Environmental Activities in Factories

We promote comprehensive environmental protection activities based on the Fujitsu Group Environmental Protection Program (Stage VI) at the factories that perform our manufacturing.

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

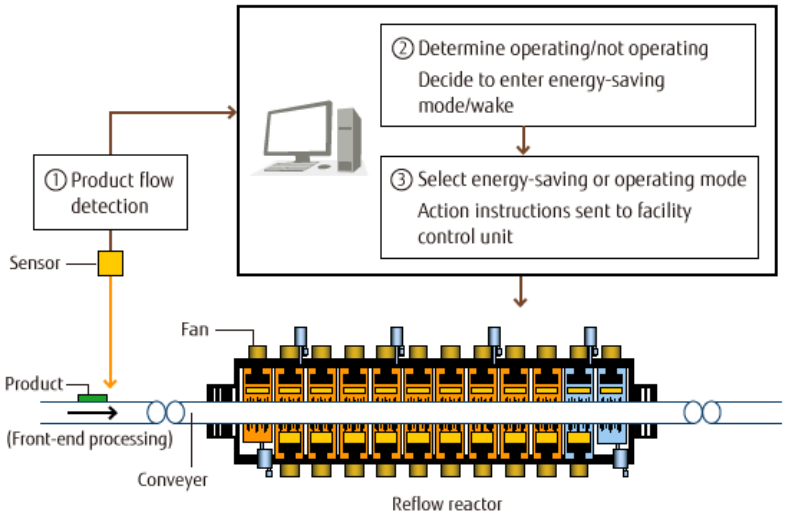
Assembly, processing and other production-related processes and equipment account for roughly 40% of overall CO2 emissions at Fujitsu factories. In a move to cut energy consumption associated with production, we are working to visualize power usage particularly around surface mount technology (SMT), 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

Reducing Standby Power by Operating Reflow Soldering Furnace on a Just-in-Time Basis

In reflow furnaces, power is always supplied to the heater even if no products are being processed. As a result, the heater used for soldering accounts for the bulk of the power consumed by this equipment. To reduce the use of standby power while this equipment is idle, we moved to develop a "just-in-time" (JIT) scheme for reflow furnaces that supplies the required amount of energy as needed. Information from products input for front-end processing, derived from sensors that detect when products pass by, determines whether the system should be active or idle. Standby power usage is reduced by putting the system into optimal energy-saving mode, which minimizes the hot-air fan speed, slows down the conveyer and turns system power off. This JIT scheme is currently applied to one reflow furnace at the Oyama Plant of Fujitsu Telecom Networks Limited, where it has reduced energy consumption for this equipment by 13%. This translates into an annual savings of roughly 150,000yen in energy costs and a reduction in CO2 emissions of around 4 tons. Plans call for extending this scheme to reflow furnaces at all Fujitsu sites, a move that is projected to cut annual energy costs by 12,000,000yen and CO2 emissions by 320 tons.

Overview of "Just-in-Time" Conversion of a Reflow Soldering Furnace



Case Study

Reducing Compressor Power Consumption by Cutting Air Use at Product Warehouses

Fujitsu has moved to reduce wasteful use of air at production-related facilities, specifically product warehouses. This initiative is designed to reduce energy consumption from compressors by lowering the use of compressed air at factories. Previously, to prevent moisture levels inside desiccators (industrial dryers) from rising, a fixed and often excess supply of air was piped in irrespective of moisture levels within the warehouse. With the installation of sensors to detect moisture, we are striving for more optimized air usage by automatically controlling the volume of air supplied. To prevent moist outside air from getting in and to reduce air leaks, we apply draft-sealing tape to entryways and take other steps to keep facilities airtight. These measures have reduced air usage by roughly 50% compared to pre-improvement levels.

Promotion of Green Process Activities in the Semiconductor Fabrication Process

In the Fujitsu Group, we promote Green Process activities, which implement, in coordination with cost-saving activities, measures such as optimizing the energy and amount of raw materials used in manufacturing processes and switching to alternative components with lower environmental burdens.

