paper use and reducing the movement of people and goods for more efficient use of office and warehouse space.

At the Fujitsu Group, we have assessed the quantitative reduction in environmental burdens (in terms of reduced CO2 emissions) from ICT adoption using an environmental impact assessment method developed by Fujitsu Laboratories Ltd., and we certify products and services that exceed the required standard as Environmentally Conscious Solutions.

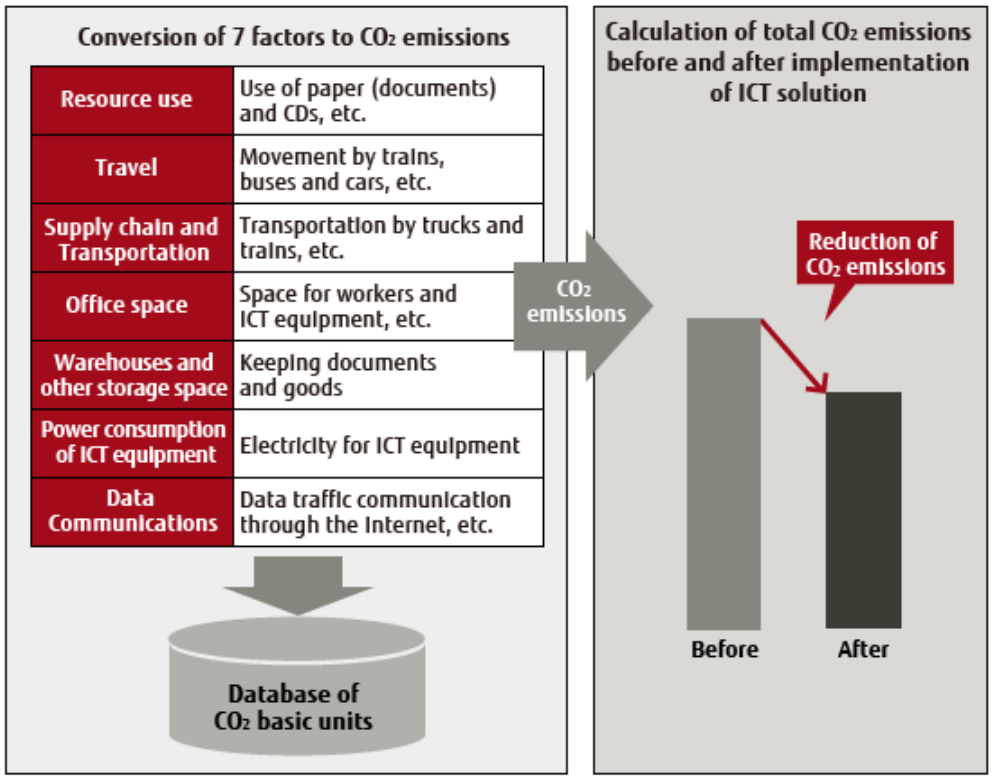
In FY 2012, we enhanced support aimed at increasing the number of Environmentally Conscious Solutions certified. This resulted in 43 new solutions being certified, bringing the total to 301 for the period FY 2004 through FY 2012. In FY 2013, we intend to continue expanding the scope of certified products and services and will consider program revisions, such as establishing standards from perspectives other than just CO2 emissions reduction.

Environmental Impact Assessment Method

We analyze environmental impact reductions produced by ICT solutions by classifying the implementation effects into seven categories: resource use, travel, supply chain and transportation, office space, warehouse space and other storage space, power consumption of ICT equipment and data communications. The benefits are converted into CO2 emissions using CO2 basic units (CO2 conversion coefficient) developed by Fujitsu. CO2 emissions from before and after ICT solution implementation are calculated and compared, and reduction effects are evaluated accordingly.

This approach accords with assessment guidelines published by Japan's Ministry of Economy, Trade and Industry and Ministry of Internal Affairs and Communications, and with methods (L.1410) recommended in March 2012 by the International Telecommunication Union (ITU).

Overview of Environmental Evaluation Method



- International Standardization of Methodology for Environmental Impact Assessment of ICT Goods, Networks and Services [Press Release]

Global Efforts

In order to globally promote solutions that contribute to reducing environmental burdens, we began in FY 2010 to perform evaluations based on the Environmentally Conscious Solutions certification system overseas as well. We have since completed informing overseas representatives about the assessment method and construction of the evaluation system itself. A remote medical system in Laos and other technologies have already been assessed under the system.

Promoting Visualization of Environmental Burden Reduction Effects from Customer ICT Utilization

In order to promote environmental impact reductions from ICT utilization, it is important that customers using ICT solutions understand how and how much they contribute to the environment. From this perspective, the Fujitsu Group makes it possible to see how ICT solutions reduce environmental impact and actively proposes this type of visibility to customers.

Aiming to further increase the number of proposals we make, we moved forward with three initiatives in FY 2012. The first was to create the environmental solution proposal manual to help sales personnel in their efforts to make proposals that result in lower environmental burden.

Next, we held around 50 training sessions for sales personnel and SEs working in sales offices and Group companies throughout Japan. The purpose of this training, which was conducted for over 1,000 participants, was to enhance abilities to win support for proposals. Training covered usage of the EcoCALC system for estimating environmental contributions, in terms of CO2 emission reductions, energy savings, and cost reductions, from the adoption of an ICT solution. It also showed participants how to incorporate ICT-based reductions of environmental burden and the use of environmental labels in proposals, and gave examples of outstanding environmental solution proposals.

The third initiative we undertook in FY 2012 was to establish a help desk to support proposal development. Through this helpdesk, we implemented support in the form of research on electricity consumption by systems, calculation of CO2 reductions and electricity savings, and assistance with the preparation of proposal documents. Sales personnel can now contact the help desk for various kinds of advice and information on prior cases, and this has accelerated the proposal development process.

As a result of the three initiatives, the number of environmental burden reduction proposals made in FY 2012 grew by 60%, compared to FY 2011, and proposals were made to customers in nearly all industries.

As an initial step in expanding the offering of proposals for reducing environmental burden to a global scale, we began operating EcoCALC in the U.K. as a pilot project in January 2013. Our goals for FY 2013 are to begin operating EcoCALC on a global scale in earnest and to further expand ICT-based contributions to the lowering of environmental burden. We aim to do the latter by actively searching for cases in which EcoCALC was adopted and communicating information on them both inside and outside Fujitsu.

EcoCALC pilot project launched in January 2013.

Case Study

Fujitsu's Global Cloud Platform Wins Environmental Awards

The FUJITSU Cloud IaaS Trusted Public S5 provides customers with network access to server, storage, network, and other ICT infrastructure at Fujitsu datacenters. This allows customers to avoid building their own ICT infrastructure and to use only what they need, when they need it. After introducing them in Japan in October 2010, Fujitsu began offering IaaS Trusted Public S5 services in Australia, Singapore, the U.S., the U.K., and Germany in June 2011. On a global basis, IaaS Trusted Public S5 services have led to major reductions in energy usage, reduced CO2 emissions by around 30,000t per year, and freed up physical space for customers.

In recognition of the reductions in energy consumption they have helped to bring about across the globe, IaaS Trusted Public S5 services were named the winner of the Commerce and Information Policy Bureau Director-General Award in the "Savings in Society's Energy Consumption by IT" category of the Green IT Awards 2012 sponsored by Japan's Green IT Promotion Council, and supported by the Japanese Ministry of Economy, Trade and Industry, in October 2012. One month later, IaaS Trusted Public S5services also received the Chairperson's Award, Eco-Products Awards Steering Committee, in the Eco-Services Category at the 9th Eco-Products Awards, sponsored by the Eco-Products Awards Steering Committee, and supported by Japan's Ministry of Finance, Ministry of Health, Labour and Welfare, Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, and Ministry of the Environment.

- Fujitsu Deploys Six-Country Global Cloud Platform [Press Release]
- Fujitsu Public Cloud Service Wins Green IT Award [Press Release]
- Fujitsu Public Cloud Service Wins Chairperson's Award at Eco-Products Awards 2012 [Press Release]

Case Study

Financial Services Business Group Vigorously Working to Propose Solutions that Reduce Electricity Consumption and Save Energy

In FY 2011, Fujitsu's financial services business group completed the development of a tool that simplifies the calculation of electricity consumption reductions from upgrades of servers, storage, network, and other ICT platforms, and began promoting its use within the business group. In FY 2012, it worked with Group companies to create a template for creating proposals that pay particular attention to energy-saving impacts and other environmental points relevant for ATM systems, palm-vein authentication devices, and other such products. This template was put to work in business negotiations throughout Japan. The business group also made it a point to discuss best practices in regular monthly meetings involving Group companies. It worked to get other units to adopt these best practices and endeavored to invigorate proposal activities, as well. These initiatives succeeded in increasing the number of environmental solution proposals by a factor of 3.3 compared to the result for FY 2011.

- Solutions that Benefit the Environment : Case Study Archives

Fujitsu Group Environmental Action Plan(Stage VII) Environmental Solution Targets

GHG Emission Reduction through the Provision of ICT

As part of the Fujitsu Group Environmental Action Plan (Stage VII), we have promised to help lower the greenhouse gas (GHG) emissions of our customers and society by providing ICT solutions. Our target is to achieve a reduction of 26 million tons – 16 million in Japan and 10 million overseas – over the three-year period of FY 2013-2015. This target constitutes a global expansion of the Fujitsu Group Environmental Protection Program (Stage VI) target of reducing CO2 emissions by customers and society by a total of 15 million tons or more through the provision of green ICT over the four-year period of FY 2009-2012.

Calculating environmental impacts from the introduction of ICT, however, is not easy. Fujitsu, therefore, has evaluated the CO2 emission-lowering impacts in around 300 prior cases in which customers implemented Fujitsu's environmental solutions. Furthermore, by calculating base units (CO2 emission reduction per monetary unit of sales) for each environmental solution, we made it possible to measure various potential emission reductions. Calculations of annual reduction contributions under the Fujitsu Group Environmental Action Plan(Stage VII) will now be performed by multiplying the annual sales figures for individual solution categories by the appropriate base unit figure.

We established our current GHG emission reduction target based on a calculation approach that uses multiple years of actual results, and that we are confident leads to accurate results. We are also, however, an active participant in an initiative aiming to define an international calculation method within the next 1-2 years. Going forward, we will continue to revise and improve the accuracy of our calculation approach based on accumulated knowledge and experience, and work to establish compatibility with the international standard to be determined.

- Cooperation with External Organizations

Provision of Sustainability Solutions

Until now, our goal has been the provision of environmental solutions focusing on the reduction of CO2 emissions. However, given recent energy conditions and social developments, we have expanded the definition of "solution" to include saving energy, saving resources, preventing environmental pollution, and conserving biodiversity - areas in which we can contribute to global sustainability under the Fujitsu Group Environmental Action Plan(Stage VII). Moving ahead, we will work to expand the provision of solutions that contribute to the resolution of these social concerns.

VOICE

Alison Rowe
Global Executive Director Sustainability International Business FUJITSU LIMITED

Information, Communications and Technology (ICT) is pervasive in every industry and every country and is critical for our future and for society. Our ambition is to reduce 26million tons of greenhouse gas emissions for our customers and society between April 2013 and March 2016, through rapidly deploying sustainability solutions globally at scale. We will provide solutions that enable massive improvements in resource and energy efficiency, enhance of quality of life and protect our environment. Our solutions will include top ranking energy efficient products, deployed on secure and flexible platforms, hosted in our sustainable data centers around the world. We will continue to consult with our customers and support them in achieving efficiency and resilience throughout their operations and supply chain to shape a sustainable future.

Providing Environmental Solutions

We provide solutions that support implementing and improving environmental management so that our customers can achieve both business growth and reduced environmental burdens.

Our Approach

In the context of increasingly severe environmental problems, our customers must promote environmental management that aims at achieving business growth and reductions in environmental burdens. Both are essential if they are to conduct sustainable business.

We at Fujitsu provide environmental solutions to support our customers' environmental management. We evaluate their environmental activities and allow them to visualize what can be improved in an integrated manner from a management standpoint. We propose measures that resolve environmental issues in a way that conforms to our customers' business strategies. Furthermore, our efforts are not limited to evaluating the current situation and proposing measures; we also support continuously increasing the level of our customers' environmental management by iterating the PDCA cycle.

Initiatives in FY 2012

In FY 2012, Fujitsu began to provide new services based on internally developed know-how. One example is the Environmental Management Dashboard, which we provide in a form adapted to aggregate and process each customer's management and environmental data. In addition to providing new services, we also worked to promote the Fujitsu Sustainability Solution Eco Track (an SaaS-based environmental management information service), the capabilities of which extend from the collection and tabulation of data, to the preparation of reports.

Case Study

Providing Internally Developed Know-How as Services

Fujitsu has implemented cutting-edge green ICT internally, and accumulated a wealth of experience and know-how as a result. A prime example is the Environmental Management Dashboard. We developed this tool to provide real-time visual representations and forecasts of electricity usage and CO2 emissions at all of our business sites. Once we began to use the Environmental Management Dashboard internally, in 2011, we realized enormous benefits in terms of measures for saving electricity and other forms of energy. We therefore decided to launch the Environmental Management Dashboard service in FY 2012 and some companies have decided to implement it in their operations.

Meanwhile, in the management of chemical substances used in products, we used know-how we have developed for identifying and properly responding to global regulatory trends to launch a new service in April 2013. This service provides information on the regulation of chemical substances in products and has already been used on a pilot basis by SEGA Corporation.

Our plans for FY 2013 call for expanded provision of environmental solutions, with these services playing central roles.

- Environmental Management Dashboard
- Fujitsu Launches Information Service for Chemical Substances Regulations [Press release]

Case Study

Global Promotion of the "Fujitsu Sustainability Solution Eco Track" Environmental Management Solution

In Europe, laws and regulations, like the EU Energy Efficiency Directive, are being tightened, and this is requiring companies to undertake increasingly sophisticated environmental management initiatives. Fujitsu has responded to this need by offering environmental management solutions with which it has built a track record of success in Japan. These solutions, which are offered under the name "SLIMOFFICE" in Japan, are now being offered under the unified "Eco Track" global brand. The European launch of these services, and our ICT-based support of the environmental management efforts of companies there, began in German-speaking countries in April 2013.

Eco Track is a cloud-based service the capabilities of which extend from the collection and measuring of energy usage and other data from multiple business sites, to report creation. They can be easily used via a personal computer with an Internet connection and require no special expertise. At the moment, services are being offered in German and English, but we plan to accommodate other languages as well to meet the needs of multinational corporations.

At CeBIT2013, held in March in the German city of Hanover, Eco Track won the IT Innovation Award 2013 for the "Mittelstand" Initiative in the Green IT category. This award is presented to for innovative ICT products and solutions, and, in its selection, Eco Track was praised as a practical solution easily implementable and applicable particularly in middle-market companies.

- FUJITSU Sustainability Solution Eco Track (SaaS-based Environmental Management Information Service)

- Providing Environmental Solutions : Case Study Archives

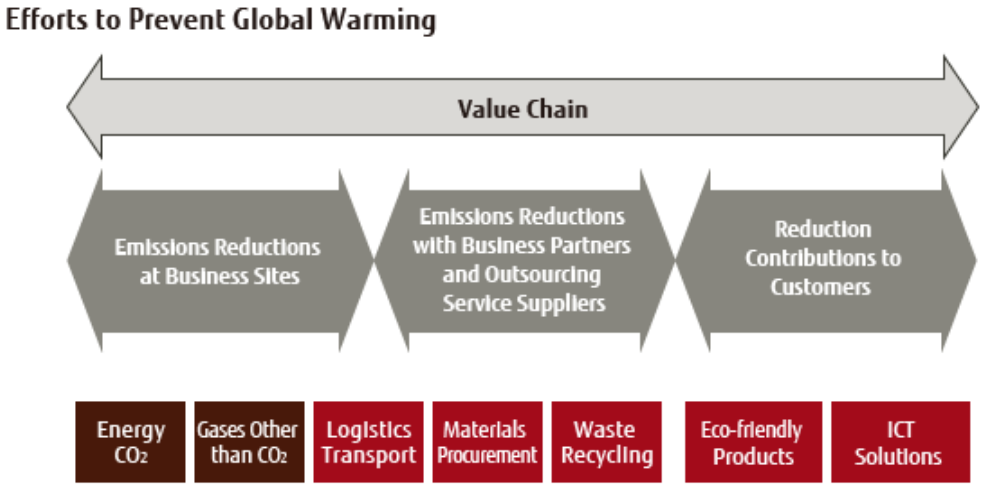
Efforts to Prevent Global Warming

We are examining all of our business operations in an effort to reduce greenhouse gas emissions--not only at our business sites but also in transportation and in the products and services we provide.

Basic Approach

We are working to reduce emissions of greenhouse gases associated with all our Group business activities. These actions include reducing emissions of CO2, due to energy consumption, and other greenhouse gases at business sites (our factories and offices), and reducing emissions associated with transportation.

Furthermore, we are working to prevent global warming throughout all areas of business activity by helping to cut greenhouse gas emissions from our customers and society in general by developing eco-friendly products that contribute to reducing environmental burdens and by providing ICT solutions.



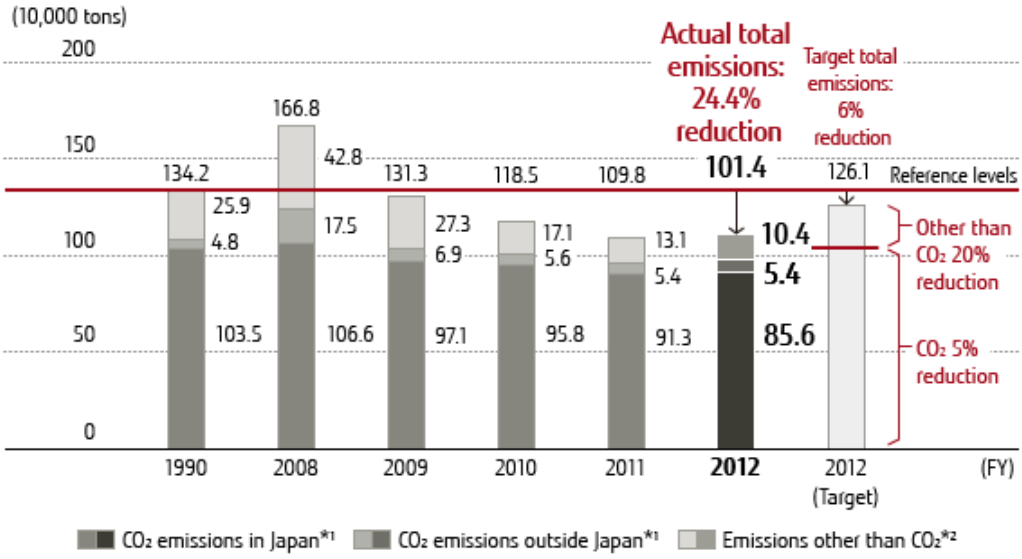
Preventing Global Warming from Business Sites

Greenhouse Gas Emission Reduction Targets and Results

We set "reducing our total greenhouse gas emissions by 6% by the end of FY 2012 compared with FY 1990 (the breakdown for total emissions is a 5% reduction in CO2 due to energy consumption and a 20% reduction in gases other than CO2)" as a goal of the Fujitsu Group Environmental Protection Program (Stage VI).

Our actual total global emissions for FY 2012, the final year covered by the Fujitsu Group Environmental Protection Program (Stage VI), were about 1.014 million tons (per unit of actual sales: 231.4 tons/billion yen), which is a 7.7% or 84 thousand ton reduction from the previous fiscal year, and a 24.4% reduction from FY 1990. At this level, we achieved our target under the Fujitsu Group Environmental Protection Program (Stage VI).

Trends in Total Greenhouse Gas Emissions



*1 CO_2 emissions in/outside Japan: CO_2 conversion factor for purchased electric power has been calculated with a fixed value of 0.407 ton of CO_2 per MWh since FY 2002 for performance reports in our Environmental Protection Program.

*2 Emissions other than CO_2: These are converted to equivalent amounts of CO_2 using the global warming potential (GWP) of each gas. Our FY 1995 performance is taken to be the emissions in FY 1990.

Reduction of CO2 Emissions due to Energy Consumption

CO2 emissions due to energy consumption are responsible for about 90% of the Fujitsu Group's greenhouse gas emissions. Therefore, we continuously work to improve the following energy-saving measures to reduce CO2 emissions.

- Energy-saving equipment, focusing on motive-power facilities (introduction of free cooling, inverters, energy-saving facilities, fuel conversion, etc.)
- Increased efficiencies through revised manufacturing processes, accompanied by proper motive-power facility operation and improvement of management
- Adjusting appropriate room temperature for office air conditioning, saving electricity for lighting and office automation equipment
- Promotion via measurement of energy consumption visualization and proactive use of that data
- Use of renewable energy such as solar power

Further, we set up our Low Carbon Committee at the corporate level in September 2008, establishing reduction targets for each business unit. Stronger measures to achieve these targets follow reforms to processes and equipment (in mounting, assembly and testing) and the development of new technologies. Moreover, our Capital Investment Guidelines define the economic and environmental criteria for investment as we identify and urgently implement priority measures. To address not only CO2 emissions reductions but also the energy supply and demand problems that have arisen following the Great East Japan Earthquake, and do so from a position of greater unity with management, we merged the Low Carbon Committee with the Environmental Management Committee in October 2012.

As a result of actions like those discussed above, our actual energy-consumption CO2 emissions for FY 2012 were about 910 thousand tons (856 thousand tons in Japan, 54 thousand tons outside Japan), which corresponds to a 57 thousand ton reduction from the previous fiscal year and a 15.9% reduction from FY 1990.

Case Study

Saving Energy by Shutting Down Datacenter Air Conditioning

Fujitsu's Kawasaki Plant operates a datacenter for internal shared service systems. In FY 2012, we performed a thermal fluid simulation with the ultimate aim of reducing electricity consumed for air conditioning.

This simulation was designed to determine whether shutting down air conditioning equipment would lead to the development of hot spots or an extreme temperature distribution. The most important characteristic of this simulation is that it can provide accurate data for an entire datacenter, which it would be impractical to test while in operation.

Through the simulation performed, it was determined that a total of eight internal datacenter air conditioners - seven during the first half of the year, and one during second half - could be turned off. Based on these results, we turned off air conditioners, took temperature readings, and confirmed that temperatures remained within tolerances. We expect that using fewer air conditioners will cut annual costs by 2.47 million yen and reduced annual CO2 emissions by 83.8 tons.

Case Study

Pursuing Energy Savings by Upgrading Lighting Facilities

Completed in August 1986, our Oita Systems Laboratory had been in use for around 25 years and its facilities had deteriorated from age. In FY 2012, therefore, we renovated it. With regard to lighting, in particular, we introduced Hf fluorescent and other high-efficiency fittings because of their longer useful lives and lower energy consumption, and installed a lighting control system enabling the adjustment of the amount of light used.

Once installation work was completed, in August 2012, we began to realize benefits, including a 9,423kWh reduction in monthly electricity consumption, annualized CO2 emissions lowered by 46 tons, and an annualized running cost savings of 1.792 million yen (based on average results through February 2013).

Renovation work also included an upgrade of the air conditioning system, which was completed in May 2013. This investment is expected to produce a 34% savings in electricity consumption, which we aim to verify in the lead-up to summer, when air conditioning will be in greatest demand.

Case Study

Saving Energy by Switching to Inverters for Cold and Hot Water Pumps

At the Kyushu R&D Center, we use cold water and hot water created at the plant to cool and heat the entire building. In fact, we use a system referred to as district heating and cooling to heat and cool tenant spaces, computer rooms, and other areas, as well. However, with increased use of personal computers, tenant heat burdens rose and the supply of hot water for heating in the winter became excessive. Furthermore, computer rooms had to be supplied with cold water for cooling even in winter, but pumping capacity, which was enough for the entire building, greatly exceeded this need.

In March 2013, therefore, we installed inverters on the cold and hot water pumps. These inverters made it possible to adjust operation of the cold water pump between 60Hz and 45Hz, and operation of the hot water pump between 60Hz and 30Hz. This ability to adjust pump speeds as needed has reduced our monthly electricity consumption by 32,176kwh, cut annual CO2 emissions by 160 tons (based on 0.407kg CO2/kWh), and slashed annual running cost by 6.55 million yen.

- Reducing Greenhouse Gas Emissions Associated with Manufacturing : Case Study Archives

Reducing Emissions of Greenhouse Gases other than CO2

Other than CO2, the Fujitsu Group mainly uses perfluorocarbon (PFC), hydrofluorocarbon (HFC) and sulfur hexafluoride (SF6) in its semiconductor divisions. Following the semiconductor industry's action plan (the Voluntary Action Plan: 10% reduction by the end of FY 2010 compared with FY 1995), we have set a target of a 20% reduction by the end of FY 2012 for the Fujitsu Group Environmental Protection Program (Stage VI). To this end, we have changed to gases with a lower global warming potential (GWP) and continued to install equipment to remove harmful materials in new and existing fabrication lines.

In FY 2012, we reduced the amount of these emissions measured in GWP equivalent by 27 thousand tons, to about 104 thousand tons. This corresponds to a 60.0% reduction compared to FY 1995.

Promoting the Use of Renewable Energy

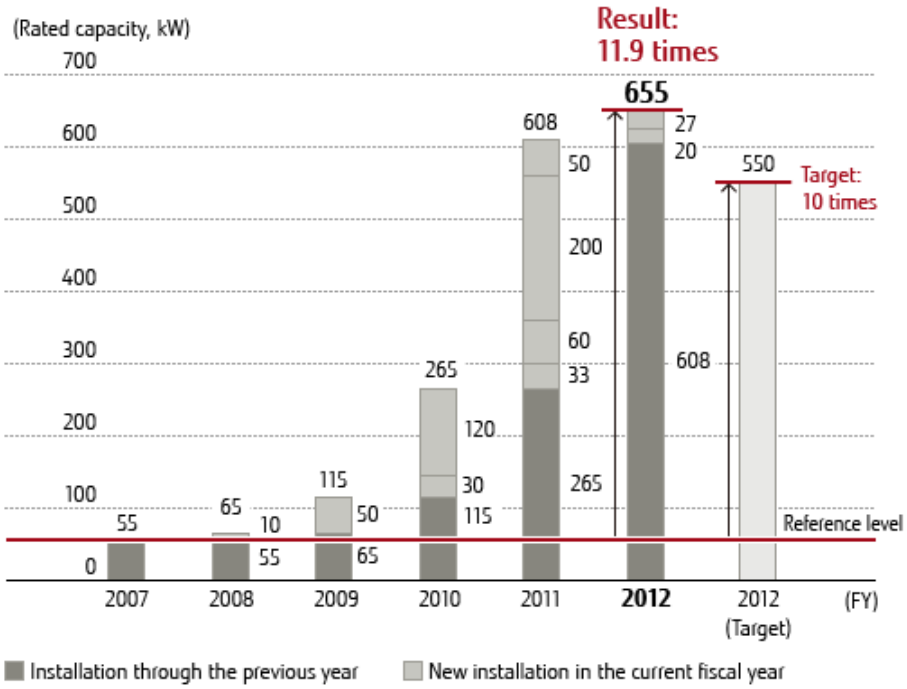
We have adopted renewable energy sources such as solar power generation at our business sites, in the Fujitsu Group Environmental Protection Program (Stage VI), and we have set increased use of renewable energy as a new goal, and introduced the target of installing ten times as much capacity by the end of FY 2012 as we had in FY 2007.

In FY 2012, Fujitsu Isotec and Fujitsu's Oyama Plant both installed solar panels, the former with a total output of 20kW and the latter, 27kW. With these two additions, our total solar power generation capacity as of the end of FY 2012 had reached 655kW. With this figure at 11.9 times that for FY 2007, we achieved the Fujitsu Group Environmental Protection Program (Stage VI) target.

Solar panels at Fujitsu Isotec

Solar panels at Fujitsu's Oyama Plant

Cumulative Total Installed Solar Power Generation (renewable energy*)



*Renewable energy utilization ratio: Calculated based on the rated capacity of solar power generation equipment installed at Fujitsu business sites.

Responding to the Japanese Revised Energy Conservation Law

As a result of the revisions to and enforcement of the Japanese Energy Conservation Law*1, business operators are now required to grasp their annual energy usage at all their business sites in Japan.

In the Fujitsu Group, we use the FUJITSU Sustainability Solution Eco Track (Fujitsu FIP Corporation) that grasps and tabulates the amount of energy we used across Japan, including for the office space we rent, and manages the amount used by each Group company. Note that the Fujitsu Group includes 26 companies that fall within the class of Specified Business Operators (businesses whose annual energy usage is in excess of 1,500 kl when converted to a crude oil equivalent value) newly stipulated in the revised law.

The amount of energy used by the Group within Japan under the Energy Conservation Law in FY 2012 was 561 thousand kl (crude oil equivalent), corresponding to CO2 emissions of about 1.145 million tons*2 based on the Act on Promotion of Global Warming Countermeasures*3, which was also revised.

*1 Energy Conservation Law:
Act on the Rational Use of Energy.

*2 About 1.145 million tons:
There are differences in ranges for tabulation, which include tenants and calculations based on CO2 conversion factor for each electric power company, for results reporting under our Environmental Protection Program.

*3 Act on Promotion of Global Warming Countermeasures:
A system for calculating, reporting, and disclosing the amount of greenhouse gas emissions stipulated by Japan's Act on Promotion of Global Warming Countermeasures.

Electricity-Saving Initiatives

In preparation for the summer of 2012, businesses served by electric utilities other than the Tokyo Electric Power Company, Incorporated (TEPCO) and Tohoku Electric Power Co., Inc. were asked by the national government to meet quantitative targets (5%-15%) for reducing their electricity usage. In response, the Fujitsu Group's Power Conservation Committee (merged with the Environmental Management Committee from FY2012), chaired by Fujitsu's president, considered objectives and measures for plants and offices in working to set targets in line with government requests. We even went so far as to implement electricity-saving measures to the extent they would not impact operations at business sites served by the Tokyo Electric Power Company, Incorporated (TEPCO) and Tohoku Electric Power Co., Inc., the two utilities for which there were no quantitative target requests.

As a result of the measures taken, business sites served by the Kansai Electric Power Co., Inc. (KEPCO) reduced their electricity consumption during peak periods by a combined 24.4% and those served by the Kyushu Electric Power Co., Inc. reduced theirs by a corresponding 12.2%. Business sites served by other electric utilities also achieved the government-requested targets. Avoiding any impacts on its business activities, the Fujitsu Group continued to implement electricity-saving measures through the winter of 2012.