Previously, we promoted these activities at all Fujitsu Group manufacturing sites. However, starting in FY 2010, based on the past results of these activities and a desire to ensure efforts are ongoing and effective, we have specialized these efforts for semiconductor fabrication factories that require particularly large inputs of raw materials, such as chemical substances. We are also promoting activities initiated in FY 2008 at other manufacturing sites that focus on facilities and process improvements, and on new technology development in manufacturing areas (mounting, assembly, and testing processes).

In the Green Process activities at semiconductor fabrication factories, we first identify the total input of materials (raw materials, chemical additives, etc.) and energy into the process, together with their purchasing costs, and then establish our own original CG (Cost Green) index. Based on this, we then set quarterly or semiannual reduction targets (planned values) at the production line level for each factory and evaluate the degree of attainment of these targets while going through the PDCA cycle. Based on the results, we try to continually improve our production processes through initiatives like introducing new manufacturing technology, revising our processes, and improving the work procedures. Also, for activities other than those for manufacturing processes at factories, if promoting the activity in coordination with the manufacturing process would be more efficient, we adopt the CG index approach in those activities as well.

Cost Green (CG) Index

We employ an originally developed "Cost Green (CG) Index" that can identify materials for which targeted measures would be most effective in terms of both cost and environmental burden. The index is calculated by multiplying three numerical values for each material, including chemicals and gases-the unit price, volume used per product unit, and degree of environmental impact determined in-house. The number derived then forms the basis for reduction activities.

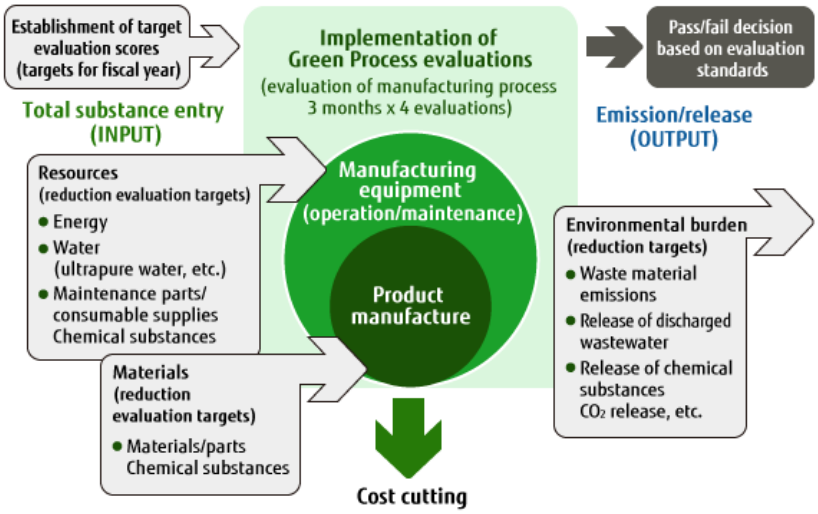
Method for Calculating Cost Green (CG) Value

This index describes the product of input volume used per product, the cost, and the environmental impact*1

*1 Environmental impact :
Measured on a scale of 1 to 10, with higher scores denoting worse environmental performance

Adoption Benefits

- **Reduced Environmental Impact from Factory Inputs**
  Reducing inputs such as raw materials, chemical substances and energy in upstream manufacturing activities makes it possible to reduce waste, chemical substances and energy consumption efficiently, and to thereby further reduce a manufacturing site's environmental impact.
- **Reduced Manufacturing Costs**
  Total inputs, including raw materials, chemical substances and energy, can be tracked and reduced, so operational benefits in the form of reduced manufacturing costs can also be expected.
- **New Assessment Indicators for Manufacturing Processes**
  Cost reductions, quality improvements, and delivery deadline compliance, the main assessment items for manufacturing processes, are joined by a new item, environmental impact reduction, which generates new added value. Activities will be carried out on an ongoing basis, with each factory setting targets and assessing relative achievement every quarter for each manufacturing line.



Case Study

Reducing Sealing Plastic with New Molding Technology
Fujitsu Integrated Microtechnology Ltd.

At Fujitsu Integrated Microtechnology, which handles Fujitsu Group semiconductor product packaging and test processes, each division within the factory sets its own targets for the Green Process activities it promotes.

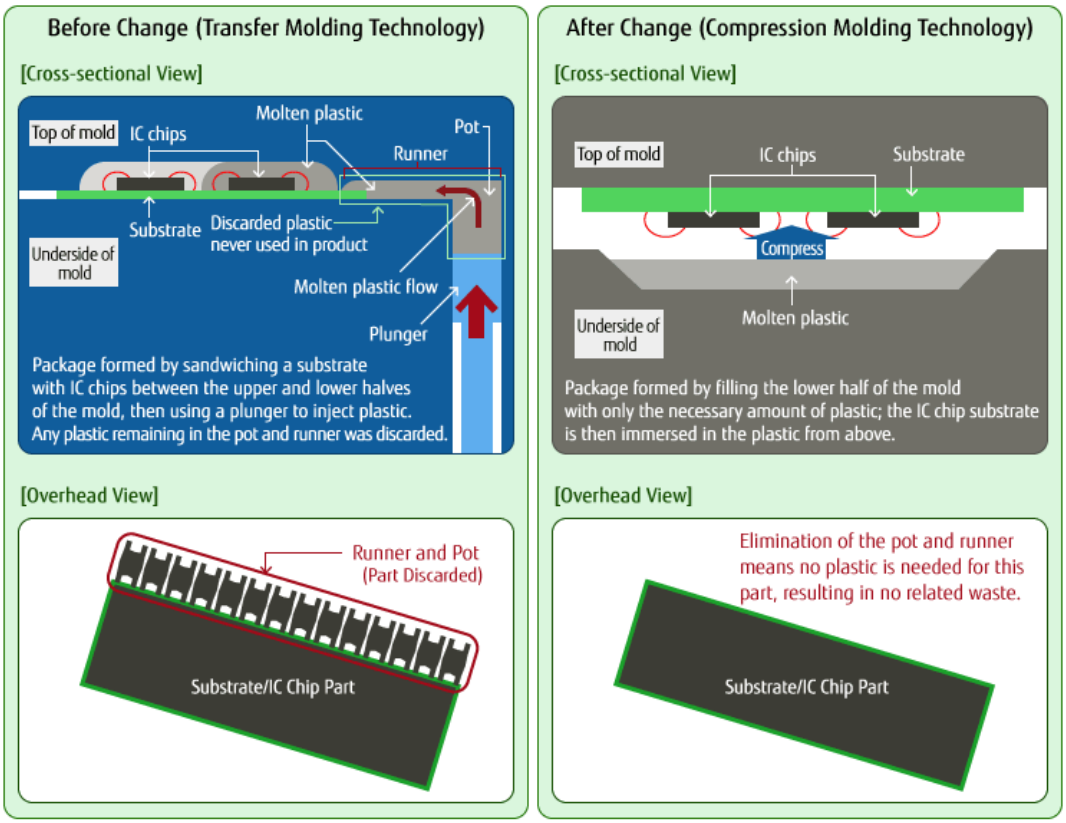
For example, the Miyagi Plant has instituted a new compression molding technology for the molding process in the IC chip packaging process (process for sealing chips with plastic), replacing the transfer molding technology that has been widely used to date. This has eliminated sealing plastic that had gone to waste and has reduced plastic usage and waste volume.

With conventional transfer molding technology, the process involved injecting plastic from a hole called a pot through which a plastic tablet is pressed and through a narrow tube called a runner to the chip. As a result of this process, plastic would remain on the pot and the runner, and this would become waste.

The new compression molding technology inputs only the necessary amount of plastic in a mold on the underside and then submerses the IC chip substrate into the plastic from the top and compresses it to perform the molding process, which renders conventional pots and runners unnecessary. This eliminates the plastic that had remained on those parts and thrown out as waste.

Moreover, switching to the new method has reduced bonding wire deformation, which had occurred when melted plastic was poured through, and has enabled more surface area of the substrate to be sealed at once, improving both quality and efficiency.