Saving Electricity with the Environmental Management Dashboard

All of the Fujitsu Group's business sites in Japan have implemented electricity saving measures using the Environmental Management Dashboard. The Environmental Management Dashboard examines electricity usage at each business site hourly, notes differences from targets, makes comparisons to the prior year's actual usage, and factors in weather data from 9:00AM of each day to forecast electricity demand for the day and display it in an easily understood format on the portal screen.

Electricity usage display screen

Initiatives at Overseas Business Sites

Case Study

Energy Management Project in FTS Augsburg

Fujitsu Technology Solutions GmbH has a development and production site in Germany Augsburg. In September 2012, the FTS Management location Augsburg committed to start the "Energy management project" in order to overcome increasing energy cost and to be an energy efficient factory. An energy management team and the necessary investment were approved.

Electricity Dash Board

Firstly we decided to establish energy management system in accordance with ISO50001 since third-party certification of this international standard is supposed to be important for coming EU and German legislation.

As one of requirement from ISO50001, we have defined following targets.

- CO2 emission reduction by 5% from the site in 3 years compared to 2011.
- Energy efficiency improvement by 10% for developed and/or manufactured products as PCs, Monitors, Workstations and Servers, in 2013 compared to 2012.

To realize those targets and accelerate activities, we thought that involvement of each employee was really important and that has been proceeding in 3 steps.

- Collecting ideas to save energy; 385 ideas were collected from employees.
- Implementation of ideas; most relevant ideas were realized concerning lighting, manufacturing or development facility and so on.
- Competition of each department to create new ideas, improve their behavior and save energy (to be realized in 2013)

Concerning electricity consumption, it's possible to confirm our effort through the electricity dash board which visualizes hourly, daily and monthly electricity consumption.

While advancing energy saving activities, we are continuing to develop our energy management systems in terms of energy policy, documentation, performance indicators, and measurement. We will obtain a third-party ISO50001 certification in the near future.

Targets under the Fujitsu Group Environmental Action Plan(Stage VII)

For the Fujitsu Group Environmental Action Plan (Stage VII), we have established the following three targets to be achieved by FY 2015. These targets are based on environmental policies and directions inside and outside Japan, and the Fujitsu Group's business forecasts. Going forward, we will continue to implement, and strengthen, initiatives for achieving these targets.

- Reduce greenhouse gas emissions in our business facilities by 20% compared to 1990.
  (Raised to a reduction of 20%, from the 6% target of the Fujitsu Group Environmental Protection Program (Stage VI))
- Improve energy intensity in our business facilities over 1% each year.
  (New targets that are consistent with Japan's Revised Energy Conservation Law and the Action Plan of the Industries of Electrical and Electronics on a Low Carbon Society*4)
- Increase generation capacity and procurement of renewable energy.
  (Move forward with the installation of photovoltaic and other power generation facilities, and the procurement of green electricity and other forms of renewable energy.)

*4 Action Plan of the Industries of Electrical and Electronics on a Low Carbon Society:
An action plan formulated to reduce CO2 emissions in the electrical and electronics industries, based on Nippon Keidanren's Commitment to a Low Carbon Society, a voluntary industry initiative. The plan outlines major initiatives beginning in FY 2013 and establishes energy intensity improvements to be achieved by FY 2020.

GHG Emissions Report based on GHG Protocol Standards*5

Upstream (Scope 3)

Category	Tons	Notes on Reduction Initiatives
Purchased goods and services	1,945,000	Eco-Friendly Products Reference
Capital goods	19,000	-
Fuel and energy-related activities not included in Scopes 1 and 2	79,000	-
Transportation and distribution (Upstream)	Not covered	-
Waste generated in operations	9,000	-
Business travel	Not covered	-
Employee commuting	Not covered	-
Leased assets (Upstream)	119,000	-

Reporting company (Scopes 1,2)

Category	Tons	Notes on Reduction Initiatives
Direct emissions	225,000	Preventing Global Warming from Business Sites Reference
Indirect emissions from energy sources	790,000	Preventing Global Warming from Business Sites Reference

Downstream (Scope 3)

Category	Tons	Notes on Reduction Initiatives
Transportation and distribution (Downstream)	"53,000 (Distribution in Japan 25,000 / Distribution overseas 28,000)"	Environmental Considerations in Transportation Reference
Processing of sold products	Not covered	-
Use of sold products	5,083,000	Eco-Friendly Products Reference
End-of-life treatment of sold products	1,000	-
Leased assets (Downstream)	Not covered	-
Franchises	Not covered	-
Investment	Not covered	-

In recent years, there has been a growing movement toward accounting for and reporting greenhouse gas emissions throughout entire supply chains. Applying the Scope 3 international standard established by the GHG Protocol for accounting for and reporting greenhouse gas emissions, the Fujitsu Group, via the Carbon Disclosure Project (CDP)*6, discloses information on greenhouse gas emissions from purchased goods and services, upstream leased assets, transportation and distribution, use of sold products, and end-of-life treatment of sold products.

Moreover, we are proactively engaged in reducing GHG emissions in areas thought to be particularly large sources within the value chain. Examples include energy consumed when products are used, and activities related to raw materials.

Accounting for and reporting Scope 3 GHG emissions in the ICT sector, however, involves many challenges, so Fujitsu is participating in the formulation of the GHG Protocol's ICT sector guidance*7. In the same vein, we have established internal working groups to consider issues related to the reduction of GHG emissions throughout society, including our supply chain. Through these and other initiatives we are actively working to adress GHG-related issues.

*5 GHG Protocol's standards:
Standards formulated by the Greenhouse Gas Protocol, which was established jointly by the World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI). The standards set forth approaches for accounting for and reporting emissions by businesses and their value chains.

*6 Carbon Disclosure Project (CDP):
The CDP is a not-for-profit organization in which institutional investors, companies, and others work together to promote the reduction of greenhouse gas emissions and the sustainable use of water resources by encouraging the world's leading companies to account for, and disclose information on, their environmental risk.

*7 ICT sector guidance developed by the GHG Protocol:
GHG Protocol: ICT Sector Guidance

Responding to Climate Change

The Fujitsu Group is not only taking initiatives to reduce GHG emissions; we are also advancing measures to address risks associated with natural disasters and climate change, on a global basis.

Case Study

Flood Defenses for a New Plant in Thailand

For three months beginning with July of 2011, Thailand suffered a flood disaster that also caused serious damage to the plant of Transtron (Thailand) Co., Ltd. (TTT), a Fujitsu affiliate. Flood water rose to a level of 3m inside TTT's one-story plant, which housed manufacturing equipment, electrical and other facilities, and finished products waiting for shipment, and caused the company to suddenly suspend its operations. TTT responded to the emergency at hand, and, looking to the future, planned and proposed a new plant that would be safe against the risk of another flood of similar proportions. The proposed design called for the elevation of transformers, the external units of air-conditioning systems, and other facilities to heights at least 5 m above ground level, and the installation of production equipment on the second floor. Furthermore, to protect the entire plant site from floods, the company came up with the idea of building a dyke on the north side of its property. It discussed that idea with the government, which gave its approval. With the March 2013 completion of the new plant and dyke, TTT has now not only secured the safety of its employees but also taken steps that will minimize impacts on its principal manufacturing facilities and products in the event of another major flood in the future.

Highlight —Environmental Consideration in Business Activities—

Contributing to Resource Reuse by Recovering High Concentrations of Copper from Wastewater

Copper, a base metal used in many everyday items, had been treated as a resource available in relative abundance in the Earth's crust. Now, however, the mining of copper has become difficult and there are even those who are starting to think of it as a "rare metal."

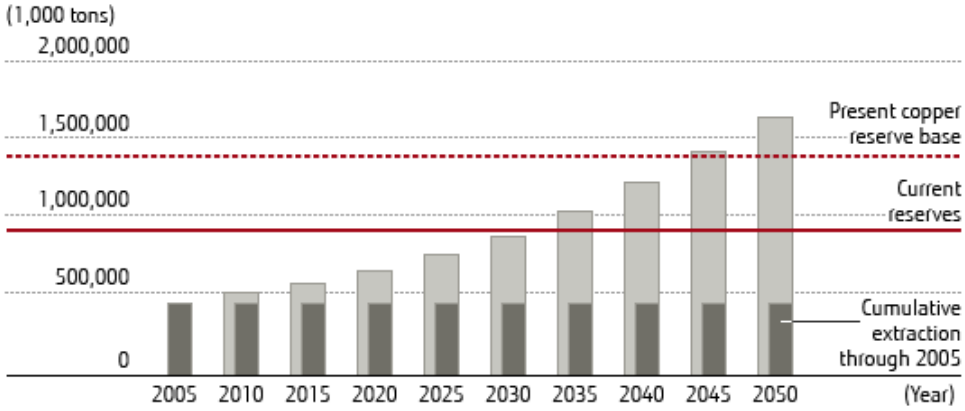
At Fujitsu's Nagano Plant, we have embarked on an initiative in which the recovery of high concentrations of copper from industrial wastewater will lead to the effective reuse of this finite resource.

Current Status of the Familiar Resource, Copper

Copper, which is referred to as a base metal, is used in familiar items like 10-yen coins and electrical wire. Said to be the metal first used by humans, the smelting of copper has been going on in various places across the globe since time immemorial. Mining rich copper ore, however, is no simple task. The limits of what can be retrieved from surface mines have been reached in recent years and underground mines are extending deeper and deeper into the Earth. This kind of mining requires more energy, and produces more waste, so there are concerns about rising environmental impacts*1. Mining can also give rise to surface subsidence and sinkholes, and chemical contamination of soil, groundwater, and surface water, as well as other forms of environmental pollution.

Even as copper becomes harder to find, however, demand for it is rising. It is predicted that by 2050, cumulative consumption of copper will exceed copper ore reserves*2. The recycling of copper, therefore, will become ever more important as a way to effectively use a finite resource without impacting the environment.

Forecast of Global Cumulative Copper Consumption



(Note) The reserve base is the amount of copper ore that is technically feasible to mine, but for which economic or other reasons have precluded mining.
Source: Prepared by Fujitsu based on information referenced from "Forecasting of the Consumption of Metals up to 2050" published by the National Institute of Materials Science.

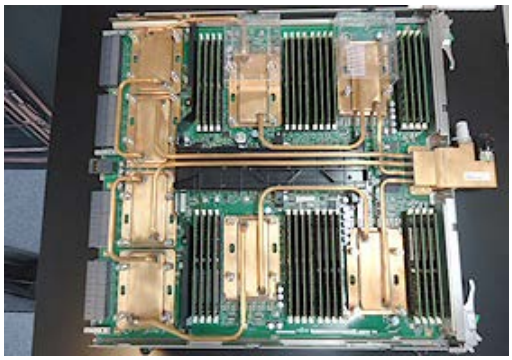
*1 Environmental impact of copper mining:
Please refer to the Annual Report on the Environment in FY 2011 [1.37MB]

*2 Copper consumption forecasts through 2050:
Please refer to "Forecasting of the Consumption of Metals up to 2050," published by the National Institute of Materials Science

Recovering High Concentrations of Copper from Wastewater

Issues in the Recovery of Copper from Wastewater

Copper is used in the Fujitsu Group's ICT equipment. One example is the printed circuit boards used in servers and other equipment. Printed circuit boards consist of plastic onto which copper sheets have been laminated and etched to create circuits connecting electronic components. Fujitsu's Nagano Plant manufactures printed circuit boards.



Printed circuit board

Wastewater containing copper results from the manufacturing process for printed circuit boards, so the Nagano Plant is pursuing initiatives aimed at recovering high concentrations of copper from the wastewater. In the past, multiple chemicals were used to coagulatively precipitate copper out of wastewater. Those chemicals, however, bonded to copper in large volumes, creating a sludge*3 from which it was difficult to recover high concentrations of copper. Moreover, the recovery process required significant amounts of time and additional space for the installation of processing facilities.

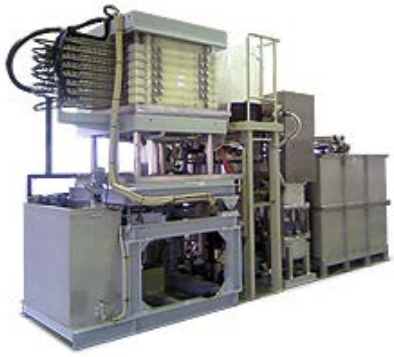
Sludge

Conventional facility

*3 Sludge:
A semi-solid substance that is generated from the processing of wastewater and contains heavy metals, water, and other substances.

Enabling the Recovery of High Concentrations of Copper by Revising the Wastewater Treatment Process

To improve the recovery of copper from wastewater, members of a new-technology advancement project organized by Fujitsu Facilities Limited, the manager of the Nagano Plant's facilities, began to consider wastewater treatment approaches that did not use chemicals in a coagulative precipitation process. What they settled on was a new system that recovers copper from wastewater with a filtration process.

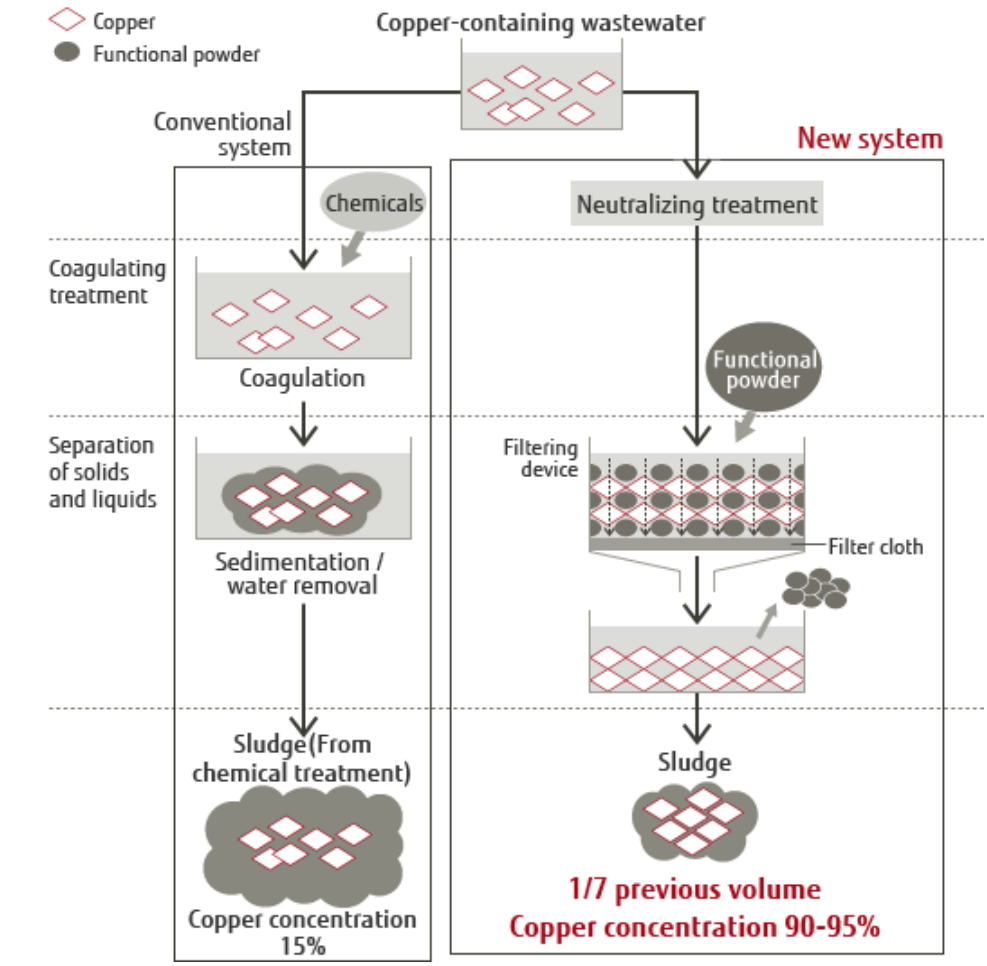


New Wastewater Processing Equipment

Copper particles are extremely small and clog filter cloth, so filtering was previously not a practical option. The new system, however, uses a functional powder that provides high filtering efficiency, so the separation of solids and liquids can be performed without clogging the filter cloth. Furthermore, after filtering, the functional powder itself is easily recovered by taking advantage of its magnetic properties, and can be reused. The Nagano Plant was the first to adopt the new copper recovery system in Japan, and began using it in June 2012.

The new system, by enabling the recovery of copper in high concentrations, has increased the copper content of sludge to 90-95%, from around 15% using the previous system. It has also reduced the volume of sludge to one seventh (5 tons/month) what it was before, and reduced money spent on chemicals by 5.48 million yen. Processing time, as well, has been shortened – to 1 hour from 2 before – and the space for processing equipment has been reduced by about half.

Overview of the New System



Expanding Application of the System and Enhancing the Added Value of Recovered Copper

At present, we are aiming to use this new system for about 10% of the total wastewater from the Nagano Plant, with plans to gradually increase this figure. We are also considering the adoption of copper oxide conversion technology*4, which has already been implemented within the Fujitsu Group, to process recovered copper into high-value-added copper oxide.

Going forward, the Fujitsu will continue to proactively reuse resources and reduce waste generation.

*4 Copper oxide conversion technology:
Technology that, through reaction processing of copper chloride and copper hydroxide, creates copper oxide.

VOICE

Masahiro Yazawa, Fujitsu Facilities Limited, Facility and Environment Services Division, Nagano Plant

Until now, I have been actively engaged in bottom-up environmental activities, like the use of geothermal heat for the air conditioning system of the Nagano Plant's clean room. The development of the new wastewater treatment system was another example of how a project got its start from frontline facility operators, including me, stepping away from conventional thinking to discuss new ways to handle problems. In the beginning, there were some struggles when the filtering process did not produce the expected results. The engineers, operators, maintenance people and others participating in the project, however, contributed their expertise and know-how in a unified effort to identify problem causes, and solved the problem by changing the process flow. Maintaining this kind of initiative going forward, we are already considering future projects, which might take on challenges like recovering heat from wastewater, creating a small-scale hydroelectric power system, or making even more effective use of wastewater.

Environmental Activities in Factories

We work to comprehensively lower the environmental burden of factories making products for the Fujitsu Group.

Approach to Reducing Burdens at the Factory

The Fujitsu Group continually strives to reduce the quantities of materials, water resources, and energy used at its factories, as well as the amounts of chemicals and waste materials generated and atmospheric pollutants emitted, while trying to minimize manufacturing costs. It also takes a rigorous approach to complying with laws and regulations and eliminating environmental risks.

Development of Green Production Technology

Assembly, processing and other production-related processes and equipment account for roughly 40% of overall CO2 emissions at Fujitsu factories. In a move to cut energy consumption associated with production, we are working to visualize power usage particularly around surface mount technology (SMT), assembly and testing processes. Improvements are then implemented beginning with processes and facilities where the most efficient reductions in power consumption are possible.

Case Study

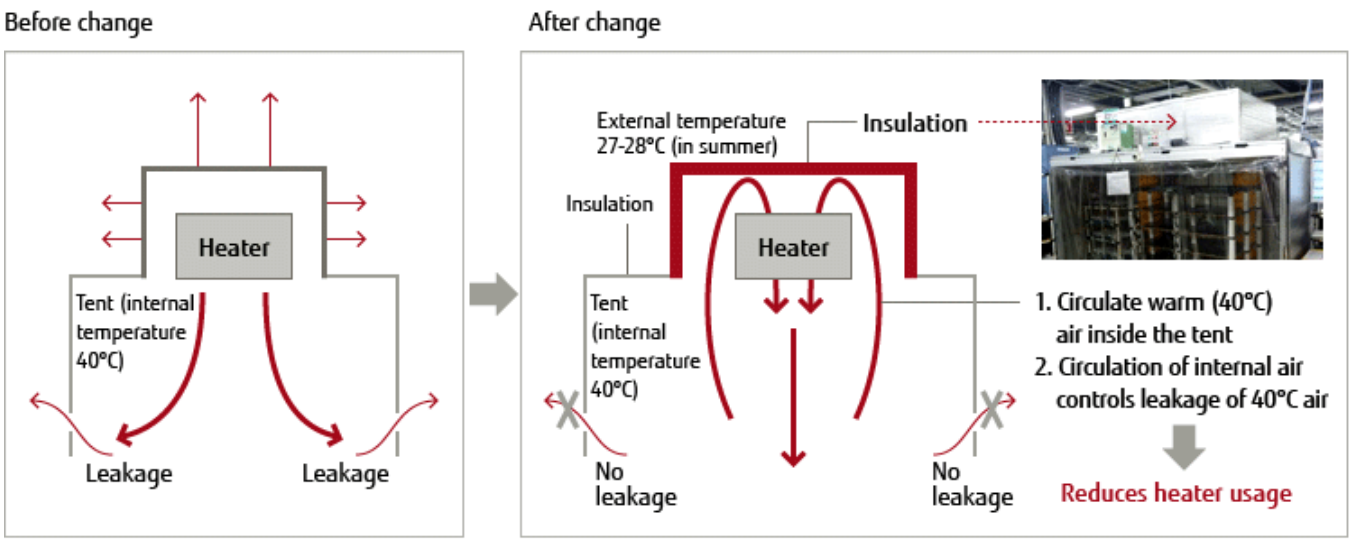
Cutting Electricity Consumption by Insulating Electric Heaters

PFU TechnoWise Limited, a manufacturer of scanners and information kiosk terminals for the Fujitsu Group, works with Fujitsu's Monozukuri Development Unit(Production Promotion Unit) to develop green manufacturing technologies, including ones that reduce electricity usage, for saving energy. In May 2012, they came up with a way to greatly reduce the amount of electricity used by aging tents, which are used in the manufacturing of information kiosk terminals and evaluate the reliability of products under high heat.

In a traditional aging tent, an electric heater positioned at the top takes in and heats outside air to keep the inside of the tent at 40℃. Air pressure inside the tent, therefore, is higher than outside, and warm air leaks from the bottom and sides. That the heater must replace the amount of warm air leaked means energy efficiency is very bad. To improve upon this situation, the electric heater was covered with an insulated box, causing the warm air inside the tent to recirculate through the heater. This relieved the difference in air pressure, eliminating the warm air leakage, and, because the recirculation of warm air improved the operating efficiency of the heater, the amount of electricity needed to keep the redesigned tent at 40℃ was reduced. Measurements show that an improved aging tent uses only 0.325kWh, less than a quarter (more specifically, a 76.7% savings) of the 1.4kWh used by a traditional model. In February 2013, this initiative was one of 60 energy-saving activities that were recognized with an award for outstanding energy management at the 2012 Ishikawa Energy-Saving promotion convention.

Moving forward, we will continue with efforts to steadily save energy with changes to air conditioning facilities, exhaust ducts, and other improvements within manufacturing plants.

Environmental Activities in Factories



Front of aging tent

Back of aging tent

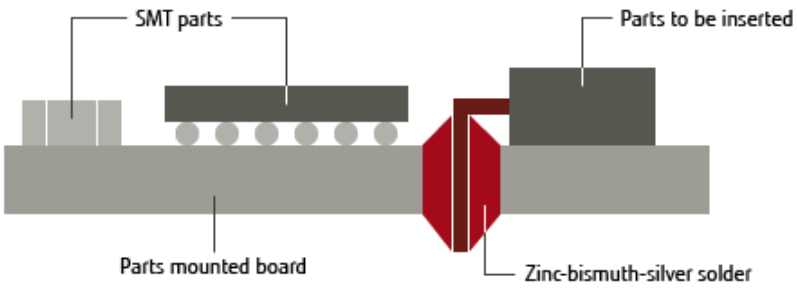
Case Study

Low-Melting-Point Lead-Free Solder for Environmentally Friendly Product Manufacturing

Fujitsu IT Products Limited, which makes server products, had adopted the use of lead-free solder to comply with the RoHS Directive for UNIX servers. The solder, however, had a high melting point of over 200℃, meaning that the heater for the solder furnace had to be kept at a high temperature and large amounts of electricity were consumed.

To improve upon this situation, the lead-free solder was fundamentally changed to a low-melting-point solder composed of zinc, bismuth, and silver. With this newsolder, which has a melting point of only 139℃, the solder furnace can be kept at a lower temperature and electricity consumption for the furnace heater has been reduced by 39%. That means an annual energy cost saving of about 740,000 yen and CO2 reduction of around 14 tons. This low-melting-point lead-free solder is now being planned for use on IA servers and mainframes.

Place where low-melting-point lead-free solder is used



- Development of Green Production Technology : Case Study Archives

Reducing the Amount of Waste Generated

Basic Approach

Working towards a recycling-minded society, our 3R*1 policy encourages all employees to separate waste materials into different categories for effective recycling.

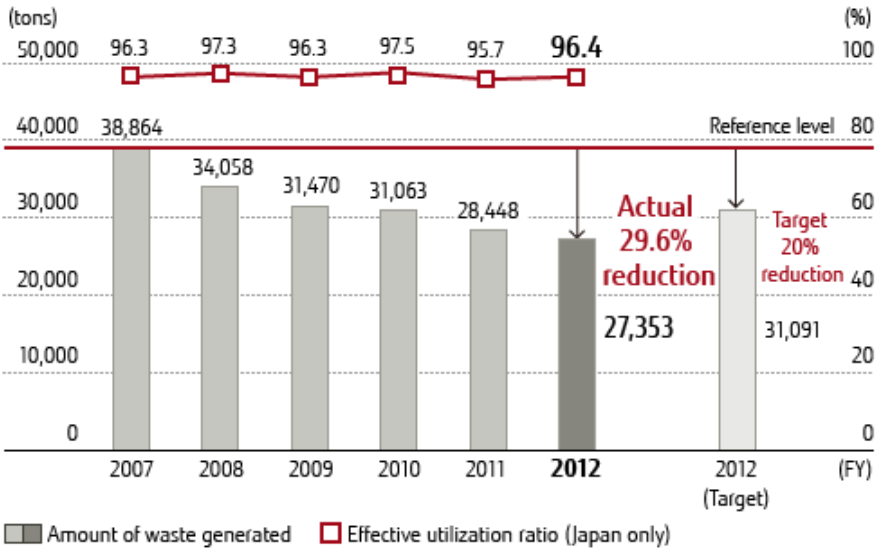
*1 3R:
Reduce, Reuse, and Recycle

FY 2012 Performance

In the Fujitsu Group Environmental Protection Program (Stage VI), we set the goal of reducing the amount of waste business operations generated by 20% compared to FY 2007 levels by the end of FY 2012.

We generated 27,353 tons of waste (per unit of actual sales: 6.2 tons/billion yen) in FY 2012, which was a 3.8% reduction from the previous fiscal year's level and a 29.6% reduction from the FY 2007 level. The Fujitsu Group Environmental Protection Program (Stage VI) target of a 20% reduction from the FY 2007 level, therefore, was achieved. The reasons for these reductions include the conversion of waste paper and cardboard to valuable materials, and the partial introduction of in-house processing of flux cleaning solvent.

Trends in Amount of Waste Generated and Effective Utilization Ratio



Breakdown of Waste Generated, Effective Utilization, and Final Disposal (t)

Waste Type	Waste Generated	Effective Utilization	Final Disposal
Sludge	4,377	4,298	79
Waste oil	1,863	1,862	0.4
Waste acid	3,728	3,725	3
Waste alkali	3,388	3,386	2
Waste plastic	4,046	3,955	91
Waste wood	1,306	1,306	0
Metal waste	517	515	2
Glass/ceramic waste	288	288	0
Other *2	7,839	6,010	1,829
Total	27,353	25,346	2,007

*2 Other:
Other includes general waste, paper waste, septic tank sludge, residues, rubble, textile waste, animal and plant residue, and infectious waste.

Case Study

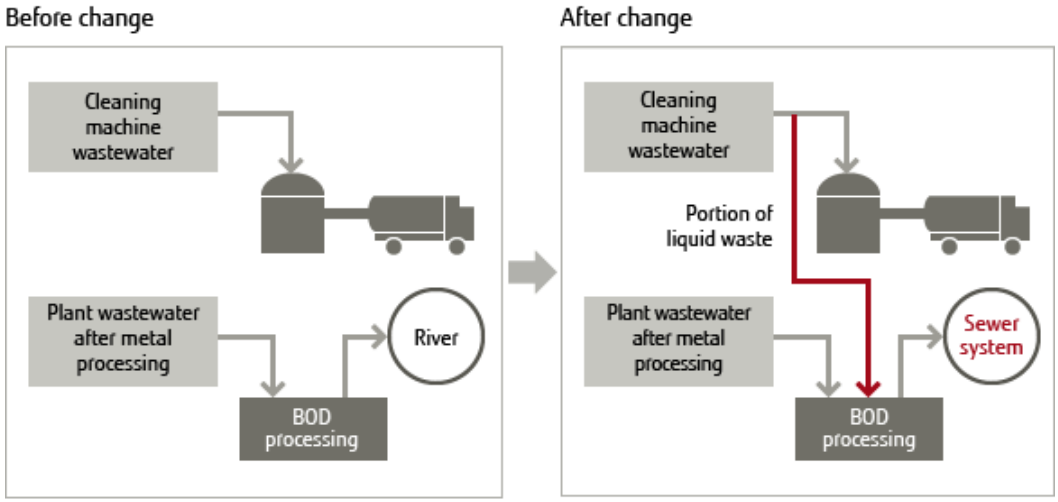
Partial Introduction of In-House Processing of Flux Cleaning Solvent

At Shinko Electric Industries Co. Ltd., the cleaning fluid (type of ethylene glycol) used in a cleaning process to remove flux from products was being disposed of as industrial waste.

Switching the discharge destination of industrial wastewater to the sewer system from a river made it possible to process a portion (47%) of the liquid waste in-house and reduce industrial waste discharges by approximately 300 tons per year.

Annual savings in processing expense, meanwhile, came to about 3.4 million yen.

In-House Processing Flow for Cleaning Machine Wastewater



- Reducing the Amount of Waste Generated : Case Study Archives

Achieving Zero Emissions at Domestic Group Companies

The Fujitsu Group promotes zero emissions*3 activities at Group companies in Japan. Zero emissions status was not achieved at some locations. We will continue considering ways to achieve zero emissions at these locations.

*3 Zero emissions:
Refers to effectively using 100% of waste and eliminating waste earmarked for landfills or simple incineration.

The Waste Targets of the Fujitsu Group Environmental Action Plan (Stage VII)

Fujitsu has already marked significant achievements in reducing waste. As ongoing management targets, therefore, we will work to reduce waste to less than the average level of 2007-2011 (31,134tons) and to continue zero emission activities among Japanese plants.

Effective Use of Water Resources

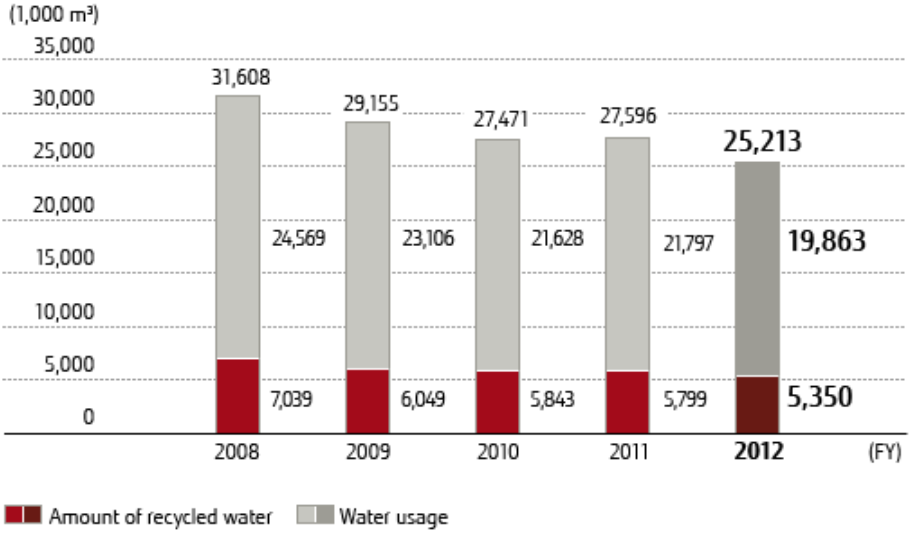
Basic Approach

We are continuously working to recirculate and reuse industrial water through approaches such as pure water recycling and rainwater use. In the Fujitsu Group Environmental Action Plan (Stage VII), which we have begun to implement in FY 2013, we have established effective water usage as a new goal and have taken steps like having overseas sites set their own quantitative targets for reducing water usage in an effort to do even more than we have in the past to use water effectively.

Results for FY 2012

Our water use for FY 2012 was 19,863 thousand cubic meters (per unit of actual sales: 4,530cubic meters/billion yen). This was 8.9% lower than FY 2011 and 8.2% lower than FY 2010. The ratio of recycled water to water use was 26.9% in FY 2012, which was about the same level as the 26.6% ratio in FY 2011.

Trends in Water Usage and Amount of Recycled Water



The Water Resource Targets of the Fujitsu Group Environmental Action Plan (Stage VII)

Fujitsu has traditionally and consistently pursued the effective use of water resources. However, with rising international interest in water resources, we decided that it was necessary to take our activities to an even higher level. Working toward the objective of efficient use of water resources, through approaches like water recycling and water saving, we are working to achieve an even higher level of effective water use.

Case Study

Reduced Water Use at Fujitsu Australia

In Australia, the driest inhabited area of the earth, climate change has given rise to severe drought and other problems making water use a critical issue in realizing a sustainable society.

Though ICT industries do not use extremely large volumes of water, they must still endeavour to use water efficiently. At Fujitsu Australia, the datacenter is the primary consumer of water, over half of which is used for cooling. Since energy and water usage are correlated, increasing the datacenter's energy efficiency resulted in reduced water consumption. Fujitsu Australia is also using rainwater collected from its grounds to water its property and gardens, flush toilets, and provide cooling in its datacenter's closed-loop cooling system.

At The Gauge, a building housing Fujitsu Australia offices, 2.4 million liters of water from a sewage treatment system are reused annually. The building is equipped with many other environmentally friendly features and has won a six-star Green Star rating, the highest available in this Australian environmental architecture rating system.

Chemical Substances Management

Basic Approach

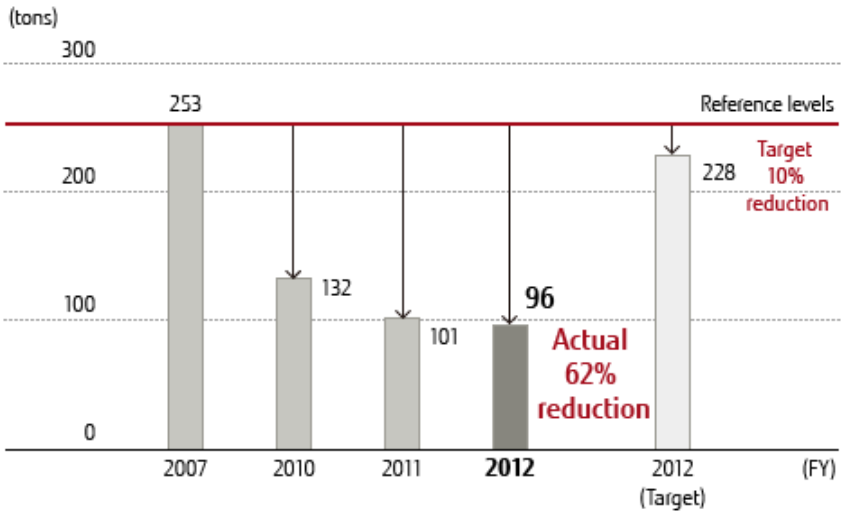
Prevention of environmental risks that could lead to environmental pollution or adverse health effects due to the use of harmful chemical substances has been established as our basic policy for chemical substances management. We manage the amounts used for about 1,300 chemicals, and we work to reduce the amount discharged and implement appropriate management at every business site.

Results for FY 2012

We set the goal of reducing emissions of specific chemical substances by 10% compared to FY 2007 by FY 2012 in the Fujitsu Group Environmental Protection Program (Stage VI).

Emissions of specific chemical substances by the whole Fujitsu Group in Japan in FY 2012 were 96 tons (4.7% reduction from FY 2011), which was a 62% reduction compared to the FY 2007 reference year. The goal of achieving a 10% reduction compared to FY 2007, therefore, was achieved.

Trends in Emissions of Specific Chemical Substances



*Specific chemical substances: Of the substances that are the object of VOC and PRTR regulation, those for which the amount handled is at least 100 kg/year, and one substance selected from the top three substances in emission levels for the reference year.

The Chemical Substance Targets of the Fujitsu Group Environmental Action Plan (Stage VII)

Fujitsu has already marked significant achievements in reducing chemical emissions. As ongoing management targets, therefore, we will work to reduce chemical emissions to less than the average level of 2009-2011 (PRTR: 21t, VOC: 258t)

Compliance with the Revised Chemical Management Law

Following revisions to the Chemical Management Law*4, more chemical substances are now covered by the MSDS*5 system and the PRTR*6 system (revisions applied to the MSDS system from October 2009, and to the PRTR system from April 2010).

Responding to these revisions, the Fujitsu Group has asked its suppliers to cooperate in the delivery of chemicals, and based on the revised PRTR system it is carrying out initiatives to obtain an accurate grasp of the amounts of chemicals transported and emitted. In FY2012, emissions of chemical substances covered by the PRTR system were 22 tons, and per unit of actual sales were 5.0kg/billion yen).

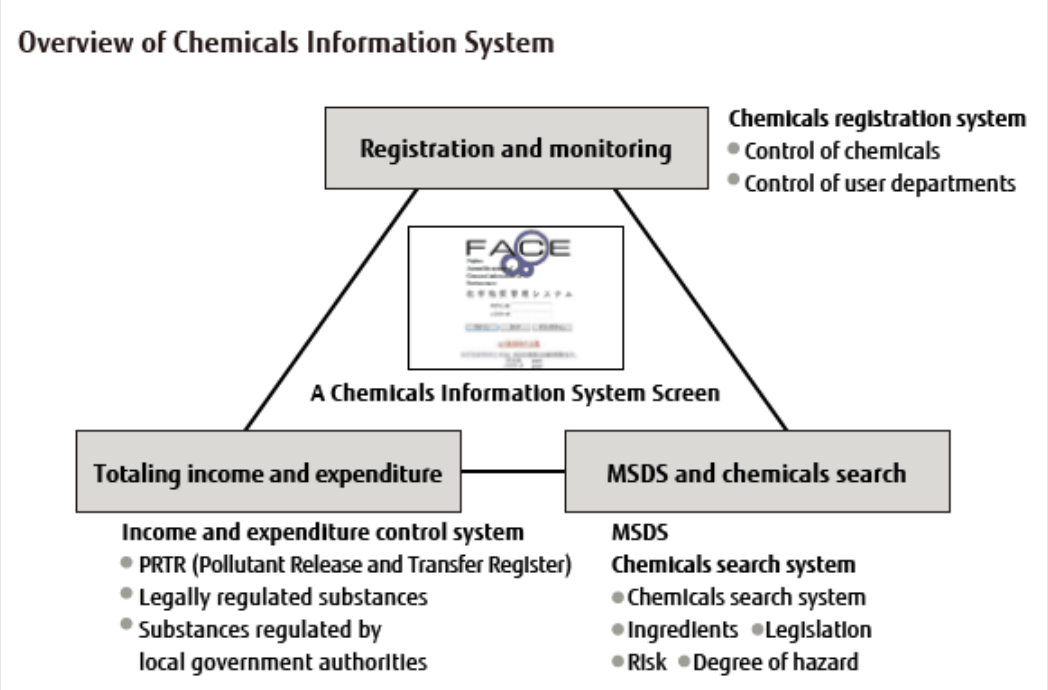
*4 Chemical Management Law:
A law to promote correct understanding, management, and reporting of amounts of designated chemicals emitted into the environment

*5 MSDS:
A system that requires attachment of a Material Safety Data Sheet to chemical deliveries

*6 PRTR:
Abbreviation of Pollutant Release and Transfer Register. This system requires the registration and reporting of data relating to the emission of harmful chemicals into the environment and volumes within transported waste.

Operation of "FACE," the Chemical Information System

The Fujitsu Group operates a Chemical Information System called "FACE." It can be used not only to register and monitor chemicals at every site but also to manage MSDS and control income and expenditure in conjunction with purchasing data and inventory data, FACE is helping the Group to strengthen its chemicals data and make it more efficient.



- Basic Policy for Chemical Substances Management : Case Study Archives

Preventing Air and Water Pollution

Preventing Air Pollution

We have set voluntary controls that are more stringent than emissions standards under related laws and ordinances in order to prevent air pollution and limit acid rain. Regular measurement and monitoring is conducted based on these controls. Efforts are made to appropriately process sulfur oxide, nitrogen oxide and other harmful substances and reduce emissions through measures such as controlling incineration at facilities that emit smoke, using fuels with low sulfur content, and managing operations at exhaust gas processing facilities. Furthermore, an absorption system using activated charcoal has been introduced to reduce the atmospheric discharge of organic solvent vapors containing substances like VOCs.

In addition, emission of dioxins has been prevented by suspending use of (completely phasing out) all in-house incineration facilities as of January 2000.

Preventing Water Pollution

In order to preserve the water quality of surrounding waterways, including rivers, groundwater and sewers, we have set voluntary controls that are even tougher than related laws and ordinances and conduct regular measurement and monitoring on this basis. We separately recover and recycle chemicals used in production processes, instead of discharging them into wastewater. And we are working to appropriately process harmful substances and other regulated substances (COD, BOD, etc.) and reduce discharges of them by ensuring appropriate chemical use, preventing chemical leaks and permeation, and properly managing the operations of water treatment and purification facilities, among other measures.

Preventing Ozone Layer Depletion

Elimination of Ozone-depleting Substances

The Fujitsu Group has completely eliminated use of ozone-depleting substances in manufacturing processes (parts cleaners and solvents) by utilizing precision aqueous cleaning systems and no-clean soldering technologies. Refrigerant CFCs used in air conditioning equipment (freezers, etc.) are being replaced with non-CFC refrigerants when equipment is upgraded, and measures are also taken to prevent leaks.

Achievements in Abolishing Ozone-depleting Substances

Ozone-depleting substance	Date of elimination
Cleaning freons (CFC-113, CFC-115)	End of 1992
Carbon tetrachloride	End of 1992
1,1,1-trichloroethane	End of October 1994
Substitute freons (HCFCs)	End of March 1999

Environmental Liabilities

The Fujitsu Group, in properly forecasting environmental liabilities and communicating our soundness and stance of not deferring environmental liabilities, has recorded a liability of 8.28 billion yen in soil-pollution cleanup costs, high-level polychlorinated biphenyl (PCB) waste disposal costs, and asbestos processing costs during facilities demolition. This total is the amount we calculate, as of the end of FY 2012, to be necessary for the Fujitsu Group in Japan to carry out these tasks.

For processing waste with high levels of PCBs (transformers and capacitors), we have registered in advance with Japan Environmental Safety Corporation (JESCO), which processes PCB waste under Japanese government supervision, and perform this processing based on JESCO plans.

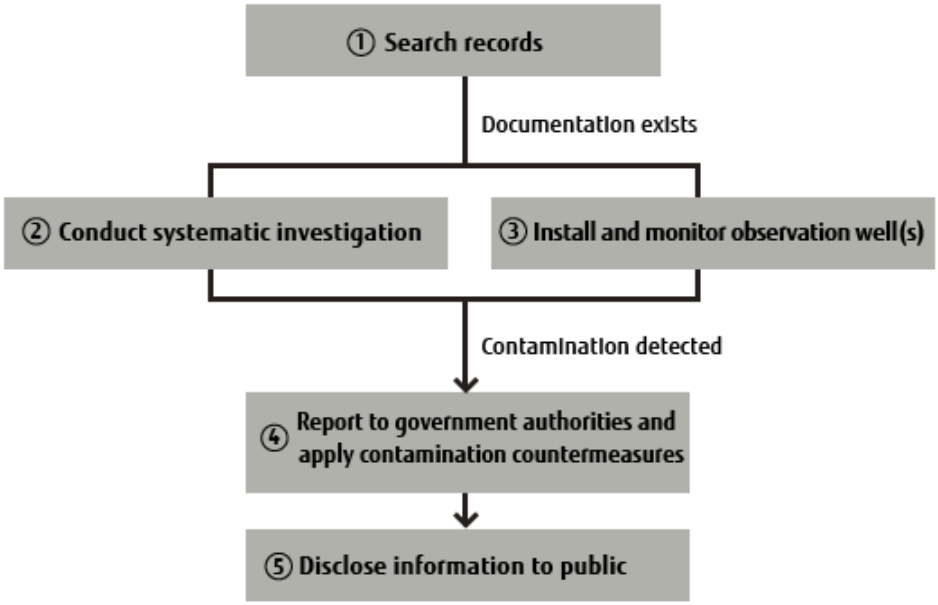
Preventing Soil and Groundwater Pollution

Fujitsu conducts soil and groundwater contamination surveys, implements countermeasures, and discloses the resulting data.

Our Approach

We review as necessary our internal rules established in FY 2006 in response to soil and groundwater problems, and will handle such problems based on these revised rules for soil and groundwater surveys, policies, and disclosure. In the future, in parallel with performing planned surveys and, if contamination is discovered, implementing cleanup operations and countermeasures appropriate for the conditions at each business site, we will also disclose relevant information in collaboration with administrative agency.

Monitoring the Impact of Groundwater Contamination Outside of Fujitsu Sites*



* We monitor groundwater contamination near our sites, which is the largest risk for soil and groundwater pollution.

Status of New Soil and Groundwater Pollution Measures Undertaken in FY 2012

A voluntary survey in FY 2012 revealed soil and groundwater contamination at two sites. We reported the state of contamination at this site and explained our countermeasures to administrative agency.

Measures to Clean Up Soil and Groundwater Pollution Due to Past Business Activities

We have dug wells to monitor groundwater contamination near our sites where soil or groundwater pollution has been found. We continuously monitored eight such sites in FY 2012.

The table below lists the largest of the most recent measurements for chemicals with levels recognized to have exceeded regulated levels in FY 2012 stemming from past business activities.

Business Sites Where Soil or Groundwater Contamination Has Been Found

Site Name	Location	Cleanup and Countermeasure status	Monitoring Well Maximum Value (mg/l)		Regulated Level (mg/l)
			Substance	Measured Value	
Kawasaki Plant	Kawasaki City, Kanagawa Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	3.0	0.04
Oyama Plant	Oyama City, Tochigi Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	4.275	0.04
			Trichloroethylene	0.048	0.03
			1,1- dichloroethylene	0.032	0.02
Nagano Plant	Nagano City, Nagano Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.16	0.04
Suzaka Plant	Suzaka City, Nagano Prefecture	We have begun construction of an underground impervious wall and facilities for processing pumped water.	Polychlorinated biphenyl	0.021	Must not be detected
Fujitsu Interconnect Technologies Kurohime Office (Formerly Shinetsu Fujitsu)	Shinano machi, Kamiminochi Gun, Nagano Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.12	0.04
Fujitsu Optical Components	Oyama City, Tochigi Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.114	0.04
			Trichloroethylene	0.18	0.03

Site Name	Location	Cleanup and Countermeasure status	Monitoring Well Maximum Value (mg/l)		Regulated Level (mg/l)
			Substance	Measured Value	
FDK Sanyo plant	Sanyo-Onoda City, Yamaguchi Prefecture	We are continuing to clean up VOCs by pumping and aeration.	1, 2-dichloroethylene*1	0.11	0.04
			Cis-1, 2-dichloroethylene	0.053	0.04
			Trichloroethylene	0.090	0.03
FDK Energy (Formerly the FDK Washizu Plant)	Kosai City, Shizuoka Prefecture	We are continuing to clean up VOCs by pumping and aeration.	Trichloroethylene	0.35	0.03
			Tetrachloroethylene	0.41	0.01
			Cis-1, 2-dichloroethylene	0.71	0.04

*1 1, 2-dichloroethylene:
The analysis item was changed from "Cis-1, 2-dichloroethylene" to "1, 2-dichloroethylene" in accordance with the guidance of administrative agency in October.

Environmental Activities in Offices

We strictly observe all laws concerning the environment and also work to save energy and achieve zero waste emissions, not only at our production sites but also at all our business offices.

Green Office System

The Fujitsu Group's Green Office system comprehensively evaluates the environmental consciousness and independent environmental initiatives undertaken by individual offices and produces visual representations of the results. The Green Office system was launched in FY 2007 for offices in Japan and, by FY2009, all of the Group's 371 offices (the total at the time) had achieved 3-star ratings and zero waste emissions*1.

In FY 2010, we established the goal of achieving ratings of 4 stars or higher for all of our offices in Japan by the end of FY 2012 as part of the Fujitsu Group Environmental Protection Program (Stage VI). Achieving this goal meant, in addition to satisfying the conditions for three stars, undertaking biodiversity conservation activities, disclosing environmental information to stakeholders, and unifying industrial waste processing for office emissions. The first two of these goals were achieved through application of the "Act-Local-System" social contribution activity database. As for the third, we introduced the first system for unifying the processing of industrial waste*2 in Japan and did so by the end of FY 2012, bringing all of our offices in Japan up to the 4-star rating and achieving our goal.

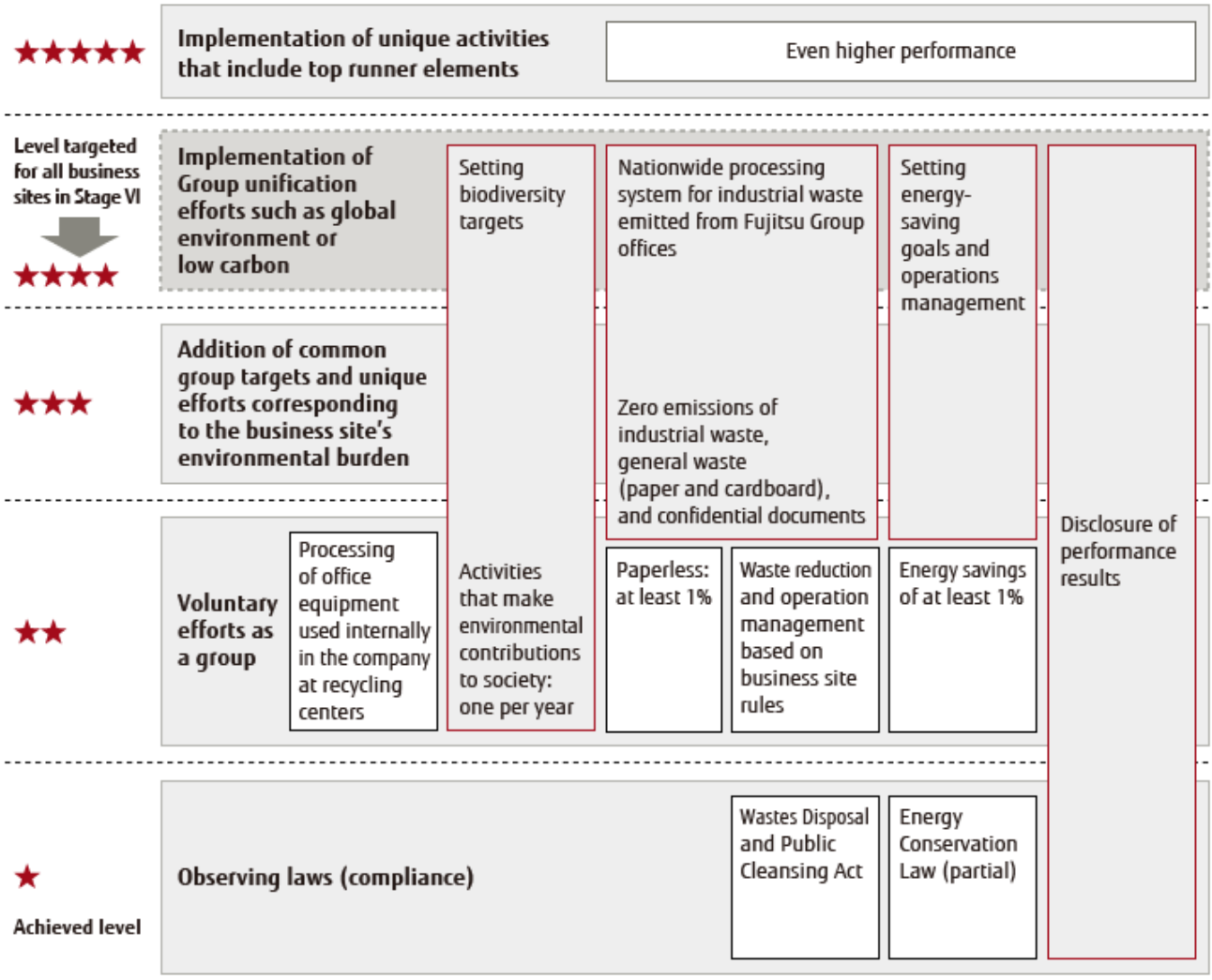
For our overseas sites, we prepared draft standards and began applying them on a trial basis in FY 2012. As results come in, we will examine them and consider steps going forward.

In Japan, we aim to further refine the Green Office system and are considering incorporating ISO14031-compliant environmental performance evaluations toward that end. By continuing with the Green Office system, making visible the details of the activities carried out by individual offices, and building a database for sharing information on and expanding activities among our offices, we will continue to raise the level of environmental activities throughout the Fujitsu Group.

*1 Zero waste emissions:
For simple calculations of emissions from the incineration or landfill disposal of industrial waste and paper waste

*2 System for unifying the processing of industrial waste:
Under this system, we have used certain criteria to select waste processing companies on a regional basis, and have them regularly collect industrial waste from our offices.

Overview of the Green Office Evaluation System



Creating a Database of Environmental Activity Measures, and Utilizing Checklists

Through Green Office system implementation, we check and create a database of the progress and status of measures targeting energy efficiency, waste reduction, paperless operations and other goals at all applicable offices, and produce a checklist of key measures. These checklists are proving useful not only as a reference for potential measures to adopt when offices set their environmental objectives and targets, but also for invigorating and enhancing activities by making visible operational improvement issues and measures that require investment.

Reducing Waste from Offices

On-Site Waste Disposal Auditing

To confirm that ICT equipment and other types of industrial waste are being properly dealt with, the Fujitsu Group has developed and operates a structure under which Fujitsu Recycling Centers, as waste processing specialists for in-house ICT equipment, have been established wherever Group companies operate. Under this framework, we perform standardized Group-level checks through periodic, on-site audits. Specifically, a member of the Fujitsu Corporate Environmental Strategy Unit visits the recycling centers once a year with the person in charge of waste disposal from the relevant office, using a standardized checklist to check the documentation and the onsite disposal operation itself.

In addition, to sustain and improve security levels with respect to confidential document disposal, we implement on-site validation once a year of Japan Security and Recycle Network, a company that processes confidential documents based on a nationwide paper recycling system created in FY 2009.

- Reducing the Waste Generated in Office : Case Study Archives

Reducing CO2 Emissions in Offices

Efforts by the Fujitsu Group to reduce CO2 emissions are guided mainly by promotion of the measures detailed below.

- Energy-saving equipment measures (for Group-owned buildings)
- Adjust appropriate room temperature for office air conditioning (28℃ in summer and 20℃ in winter)
- Extinguish unnecessary lighting, shorten air-conditioner use outside of regular work hours (uniform quitting time, etc.)
- Set energy-saving mode for PCs, turn off display when away from desk
- Turn off standby mode power in AC adapters, use smart power sockets
- Implement nighttime operation control for PCs, shared terminals, development terminals and other equipment
- Consolidated access points
- Perform in-house and request external evaluations of energy efficiency
- Install green curtains (including at some leased offices)
- Transition to energy-saving vending machines
- Introduce LED lighting and transition to switches that adjust lighting to activity levels
- Introduce hybrid cars

For more information on CO2 emission reductions at our business sites, including some leased offices, in Japan, please refer to the following webpage.

- Efforts to Prevent Global Warming
- Reducing CO2 Emission in Offices : Case Study Archives

Environmental Activities in Datacenters

Fujitsu promotes the construction of environmentally conscious datacenters, and aims to help realize low-carbon, sustainable societies by contributing to greater productivity for customers, and lowering the burden on the environment.

Promoting Environmentally Conscious Datacenters

Fujitsu's environmentally conscious datacenters, which have as their top priority the provision of high-quality service to customers, are characterized not only by their energy efficiency but also by their emphasis on reliability and safety. In addition, by visually communicating energy usage, they enable continuous PDCA cycles for identifying issues, taking action, and checking results, and make clear the environmental contribution effects of using a Fujitsu datacenter.

Fujitsu has identified seven categories of technical aspects that merit consideration when constructing an environmentally conscious datacenter. The Fujitsu Group has accumulated technology and know-how in conformity with this framework and applies it in constructing or refurbishing datacenters inside and outside of Japan.

Framework for Considering Technology for Constructing an Environmentally Conscious Datacenter

- **Visual Representation**
  Monitoring electricity consumption, temperature, and humidity to analyze and evaluate energy usage.
- **Power Distribution Innovation (Optimal Energy Usage)**
  Our goal is to achieve high reliability and rationality in the distribution of electric power to ICT equipment, and do so from the perspectives of stable operation, business continuity, and energy efficiency. We are also working with suppliers to achieve technological improvements and innovations in battery materials for uninterruptible power supplies (UPS) and in other individual devices and facilities.
- **Ultra-High Efficiency Air Conditioning (Optimal Air Conditioning)**
  We work to make air conditioning, which is critical to saving energy, more efficient. Our aim is to achieve air conditioning that relies 100% on external air and is optimized for the climatic and geographic conditions of each datacenter.
- **Green Energy**
  We continue to seek ways to use solar power and other renewable forms of energy.
- **Facility Delivery Innovations (Housing Innovations)**
  We provide datacenters from the very largest to the very smallest and of various specifications to match customer needs. Working from a modular datacenter concept, rapid delivery of high-quality datacenters matching customer needs is our goal.
- **ICT Platforms**
  The ICT equipment for installation in datacenters is constantly evolving. But it is not enough to simply use the latest, most efficient equipment; we search for equipment best suited for use in a datacenter and work with our ICT Equipment Unit to offer datacenters with the best overall efficiency.
- **Energy Procurement Innovation (Energy links between facilities)**
  To maintain business continuity, we aim to create datacenters with high energy source independence. We, therefore, seek to ensure a stable supply of power and we consider a variety of energy procurement possibilities, including on-site and nearby facilities.

Initiatives in FY 2012

Contributions to Industry Organizations

Concentrating a customer's ICT assets in a datacenter also contributes as an energy-saving benefit for society as a whole. By actively being involved in working group activities in the various industry organizations related to datacenters, Fujitsu helps to enhance the value of datacenters to society. Citing one example, in particular, Fujitsu is leading efforts to devise and promote the use of PUE (Power Usage Effectiveness) measurement and calculation methods as an industry representative to the Japan Data Center Council (JDCC).

Visualization of Effects

Fujitsu has won approval from the Ministry of Economy, Trade and Industry's J-Credit Scheme (for reduction of CO2 emissions in Japan) for a method for calculating CO2 reductions achieved by switching to a Fujitsu datacenter and for a scheme that will actually issue credits. This makes it possible to visualize a customer's environmental contribution from outsourcing datacenter services to Fujitsu and to credit the customer for that contribution.