Since October, when the new technology was applied, plastic use has declined per unit of production (per component) in processes using the new method compared to before. In particular, since November, production volume has been increased and both CG values and resin costs per component have declined by 25-40% range, close to the rate that was expected (roughly 36%).



- Green Process : Case Study Archives

Reducing the Amount of Waste Generated

Basic Approach

Working towards a recycling-minded society, our 3R*2 policy encourages all employees to separate waste materials into different categories for effective recycling.

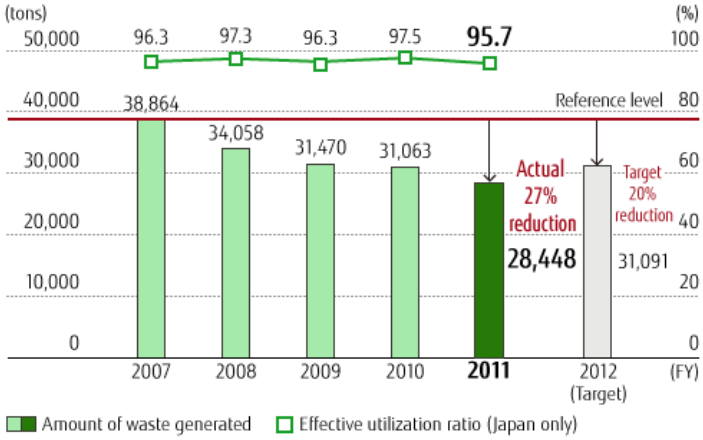
*2 3R :
Reduce, Reuse, and Recycle

FY 2011 Performance

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

We generated 28,448 tons of waste (per unit of actual sales: 0.064 tons/billion yen) in FY 2011, which was an 8.4% reduction from the previous fiscal year's level and a 27.0% reduction from the FY 2007 level. The reasons for these reductions include the conversion of waste paper and waste acid to valuable materials, and in-house processing of alkali wastewater.

Amount of Waste Generated



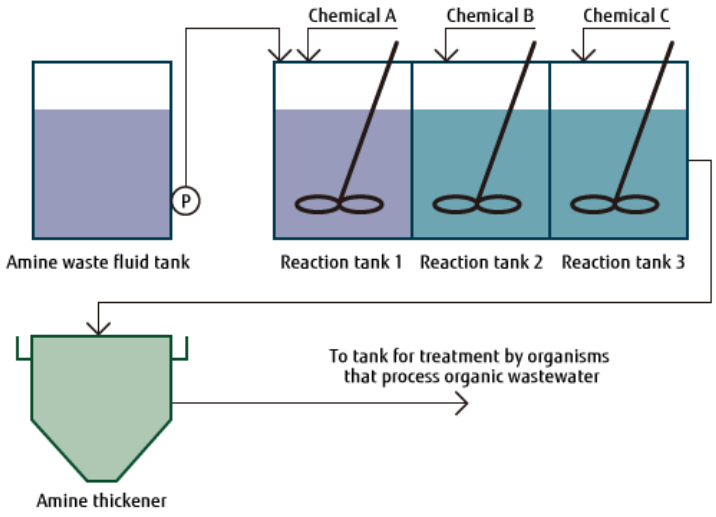
Case Study

Shinko Electric Industries Co., Ltd.
Internal Processing of Organic Amine Waste Fluids

Shinko Electric Industries Co., Ltd. previously processed all the waste stripping fluid (organic amine alkali chemicals) that was used to strip dry film laminate, which is necessary for patterning (a semiconductor production process), as industrial waste.

After repeated experimentation, the company established an internal processing technology and succeeded in making it possible to process the waste fluid in-house. As a result, industrial waste volume was reduced by 777 tons annually.

Method for Internal Processing of Amine Group Organic Alkali Waste Fluids



- 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. One business location did not achieve zero emissions status. We will continue considering ways to achieve zero emissions at this location.