Datacenter Solution wins 2013 Datacenter Management and Automation Award in Germany

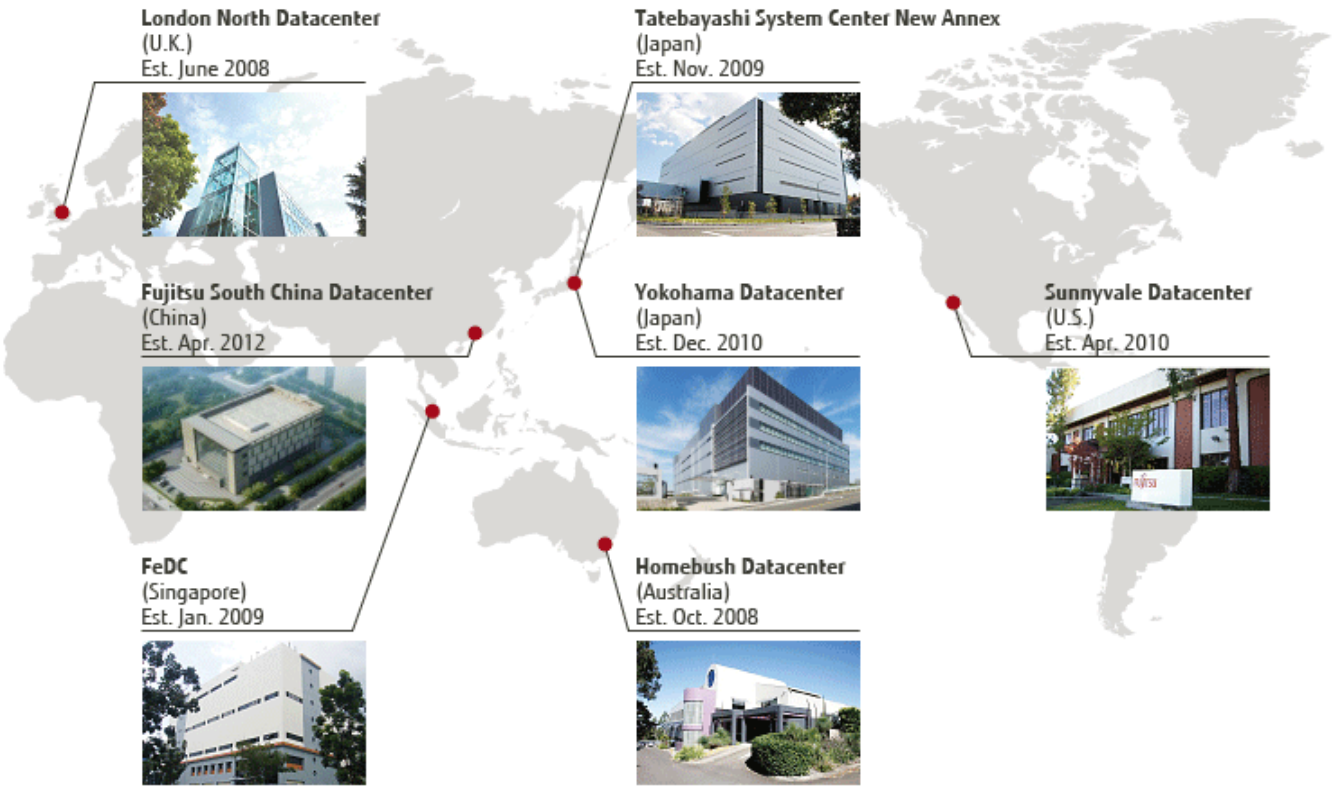
Fujitsu datacenter solutions won the 2013 Datacenter Management and Automation Award sponsored by Germany's Club Gala. This prize is presented to the datacenter implementation with high energy efficiency and the most outstanding environmental performance.

Fujitsu's datacenter solutions are provided to customers as cloud-based ITMaaS (IT Management as a Service). In providing these solutions, we identify inefficient energy usage at customer datacenters, recommend actions for reducing operating costs and improving energy efficiency, and offer customers cost and energy savings through the automation of their datacenter operations.

Example of the Fujitsu Group's Global Environmentally Conscious Datacenters

The Fujitsu Group has datacenters in over 100 locations across the globe and is vigorously moving forward with the introduction of technologies and facilities that are good for the environment.

Examples of the Fujitsu Group's Global Environmentally Conscious Datacenters



Fujitsu South China Datacenter (China) Est. Apr. 2012

The Fujitsu South China Datacenter is the first datacenter established and owned by the Fujitsu Group in China. Based on the latest technology, this datacenter offers quality equal to the world's highest standards and is equipped with state-of-the-art technologies for energy efficiency. Equipped with an efficient power plant featuring a rotary UPS (Uninterruptible Power Supply), an energy management system that monitors temperature and individual server rack electricity consumption 24/7, an air-conditioning system with geothermal features, a lighting control system, and other energy efficiency innovations, we have done everything practicable to minimize this datacenter's electricity consumption.

Yokohama Datacenter (Japan) Est. Dec. 2010

In establishing the Yokohama Datacenter, we not only equipped it with all of the latest energy-efficient facilities and energy-efficiency management systems; we also used a design that uses server room waste heat to warm office space, uses rainwater to flush toilets, and took other proactive steps as well to help realize a recycling-based society. In recognizing the value of our efforts, the City of Yokohama's Comprehensive Assessment System for Building Environment Efficiency (CASBEE) awarded the Yokohama Datacenter its highest, S, rank. In FY 2012, it also won the Kanagawa Prefecture's 2nd Kanagawa Global Warming Prevention Award in the greenhouse gas reduction performance category.

London North Datacenter (U.K.) Est. June 2008

At the London North Datacenter, in the U.K., we have deployed energy use simulation technology designed to optimize datacenter facility and ICT equipment operations. We have also installed free cooling, high-efficiency UPS, and other technologies to cut facility-related CO2 emissions by about 3,000 tons per year, compared to a conventional datacenter.

Homebush Datacenter (Australia) Est. Oct. 2008

For our Homebush Datacenter, in Australia, we employed a cooling system that combines the reuse of cooling water and a layout optimized for heat flow, and achieved an 80% reduction in water usage and up to a 32% reduction in energy usage, compared to conventional systems. In addition, we reduced energy consumption by up to 60% through the use of centralized equipment controls and sensor-equipped lighting.

Sunnyvale Datacenter (U.S.) Est. Apr. 2010

At our Sunnyvale Datacenter in the U.S., we have taken energy-saving steps like installing an on-site power generation facility that uses hydrogen fuel cells and biofuels.

FeDC (Singapore) Est. Jan. 2009

At the FeDC in Singapore, we have installed a high-efficiency power plant, temperature monitoring system, lighting control system, and other technology to make this facility energy efficient.

Indirect Air Cooling Container Datacenters

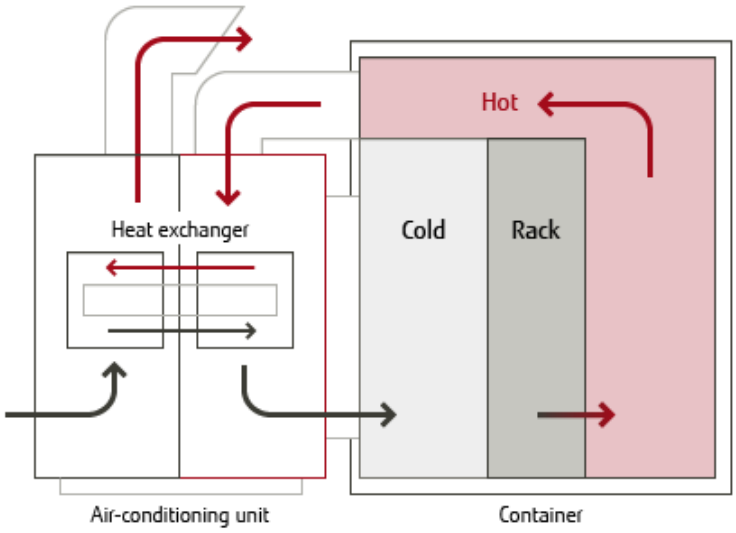
With the rapid adoption of ICT and cloud computing in particular, the datacenters that underlie it all are taking on even greater importance. As a new form of datacenter, Fujitsu began in October 2012 to provide "container" datacenters that can be constructed in a short time and used to start operations at a small scale. Because they are relatively small and can be cooled without waste, container datacenters operate with only a small amount of electric power and have low operating costs.

Container datacenter

Our container datacenters employ indirect air cooling that takes external air into a heat exchanger and expels air warmed by the ICT equipment. The use of external air reduces the amount of energy needed for air conditioning and eliminates the need to install the external water-cooling equipment required for a water-cooled system. A key characteristic of our container datacenters, therefore, is that they can be installed in any environment or location. In addition, because external air is not taken into the container directly, the system is one that does not require adjustments of humidity and is not subject to the effects of dust or insects.

The ICT equipment and facilities installed in the container are controlled by Fujitsu's own operating and management software. And electricity consumption is minimized through the deployment of electrical system control technology developed by Fujitsu Laboratories Ltd.

Indirect external air cooling system



Green Procurement with a Centralized Global Procurement System

To provide our customers with products and services that have minimal environmental impact, the Fujitsu Group is promoting green procurement together with our business partners through a centralized global procurement system in an effort to protect the global environment.

Fujitsu Group Green Procurement Direction

The Fujitsu Group has formalized its basic requirements regarding procurement of eco-friendly parts, materials, and products as the Fujitsu Group Green Procurement Direction, and is moving forward with green procurement activities together with business partners inside and outside Japan.

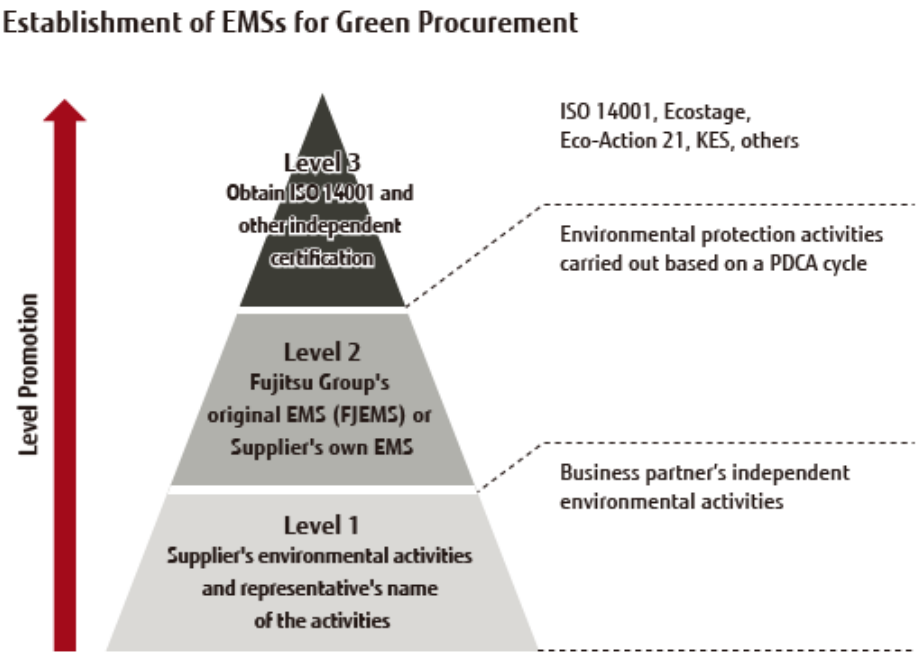
- Fujitsu Group Green Procurement Direction

Green Procurement Requirements for Our Business Partners

We request that our business partners meet the following requirements to promote green procurement.

Establishment of Environmental Management Systems*1

We request our business partners to establish an EMS to ensure that they continuously implement environmental burden reduction activities. We also conduct regular surveys to determine their EMS level (Refer to the following diagram.) . For business partners whose survey responses indicate a level 1 EMS, we will provide the Fujitsu Group's original EMS (FJEMS*2) and support efforts to bring thebusiness partner's EMS up to the third-party-certified EMS (level 3).



*1 EMS:
Environmental management system

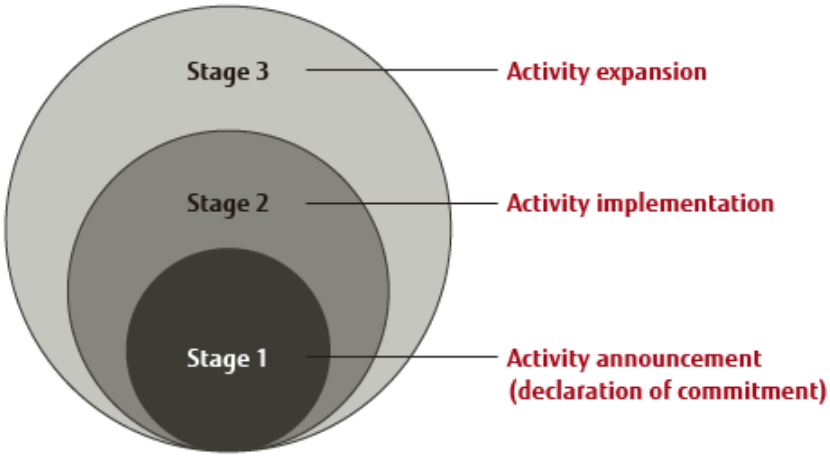
*2 FJEMS:
The Fujitsu Group's own EMS, which focuses on ISO14001 requirements and getting environmental protection activities based on a PDCA cycle to take root.

Promoting Efforts to Limit or Reduce CO2 Emissions and to Conserve Biodiversity

One of our goals under the Fujitsu Group Environmental Protection Program (Stage VI), which covered the period FY 2010-2012, was to increase to 100% by FY 2012 the number of our parts business partners taking action to limit or reduce their CO2 emissions and to preserve biodiversity. Toward that end, therefore, we asked our business partners to get to at least stage 2, activity implementation, regarding the limitation or reduction of CO2 emissions, and to stage 1, declaration of a commitment, regarding the protection of biodiversity.

Drawing Up an Activity Evaluation Index

We set up an original three-stage index for measuring the situation of our business partners' activities and requested their cooperation.



We have actively helped our business partners to determine what activities they should be taking and reach the point of being able to do so. We have, for example, provided tools for calculating CO2 emissions from electricity usage and for monitoring progress toward quantitative targets. We have also prepared guidelines providing basic information on protecting biodiversity along with explanations and examples of biodiversity protection activities, and created a check tool to promote awareness of biodiversity protection.

To encourage business partners to take notice of issues related to CO2 emissions and biodiversity, we have also held seminars in which we explained the need for action, provided examples of what could be done, and led participants in exercises. During the FY 2010-2012 period, we held eight of these seminars with participation by a total of 75 companies.

For our overseas business partners, we have provided explanations of the issues that companies throughout the world should be addressing and gained understanding while supporting their activities. As a result of our efforts, we fully achieved the goals mentioned above for our business partners inside and outside Japan in January 2013.

TOPICS

Participatory Environmental Protection Activities for Business Partners

With positive feedback from the FY 2011's environmental protection activity with business partners, Fujitsu's Purchasing Unit held the event again, in October 2012, at the Higashi Toyoda Nature Preservation Area in Hino City, Tokyo. The impetus for sponsoring these activities was to give as many business partners as possible an opportunity to initiate their own activities to protect biodiversity.

Business partner participants included 22 people from 10 companies. With Fujitsu employees bringing the total to 40, participants set to work cutting bamboo grass and thinning the forest. While walking though the preserve, they also deepened their understanding of the relationship between people and nature by listening to a lecture, by the staff of an NPO, on the protection of biodiversity. Such opportunities to engage with business partners outside of strictly business-related settings also help to strengthen our relationships with them.

Environmental protection activities

Objectives of Fujitsu Group Environmental Action Plan (Stage VII)

In the Fujitsu Group Environmental Action Plan(Stage VII), which began in FY 2013, the Fujitsu Group acknowledges that the limitation or reduction of CO2 emissions upstream in the value chain is an important issue that companies should address. We, therefore, will expand our environmental protection activities to include solution services and other non-component business partners. Regarding the conservation of biodiversity in particular, we will continue with our supplier-focused activities to reinforce the importance of protecting biodiversity, and pursue green procurement activities together with business partners.

Establishment of Chemical Substances Management Systems (CMS*3)

We request our business partners to establish a chemical substances management system (CMS) based on the industry standard, JAMP*4 guidelines on management of chemical substances contained in products. If their management system is inadequate when we audit their manufacturing sites for parts supplied to the Fujitsu Group, we will provide support for correctional efforts that aim to strengthen their management system in the supply chain. Once business partners have been recognized as having established a CMS, we periodically check the operational status of the system. The Fujitsu Group will continue CMS development efforts of this kind to ensure that strict legal compliance is maintained.

*3 CMS:
Chemical substances management system

*4 JAMP:
Joint Article Management Promotion-consortium

Collaborating with Business Partners in Management of Chemical Substances Contained in Products


Seminar held in Japan

In order to comply with new chemical regulations in Japan and globally, starting with Europe's REACH regulations, we started surveys in June 2011 based on the AIS*5 and MSDSplus*6 formulated by JAMP. Ahead of the surveys, in May, we held seminars on creating AIS sheets for 73 processing-related business partners in Japan. In June, we also held seminars for 17 business partners in greater China. The seminars included computer-based study and instruction on how to prepare AIS sheets.

Surveys are conducted when products are designed, designs are changed, or there is a change in business partners. In addition, following the release of AIS (MSDSplus) Ver.4.0, the Fujitsu Group made approximately 12,000 requests to business partners to complete new chemical substance surveys based on the latest AIS during FY2012.

ProcureMART*7, the Fujitsu Group's solution for online procurement, is used to connect the Fujitsu Group with its business partners, which enables purchasing activities and chemical substance surveys to be conducted with a single interface. Management of chemical substance information sent from business partners is accomplished by utilizing another Fujitsu Group solution, PLEMIA/ECODUCE*8, and the information is shared within the Group.

The Fujitsu Group is actively involved in standardization activities for green procurement surveys being promoted by industry bodies like JAMP. We intend to continue raising the efficiency of such supply chain surveys going forward.

*5 AIS:
Information transmission sheet for conveying information on chemical substances in molded products.

*6 MSDSplus:
Information transmission sheet for conveying information on chemical substances in chemicals and preparations.

*7 ProcureMART:
Service that allows procurement processes for production materials to be conducted online.

*8 PLEMIA/ECODUCE:
Fujitsu's chemical substance management system

Raising Product Value with Environmental Technologies (Soliciting Proposals for Environmental Technologies)

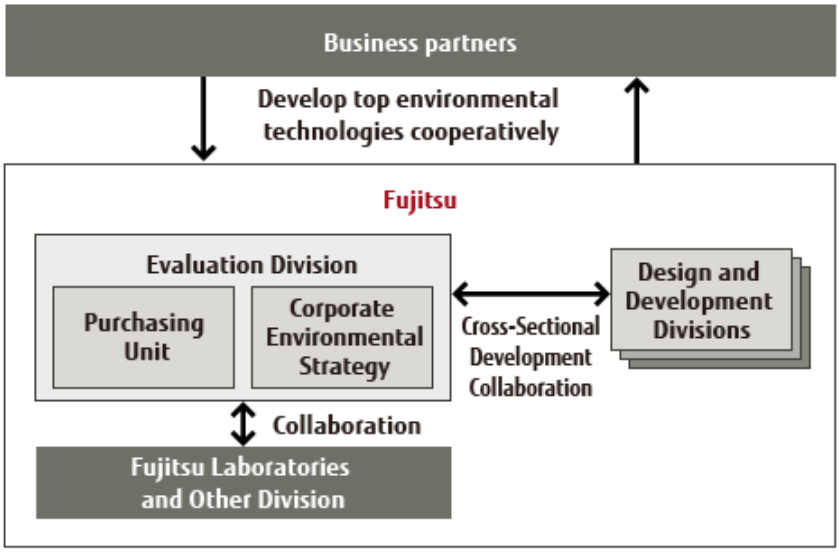
Fujitsu asks its business partners to propose environmental technologies and materials to achieve Green Policy Innovation, our project to help customers reduce their environmental impact using Green ICT.

Proposals made by business partners are evaluated in our evaluation divisions and exceptional proposals are forwarded to our design and development divisions with recommendations for timely and extensive adoption. All information is stored in an internal database that can be accessed and further developed across Fujitsu. We remain committed to proactively adopting outstanding environmental technologies and materials, and will continue to develop and promote products with exceptional environmental performance.

Please refer to the following link for details on the types of environmental technologies Fujitsu is seeking and how proposals are made.

- About the Environmental Technologies Proposal Application

Infrastructure for Achieving Green Policy Innovation



Environmental Considerations in Transportation

We are promoting the rationalization and streamlining of logistics in our whole global supply chain and working to reduce transport-related CO2 emissions.

Promoting Global Green Logistics Activity

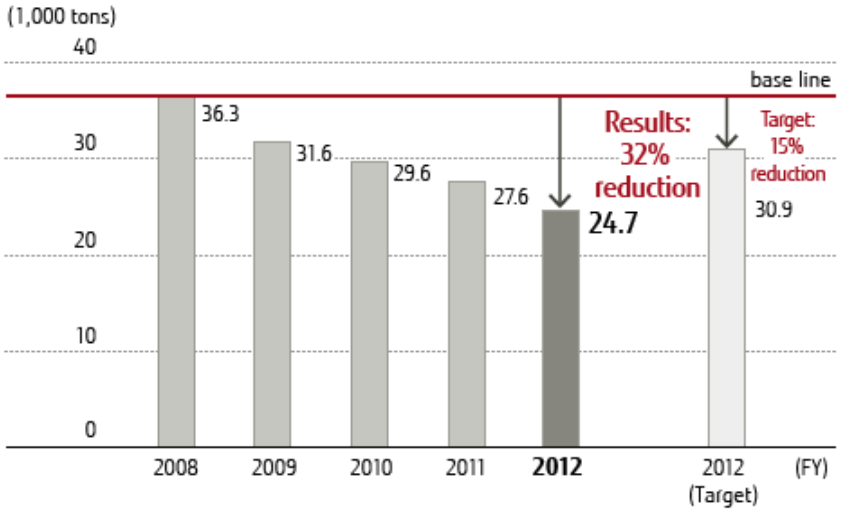
We are working on Green Logistics Activities that aim to reduce CO2 emissions associated with transportation through coordination among the logistics divisions of all Group companies, and cooperation between manufacturing and sales divisions.

In FY 2011, we created the Fujitsu Group Green Procurement Standards which encapsulate Fujitsu's ideas on green logistics and its specific requests to suppliers. The purpose of these standards is to promote green logistics activities with our suppliers and with the foundation provided by these standards, we will strengthen our relationships with suppliers and strive to reduce the environmental burden associated with distribution across the whole supply chain.

- Fujitsu Group Green Logistics Procurement Direction Edition1.0 [In Japanese] [253KB]

Toward achievement of the goal to reduce CO2 emissions from domestic transport by 15% below FY 2008 levels by the end of FY 2012, as proposed in the Fujitsu Group Environmental Protection Program (Stage VI), we expanded modal shifts and reduced the number of trucks used. As a result, by the end of FY 2012, we were able to achieve an emission of 24,700t, a reduction of 32% (this includes fluctuations in amounts distributed and the effects of the March 2011 earthquake) compared to FY 2008.

Trends in CO_2 Emissions from Domestic Transportation in Japan (Fujitsu Group)



Fujitsu Group Environmental Action Plan(Stage VII)

Under the Fujitsu Group Environmental Action Plan(Stage VII), the Group is promoting green logistics activities for transportation within Japan, for intra-region transportation outside of Japan, and for international transportation to achive the goal of reducing CO2 emissions per sales from logistics over 4% compared to FY 2011.

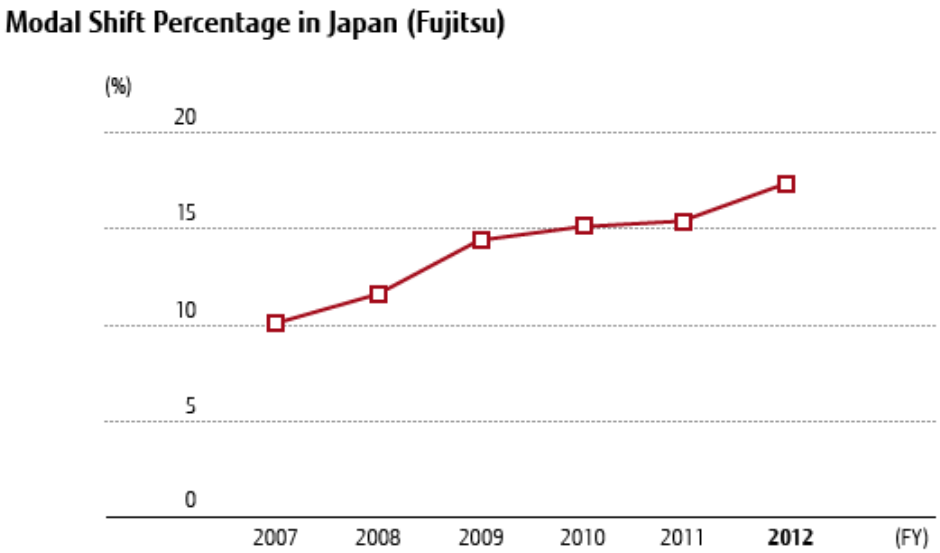
Expanding Modal Shifts

The Fujitsu Group is working to reduce CO2 emissions through an ongoing modal shift. This entails effectively utilizing rail transport and shifting from air to ground transport in everything from parts procurement to product transport.

In FY 2012, we widened our use of rail transport by expanding the rail-based shipment of mobile phones for not only NTT DOCOMO, INC. and KDDI Corp., but also SoftBank Mobile Corp.

In the area of personal computers for individuals, we shifted, in October 2012, from truck to rail transport for shipments from Fujitsu Isotec Limited and Shimane Fujitsu Ltd. to the Tokyo Distribution Center.

Since acquiring the Eco Rail Mark certification in March 2010, we have continued to vigorously promote the use of rail transport.



FDK Corporation is working to reduce CO2 emissions from logistics by shifting from trucks to rail transport for the movement of goods between its Sanyo Plant (Yamaguchi Prefecture) and Kosai Plant (Shizuoka Prefecture). Products are shipped from the Sanyo Plant to the Kosai Plant, which then uses rail on return trips to send returnable boxes back to the Sanyo Plant. FDK also changed the way products and returnableboxes are packed and loaded to improve loading efficiency.

Products loaded into a rail container

Reducing Truck Numbers

In August 2012, we began to share truck space with other electronics manufacturers for shipments of products to the distribution centers of major retailers in some parts of Japan. This increased truck loading efficiency and reduced the number of trucks used.

We also reduced the number of trucks for delivering service parts by changing the logistics networks among parts centers in Tokyo, Minami Machida, Chiba, Yokohama area and delivery to Customer Engineers (CEs).

International Transport Initiatives

The Fujitsu Group began measuring CO2 emissions from international transport in FY 2008, and is now actively working to reduce CO2 transport emissions.

Our activities include modal shifts (shifting from air to ocean transport), shortening transport distances, raising container loading ratio, and reducing air transport frequency.

Initiatives at Group Companies

At major group companies in Europe, North America and APAC, we began in FY 2011 to measure CO2 emissions from international and regional transport. We have been promoting green logistics activities with logistics partners and with the cooperation of customers.

Using Low-Emission Vehicles to Cut Shipping-Related CO2 Emissions

U.K.-based Fujitsu Services (FS) began in 2012 to use fuel-efficient low-emission vehicles equipped with idling-stop functions as delivery vehicles for service parts.

Low-emission vehicles

Cutting Distance Traveled and Increasing Loading Efficiency by Reducing Emergency Shipments

By adjusting service part inventories at parts centers, FS has also reduced the distance traveled to deliver service parts. When parts are not needed immediately, shipments are rescheduled to the next day to concentrate shipments. Furthermore, appropriately sized vehicles are used to increase loading efficiency.

Promoting Modal Shifts (Shifting to ground transport from air transport)

Hong Kong-based Fujitsu PC Asia Pacific Ltd. (FPCA) has begun to shift from air transport to ground transport for the shipment of procured items from Shanghai to Hong Kong. This not only reduces CO2 emissions but also helps to lower costs.

Packaging and Container Loading Improvements

When Fujitsu Australia (FAL) needs to ship multiple, separate products to customers, it consolidates the packaging on a customer-by-customer basis. This activity helps reduce use of packing material and improve transport efficiency.

Reducing the Use of Cardboard and other Packaging Materials

To reduce the whole environmental burden of the distribution process, we are promoting 3R*1 efforts for packaging products and parts.

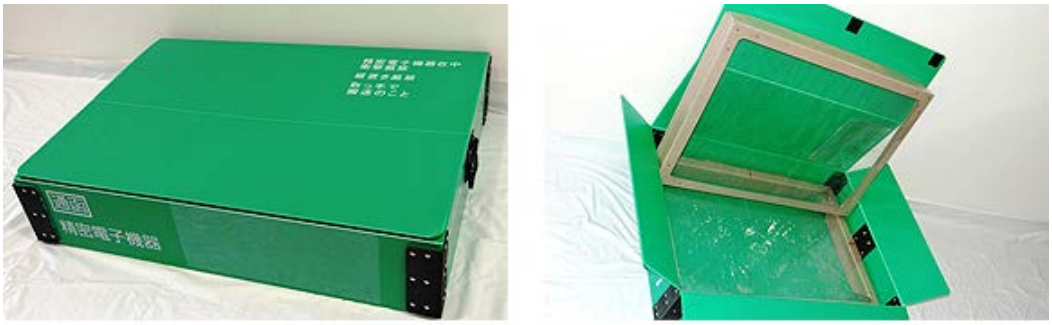
Reducing the Use of Cardboard and other Packaging Materials

The Fujitsu Group has been replacing cardboard and other materials used to package products with reusable alternatives. This has reduced the use of cardboard and other cushioning packaging materials.

In addition, returnable containers have been adopted for use in shipping products to and from Fujitsu's service centers. The use of reusable packaging materials, rather than single-use cardboard and foam cushioning materials, reduces waste and lowers the burden on the environment.

*1 3R:
Reduce, Reuse, and Recycle

- Eco-Friendly Packaging



Returnable container for IA Servers

Highlight —Benefitting to Customers and Society—

Providing Cloud Services to Support Organizations Working to Conserve Biodiversity

Human beings live on blessings – water, food, wood, fiber, etc. – derived from countless other living beings. The Earth's abundant biodiversity, however, is rapidly being lost as a result of habitat destruction, ecosystem changes, and other impacts of human activities.

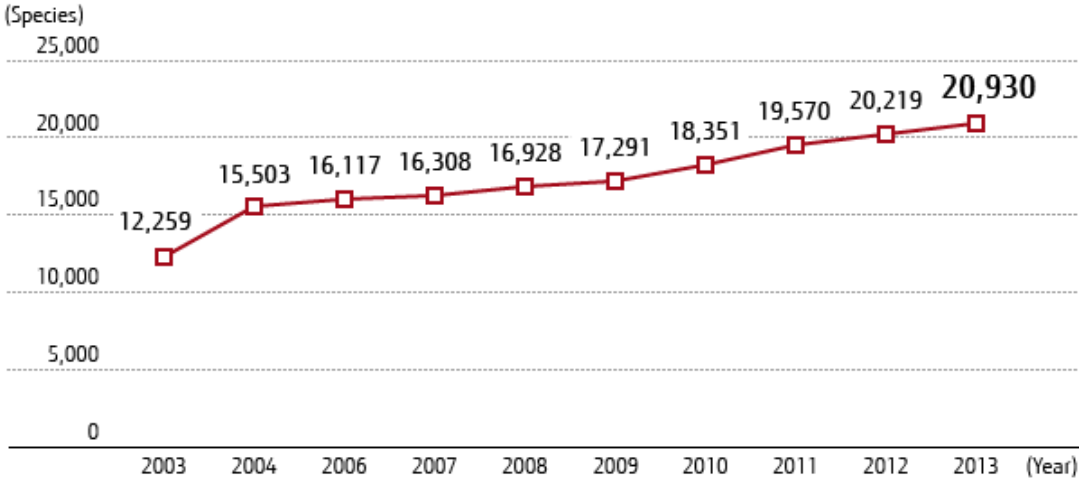
As national and local governments, NPOs, and various other actors expand their activities aimed at conserving biodiversity, Fujitsu is providing cloud services free of charge to support their work.

Rapidly Declining Biodiversity

At present, it is estimated that there are as many as 30 million species of life on the Earth, and human life enjoys the benefits of that diversity. In 2012, however, it was determined that the number of the world's species in danger of extinction had risen to 20,930, from 12,259 ten years earlier. The speed of species extinction, in other words, is accelerating*1.

With species extinction a growing concern, the Convention on Biological Diversity's 10th meeting of the Conference of the Parties (COP10) adopted the Aichi Targets on global biodiversity*2. To stop the loss of biodiversity by 2020, these targets call for national and local governments, NPOs, and various other actors to take effective, immediate action.

Global Trend of Threatened Species



Source: Prepared by Fujitsu based on the "Numbers of threatened species by major groups of organisms (1996-2013), " published by the International Union for Conservation of Nature (IUCN).

*1 Threatened species:
Please refer to the "Numbers of threatened species by major groups of organisms (1996-2013)." [108KB] published by the IUCN.

*2 Aichi Targets:
Formerly known as the "Strategic Plan for Biodiversity 2011-2020."

Fujitsu Providing ICT to Promote Greater Efficiency in Biodiversity Surveys

Issues on the Frontlines of Biodiversity Conservation

Employing a PDCA cycle – including stages like formulating a biodiversity conservation strategy and checking the effectiveness of biodiversity actions – requires detailed and accurate knowledge of the distribution of the conservation area's wild plants and animals.

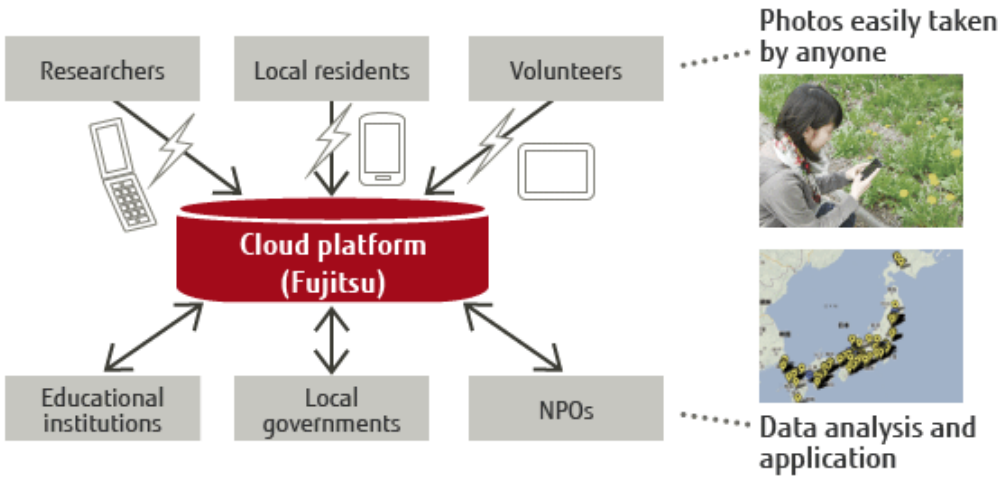
For example, investigating the invasive and native distributions of a certain plant traditionally required that experts physically go to the study location and record data, such as the names of species, locations, and times. That approach, however, faces limitations in terms of the people who can carry out the study and the geographic area that can be covered. It also involves the tedium of numerous procedures that must be followed for collecting and sorting information.

Building a Scheme for Broad-Based Public Participation in the Cloud

Fujitsu, therefore, wanted to have conservation workers apply ICT to reduce the tedium and number of procedures involved in biodiversity surveys, and increase the efficiency and effectiveness of conservation activities.

We created the Mobile Photo System cloud service, which allows anyone to easily conduct surveys using Fujitsu's cloud platform, and a mobile phone or smartphone, from anywhere. With this service, a person conducting a survey photographs an animal or plant and sends it by email to an address where the photograph is added to a database. Experts can then examine the data and identify species, and the data can be viewed and analyzed on a map. This service enables broad-based public participation in the provision of data.

Overview of a Mobile Photo System and Cloud Services



Cloud Services are being Used by Various Organizations Working to Conserve Biodiversity

Fujitsu began providing these services, in 2011, to the Aichi University of Education for a nationwide survey of dandelions and to Kawasaki City for a survey of vegetation along the Tama River, and, in 2012, to Kawasaki City for conservation activities in the Kuriki Greenery Conservation Area.

In addition, to promote biodiversity conservation initiatives, we began in April 2013 to expand provision of these services by making them available to local governments, universities and other educational institutions, NPOs, and other organizations through a public application process. Large amounts of data have already been collected and posted on the following web sites.

- Biological Information Collection System (in Japanese)

VOICE

Use of Fujitsu Systems for a Citizen-Participation Natural Environment Baseline Survey for Formulation of a Biodiversity Regional Strategy in Kurashiki City
Yasuhiro Miyake, Environmental Affairs Policy Section, Kurashiki City

Kurashiki City is in the midst of formulating a regional biodiversity strategy, and we believe this system will make it easy to gather from the citizenry-at-large the biodiversity information needed to formulate our strategy. We have only just begun, so we have no concrete results yet, but we have been covered by the media several times and have seen signs that the system, as one that involves citizens, is generating a great deal of interest. There are expectations that using the new system will lead to some kind of new discovery.

VOICE

National Census of Bumblebees
Masakado Kawata, Graduate School of Life Sciences, Tohoku University

We are conducting a survey to determine the current distribution of bumblebees, which play a very important as pollinators. We have received media coverage from not only local but also national newspapers and many people have taken an interest in our survey. In less than a month, we have already received 300 data submissions and are anxious to see just how the total will rise. The request to send images with GPS data, however, has proven to be a hurdle for many people. The percent of people sending photos without GPS data to a different address is high, so it would be nice to have a special app for those cases.

VOICE

Animal and Plant Distribution Survey and Species Monitoring by the Tokyo College of Environment at its Fieldwork Location
Masaaki Kohmaru, President, Tokyo College of Environment

Information on when, where, and the kind of species identified is indispensable for understanding nature, and obtaining this information constitutes the valuable work of the naturalist. Our aim – to gather biological information on all species in Japan – is ambitious, and, as an initial step, we have chosen 30 animal and plant species and begun to conduct a survey at our fieldwork location in the town of Masuho in Yamanashi Prefecture. We are looking forward with great anticipation to the results of our combination of state-of-the-art technology with the primitive survey approach of applying all five senses to physically find species.

Survey with Participation Open to All

The Mobile Photo System cloud services allow anyone to participate in our survey by using a smartphone or mobile phone. The accuracy of the survey will rise with the amount of data collected, and we welcome participation from as many people as possible, so that we can ultimately implement conservation activities that are best-suited for their purposes. We also believe that going out into the field to look for species will encourage participants to feel closer to them and think about the decline in biodiversity.

Activities of Organizations Using the Mobile Photo Cloud Service (No particular order)

No.	Activity and Organization Name	Activity Summary
1	**Search for dandelions!** Aichi University of Education, Mikio Watanabe's laboratory	This project is gathering data on and creating a map showing the extent of dandelion distribution in Japan. In addition, by having participants come into contact with the natural environment and learn about dandelions, the dandelion survey is also an opportunity for participants to develop their understanding of the importance of biodiversity conservation.
2	**Tama River Vegetation** Kawasaki City	Through citizen, government, and business cooperation, vegetation found along the Tama River is being recorded and information is being shared to investigate the characteristics of vegetation in this riverine environment.
3	**Kawasaki City Kuriki Greenery Conservation** Kawasaki City and Fujitsu's Corporate Environmental Affairs Unit	A woodland is being rehabilitated based on the Kuriki San'noyama Special Greenery Conservation Area Management Plan created by Kawasaki City and Fujitsu's Kawasaki Plant. The change brought about to the ecosystem through rehabilitation work is being studied.
4	**Hakusan Non-native Plant Species Initiative** Chubu Regional Environment Office of the Ministry of the Environment, Hakusan Ranger Office for Nature Conservation	With the help of volunteers, this activity is identifying and eliminating distributions of plantain and other invasive plant species in Hakusan National Park. National and prefectural governments, and the management association are working together to deal with the difficult problem of eliminating invasive species.
5	**Survey of Living Things in the Chita Peninsula Green Belt** Intertwined Life Project Office	On the Chita Peninsula of Aichi Prefecture, businesses, students, and local residents are working to protect the area's plants and animals by conducting a survey and creating a map of Chita Peninsula plants and animals. Businesses are aiming to work together to build an ecosystem network for the entire Chita Peninsula.
6	**Search for Kurashiki Plants and Animals** Kurashiki City	In this activity, any citizen-participation survey will be conducted to gather information on plants and animals in the Okayama Prefecture city of Kurashiki. The activity is intended to determine the status of the natural environment within the city and enlighten citizens. A Regional Biodiversity Strategy will be developed.
7	**National Census of Bumblebees** Graduate School of Life Sciences, Tohoku University	Focusing on the important role played by flower-visiting insects in ecosystems, this activity is enlisting the cooperation of people throughout Japan in recording data on the activities of bumblebees found in the field. It will not only clarify the movements of bumblebees but also enlighten citizens.
8	**Woodland Plants and Animals in Tsushima** MIT	To conserve the unique ecosystem of Tsushima, this activity is conducting a citizen-participation survey of plants and animals in areas hosting the Tsushima leopard cat and other endangered species. It will investigate human activities and the woodland environment.
9	**General Survey of the Natural Environment of the Tokachi Coastal Wetlands** The Wetlands Institute of Northeastern Asia	This activity is undertaking a general survey (employing the Flowerthon method) of the natural environment of the Tokachi coastal wetlands, which are registered under the Ramsar Convention on Wetlands of International Importance. The survey is being conducted from multiple perspectives, including human activities and cloud observations.

No.	Activity and Organization Name	Activity Summary
10	**TCE Animal and Plant Species Habitat Distribution Survey** Tokyo College of Environment	Using a plant and animal survey tool as a field work curriculum, this activity seeks to enlighten students and test the practicality and extensibility of the tool. The activity will foster human resources who will engage in natural environment conservation in the future.
11	**Honeybees were here! Great Survey** A Thousand Flowers for Bees, an NPO registered in Japan	This activity is investigating how people relate to nature via honeybees. It is enlisting the cooperation of citizens, schools, beekeepers, and others in conducting a survey of the flower-visiting activity of honeybees in areas including the Tokyo cities of Kunitachi and Machida, and the town of Fujimi in Nagano Prefecture. It is also using the familiar honeybee as a vehicle for contributing to environmental education.
12	**Woodland Living and Biodiversity** ECOPLUS, an NPO registered in Japan	In this activity, a citizen-participation survey is being conducted of insects, amphibians, birds, and other forms of life in Uonuma City, Niigata Prefecture. By also covering medicinal plants, the survey is investigating the relationship between people and woodlands, as well.

Conservation of Biodiversity

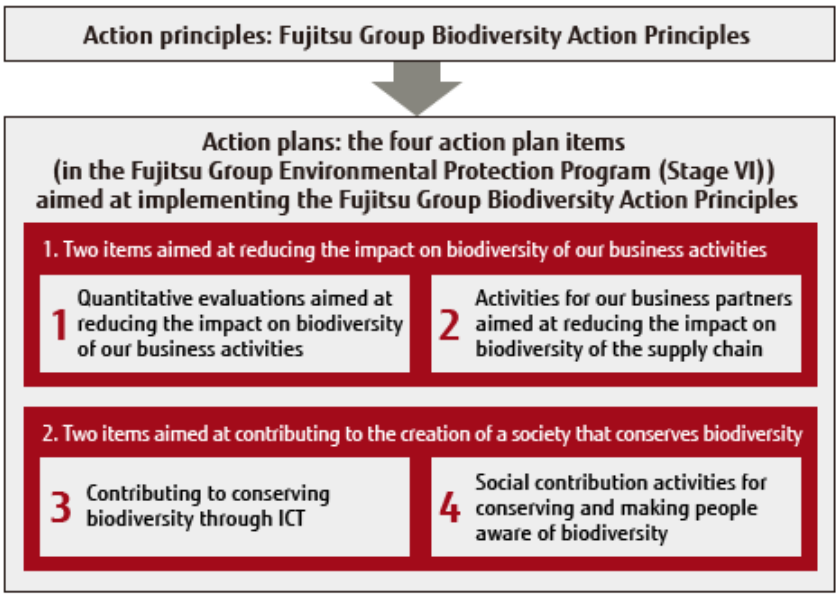
We have set conservation of biodiversity as one of our most important priorities, and are promoting activities toward that end.

Our Approach

Only the bounty of nature makes our daily lives possible. From the provision of food and forests, to climatic regulation, water purification and recreation, the value to humankind of the functions nature performs is incalculable. These functions are called "ecosystem services," and they depend on biodiversity. The recent significant deterioration of ecosystems makes conserving biodiversity an urgent necessity to ensure sustainable ecosystem services.

Given this background, we set conserving biodiversity as one of our most important priorities and became a signatory to the leadership declaration for the Business and Biodiversity Initiative at the ninth meeting of the Conference of the Parties (COP 9) to the Convention on Biological Diversity (CBD), held in May 2008. Furthermore, we set a goal of promoting specific efforts by 2020 for all of the items proposed in the leadership declaration.

To achieve that goal, we settled on the Fujitsu Group Biodiversity Action Principles in October 2009. In this, we introduced both (1) Pursuing the Conservation of Biodiversity and the Sustainable Use of Natural Resources in Business Activities and (2) Contributing to Building a Society that Ensures the Conservation of Biodiversity and the Sustainable Use of Natural Resources as themes for future efforts. We then established four related action plan items in the Fujitsu Group Environmental Protection Program (Stage VI), which started in FY 2010, and have diligently worked to implement them.



- Fujitsu Group Biodiversity Action Principles

Furthermore, toward the achievement of two corporate citizenship targets "social challenges" and "social activities" under the Fujitsu Group Environmental Action Plan(Stage VII), which began in FY 2013 - employees are working with various organizations to apply ICT to the monitoring of species; working to conserve forests and woodlands near populated areas, and advancing other biodiversity conservation activities.

Initiatives in FY 2012

Quantitative Evaluation of Impacts on Biodiversity

To determine how our business activities impact biodiversity, we constructed the Fujitsu Group Biodiversity (BD) Integration Index in FY 2010 and have been evaluating the degrees to which our main business areas impact biodiversity. In FY 2012, we determined that this impact had declined by 9.6% compared to FY 2009, because of a reduction in our energy resource consumption. Going forward, we will continue to use the BD Integration Index as an indicator of the biodiversity impacts of our business activities.

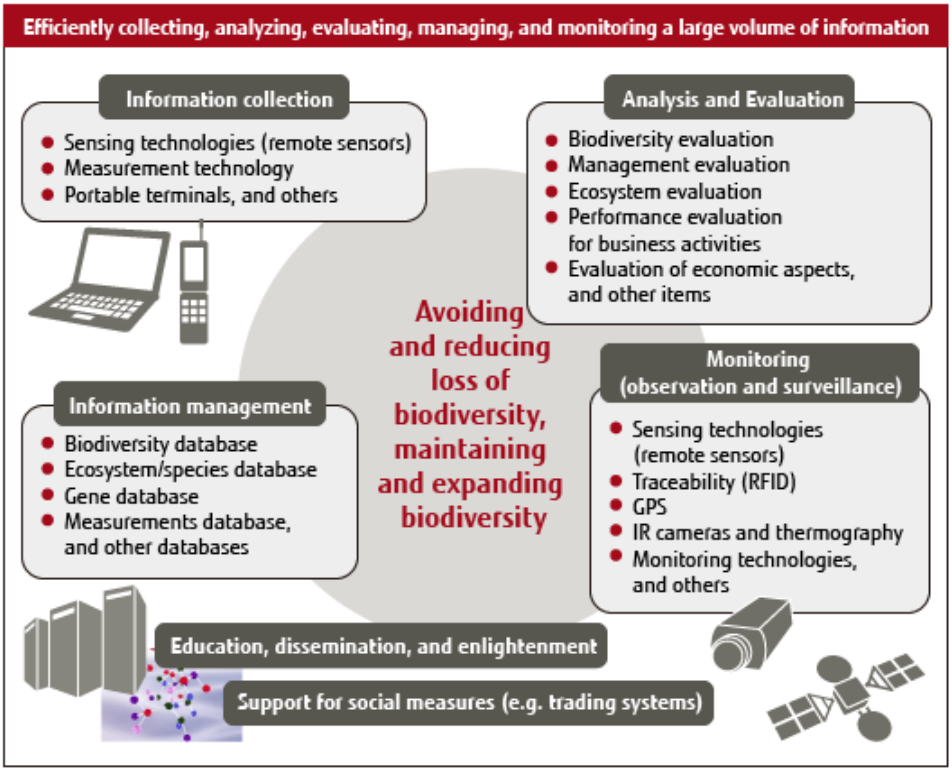
Advancing Biodiversity Conservation Activities

To contribute to the building of a society that conserves biodiversity, Fujitsu has engaged in activities that use ICT to advance biodiversity conservation activities. Examples include the use of a multi-sensing network to protect the Japanese crane and the application of voice recognition technology in research on the Blakiston's fish owl. Furthermore, in pursuit of the Fujitsu Group Environmental Action Plan (Stage VI) goal of undertaking environmental and social contribution activities (once a year in Japan and once every three years overseas), we have also conducted rainforest revitalization activities on the Malaysian island of Borneo, forest and woodland conservation activities throughout Japan, and other biodiversity conservation and education activities at all 434 of our business sites across the globe.

Contributing to the Conservation of Biodiversity Using ICT

The use of ICT makes it possible to avoid or reduce losses of biodiversity, and help to maintain or expand populations of species. It does this by enabling the proper gathering, analysis and evaluation, and management of complex, wide-ranging data relating to the conservation of biodiversity. Applying ICT in this way, the Fujitsu Group has developed a mobile photo system, which it is using to support a nationwide survey of dandelions and a survey of vegetation along the Tama River. Meanwhile, at a vineyard and winery in Yamanashi Prefecture, we are using a multi-sensing network to help boost productivity in agriculture, a form of the ecosystem service of provisioning.

The Possibility of Conserving Biodiversity through ICT



In FY 2012, we embarked on the following efforts applying ICT to help conserve biodiversity.

- Fujitsu provides free cloud service to ten organizations involved in biodiversity conservation activities [Press Release]
- Fujitsu uses ICT to support study of Blakiston's fish owl habitat in eastern Hokkaido [Press Release]

Other Ongoing Fujitsu Group Initiatives:

- Agricultural support activities at a vineyard and winery in Yamanashi Prefecture (in Japanese)
- Japanese crane conservation activities near the Kushiro wetlands
- Survey of vegetation along the Tama River using a mobile photo system

Biodiversity Conservation and enlightenment activities

Promoting Tropical Rainforest Restoration Activities in Malaysia

To contribute to biodiversity conservation from a global perspective, we have implemented tree planting activities in Thailand, Vietnam, and Malaysia. Currently, at the Fujitsu Group Malaysia Eco-Forest Park, we continuously call for volunteers to assure that the saplings planted grow into a tropical rainforest, and we also perform supplementary plantings and maintenance.

Performing forest maintenance work

At the Fujitsu Group Malaysia Eco-Forest Park, located in the Malaysian state of Sabah on the island of Borneo, we have been pursuing a tropical rainforest revitalization project with the support of a Sabah state forest development public corporation since 2002. This project is used as a place where people from the Fujitsu Group can come together from across the globe to work on the conservation of biodiversity. In FY 2012, Fujitsu Group employees and their families, a total of 64 people from seven countries – the U.K., Holland, Australia, China, Canada, Malaysia, and Japan – participated in this project under the slogan, "shaping tomorrow with you," the Group's brand promise. Together with local university students, students and parents from a school for Japanese, and others numbering approximately 100 in all, they worked up a good sweat performing supplementary plantings and maintenance. They also toured a tropical rainforest and mangrove forest to learn about biodiversity. Though unaccustomed to working outside in temperatures exceeding 30℃ was extremely trying, involvement in an activity for protecting a tropical rainforest was of immense significance for the participants.

Planting trees

Local stakeholders and Fujitsu employees

Fujitsu CoWorCo Limited conducted its Eco-Forest Campaign in FY 2009 and FY 2010, donating funds to the Fujitsu Group Malaysia Eco-Forest Park based on the volume of used toner cartridges it collected. In August 2011, funds collected in FY 2009 were used to construct a summer house where Eco-Forest Park workers can take breaks, and, in November 2012, funds collected in FY 2010 were used to donate 6,000 seedlings and establish the FUJITSU COWORCO'S FOREST. Employees of Fujitsu CoWorCo visited the site in November 2012 to plant trees for the company's forest.

The FUJITSU COWORCO'S FOREST, established in November 2011

- Tropical rainforest revitalization activities at the Fujitsu Group Malaysia Eco-Forest Park (in Japanese)

Tree Planting Activities in Brazil

Fujitsu do Brasil Ltda (FBR), the Fujitsu Group company in Brazil, embarked on a tree planting activity in June 2012 to restore greenery to devastated land. 23 employees participated in the first year of this project. For the participants, most of whom had never participated in tree planting, this activity was very rewarding and an excellent opportunity to learn about biodiversity conservation. The next two years of the project will be spent nurturing the growth of the planted seedlings.

Tree planting site

Tree planting participants

Green Curtain Initiative

To help conserve biodiversity and prevent global warming, the Fujitsu Group pursues its Green Curtain Project at business sites throughout Japan every summer. In FY 2012, 33 Fujitsu Group business sites participated in the project.

A green curtain is made by having climbing plants – like bitter melon, morning glory, or gourd – grow along windows and walls. By adding greenery where there was none, green curtains contribute to local biodiversity and block the sun's hot rays to provide shade that mitigates indoor temperature increases. When bitter melons are grown, the harvest is distributed for free within the company or used by the employee cafeteria to make special summertime dishes. In addition to promoting local production and local consumption, green curtains provide employees with the satisfaction of seeing seedlings they have planted grow day-by-day.

Case Study

Fujitsu Semiconductor Ltd. Akiruno Technology Center

Fujitsu Semiconductor Ltd.'s Akiruno Technology Center created a green curtain that consisted of bitter melon and sponge gourd plants, and was 4.5m high and 60m wide. To make this curtain, employees actively sought to use repurposed items. For example, as a structure upon which the plants could climb, they used netting for the culturing seaweed and, as planter boxes, they used wafer cases no longer needed for their original purpose. As a planting medium, they used soil with plenty of organic matter, which they collected from the center grounds, and fertilizer they made from cafeteria waste. Harvested bitter melons were used by the cafeteria to prepare a dish for employees in an on-site local production / local consumption initiative. In November 2012, the Akiruno Technology Center was named the winner of an award for excellence in the organization category of the city of Akiruno's FY 2012 Green Curtain Contest.

Activity Period: April – September 2012
Activity Location: Akiruno City, Tokyo

Green curtain at Fujitsu Semiconductor Ltd.'s Akiruno Technology Center

Green curtain contest awards ceremony

Case Study

Fujitsu Solution Square

Fujitsu Solution Square has been growing plants for the Green Curtain Project since 2008. This year, the fifth year of this effort, it is growing a total of 336 plants, including bitter melon, sponge gourd, and morning glory. These will be used to green an area now expanded to 260㎡. Fujitsu Solution Square has also made its own original system for using rainwater collection nets to gather rainwater and store it in planter tanks, and increased the number of soil moisture sensors to appropriately water plants. With increasing numbers of employees participating in activities like planting, weeding, and harvesting, green curtain activities at Fujitsu Solution Square have also become an important venue for communication among employees.

Fujitsu Solution Square's green curtain

Activity Period: May 14 - October 2012
Activity Location: Ota Ward, Tokyo

Case Study

Fujitsu Oita Systems Laboratory

In FY 2012, Fujitsu Oita Systems Laboratory, in pursuing its Green Tunnel Project, planted bitter melon, sponge gourd, and morning glory and was later rewarded with a prize in the organization category of Oita Prefecture's FY 2012 Green Curtain Photo Contest. The Green Tunnel helps to save energy through the shade it provides and the transpiration effect, and is soothing to walk through. The large number of bitter melons harvested from the Green Tunnel was distributed to employees, while harvested Japanese morning glory seeds were provided to various regions as part of a "morning glory bank" initiative. Going forward, we aim to use future initiatives to further expand the green curtain movement.


Fujitsu Oita Systems Laboratory's green curtain

Activity Period: May 11 - September 2012
Activity Location: Oita City, Oita's

- Green Curtain Initiative: Case Study Archives

Contributing to Spreading these Efforts Throughout Society

We participate in external organizations such as the Business and Biodiversity Initiative (B&B) and the Japan Business Initiative for Biodiversity (JBIB) and contribute to the spread of biodiversity conservation efforts throughout society.

At the ninth meeting of the Conference of the Parties (COP 9) to the Convention on Biological Diversity (CBD), B&B inaugurated the event with the signing, by more than 40 companies from around the world, of the "leadership declaration." By publishing their best practices, these companies promote the conservation of biodiversity and sustainable use.

JBIB is a group in which over 30 Japanese companies from a wide range of businesses participate. Its purpose is to deploy activities that contribute to conserving biodiversity by aiming for dialogue between stakeholders and other companies based on the results of joint research. Fujitsu is involved with research activities and tool development for this effort.

Environmental and Social Contribution Activities

All employees of the Fujitsu Group recognize the importance of the global environment and, to assure that the next generation inherits a beautiful planet-wide environment, they contribute to their local community through activities based on the following three pillars: regional contributions, nature conservation and environmental education.

FY 2012 Initiatives

Fujitsu Group business sites throughout the world pursued environmental and social contribution activities, achieving the Fujitsu Environmental Protection Program (Stage VI) goal (1 activity per year in Japan, and 1 activity every three years at overseas sites) at all 434 covered business sites. Results of activities are being shared over the "Act-Local-System" information sharing system, and being used to improve or plan new activities at individual business sites.

Regional Contributions

To maintain local environments and to provide pleasing environments for local residents, we implement regional contribution activities, such as cleanup activities and planting activities at our offices, stores, and plants throughout Japan, as well as at our overseas sites.

We also participate in everyday social contribution activities, such as collecting used plastic bottle caps, stamps and prepaid cards.

Case Study

Cleanup of Kushida Shrine (Kyushu Branch, Hakata-ku, Fukuoka City, Fukuoka Prefecture)

The Kyushu Branch carried out a cleanup of the Kushida Shrine and the surrounding area on December 9, 2012. Employees and their family members, numbering 49 in all, participated.

Kushida Shrine is revered by the people of Hakata as a home for deities who can bestow eternal youth and long life, as well as commercial success. The Hakata Gion Yamakawa festival, which, this year, began early on the morning of July 15, is an exhilarating event that starts at Kushida Shrine.

As they go back to work at the beginning of each new year, local people go to Kushida Shrine and pray for commercial success. To have the shrine ready for the new year and with wishes for the coming new year in mind, a year-end cleanup was organized. This year will be the 10th cleanup, which has now become a winter tradition for the Kyushu Branch.

Cleanup activity at Kushida Shrine

Participating employees and their families

Case Study

Neighborhood Cleanup Activities
(Fujitsu Advanced Solutions Limited, Kanagawa-ku, City of Yokohama, Kanagawa Prefecture)

Fujitsu Advanced Solutions Limited, as a part of its area contribution activities regularly holds cleanup activities for the area around its offices. In FY 2012, it held these activities 13 times with participation by a total of 141 employees.

Cleanup activity

Participating employees

Case Study

Contributing to the Local Area through a Computer Recycling Scheme
(FUJITSU SERVICES HOLDINGS PLC(UK&I), United Kingdom Highlands, Scotland)

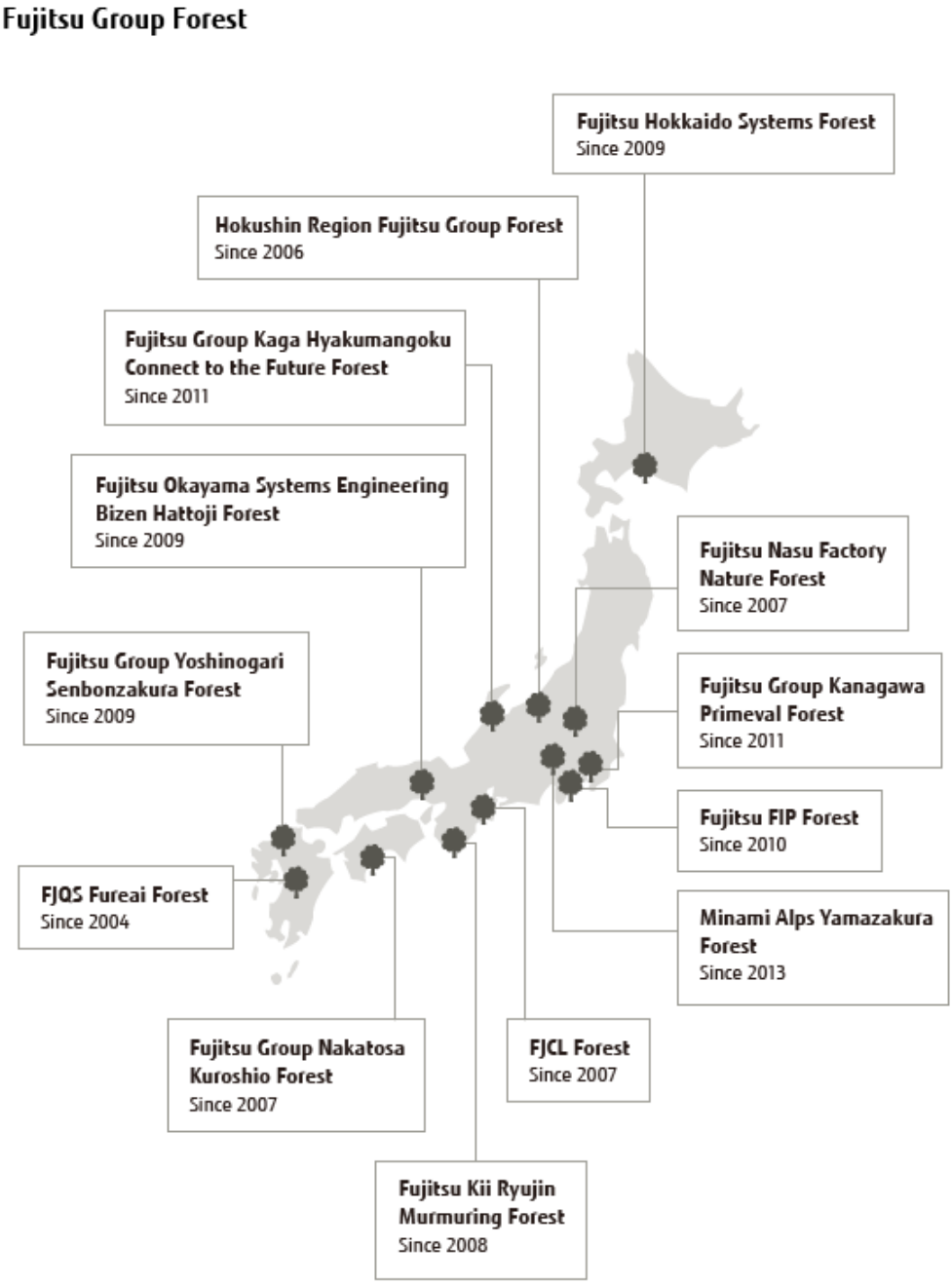
FUJITSU SERVICES HOLDINGS PLC(UK&I) pays a refurbishing company £300,000 a year to refurbish ICT devices that are no longer being used. It then donates these devices to companies helping to revitalize the local area, children's support groups, and others. This activity prevents the improper disposal of ICT devices and contributes to the local community by providing it with ICT devices.