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

Effective Use of Water Resources

Basic Approach

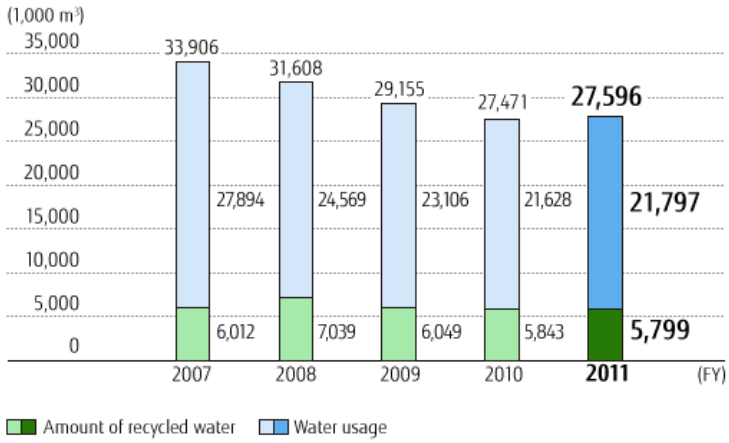
We are working to reduce our use of water resources through recycling and reuse of service water, the use of rainwater, and other measures.

Results for FY 2011

Our water use for FY 2011 was 21,797 thousand cubic meters (per unit of actual sales: 49 cubic meters/billion yen). This was 0.8% higher than FY 2010 but 5.7% lower than FY 2009.

The ratio of recycled water to total water use was 26.6% in FY 2011, which was about the same level as the 27.0% ratio in FY 2010.

Trends in Water Use



Chemical Substances Management

Basic Approach

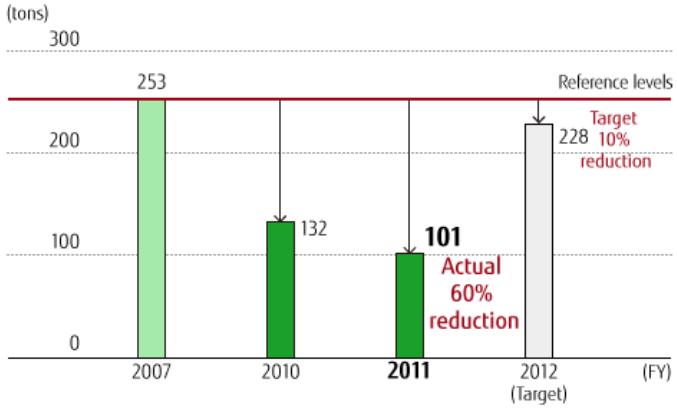
Prevention of environmental risks that could lead to environmental pollution or adverse health effects due to the use of harmful chemical substances has been established as our basic policy for chemical substances management. We manage the amounts used for about 1,300 chemicals, and we work to reduce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

Results for FY 2011

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 2011 were 101 tons, which was a 60% reduction compared to the FY 2007 reference year.

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.

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. Emissions of chemical substances covered by the PRTR system were 24 tons, and per unit of actual sales were 0.054kg/billion yen).

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

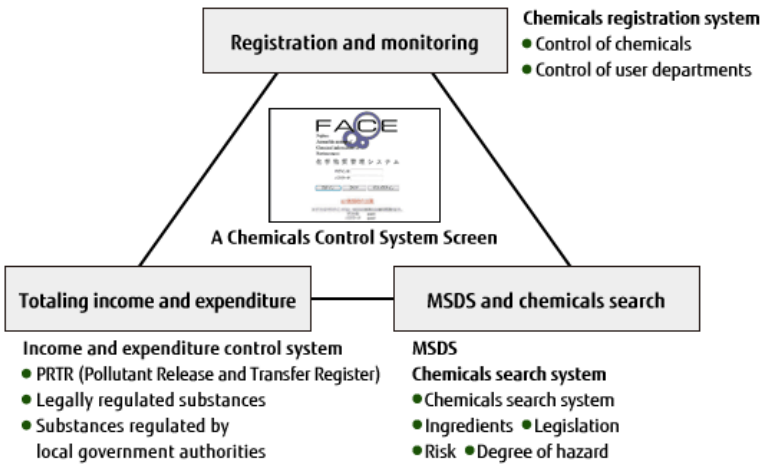
*5 MSDS :
A system that requires attachment of a Material Safety Data Sheet to chemical deliveries

*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 Infomation 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.