Nature Conservation

The Fujitsu Group is working on forest conservation, urban woodland preservation, seashore cleanup and similar activities to promote the maintenance and recovery of biodiversity and to defend nearby natural environments.

Forest Conservation Activities

The Fujitsu Group carries out forest conservation activities throughout the world. In Japan, 13 locations participate in the "Corporate Forest" program promoted by local governments and implement "Fujitsu Group Forest" conservation activities. The Fujitsu Group also engages in tree planting activities, mainly on business site grounds, that help to conserve biodiversity.



Case Study

Conservation of the Fujitsu Group Kaga Hyakumangoku Connect to the Future Forest

At the Fujitsu Group Kaga Hyakumangoku Connect to the Future Forest, located in the Ishikawa Prefecture Forest Park (Tsubata Town, Ishikawa Prefecture), we conduct forest maintenance activities within unimproved forests and woodlands to deepen understanding of forests and improve the environment in ways that help prevent global warming.

In FY 2012, we trimmed grass in June and August, installed grass and tree cuttings to help prevent erosion in October, and planted 100 kobushi magnolia and mountain maple seedlings in November. A total of 340 people participated in these four activities. Going forward, we will continue to plant trees that will bring color to the mountains in each of the four seasons and create a delightful forest for people who visit.

Planting trees at the Fujitsu Group Kaga Hyakumangoku Connect to the Future Forest

Case Study

Planting Trees in Beijing (BEIJING FUJITSU SYSTEM ENGINEERING CO., LTD.)

As part of its natural environment conservation activities, Beijing Fujitsu System Engineering Co., Ltd. (BFS) conducted tree planting activities in a suburb of Beijing on March 23, 2012. Around one hundred BFS headquarters employees and their families participated, planting a total of 108 seedlings.

BFS employees and family members who participated in tree planting

Tree planting activities

Satoyama Preservation

In Japan today, urban woodlands (or Satoyama) are plagued by a variety of problems, such as abandoned farmland and an increase in invasive species, causing the original Satoyama ecosystem to gradually disappear. The Fujitsu Group undertakes a number of activities aimed at protecting urban woodlands in places like natural parks and greenbelt preservation areas.

Case Study

Participation in Tokyo Greenship Action

Since 2005, Fujitsu has been participating in the Tokyo Greenship Action activities promoted by the Tokyo Metropolitan Government.

In the Kiyose Matsuyama Green Conservation Area, located to the southwest of Kiyose City, 20 Fujitsu group employees and family members came together in November of FY 2012 to repair a wooden fences, and make signs and nest boxes. This conservation area includes mixed woodlands where Japanese red pine is the main species, a young forest of black locust, grassland, and woods with other species, as well. The fundamental goal of Tokyo Greenship Action in this area is to protect to the extent possible the richly biodiverse natural space represented by the lowland forest of Japanese red pine, a species that has become a rarity in urban areas.

Tokyo Greenship Action

Environmental Education and Enlightenment Training Outside the Fujitsu Group

Environmental Education for the Next Generation

In Japan, the Fujitsu Group visits schools to give lessons, in order to make local adults and children aware of the importance of the environment. In FY 2012, we gave lessons at 77 locations, including elementary schools, junior and senior high schools, and community centers, for 4,238 people. Lessons touched on topics such as the "PC 3R" exercise (in which students learn about 3R while dismantling a PC), the My Earth card game (in which students study global environmental problems), and how electricity is produced and ways to measure when it is being wasted. As of April 2013, 79 instructors are conducting lessons in various areas throughout Japan.

Over the seven years since FY 2006, we have conducted 329 lessons for 18,487 people. In addition to the lessons mentioned above, Group companies, plants, and other facilities, have used the special opportunities afforded by their operations to conduct their own lessons on the environment.

On-Site Environmental Classes in FY2012

Class Theme	Classes Given	Participants
PC 3R exercise (learning about 3R while dismantling a PC)	63	3,511
My Earth (card game that teaches about global environmental problems)	7	408
How electricity is produced and how to measure when it is wasted	6	289
Other	1	30
Total	77	4,238

Chouhouji Elementary School, Nagaokakyo City, Kyoto Prefecture (Personal computer recycling)

Ueki Junior High School, Nogata City, Fukuoka Prefecture (Personal computer dismantling)

Hamagawa Elementary School, Shinagawa Ward, Tokyo (My Earth)

Wakamatsu Elementary School, Sagamihara City, Kanagawa Prefecture (Production of electricity)

Breakdown of On-Site Environmental Classes in FY2012

Date		Requesting Party	Content	Participants
May 8	Tu.	Takaoka Junior High School, City of Kanazawa, Ishikawa Prefecture	Production of electricity	23
May 13	Su.	"Fureai Environmental Exhibit" Numazu Plant Environmental Event	PC dismantling	30
June 5	Tu.	Yokosuka Otsu High School, Kanagawa Prefecture	PC dismantling	16
June 8	Fr.	Minamino Kimita Elementary School, Hachioji City, Tokyo	PC recycling	113
June 15	Fr.	Higashi Azuma Elementary School, Sumida Ward, Tokyo	My earth	69
June 21	Th.	Kohoku High School, Tokyo	PC dismantling	70
June 23	Sa.	Fujitsu Hokuriku Systems Environmental Lecture	PC recycling	10
June 29	Fr.	Hamagawa Elementary School, Shinagawa Ward, Tokyo	My earth	40
July 3	Tu.	Nakano Second Junior High School, Nakano Ward, Tokyo	My earth	94
July 6	Fr.	Ankouji Elementary School, Takatsuki City, Osaka	PC recycling	72
July 11	We.	Tsukuichuo Elementary School, Sagamihara City, Kanagawa Prefecture	PC recycling	23
July 21	Sa.	Junior High School Attached to Minami High School, City of Yokohama Kanagawa Prefecture	PC dismantling	31
July 23	Mo.	Tamon Elementary School, Setagaya Ward, Tokyo	PC recycling	14
July 24	Tu.	Higashi Fukasawa Elementary School, Setagaya Ward, Tokyo	Production of electricity	26
July 25	We.	Consumer Co-Operative Kobe Seikatsu Bunka Center	PC dismantling	32
		Todoroki Elementary School, Setagaya Ward, Tokyo	PC recycling	49
July 26	Th.	Summer Seminar, Takezono Nishi Elementary School, Tsukuba City, Ibaraki Prefecture	PC recycling	24
July 30	Mo.	FSL Mie Plant Employee Family Tour	PC dismantling	35
Aug. 1	We.		PC dismantling	30
July 30	Mo.	Inagi City Silver Jinzai Center	PC recycling	12
July 31	Tu.	General learning event for Kawasaki City elementary schools	PC recycling	43
Aug. 2	Th.	EPOC visiting environmental lecture	PC dismantling	39
		FSL Akiruno TC Family plant tour	PC dismantling	15
Aug. 4	Sa.	Summer Seminar, Tomigaokakita Junior High School, City of Nara	PC dismantling	25
Aug. 6	Mo.	"Bikkuri! Eco 100 Best 2012" Takashimaya Department Store, Kyoto Location	PC dismantling	12
Aug. 10	Fr.	"Bikkuri! Eco 100 Best 2012" Takashimaya Department Store, Shinjuku Location	PC dismantling	20
Aug. 11	Sa.	Recycle Kobo Rokko	PC dismantling	23

Date		Requesting Party	Content	Participants
Aug. 14	Tu.	Fujitsu Kawasaki Plant Employee family tour	PC dismantling	23
Aug. 23	Th.	Kansai University Hokuyo Junior High School	PC dismantling	2
Aug. 24	Fr.	Fujitsu Numazu Plant Summer Vacation Parent-Child Eco Classroom	PC dismantling	46
Aug. 28	Tu.	Children's Club Onojo City, Fukuoka Prefecture	PC recycling	16
Sep. 5	We.	Tokai University Urayasu Senior High School	PC dismantling	40
Sep. 11	Tu.	Ueki Junior High School, City of Nogata, Fukuoka Prefecture	PC dismantling	81
Sep. 15	Sa.	The Children's University of Kawagoe	PC dismantling	77
Sep. 26	We.	Oono Elementary School, Kumamachi Elementary School, Town of Ookuma, Fukushima Prefecture	PC recycling	42
Sep. 29	Sa.	Matsugaya Elementary School, City of Hachioji, Tokyo	PC recycling	40
		Festival 2012 at Fujitsu Nasu Plant	PC dismantling	35
Oct. 11	Th.	Masaki Elementary School, City of Hashima, Gifu Prefecture	PC recycling	175
Oct. 14	Su.	Nibu Elementary School, City of Higashi Kagawa, Kagawa Prefecture	My earth	30
Oct. 16	Tu.	Tado Junior High School, City of Kuwana, Mie Prefecture	PC recycling	51
Oct. 21	Su.	Aizuwakamatsu City Environmental Festival	Others	30
Oct. 23	Tu.	Sonobe High School, Kyoto Prefecture	PC dismantling	75
		Takada Elementary School, Town of Aizumisato, Fukushima Prefecture	PC recycling	73
Oct. 26	Fr.	Sunamachi Elementary School, Koto Ward, Tokyo	Production of electricity	80
Oct. 27	Sa.	Gosho Minami Elementary School, City of Kyoto, Kyoto Prefecture	PC recycling	47
Oct. 31	We.	Ota Sakuradai High School, Tokyo	PC dismantling	57
		Musashino Higashi Elementary School	PC recycling	71
Nov. 6	Tu.	Kodaira City Second Junior High School, Kodaira City, Tokyo	PC dismantling	25
Nov. 10	Sa.	Junior High School Attached to Oizumi High School, Tokyo	PC dismantling	120
Nov. 16	Fr.	Minamino Elementary School, Hachioji City, Tokyo	PC recycling	90
Nov. 20	Tu.	Tsutsujigaoka Elementary School, Inagawa Town, Hyogo Prefecture	PC recycling	131
Nov. 27	Tu.	Nishi Akiru Elementary School, Akiruno City, Tokyo	PC recycling	61
Nov. 29	Th.	Toyono Elementary School, Kasukabe City, Saitama Prefecture	PC recycling	90
Nov. 30	Fr.	Masugata Junior High School, Kawasaki City, Kanagawa Prefecture	Production of electricity	30

Date		Requesting Party	Content	Participants
Dec. 3	Mo.	Atsugi Elementary School, Atsugi City, Kanagawa Prefecture	PC recycling	152
Dec. 6	Th.	Kawakami Elementary School, City of Yokohama, Kanagawa Prefecture	PC recycling	66
		Shinjo Minami High School, Yamagata Prefecture	PC dismantling	22
Dec. 10	Mo.	Jissen Gakuen Junior High School	PC dismantling	59
Dec. 14	Fr.	Takakura Elementary School, Kasugai City, Aichi Prefecture	My earth	122
Dec. 17	Mo.	Toyotama Junior High School, Nerima Ward, Tokyo	PC dismantling	270
Dec. 18	Tu.			
Dec. 18	Tu.	Jonan Elementary School, Aizuwakamatsu City, Fukushima Prefecture	PC recycling	79
Dec. 20	Th.	Miyakami Elementary School, Hachioji City, Tokyo	PC recycling	36
Jan. 8	Tu.	Takasuna Elementary School, Fujisawa City, Kanagawa Prefecture	My earth	35
Jan. 10	Th.	Shincho Elementary School, Kawasaki City, Kanagawa Prefecture	Production of electricity	52
Jan. 16	We.	Kuwabe Elementary School, Kuwana City, Mie Prefecture	PC recycling	41
Jan. 17	Th.	Kume Elementary School, Kuwana City, Mie Prefecture	PC recycling	70
Jan. 19	Sa.	Arakawa Ward Third Junior High School, Arakawa Ward, Tokyo	My earth	18
Jan. 23	We.	Chouhouji Elementary School, Nagaokakyo City, Kyoto Prefecture	PC recycling	25
Jan. 24	Th.	Jujodai Elementary School, Kita Ward, Tokyo	PC recycling	18
Jan. 25	Fr.	Fujinoki Junior High School, City of Yokohama, Kanagawa Prefecture	PC dismantling	18
Jan. 29	Tu.	Yamoto Junior High School, City of Yokohama, Kanagawa Prefecture	PC dismantling	52
Feb. 1	Fr.	Kawasaki International Eco-Tech Fair 2013	PC dismantling	49
Feb. 2	Sa.	Fujitsu Kanagawa Branch Tour	PC dismantling	27
Feb. 12	Tu.	Wakamatsu Elementary School, Sagamihara City, Kanagawa Prefecture	Production of electricity	78
Feb. 14	Th.	Tomioka High School, City of Susono, Shizuoka Prefecture	PC dismantling	129
Feb. 25	Mo.	Hakone Junior High School, Town of Hakone, Kanagawa Prefecture	PC dismantling	76
Feb. 27	We.	Kashiwai Elementary School, CIty of Ichikawa, Chiba Prefecture	PC recycling	105
Mar. 7	We.	Nagoya Keizai University Takakura High School	PC dismantling	11
Total				4,238

Case Study

Instructor for Toyama Environmental Challenge 10 (Environmental Education Class)

Toyama Fujitsu Limited provided an instructor for the Toyama Environmental Challenge 10 project Toyama Prefecture and the Toyama Environmental Foundation have been carrying out since FY 2004 as part of their efforts to educate the prefecture's citizens on the topic of preventing global warming.

Toyama Environmental Challenge 10 is an initiative in which Toyama Prefecture's 10-year olds (4th graders) learn about the problem of global warming, decide on a goal, work with their families to achieve that goal, and then evaluate their results. In a school class, a Toyama Fujitsu employee explained to students the basics of global warming prevention and what individual households can do about it. In FY 2012, three lessons were held - on June 23 and 27, and October 31 – for two classes of approximately 35 students.

TOPICS

"Birdie for Green" Tree Planting Activity in Miyagi Prefecture

The Fujitsu Ladies women's pro golf tour sponsored by Fujitsu is working to revitalize forests and conserve biodiversity through the "Birdie for Green*1" program.

Based on the 2011 "Birdie for Green" program, a tree planting activity was held at a prefectural forest in Taiwa, a town in Kurokawa-gun, Miyagi Prefecture in June 2012. Part of the motivation for this activity was to support efforts to recover from the Great East Japan Earthquake. Fujitsu Group employees in the Tohoku Region, however, wanted to go beyond contributing money; they wanted to take some kind of concrete action. Seventy-four employees and their families, therefore, worked up a sweat earnestly planting trees. For the participants, the activity became a concrete experience of the idea that steadily doing what one can does help to support recovery and conserve the global environment.

Tree planting activity participants

*1 Birdie for Green:
One of the environmental conservation initiatives of the Fujitsu Ladies pro golf tour, the Birdie for Green program contributes to forest revitalization and biodiversity conservation by converting golfers' scores into numbers of seedlings and donating funds to purchase them.

Fujitsu Environmental Action Plan (Stage VII) Objectives

Based on results achieved to date, the Fujitsu Group will strive to work with society and undertake activities as a good corporate citizen.

In working with society, we will provide financial, technical, human resource, and other support for initiatives that address biodiversity and other social and environmental challenges. In pursuing this objective, we will support the initiatives of a diverse array of actors, including NPOs / NGOs, educational institutions, local governments, and citizens' organizations. Support means, for example, technical support for biosurveys needed by a local government to formulate and implement a local biodiversity strategy; financial support, or monitoring system or other technological support, to help an NPO protect rare species or implement global warming projects; and human resource support for the social contribution programs of an international institution. Working to fulfill this objective, we will expand our support for the activities of a diverse array of stakeholders.

As for the objective of undertaking activities as a good corporate citizen, we will support the social activities our employees volunteer their time for with other elements of society. The focus will be social contribution activities employees implement themselves, which could include forest and woodland conservation activities; tropical rainforest revitalization activities; coastal, river, or area cleanup activities; the holding of classes or other types of educational support; sponsorship of charity events, or disaster relief. Achieving this objective will have the effect of expanding the contribution activities undertaken by employees.

These objectives were determined from the perspective of sustainability. Activities will be promoted globally to solve not only environmental issues but social problems defined broadly.

Environmental Management

We are continuously working to improve our ISO 14001*1-based environmental management systems and to promote group-wide environmental management.

*1 ISO 14001:
Environmental Management Systems (EMS) standard determined by the International Organization for Standardization (ISO). Certification is granted to environmentally aware organizations that develop systems for ongoing reductions in their environmental footprint.

Fujitsu Group's Environmental Management Systems

Fujitsu has constructed environmental management systems (EMS) based on the ISO 14001 international standard and is promoting environmental improvement activities across the Group. After acquiring ISO 14001 certification for Japanese consolidated subsidiaries at the end of FY 2004, we expanded this effort to include overseas subsidiaries and acquired global integrated certification in FY 2005.

By constructing EMS along with a global supply chain, the Fujitsu Group has further strengthened its global governance. This also allows the Group to promote even more efficient and highly effective environmental activities; not only grasping our achievement status for the Fujitsu Group Environmental Action Plan but also collecting a wide variety of information from all Group companies, such as legal compliance, emergency response, environmental communication and preservation activities, and conducting management reviews.

EMS Implementation and Operational Status

As of the end of FY 2012, Fujitsu has acquired global integrated ISO 14001 certification for a total of 82 companies, including 12 overseas Group companies. In addition, our 25 overseas companies which are not production base sites are constructing and operating an EMS in line with Fujitsu Group environmental policies. In this way, we have established an environmental management structure across the whole Group.

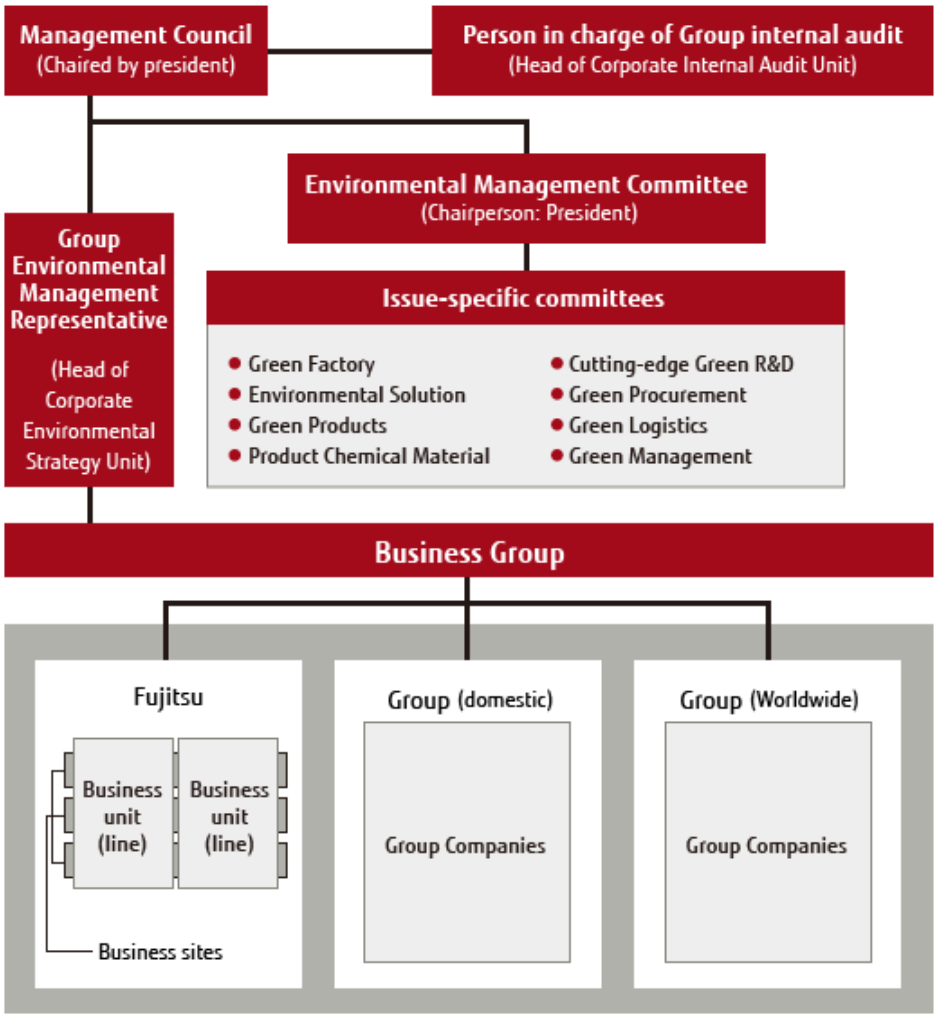
Environmental Promotion Structure

The final decisions on environmental management are taken at meetings of the Management Council, chaired by the president. The Environmental Management Committee, which also is chaired by the president, discusses all manner of issues related to environmental management. Its purpose is to strengthen the Fujitsu Group's environment-related governance, raise the level of the Group's environmental management, and consider medium-to-long term issues.

Under the Environmental Management Committee, we form issue-specific committees depending on the importance of the environmental issues at hand . These committees make it possible to deal with issues in a manner that enables both the swift uptake of action approaches throughout the Group, and achievement of efficiency and speed improvements.

The Environmental Management Committee's deliberations are also shared with the whole group and we have created a Global Environment Management Working Group (WG) under the Green Management Committee as an organization to strengthen our EMS activities through promoting an understanding of the results of the committee to encourage proactive actions. In the Global Environment Management WG, we assemble people from across the various business groups and inform them of items that we request be handled by the various divisions and group companies to unify our global information sharing.

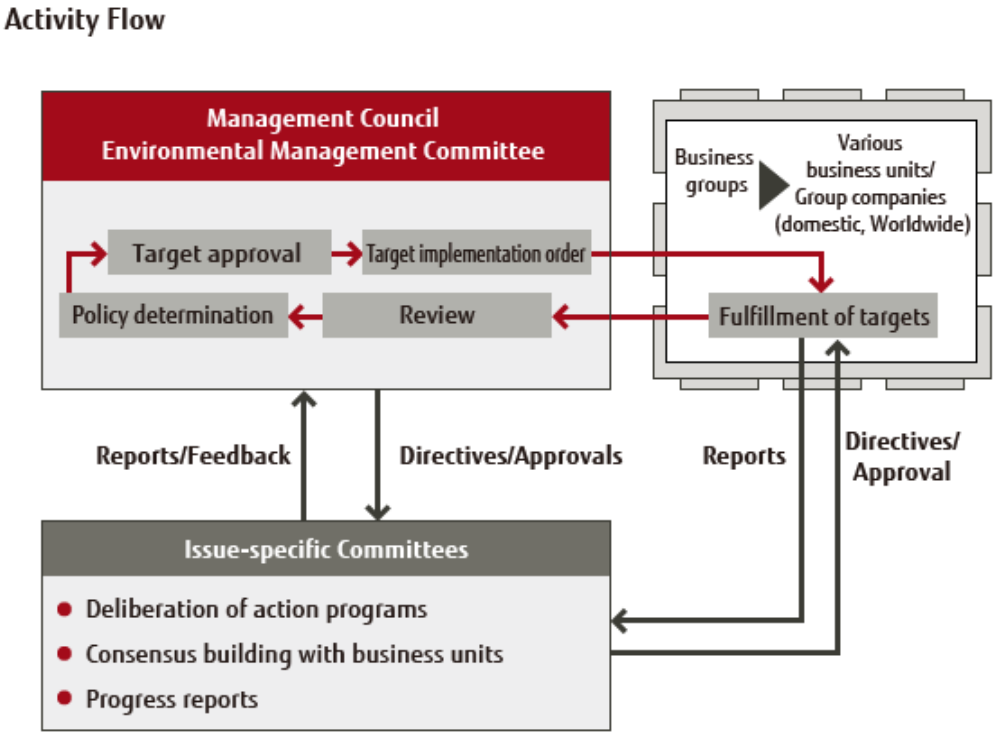
Environmental Management Framework (as of March 2013)



Activity Flow

The Environmental Management Committee proposes, deliberates, and decides upon environmental matters relating to all Group companies. It determines the directions to be taken for energy usage volume, CO2 emissions reductions, ways to address environmental risk, and other medium-to-long term matters important to environmental management at an overall level. The Environmental Management Committee also conducts environmental management reviews and has approval authority for the Fujitsu Group Environmental Action Plan.

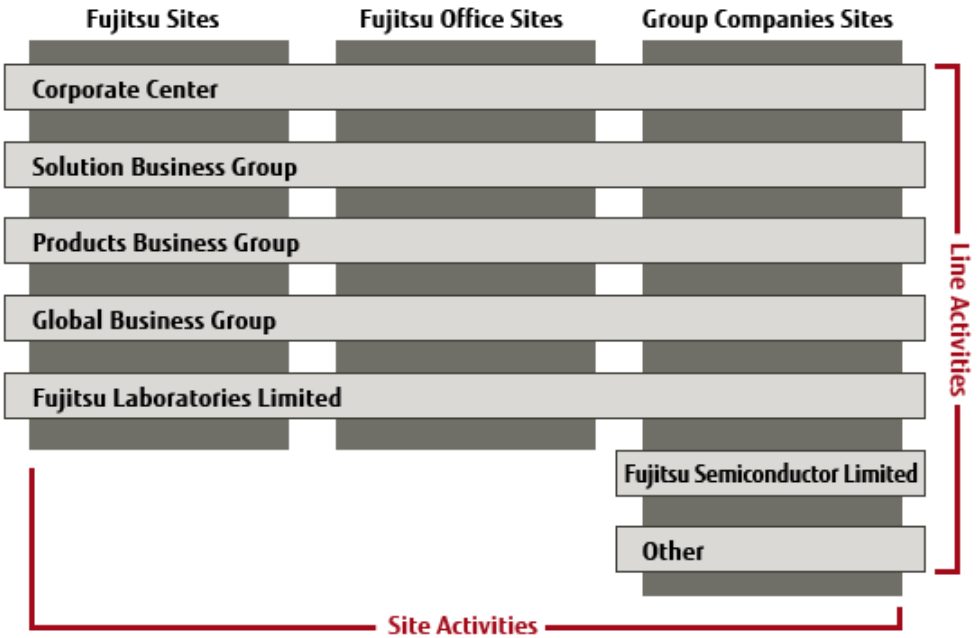
The issue-specific committees are subcommittees set up by the Environmental Management Committee to make a dedicated response to specific issues. Their main role is to discuss targets for the Environmental Action Plan check on the progress being made for each target and promote further activity toward achieving them. Issue-specific committees' progress reports are approved and directed by the Environmental Management Committee.



Management Based on the Line/Site Matrix Structure

The Fujitsu Group carries out its environmental management along the same lines as its corporate management. To this end, we are pursuing environmental management within a matrix structure combining (1) "line activities" directly tied to the business operations of various divisions and companies (including eco-friendly product development and the expansion of environmental contribution solutions) and (2) "site activities" to tackle common themes affecting each factory or business location (such as energy conservation and waste reduction).

In this way, along with minimizing the environmental burden of our own business activities, we promote reductions in environmental burdens more generally through the sale of our products and services.



- Environmental Management : Case Study Archives

Continuous Improvements to Environmental Management Systems

Efforts to Improve Environmental Performance

To improve our environmental management performance, we are implementing performance evaluations (ISO14031-compliant). Performance evaluations provide comprehensive feedback on matters such as progress in achieving targets, compliance with laws and regulations, and operating and management conditions. In FY 2012, we completed evaluations of all 23 of the Fujitsu Group's principal production sites.

Implementing Environmental Audits

Internal Audit Implementation and Results

Internal audits are directed by the Corporate Internal Audit Unit, which is unaffiliated with any line organization, to ensure that our internal audits are fully objective and independent. The Corporate Internal Audit Unit allocates internal auditors who belong to Fujitsu or Fujitsu Group companies.

In FY 2012, we carried out internal audits for factories, offices, and other facilities at 405 locations in Japan and 16 overseas from June 2012 to January 2013. For this audit, we scrutinized the trends and results with the FY 2011 internal audit and the external audit and found four major points to be focused on: (1) adherence to compliance, (2) achievement of environmental objectives and targets, (3) complete and thorough operational control and (4) confirmation of the status of activities being carried out by the organization that has created and operates the EMS tailored to the purpose of fulfilling all requirements of the ISO14001 standard. Also, we continuously implement mutual audits between different sites, a program we have been working on since FY 2009 to share experience among different divisions and, thereby, invigorate environmental activities.

As a result of these internal audits, we discovered 277 findings, of which none were classified as major, 26 as minor, and 251 were observations.

The number of findings decreased by 70 from the previous year. And the fact that the number of findings per audit is declining year-by-year suggests that our environmental management system has taken hold. In terms of content, 45% involved adherence to compliance, operational control, environmental objectives, targets and programs. The matters concerning compliance with various laws involved deficiencies in notifications and outsourcing agreements concerning industrial waste, and omissions from industrial waste manifests. Matters related to operational control involved deficiencies in control of waste and chemical substances. Matters related to environmental objectives and targets involved deficiencies in programs and progress management charts.

To enhance environmental activities in overseas locations, we conducted internal audits at 13 sites, including all production sites, in FY 2012. Among the indicated matters, 50% were related to "Emergency preparedness and response", "Control of documents", and "Objectives, targets and programs". At a more specific level, "Emergency preparedness and response"refers to the lack of procedures for determining what aspects of an emergency situation are clearly environmental and a lack of records of training. "Control of documents" refers to the lack of clear indications of the degrees to which prior fiscal year objectives and targets were achieved. There were also findings of an unclear separation between objectives/targets and operational control. Enhancement of local internal audit functions, however, reduced by 62.5% the number of non-conformities detected by external audits, a marked improvement from prior results.

To further enhance environmental management at overseas business sites, we conducted internal auditor training for employees responsible for advancing environmental matters. This training was held at 13 sites, for approximately 180 participants.

Internal audit being performed at an overseas site

Training for internal auditors

External Audit and Results

In FY 2012 an external audit was carried out from September 2012 through January 2013. In Japan, we were audited by the Japan Audit and Certification Organization for Environment and Quality (JACO). JACO identified no matters for the Fujitsu Group as a whole. In addition, JACO made 67 observations for individual Group companies. Outside Japan, we were audited by DNV BUSINESS ASSURANCE JAPAN K.K. DNV also identified no matters for the Fujitsu Group as a whole, but they identified 1 major non-conformity and 5 minor non-conformities,and made 25 observations. We have completed remedying these matters as of the end of FY 2012. Audit findings were shared throughout the Group, and we are confirming the status of these matters in the FY 2013 internal audit.

An ISO 14001 regular post-certification surveillance audit was conducted in FY 2012 and approval for maintenance of our certification was granted in February 2013.

Status of Environmental Compliance

While the Fujitsu Group committed no major violations of environmental laws and caused no accidents that had any major impact on the environment in FY 2012, there were 6 events in which laws were violated. Most of these were (1) violations related to industrial waste processing manifests or outsourcing contracts, or (2) deficiencies in notification documents.

Legal violations were greatly reduced through the horizontal sharing of information on FY 2011 findings and through training targeting personnel responsible for industrial waste. But there we still had violations, so we will move forward with thorough self-checks. With regard to industrial waste, in particular, we are developing a new approach and will select outstanding waste processors to eliminate administrative violations related to waste from offices.

ICT-based EMS

To improve the efficiency and visibility of environmental management, the Fujitsu Group makes aggressive use of unique environmental management tools that take full advantage if ICT.

EMS Applying ICT

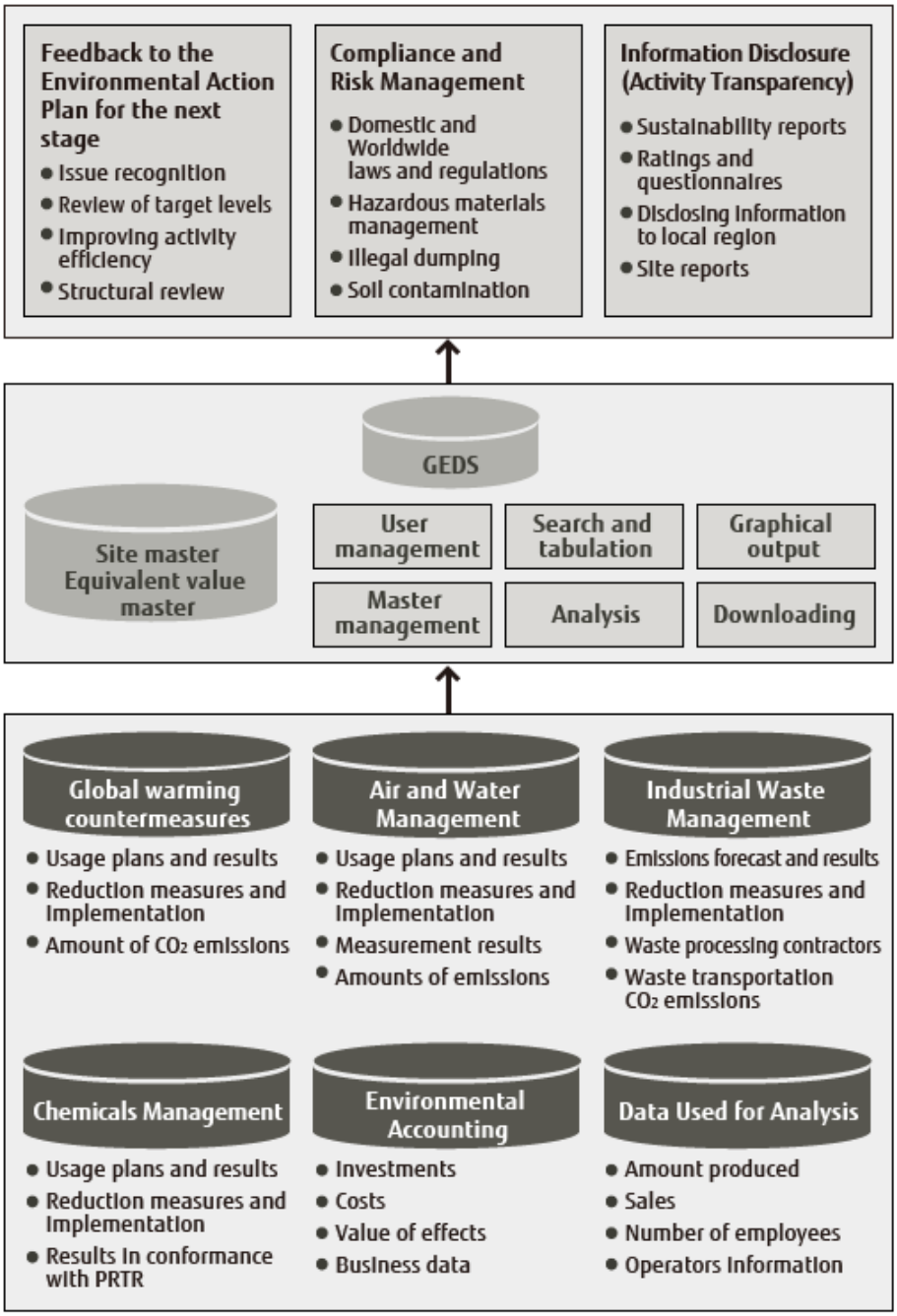
The Fujitsu Group uses proprietary environmental management tools that make the most of ICT. For example, we use the Global Environment Database System (GEDS), which can centrally manage data on plans, results, implementation status, and other matters for Fujitsu Group business sites throughout the world, and the ISO 14001 Green Management System (GMS), which supports EMS operation by centrally managing data on compliance and risk management conditions, to make environmental management efforts more efficient and visible.

In addition, the communications platforms of all Fujitsu Group companies are used for EMS operations. Video conference systems, for example, are used for regional seminars and other forms of smart communication for EMS operation.

Use of the Global Environment Database System

The Fujitsu Group uses the Global Environment Database System (GEDS) to collect the environmental burden (performance) information for Fujitsu Group companies and business sites and to manage plans, results, and policy information uniformly.

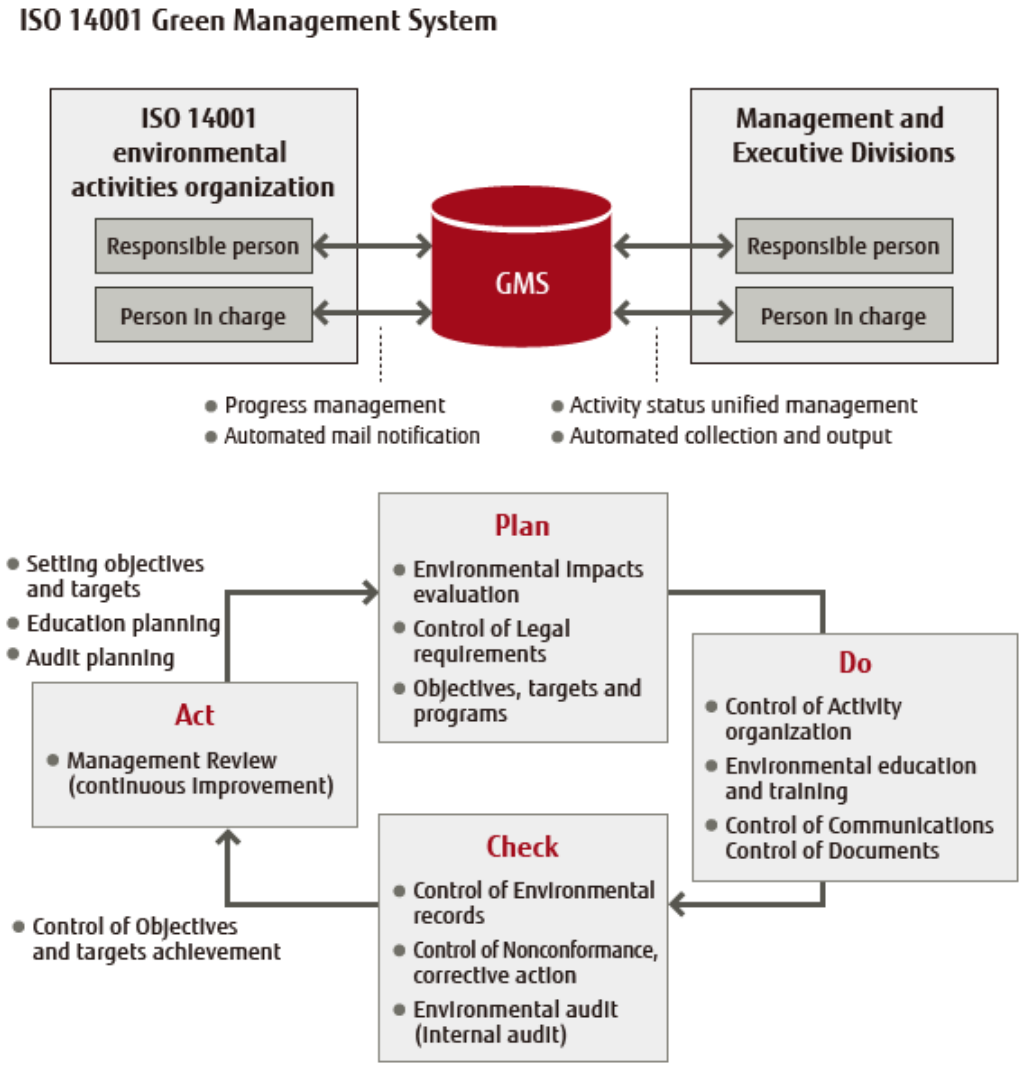
Global Environment Database System



Use of the ISO 14001 Green Management System

The ISO 14001 Green Management System (GMS) is used to exercise unified control over the operational status of the EMS, and to monitor the situation involving improvements to, and legal compliance with, nonconformance issues notified at environmental audits; communications activities; direct and indirect effects and risk/countermeasure levels identified in environmental impact assessments; the setting of environmental management objectives and targets.

This enables corrective measures and objectives to be soundly managed, and effectively ensures continual improvement of the activities with reduced risks.



In-House Educational and Enlightenment Activities

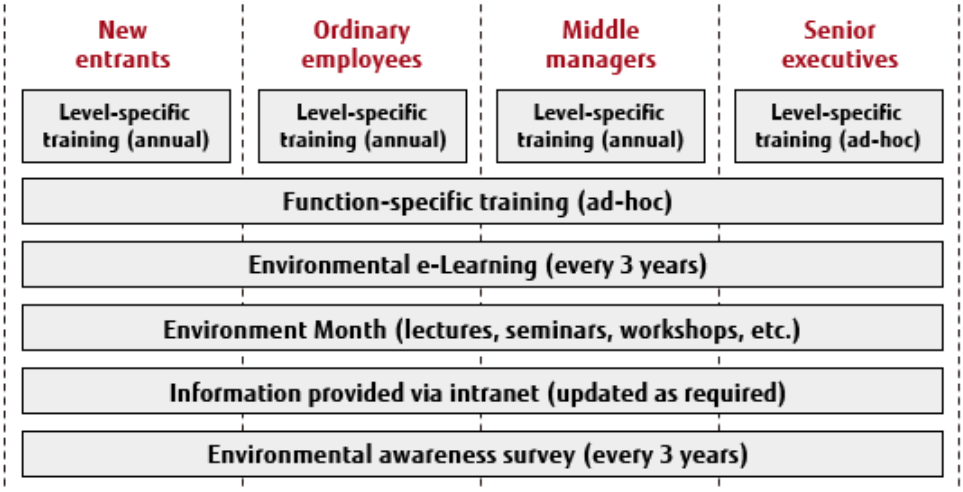
The Fujitsu Group believes heightened awareness, and the initiatives of individual employees are critical to the pursuit of environmental management and, therefore, we implement various forms of environmental education and enlightenment.

Our Environmental Education System

To ensure that our environmental management takes firm root through the participation of all employees, the Fujitsu Group believes it essential to inculcate and raise the environmental awareness of each and every employee to a point where it links to actual practice. Based on this belief, the Group has been carrying out comprehensive environmental education and enlightenment training since 1995, based on the system described below.

In addition to having all of our employees undertake environmental e-learning once every three years to acquire a basic understanding of environmental management, we conduct environmental education for new entrants, ordinary employees, middle managers and senior executives, according to their job responsibilities. On top of this, customized environmental training is also delivered to individual areas of the business such as sales, systems engineering (SE), software development, procurement, logistics, manufacturing, hardware design and development, and R&D. We are implementing internal auditor, waste management, and other training as professional education for employees in charge of work related to the environment.

Fujitsu's Environmental Education System



Environmental e-Learning for All Group Employees

To help ensure that individual employees understand the Fujitsu Group's thinking on environmental management and encourage them to engage in environmentally conscious initiatives in their work, and to facilitate our practice of environmental management in conformity with the ISOI14001 international standard and promote general knowledge, understanding, and practice of the Fujitsu Group Environmental Action Plan, we conduct environmental e-Learning for all Group employees. A new version of environmental e-Learning is planned for implementation given that FY 2013 is the first year of the Fujitsu Group Environmental Action Plan(Stage VII).

Environmental e-Learning program screenshot

Environmental Education by Division

Recycling Center Tours for Sales and Design Divisions

Environmental business seminars were held on May 23 and May 28, 2013 for sales divisions. The purpose of these seminars was to have participants observe with their own eyes Fujitsu's recycling initiatives and experience firsthand the dismantling of products and separation of materials, to improve their business skills by having them share in an understanding of environmentally conscious manufacturing. We have conducted these seminars every year since 2009 at Fujitsu recycling centers located throughout Japan and have so far hosted over 400 participants.

Workshops for Sales Divisions

On June 26 and July 9, 2012, we conducted workshops on the theme of contributing to the green development of customers. These workshops were held for sales divisions and were attended by 43 participants.

After considering the topic of "starting points for customers and starting points for the global environment," participants broke into groups, and discussed and made presentations on the topics of "what is necessary to advance toward a sustainable future together with customers" and "effective initiatives that Fujitsu could take and methods for approaching customers."

Environmental Proposal Training for Sales and SE Divisions

We have held approximately 50 training sessions, attended by over 1,000 participants, at sales offices throughout Japan to enhance the attractiveness of proposals to customers by adding an environmental element. In this training, we showed participants how to use the EcoCALC Web tool for calculating environmental contributions, and demonstrating the impacts of ICT solutions, in terms of CO2 emissions reductions, energy savings, and cost savings. We also showed participants how to incorporate the environmental-burden-lowering effects of ICT and environmental labels in proposals, and provided examples of outstanding environmental proposals.

Promoting Awareness Through Environment Month

The Fujitsu Group holds a number of events to raise environmental awareness among our employees in conjunction with Environment Month (June), which is sponsored by Japan's Ministry of the Environment.

Case Study

Initiatives at the Kawasaki Plant

Since 2009, the Kawasaki Plant has been collaborating with Kawasaki City, Kawasaki-shi park green tract of land association, and Kawasaki Frontale, on Carbon Challenge (CC) Todoroki, an initiative the four parties created to reduce CO2 emissions.

One of the activities sponsored by CC Todoroki was the Eco Kurashiko Fair held at Todoroki Ryokuchi Park on June 23, 2012. The purpose of the event was environmental education on a low-carbon society, resource circulation, and coexistence with nature, and the Kawasaki Plant participated with a booth where children could rescue dragonfly larvae left in a pool.

Eco Kurashiko Fair


Dragonfly larvae rescue event for children

Development of Environmental Learning Materials

In order to share with the outside world the environmental education expertise it has developed for its employees, Fujitsu has teamed up with Fujitsu FOM Limited to create a set of learning materials for environmental education entitled "Global Environmental Issue Keywords," and has been marketing them since May 2008 in the form of books and e-learning materials.

The program incorporates a broad spectrum of issues, including basic knowledge of global environmental issues, the environmental business of other companies, and ICT's contribution to the environment, all from the viewpoint of providing a broad understanding not only to those involved in environment-related businesses, but to all employees in the Fujitsu Group.

Global Environmental Issue Keywords book and e-Learning screenshot display

In-House Award Scheme

Fujitsu presents awards recognizing outstanding environmental contribution efforts within the Group to raise awareness and promote activities that benefit the environment.

Environmental Contribution Award and Environment Contest

To raise the environmental awareness of employees at all Fujitsu Group companies, we have operated an Environmental Contribution Awards scheme and conducted an Environmental Photo Contest, open to all employees, every year since 1995.

Winner of the Environmental Photo Contest 1st Prize "Turtle from the highway"

Numerous entries were put forth for the FY 2012 Environmental Contribution Awards. Among them were efforts in areas like making environmental contributions to customers through the provision of products and services, reducing internal environmental burden, and social contribution activities. In the end, however, the FY 2012 Environmental Contribution Awards went to entries including an energy management system for mobile base stations; a robot class titled, "Future Dreams," to be held for families as a disaster recovery project; and approaches for reducing electricity consumption. For the Environmental Photo Contest, many entries were received from Fujitsu Group employees across the globe. This contest, through the solicitation of entries and voting for winners, encourages employees to think of environmental problems from a global perspective. The contest's 1st Prize was presented to the photo appearing to the right, but prizes also went to 22 other entrants, as well.

Special Environmental Award

Since FY 2008, the Fujitsu Group has offered a Special Environment Award program, intended to encourage Group sales and system engineers to promote the use of ICT solutions in helping customers reduce their environmental load.

New evaluation items were added in FY 2011 and FY 2012. The former included introducing ICT to make the effects of CO2 reduction visible, enhancing the solutions business through pursuit of such opportunities, and pursuit of business discussions aimed at achieving customer cost reductions through energy conservation (reductions in electricity consumption). Added in FY 2012 was the pursuit of resource savings through the use of ICT. Organizations notable for their activities in these areas were recognized by Fujitsu's president at the Company's April 2013 Solutions Business Expansion Conference.

Award ceremony

Commemorative photo of award winners and Fujitsu's president

Environmental Communication

The Fujitsu Group is committed to two-way communication with all stakeholders and pursues a variety of different opportunities to this end.

Information Disclosure via Sustainability Reports and the Fujitsu Website

In 1996, the Fujitsu Group began publishing an Environmental Report, focusing on the records and results of environmental protection activities carried out by the Group. The report reflects Fujitsu's commitment to making such information publicly available, thereby increasing the transparency of the Group's activities. In 2003, social aspects were combined with the Environmental Report for the publication since then of the Fujitsu Group Sustainability Report. The Environment page of the Fujitsu website, meanwhile, contains the contents of the Sustainability Report, as well as specific details of individual initiatives, and is frequently updated with the latest information.

- Fujitsu Group Sustainability Report

Site Report Publication

Fujitsu production plants, business sites and Group companies publish environmental reports, so that local residents and customers can better understand our environmental initiatives.

Events & Seminars

Main Conventions in which Fujitsu Participated in FY 2012

Convention	Location	Date
Japan		
Kawasaki International Eco-Tech Fair 2013	Kawasaki	February 2013
Eco Products 2012	Tokyo	December 2012
Carbon Offset Matching in Kochi	Kochi	November 2012
Ishikawa "Yume" Mirai Haku (Ishikawa "Yume" Future Exposition) 2012	Kanazawa	November 2012
CEATEC	Chiba	October 2012
Eco-Life Yamagata 2012	Yamagata	October 2012
Fujitsu Ladies 2012	Chiba	October 2012
Overseas		
ASEAN Fujitsu Day 2012	Kuala Lumpur, Malaysia	October 2012
ITU Green Standards Week	Paris, France	September 2012
Rio+20 Japan Pavilion	Rio de Janeiro, Brazil	June 2012

ITU Green Standards Week (Paris)

Eco-Products 2012 (Tokyo)

Environmental Efforts at Events and Seminars

At exhibition events such as the Fujitsu Forum, at the annual meeting of shareholders, and at other seminars and events, Fujitsu uses green electricity to reduce our CO2 emissions. Our environmental efforts at such venues take various forms including reducing the amount of paper used and utilizing eco-friendly materials.

In FY 2012, Fujitsu purchased a Green Power Certificate for a total of approximately 39,000kWh of electricity.

Environmental Efforts in Catalog Printing

When printing catalogs, Fujitsu utilizes environmentally friendly materials, including certified eco-friendly paper and ink, and ecologically sound printing methods. These efforts help reduce CO2 emissions as well as harmful liquid waste and other printing byproducts.

Communicating with Stakeholders

The Fujitsu Group works to establish proactive communications, as a way of working better together with its stakeholders.

Environmental Dialogues with Stakeholders

Fujitsu conducts environmental dialogues with a broad range of stakeholders as a way to promote better environmental management, build trust, and engage in creative activity together with society.

FY 2012 Dialogues

In FY 2012, we held a total of seven dialogues to which we invited a total of 15 experts. The first two dialogues of FY 2012 continued the theme of the March 2012 dialogue. In these two sessions, participants discussed Fujitsu's environmental management accomplishments and results, and communication with society. Beginning with the third dialogue, we sought to address particular themes based on discussions in previous dialogues and to further deepen mutual understanding.

1st Dialogue : held on April 17, 2012

[Participants]

- Miyako Maekita
  Representative of Sustena
- Yasunari Matsuno
  Associate Professor, Department of Materials Engineering, Graduate school of Engineering, The University of Tokyo
- Kana Yamashita
  Deputy Director, Director, Climate Security Program, Conservation International Japan
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

2nd Dialogue: held on June 28, 2012

[Participants]

- Toshihiko Goto
  Chair, Environmental Accounting Research Group
- Seita Emori
  Chief, Climate Risk Assessment Section, Center for Global Environmental Research, National Institute for Environmental Studies
- Rie Asaba
  Chairman of the Board of Directors, NPO Kawaguchi Citizens Environmental Council
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

[1st and 2nd Dialogues]

The participants expressed the views that Fujitsu is playing a leading role in pursuing biodiversity conservation activities that include suppliers, and that our environmental activities are at the forefront of such initiatives. They also pointed out, however, that the results of our activities have yet to be fully publicly recognized . This reminded us that strengthening communication with society is an issue we must address. Turning to initiatives pursued through main business activities, the participants expressed the view that, from the perspective of social contributions, corporate environmental activities can be quite transient, and that Fujitsu's major strength is that it can contribute to the environment through its main business of providing solutions.

- Dialogue in FY 2011

3rd Dialogue: held on December 18, 2012
Theme: Measures for Preventing Global Warming, Forest Conservation Activities

[Participants]

- Atsuko Suzuki
  Representative Director, Environmental Business Agency
- Yasunari Matsuno
  Associate Professor, Department of Materials Engineering, Graduate School of Engineering, The University of Tokyo
- Kana Yamashita
  Deputy Director, Director, Climate Security Program, Conservation International Japan
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

[Opinions]

- Issues related to how to cut CO2 and save electricity in the daily lives of individuals is exactly where ICT should come into play. (Suzuki)
- For forest conservation, the extent to which a large number of people can be involved is key. Activities should be established, so that projects can continue even without corporate involvement. (Suzuki)
- Fujitsu has lots of good ICT solutions, for example the use of smart grids to promote the saving of electricity. Instead of attacking global warming directly, what about approaching it indirectly from the perspectives of saving energy and electricity? (Matsuno)
- Fujitsu shouldn't be protecting forests itself; it should be doing things like creating databases and supporting conservation activities indirectly. In other words, unless it uses its main business activity of ICT to engage in business, benefits to conservation won't continue. (Matsuno)
- The decline of forests accounts for 1/5 of annual greenhouse gas emissions, and has a great impact on the protection of biodiversity and water resources. By all means, I would like Fujitsu, as a global ICT business, to consider what it can contribute going forward. (Yamashita)
- Climate change must be dealt with as a common issue for humanity. I believe that ICT solutions are critical as a sector in which companies can powerfully show government what is possible. (Yamashita)

4th Dialogue: held on February 15, 2013
Theme: Energy

[Participants]

- Seita Emori
  Chief, Climate Risk Assessment Section, Center for Global Environmental Research, National Institute for Environmental Studies
- Yosuke Ikehara
  Climate & Energy Project Leader, Conservation Division, WWF Japan
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

[Opinions]

- On the 2℃ objective for global warming measures, there needs to be more discussion in society of things that should be avoided because of their impacts. Actually, we also need more opportunities for discussion. (Emori)
- If we look back on the past when thinking about the things that brought about change for the global environment, we can see that the industrial structure changed because the industrial revolution was "innovation." Changing society with ideas is difficult, but society can change with innovation Fujitsu brings about through technology. (Emori)
- It is technologically and economically feasible to meet all of the world's energy demand with renewable energy by the year 2050. The WWF's scenarios show that is possible. (Ikehara)
- I want Fujitsu to have a vision of itself in the year 2050 and beyond – what it wants to become – and to paint a picture of how it will use ICT in society. (Ikehara)

5th Dialogue: held on March 5, 2013
Theme: Environmental communication

[Participants]

- Miyako Maekita
  Representative of Sustena
- Rie Asaba
  Chairman of the Board of Directors, NPO Kawaguchi Citizens Environmental Council
- Takeshi Mizuguchi
  Professor, Faculty of Economics, Takasaki City University of Economics
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

[Opinions]

- About letting people know about the environmental contributions of ICT, my impression is that there are many aspects that are not visible, so people won't get it if you don't change the way they are expressed. What Fujitsu is doing is wonderful, but may be it should consider that it is pursuing a kind of rigor that is beyond ordinary people, so it doesn't get communicated. (Maekita)
- It doesn't come through in press releases, but I think the message would be communicated if you talk about how difficult conditions are for people on the ground. (Maekita)
- Maybe it would be good if Fujitsu approaches this from the perspective of how ICT would make daily life more convenient; how communities could change for the better; things in which ordinary people would be interested. (Asaba)
- Showing concrete examples from residents' daily lives - examples in which people's voices can be heard and their faces can be seen – would communicate Fujitsu's activities. What I mean is the background of a product's development, little known facts, and other kinds of communications, by employees, that have a story to them. (Asaba)
- We were talking about how to communicate what exists now, but isn't the question of how social issues have been solved more important? (Mizuguchi)

6th Dialogue: held on March 8, 2013
Theme: Smart cities, resources

[Participants]

- Tsuyoshi Fujita
  National Institute for Environmental Studies, Director of Eco-City System Research Program, Alliance Professor, Nagoya University. Visiting Professor, United Nation University. National Eco-Future City Promotion Board Member, National Minister Cabinet Administration Office
- Shinsuke Murakami
  Associate Professor, Department of Systems Innovation, Graduate School of Engineering, The University of Tokyo
- Masatsugu Taniguchi
  Journalist, Strategy Design Institute Resources and Environment
- Junko Edahiro (Facilitator)
  President, Institute for Studies in Happiness, Economy, and Society

[Opinions]

- If recommendations cover not just private-sector technology but instead smart cities on which the private and public sector will collaborate, and a scheme for a smart resource cycle, that will make for a growth strategy. (Fujita)
- It is also important to have an approach in which companies put forth bold visions of the future, draw a roadmap to get there, and include the need for their technology. Companies describing visions of the future, and communicating and promoting them to the government and society, will lead to new strengths and competitiveness for Japan. (Fujita)
- People say that the lack of success is due to low awareness of the recycling system, but there are lots of people who don't use the recycling systems for products like cell phones, even though they know about them, so wouldn't it be good to think about other ways to publicize these systems. If they know why products are being collected, people may change their behavior. (Murakami)
- In Japan, huge amounts of money are required for processing wastewater from mines even after the mines had been closed. The mining of resources entails a large environmental burden, but it is necessary. There needs to be a broad discussion of sustainable resource usage, including everything from mining to recycling and waste processing, but it isn't really taking place. (Murakami)
- Sustainability must be interpreted to mean not sacrificing the needs of future generations to satisfy the needs of the current generation. Recycling leads to the saving of resources for future generations and is a high-value activity for companies. (Taniguchi)
- For example, something like a tax system that will change society by attaching a monetary cost to the use of precious resources is needed. (Taniguchi)

7th Dialogue: held on March 22, 2013
Theme: Vision of the Future

[Participants]

- Shinichi Takemura
  Anthropologist, environmental thinker; Professor, Kyoto University of Art & Design; Founder of the Earth Literacy Program
- Nao Suzuki
  Publisher of greenz.jp; Director, NPO Greenz
- Yoshihiro Fujii
  Professor, Sophia University Graduate School of Global Environmental Studies

[Opinions]

- I want Fujitsu to develop for the world ICT solutions that promote human development – that release the hidden potential of humans - not things that become a human substitute. (Takemura)
- A CSV(Creating Shared Value) vision like one that creates opportunities that use ICT to increase human value means new opportunities for Japanese companies. (Takemura)
- We are entering an era in which individuals work to change their surroundings to create the society they want, and this could be called a society in which the potential of individuals is unlocked. It would seem there are possibilities for putting forth services and ICT that bring people together.(Suzuki)
- There are cases in which ICT becomes the objective, but ICT is not the goal; it must be used to solve social issues. (Suzuki)
- It is not just finances and assets that are being used to evaluate companies; environmental and social factors are taking on greater and greater importance, and it is becoming difficult for investors to assess the value of a company simply by looking at its balance sheet. (Fujii)
- Fujitsu already has a wealth of resources and technologies, so I'm interested in how they will use them to respond to society's expectations and relate to society going forward. It needs to take some degree of risk and move forward with social contributions and business activities. (Fujii)


5th Dialogue


6th Dialogue

We will use the opinions expressed in dialogues to enhance and strengthen the Fujitsu Group's environmental management. We will continue with our efforts to help realize a sustainable society and will continue to value communication with all members of society.

Cooperation with External Organizations

The Fujitsu Group works to reinforce environmental management through cooperation with external organizations.

Collaborating with External Groups to Promote Green ICT

The Fujitsu Group is committed to reducing environmental impact on a global scale by promoting widespread use of Green ICT through proactive initiatives with external organizations, including international standardization bodies.

For example, methods for measuring positive environmental impact produced by Fujitsu Group solutions had not been standardized internationally. So Fujitsu took part in the ICT and Climate Change Group (SG5 WP3) of the International Telecommunication Union Telecommunication Standardization Sector (ITU-T), an international standardization body in the electrical and electronics sector. The group's findings were announced in March 2012 as the "Methodology for the Assessment of the Environmental Impact of Information and Communication Technology Goods, Networks and Services (L.1410)."*1 At the national and regional level as well, we serve as chair of the Green IT Promotion Council's (now known as the JEITA Green IT Committee) Committee of Survey and Analysis in Japan, leading the establishment of more practical methods for assessing environmental impact, and contributed to the establishment of a method for evaluating the contributions of products and services under the Action Plan of the Industries of Electrical and Electronics on a Low Carbon Society, implementation of which begins in FY 2013. We have also participated in the Global Taskforce on Harmonizing Global Metrics for Data Center Energy Efficiency and in the ISO/IEC JTC1 SC39 (Sustainability for and by Information Technology) standardization committee, and acted as an industry representative leading the development and promotion of measurement and calculation methods for power usage effectiveness (PUE), a datacenter energy efficiency index, at the JDCC (Japan Data Center Council). These initiatives have made it possible for CO2 reductions produced by ICT to be assessed under an international framework, which is expected to promote further utilization of the technologies.

Fujitsu has also made significant contributions to the development of other international environmental evaluation methodologies and indices. One is the ICT Sector Guidance to the GHG Protocol Product Life Cycle Accounting and Reporting Standard, for which Fujitsu serves as a Steering Committee member. Fujitsu is also heavily involved with The Green Grid – a non-profit organization that works to improve the resource efficiency of ICT devices and define environmental metrics, such as PUE*2 for datacenters throughout the world. Fujitsu became this organization's first Contributor Member*3 from Japan in 2008 and, in FY 2012, served as the EMEA Technical Work Group Vice-Chair.

Further, the Fujitsu Group joins in activities to evaluate the sustainability of our products using internationally recognized methods. For example, the IEC TC 111 committee creates environmental standards for electrical and electronics products, and we are actively involved in the Japanese committee of its Working Group 4, which drafts international standards for calculating greenhouse gas emissions. In addition, for the IEC TC 100 committee, which is responsible for international standards for audio, video and multimedia systems and equipment, Fujitsu serves as technical secretary for TA 13, which is in charge of environmental regulations, and chair of the Japanese committee.

*1:
Ministry of Internal Affairs and Communications of Japan press release (in Japanese)

*2 PUE (Power Usage Effectiveness) :
PUE (Power Usage Effectiveness) is an index of datacenter energy efficiency. PUE is calculated as total datacenter electricity consumption, divided by electricity consumed by ICT devices inside the datacenter.

*3 Contributor Member:
A Contributor Member participates on the Technical Committee, reviews technical documents at each stage of development, and helps to determine the organization's future direction.

External Organizations

Green ICT

Promoting and disseminating Green ICT and standardization activities

- JEITA Green IT Committee [In Japanese]
- The Green Grid
- Japan Data Center Council
- ISO/IEC JTC1 SC39 (Sustainability for and by Information Technology) Japan committee and task force
- ISO TC286 SC1(Smart Urban Infrastructure Metrics) Japan committee and Steering Committee

Climate Change

Working on initiativesto achieve a sustainable low carbon society

- Japan Climate Leaders' Partnership (Japan-CLP)
- ITU and Climate Change, the climate change group of the International Telecommunication Union Telecommunication Standardization Sector (ITU-T)
- International Electrotechnical Commission (IEC)
- Greenhouse Gas Protocol (GHG Protocol)

Biodiversity

Promoting the conservation of biodiversity by corporations

- Business and Biodiversity Initiative
- Japan Business Initiative for Conservation and Sustainable Use of Biodiversity (JBIB)

Product Chemicals and Eco Design

Investigating frameworks to effectively communicate information on chemical substances contained

- The Japan Article Management Promotion Committee (JAMP)
- The Japan Green Procurement Survey Standardization Initiative (JGPSSI)
- Japan Environmental Management Association for Industry (JEMAI)

Environmental and Social Contribution

Promote environmental and social contribution activities

- WWF (World Wide Fund for Nature) Japan
- Nature Conservation Society of Japan (NACS-J)
- Wild Bird Society of Japan
- Japan International Forestry Promotion and Cooperation Center (JIFPRO)

Environmental Communication

Promote environmental communication

- Nippon Environment Club
- Japan for Sustainability (JFS)

Environmental Activities

- Communications and Information Network Association of Japan
- Japan Electronics and Information Technology Industries Association (JEITA)
- KEIDANREN (Japan Business Federation)

List of External Awards and External Evaluations

The Fujitsu Group's various initiatives for developing a sustainable society have been highly praised by external observers.

(As of March 2013)

Major External Awards and Evaluations Received by the Fujitsu Group

Recognition	Date	Sponsor(s)	Initiative
Low CO2 Kawasaki Pilot Brand '12	February 2013	Kawasaki City, Kanagawa Prefecture	Entry-level disk array ETERNUS DX60 S2, DX80 S2, DX90 S2
Award for outstanding energy management at the 2012 Ishikawa Energy-Saving Promotion Convention	February 2013	Ishikawa Prefecture Electricity Usage Rationalization Committee	Electricity conservation activities at PFU TechnoWise Limited
Ranked 4th in the 16th Nikkei Environmental Management Survey	January 2013	Nikkei Inc.	Environmental management initiatives
Environmental Award at the Business and Industry Awards	January 2013	Richardson Chamber of Commerce	Sustainability initiatives at Fujitsu Network Communications
Chairperson's Award, Eco-Products Awards Steering Committee in the Eco-Services Category at the 9th Eco-Products Awards	November 2012	Eco-Products Awards Steering Committee	Fujitsu Global Cloud Platform FGCP/S5
Green-IT Awards 2012 Commerce and Information Policy Bureau Director-General Award in the category of "Savings in Society's Energy Consumption by IT"	October 2012	Green IT Promotion Council	Fujitsu Global Cloud Platform FGCP/S5
Named to the Carbon Performance Leadership Index (CPLI) and Carbon Disclosure Leadership Index (CDLI)	October 2012	Carbon Disclosure Project	Activities that reduce greenhouse gas emissions, lower climate change risk, and disclose climate change information
Ranked 17th in Newsweek Green Rankings 2012	October 2012	Newsweek	For consideration of corporate environmental impact, environmental management and information disclosure policies
"Best of Show Award" Special Award (Frontier Challenge Category)	June 2012	Interop Tokyo 2012	Geothermal heat extraction system
21st Century Achievement Award, Environmental Category	June 2012	Computerworld	Response to the Great East Japan Eathquake
Social and Environmental Green Evaluation System(SEGES), Superlative Stage	April 2012	Organization for Landscape and Urban Green Infrastructure	Fujitsu Numazu plant's greening activities

Environmental Performance Data Calculation Standards

■Subject Period： April 1, 2012 – March 31, 2013
■Scope ： Fujitsu and Fujitsu Group (For details, refer to the List of Companies Covered by the Report on Environmental Activities (123 companies).)

Operating Activities and Environmental Load (FY2012)

Indicator			Unit	Calculation Method
INPUT				
Development & Design/ Planning & Design Procurement Manufacturing Development	Raw Materials		Tons	Material inputs to our major products*1 shipped in FY 2012 (raw materials per unit for each product × the number of units shipped in FY 2012)
	Chemical Substances	Volume of substances subject to VOC emissions restrictions	Tons	For the 20 VOCs (Volatile Organic Compounds) specified in the environmental voluntary action plans of four electrical and electronic business organizations (the Japan Electrical Manufactures' Association [JEMA], Japan Electronics and Information Technology Industries Association [JEITA], Communications and Information Network Association of Japan [CIAJ], and Japan Business Machine and Information System Industries Association [JBMIA]), total amounts handled are provided for those substances handled in quantities exceeding 100kg annually at individual business sites. Substances subject to VOC emissions controls that are also covered by the PRTR law are included in the section on substances subject to VOC emissions controls.
		Volume of PRTR-targeted substances	Tons	For the substances covered by the PRTR law (Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof), totals are provided for those substances handled in quantities exceeding 100kg annually per business site.
	Water use		1,000 ㎥	Annual use of clean water, industrial water, and groundwater (Not including groundwater for melting snow and groundwater extracted for purification)
	Energy consumption (calorie basis)		10,000 GJ	∑〔（Electricity, fuel oil, gas, and district heating and cooling annual usage）× Thermal conversion factor for each type of energy*1 〕 *1 Thermal conversion factor (Heating value unit): Based on sources including a table of standard heating values for specific energy sources published in February 2012 by the Agency for Natural Resources and Energy. Conversion factors of 9.83 GJ /MWh for electricity, and 46.1GJ/1,000 ㎥ for town gas were used.
		Purchased electricity	MWh	Annual electricity usage
		Bunker A, fuel oil, light oil, benzin, gasoline	Kl	Annual fuel oil usage (or purchases)
		Natural gas	1,000 ㎥	Annual natural gas usage (or purchases)
		Town gas	1,000 ㎥	Annual town gas usage (or purchases)
		LPG	Tons	Annual LPG usage (or purchases)
		LNG	Tons	Annual LNG usage (or purchases)
		District heating and cooling	GJ	Annual district heating and cooling (cold and hot water for cooling and heating) usage (or purchases)
Distribution / Sales	Energy consumption for transportation of goods in Japan		10,000 GJ	Energy consumption related to transportation of goods by the Fujitsu Group within Japan as a part of logistics activities defined under the Act on the Rational Use of Energy (the Energy Conservation Law)
Usage	Energy	Electricity	MWh 10,000 GJ	Electricity consumed in connection with major products*1 shipped during FY 2012 (Amount of electricity used for time estimated per product unit ×units shipped in FY 2012)

Collection / Reuse / Recycling Operation and Maintenance	Resource recycling rate		%	Based on the calculation method provided by the JEITA, recycled components and resources as a percentage of the weight of used products processed in Japan. Excludes collected waste other than used electronic products.
	Processed volume		Tons	
OUTPT				
Development & Design/ Planning & Design Procurement Manufacturing Development	Raw Materials	CO_2 emissions	Tons	CO_2 emissions related to all stages from resource extraction through processing into raw materials (CO_2 emissions equivalent for raw materials used per product unit × Units shipped in FY 2012) for the raw materials used in major products*1 shipped in FY 2012.
	Chemical Substances	Volume of substances subject to VOC emissions restrictions	Tons	For the 20 VOCs (Volatile Organic Compounds) specified in the environmental voluntary action plans of four electrical and electronic business organizations (the Japan Electrical Manufactures' Association [JEMA], Japan Electronics and Information Technology Industries Association [JEITA], Communications and Information Network Association of Japan [CIAJ], and Japan Business Machine and Information System Industries Association [JBMIA]), total amounts released are provided for those substances handled in quantities exceeding 100kg annually at individual business sites. Substances subject to VOC emissions controls that are also covered by the PRTR law are included in the section on substances subject to VOC emissions controls.
		Volume of PRTR-targeted substances	Tons	For the substances covered by the PRTR law (Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof), released totals are provided for those substances handled in quantities exceeding 100kg annually per business site.
	Atmospheric Release	CO_2 emissions	10,000 tons	∑〔 (Electricity, fuel oil, gas, and district heating and cooling annual usage) × CO_2 conversion factor for each type of energy*1 〕 *1 CO_2 conversion factor: In FY 2002 and later, the conversion factor for electricity is 0.407 tons CO_2/MWh (fixed), based on sources including an energy and industrial process subcommittee report (related to fuel) issued under the auspices of an investigative committee on greenhouse gas emissions conversion calculation methods organized by the Japanese Ministry of the Environment in FY 2002. The conversion factor for district heating and cooling is 0.061 tons CO_2/GJ.
		GHG emissions other than CO_2	10,000 tons CO_2	Annual emissions of HFCs, PFCs, and sulfur hexafluoride by four semiconductor plants (Fujitsu Semiconductor Limited's Iwate, Aizuwakamatsu, Mie Plants, and a plant owned by Fujitsu Semiconductor Technology, Inc.) ∑〔 Annual emissions for each type of gas*1 × Global warming potential for each gas*2 〕 *1 Based on the calculation method used by the industries of electrical and electronics: Amount of each gas used (or purchased) × Reactant consumption rate × Removal efficiency, etc. *2 Global Warming Potential (GWP): IPCC (Intergovernmental Panel on Climate Change) Third Assessment Report "Climate Change 2001."
		NOx emissions	Tons	NOx concentration (ppm) ×10^{-6}× Dry gas emissions (m^3N/hr) × Operating time (hr/yr) ×46/22.4×10^{-3}
		SOx emissions	Tons	SOx concentration (ppm) ×10^{-6}× Dry gas emissions (m^3N/hr) × Operating time (hr/yr) ×64/22.4×10^{-3}

	Water Discharge	Wastewater discharges	1,000 ㎥	Annual water discharges into public waterways and sewers (Not including groundwater used for melting snow)
		BOD emissions	Tons	BOD concentration （mg/l）× Water discharges（㎥/yr）×10^{-6}
		COD emissions	Tons	COD concentration（mg/l）× Water discharges（㎥/yr）×10^{-6}
	Waste	Amount of Waste Generated	Tons	Total amount for industrial waste and general waste generated by factories and offices (Thermal recycling volume + Material recycling volume + Disposal volume）
		Thermal recycling volume	Tons	Among all types of waste put to effective use, the total volume used in thermal recycling ※ Thermal recycling: Recovery and use of the heat energy generated by incinerating waste.
		Material recycling volume	Tons	Among all types of waste put to effective use, the total volume used in material recycling ※ Material recycling: Processing of waste to facilitate its re-use, and re-use of processed waste as material or raw materials for new products.
		Disposal volume	Tons	Volume of industrial and general waste processed by, for example, landfilling or simple incineration
Distribution/Sales	CO_2 emission s from domestic transport		1,000 tons CO_2	CO_2 emissions related to transportation of goods by the Fujitsu Group within Japan as a part of logistics activities defined under the Act on the Rational Use of Energy (the Energy Conservation Law). Fuel economy method (for some vehicles) and the improved ton-kilometer method (road vehicles, rail, air, ocean transport).
Usage	Atmospheric Release		Tons CO_2	Electricity consumption by major products*1 shipped in FY 2012 (Electricity consumed for the assumed hours of use per product x Number of units shipped in FY 2012)

*1 Major products:
Personal computers, mobile phones, servers, workstations, storage systems, printers, scanners, financial terminals, retail terminals, routers, LAN access equipment, access network products, mobile phone base stations, and electronic devices.

Green ICT Achievements in Reducing CO_2 Emissions

Indicator	Unit	Calculation Method
ICT infrastructure	10,000 tons	For total products shipped, the difference between new and prior platform products in terms of CO_2 emitted for a level of functionality similar to that of FY 2008 products (Using eco-efficiency factors in Fujitsu has worked to improve with FY 2012 as its target year.)
ICT solutions	10,000 tons	CO_2 emissions before and after adoption of environmental solutions and data center outsourcing services by customers, calculated using sales figures and CO_2 conversion factors. Cumulative results for FY 2009 through FY 2012.

Efforts to Prevent Global Warming and initiatives of reducing CO2 emisions

Indicator			Unit	Calculation Method
Percentage reduction in total greenhouse gas emissions			%reduction	(Total GHG emissions in FY 1990 – Total GHG emissions in FY 2012) / Total GHG emissions in FY 1990 × 100
Adoption of solar power generation			kW	Total rated capacity of solar power generation facilities installed at business sites
Usage based on the Revised Act on the Rational Use of Energy			10,000 kl	Usage of electricity, fuel, etc. in terms of crude oil equivalents, based on the Act on the Rational Use of Energy (the Energy Conservation Law)
GHG Emissions Report based on GHG Protocol Standards	Upstream (Scope3)	Purchased goods and services	Tons	Components purchased during the fiscal year × Emissions per unit of purchases (Source: Embodied Energy and Emission Intensity Data (3EID) published by the National Institute for Environmental Studies Center for Global Environmental Research)
		Capital goods	Tons	Monetary value of capital X Emissions value per unit of capital value (Source: Embodied Energy and Emission Intensity Data (3EID) published by the National Institute for Environmental Studies Center for Global Environmental Research)
		Fuel and energy-related activities not included in Scopes 1 and 2	Tons	Annual amounts of fuel oil and gas, electricity and heat purchased (consumed) mainly at business sites owned by Fujitsu × Emissions per unit (Source: Basic Guidelines for Calculating Greenhouse Gas Emissions Via Supply Chains and the Carbon Footprint Communication Program Basic Database Ver. 1 published by the Ministry of the Environment and the Ministry of Economy, Trade and Industry)
		Waste generated in operations	Tons	Annual amounts of waste (discharged mainly by business sites owned by Fujitsu) processed or recycled, by type and processing method × Emissions per unit of annual amount of waste processed or recycled (Source: Basic Guidelines for Calculating Greenhouse Gas Emissions Via Supply Chains published by the Ministry of the Environment and the Ministry of Economy, Trade and Industry)
		Leased assets (Upstream)	Tons	Annual amounts of fuel oil, gas, electricity, and heat consumed mainly at leased business sites in Japan × Emissions per unit of fuel oil, gas, electricity, and heat consumed (Source: Act on Promotion of Global Warming Countermeasures - GHG Emissions Accounting, Reporting, and Disclosure System)
	Reporting company (Scopes 1,2)	Direct emissions	Tons	Amount of CO_2 emissions from the consumption of fuel oil and gas (burning of fuel) , and GHG emissions, other than CO_2 mainly at business sites owned by Fujitsu ※ For information on calculation methods, refer to the items on OUTPUT Atmospheric Release "CO_2 emissions" and "GHG emissions other than CO_2".
		Indirect emissions from energy sources	Tons	CO_2 emissions from the consumption (purchase) of electricity and heat mainly at business sites owned by Fujitsu * For information on calculation methods, refer to the item on OUTPUT Atmospheric Release "CO_2 emissions".
	Downstream (Scope 3)	Transportation and distribution (Downstream)	Tons	Transportation of goods within Japan: CO_2 emissions related to the transportation of goods within Japan by the Fujitsu Group. * For information on calculation methods, refer to the item on "CO_2 emissions from domestic transport".

				International Transportation of Goods: Cargo ton-kilometers of international transportation of goods to or from Japan; or, fuel consumption of transportation mode × Ton-kilometers (road vehicles, rail, air, ocean transport); or, emissions coefficient per unit of fuel consumption (road vehicles) (Source: Calculation Guidelines for Logistics Sector CO2 Emissions published by the Ministry of Economy, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism in connection with the Act on the Rational Use of Energy; and the GHG Protocol Emissions Coefficient Database GHG)
		Use of sold products	Tons	Electricity consumption during product use × Emissions per unit of electricity (Source: Daily averages for FY 2004 – 2008 from the Summary of Electrify Demand and Supply published by the Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, Electricity and Gas Industry Department) Electricity consumption during product use is calculated as electricity usage for the anticipated usage time per product unit × Units shipped for the subject fiscal year. Electricity usage for the anticipated usage time per product unit is calculated as electricity consumed (kw) X Time used (h) / Days X Number of days used / Year X Number of years used. Time used (h), number of days used per year, and number of years used are set according to Fujitsu's internal scenarios.
		End-of-life treatment of sold products	Tons	(Weight of all sold products / Weight of products processed at Fujitsu's recycling centers during the year) × Electricity used at Fujitsu's recycling centers during the year × Emissions per unit of electricity (Source: Electric Power Enterprise (FY 2002 average for 10 electric power companies in Japan, receiving end)
% Reduction in CO_2 emissions from domestic transport			% reduction	(FY 2008 CO_2 emissions from transportation of goods inside Japan - FY 2012 CO_2 emissions from transportation of goods inside Japan) / FY 2008 CO_2 emissions from transportation of goods inside Japan × 100

Environmental Activities in Factories

Indicator		Unit	Calculation Method
Indicators Related to Waste	% Reduction in the amount of waste generated	% reduction	(Amount of waste generated in FY 2007– Amount of waste generated in FY 2012) / Amount of waste generated in FY 2007 × 100
	Effective utilization ratio (Japan only)	%	(Amount of effective utilization(Thermal recycling volume and Material recycling volume) / Amount of Waste generated) × 100
Indicators Related to Water-Resources	Amount of recycled water	1,000 ㎥	Annual amount of water used for manufacturing and other purposes, then recovered, processed, and used again for manufacturing and other processes
Indicators Related to Chemical Substances	Emissions of specific chemical substances	Tons	Of the substances subject to VOC emission controls and PRTR-targeted substances handled in amounts exceeding 100kg annually at individual Japanese business sites included in the FY 2007 data collection scope, total emissions of 1 of the top 3 emitted chemical substances for the baseline year (FY 2007)
	% reduction in specific chemical substance emissions	% reduction	(Specific chemical substance emissions in FY 2007 – specific chemical substance emissions in FY 2012) / specific chemical substance emissions in FY 2007 × 100

Cost for Environmental liabilities	100 million yen	① Asset retirement obligation (Only asbestos removal cost related to facility disposal) ② Cost for soil contamination measures ③ Disposal processing cost for waste with high concentrations of PCB (Polychlorinated biphenyl)
Measured value of Groundwater pollution	mg/l	The highest FY 2012 measurements for substances detected at levels exceeding regulated levels set in the Soil Contamination Countermeasures Act etc. at monitoring wells at the boundaries of sites where past business activities have resulted in soil contamination.

List of Organizations Covered by the Report on Environmental Activities (123 companies)

		Environmental burden	Transportation	Environmental Accounting	EMS※1
1	Fujitsu Limited	✓	✓	✓	✓

Fujitsu Group companies in Japan (85 companies)		Environmental burden	Transportation	Environmental Accounting	EMS※1
1	FUJITSU ADVANCED PRINTING & PUBLISHING CO.,LTD.		✓		✓
2	FUJITSU HOME & OFFICE SERVICES LIMITED.				✓
3	FUJITSU UNIVERSITY				✓
4	KAWASAKI FRONTALE LIMITED				✓
5	FUJITSU REFRE LTD.				✓
6	FUJITSU TRAVELANCE LIMITED				✓
7	Fujitsu Human Resource Professionals Limited.				✓
8	Fujitsu Techno Research Limited				✓
9	FUJITSU CIT LIMITED				✓
10	TOYAMA FUJITSU LIMITED	✓			✓
11	FUJITSU FACILITIES LIMITED				✓
12	OKINAWA FUJITSU SYSTEMS ENGINEERING LIMITED.				✓
13	DIGITAL PROCESS LTD.				✓
14	PFU LIMITED	✓	✓	✓	✓
15	FUJITSU ADVANCED SOLUTIONS LIMITED				✓
16	FUJITSU BANKING SOLUTIONS LIMITED				✓
17	SHIGA FUJITSU SOFTWARE LIMITED				✓
18	FUJITSU BROAD SOLUTION & CONSULTING Inc.				✓
19	FUJITSU SOCIAL SCIENCE LABORATORY LIMITED				✓
20	FUJITSU MISSION CRITICALSYSTEMS LTD.				✓
21	FUJITSU YFC LTD.				✓
22	FUJITSU NIIGATA SYSTEMS LIMITED				✓
23	FUJITSU HOKURIKU SYSTEMS LIMITED				✓
24	FUJITSU KYUSHU SYSTEMS LIMITED				✓
25	FUJITSU KAGOSHIMA INFORNET LIMITED.				✓
26	FUJITSU FIP CORPORATION	✓			✓
27	NIFTY Corporation				✓
28	G-Search Limited				✓
29	FUJITSU FSAS INC.		✓		✓
30	FUJITSU COMMUNICATION SERVICES LIMITED				✓
31	FUJITSU NETWORK SOLUTIONS LIMITED				✓
32	Fujitsu Frontech Limited	✓	✓	✓	✓
33	FUJITSU SYSTEM INTEGRATION LABORATORIES LIMITED				✓
34	FUJITSU TOKKI SYSTEMS LIMITED				✓
35	FUJITSU DEFENSE SYSTEMS ENGINEERING LIMITED				✓
36	Fujitsu Applications, Ltd.				✓
37	FUJITSU LEARNING MEDIA LIMITED				✓
38	FUJITSU RESEARCH INSTITUTE				✓
39	FUJITSU Marketing LIMITED.		✓		✓
40	FUJITSU FOM LIMITED		✓		✓
41	FUJITSU CoWorCo LIMITED		✓		✓
42	TWO-ONE LIMITED				✓
43	FUJITSU I-NETWORK SYSTEMS LIMITED	✓	✓	✓	✓
44	ECOLITY SERVICE LIMITED			✓	✓
45	FUJITSU ADVANCED ENGINEERING LIMITED				✓
46	Fujitsu Software Technologies Limited				✓
47	FUJITSU MIDDLEWARE LIMITED				✓
48	Fujitsu Kyushu Network Technologies Limited				✓
49	FUJITSU TELECOM NETWORKS LIMITED	✓	✓	✓	✓
50	FUJITSU WIRELESS SYSTEMS LIMITED	✓	✓	✓	✓
51	FUJITSU COMPUTER TECHNOLOGIES LIMITED				✓
52	FUJITSU IT PRODUCTS LIMITED	✓	✓	✓	✓
53	SHIN-ETSU FUJITSU LIMITED	✓	✓		
54	Fujitsu Isotec Limited	✓	✓	✓	✓
55	FUJITSU PERIPHERALS LIMITED	✓	✓	✓	✓
56	FUJITSU PERSONAL SYSTEM LIMITED		✓		✓
57	Shimane Fujitsu Limited	✓	✓	✓	✓
58	FUJITSU KASEI LIMIED	✓	✓	✓	✓
59	Fujitsu Integrated Microtechnologies Limited	✓	✓	✓	✓
60	FUJITSU QUALITY LABORATORY LTD.				✓
61	Fujitsu Optical Components Limited	✓		✓	✓
62	FUJITSU KANSAI-CHUBU NET-TECH LIMITED				✓
63	Fujitsu Mobile-phone Products Limited	✓	✓	✓	✓
64	Fujitsu Mission Critical Software LTD.				✓
65	FDK CORPORATION	✓	✓	✓	✓
66	FUJITSU COMPONENT LIMITED	✓	✓	✓	✓
67	Transtron Inc.		✓	✓	✓
68	FUJITSU ELECTRONICS INC.		✓		✓
69	FUJITSU VLSI LIMITED	✓		✓	✓

70	Fujitsu Semiconductor IT Systems Ltd.				✓
71	FUJITSU FACILITIES ENGINEERING LIMITED				✓
72	FUJITSU Microelectronics Solutions Limited				✓
73	FUJITSU INTEGRATED MICROTECHNOLOGY LTD.	✓			
74	FUJITSU SEMICONDUCTOR TECHNOLOGY INC.	✓		✓	✓
75	SHINKO ELECTRIC INDUSTRIES CO. LTD.	✓	✓	✓	✓
76	FUJITSU TEN LIMITED	✓	✓	✓	✓
77	FUJITSU LABORATORIES LTD	✓		✓	✓
78	FUJITSU SEMICONDUCTOR LIMITED	✓	✓	✓	✓
79	Fujitsu Design Limited				✓
80	Fujitsu Advanced Technologies Limited				✓
81	TOCHIGI FUJITSU TEN LIMITED			✓	
82	FUJITSU MOBILE COMMUNICATIONS LIMITED				✓
83	Fujitsu Systems West Limited				✓
84	Fujitsu Systems East Limited				✓
85	FUJITSU CAPITAL LIMITED				✓

Fujitsu Group companies in worldwide(37companies)		Environmental burden	Transportation	Environmental Accounting	EMS※1
1	FUJITSU COMPUTER PRODUCTS OF VIETNAM, INC.	✓		✓	✓
2	Jiangsu Fujitsu Telecommunications Technology Co., Ltd.				✓
3	Fujitsu Semiconductor Asia Pte. Ltd.				✓
4	Fujitsu Semiconductor Pacific Asia Limited				✓
5	Fujitsu Semiconductor (Shanghai) Co., Ltd.				✓
6	FUJITSU HONG KONG LIMITED				✓
7	FUJITSU DO BRASIL LIMITADA				✓
8	FUJITSU ASIA PTE.LTD				✓
9	FUJITSU NETWORK COMMUNICATIONS, INC.	✓		✓	✓
10	Fujitsu America, Inc.				✓
11	Fujitsu Systems Business (Thailand) Ltd.				✓
12	Fujitsu Semiconductor Design (Chengdu) Co. Ltd.				✓
13	Fujitsu PC Asia Pacific Pte Ltd.				✓
14	FUJITSU TELECOMMUNICATIONS EUROPE LTD.			✓	✓
15	FUJITSU AUSTRALIA LTD.				✓
16	FUJITSU TECHNOLOGY SOLUTIONS（HOLDING）	✓		✓	✓
17	Fujitsu Semiconductor Europe GmbH				✓
18	Nanjing Fujitsu Nanda Software Technology Co., Ltd.				✓
19	FUJITSU SERVICES HOLDINGS PLC（UK&I）				✓
20	FUJITSU SERVICES HOLDINGS PLC（Nordic）				✓
21	FUJITSU KOREA LTD.				✓
22	FUJITSU TAIWAN LIMITED				✓
23	Fujitsu Telecomunication Asia Sdn. Bhd.				✓
24	FUJITSU VIETNAM LIMITED.				✓
25	FUJITSU (MALAYSIA) SDN. BHD.				✓
26	P. T. FUJITSU SYSTEMS INDONESIA				✓
27	Fujitsu Philippines, Inc.				✓
28	FUJITSU (CHINA) HOLDINGS CO., LTD				✓
29	Fujitsu Management Services of America, Inc.				✓
30	FUJITSU (XI'AN) SYSTEM ENGINEERING CO., LTD.				✓
31	Beijing Fujitsu System Engineering Co., LTD.				✓
32	GLOVIA International,Inc.				✓
33	FUJITSU AUSTRALIA SOFTWARE TECHNOLOGY PTY. LTD.				✓
34	FUJITSU Enabling Software Technology GmbH				✓
35	Fujitsu Semiconductor America, Inc.				✓
36	Fujitsu Semiconductor Korea Limited				✓
37	Fujitsu Research and Development Center Co., LTD.				✓

※1 EMS: Environmental Management System