Overview of Chemicals Control System



- 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. 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 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 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

We intend to be a corporate group that accurately forecasts and evaluates today the extent of its environmental liability tomorrow, that does not defer settlement of this liability to a later date, and that discloses information to its stakeholders on the soundness of the Group in this area from a medium- to long-term perspective. To achieve this, at the end of FY 2011 we recorded as a liability on the Group's consolidated balance sheet 8.94 billion yen in soil-pollution cleanup costs, high-level polychlorinated biphenyl (PCB) waste disposal costs, and asbestos processing costs during facilities demolition. Based on data previously acquired, this total is the amount we calculate to be necessary for the Fujitsu Group in Japan to carry out these tasks (additional costs likely forthcoming with the recent detection of PCB in monitoring wells at the Suzaka Plant).

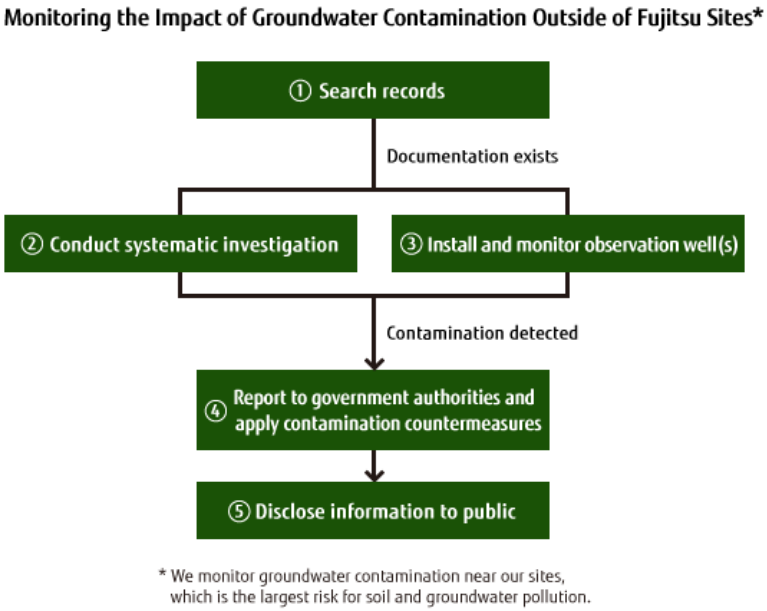
For processing waste with high levels of PCBs (transformers and capacitors), we have registered in advance with Japan Environmental Safety Corporation (JESCO), which processes PCB waste under Japanese government supervision, and perform this processing based on JESCO plans.

Preventing Soil and Groundwater Pollution

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

Basic 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 government authorities.



Status of New Soil and Groundwater Pollution Measures Undertaken in FY 2011

A voluntary survey in FY 2011 revealed soil and groundwater contamination at one site. We reported the state of contamination at this site and explained our countermeasures to local citizen and authorities.

- Groundwater Contamination Survey Results and Status of Cleanup Measures at Fujitsu Group Business Sites in Japan (in Japanese) [250KB]

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 seven such sites in FY 2011.

The table below lists the largest of the most recent measurements for chemicals with levels recognized to have exceeded legal limits in FY 2011 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)		Regulation Value (mg/l)
			Substance	Measured Value	
Kawasaki Plant	Kawasaki City, Kanagawa Prefecture	We are counting to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	5.3	0.04
Oyama Plant	Oyama City, Tochigi Prefecture	We are counting to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	6.107	0.04
			Trichloroethylene	0.043	0.03
Nagano Plant	Nagano City, Nagano Prefecture	We are counting to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.21	0.04
Suzaka Plant*1	Suzaka City, Nagano Prefecture	Soil survey underway to determine cause of contamination	Polychlorinated biphenyl	0.0028	Must not be detected
Shinetsu Fujitsu	Shinano machi, Kamiminochi Gun, Nagano Prefecture	We are counting 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 counting to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.13	0.04
			Trichloroethylene	0.172	0.03
FDK Sanyo plant	Sanyo-Onoda City, Yamaguchi Prefecture	We are counting to clean up VOCs by pumping and aeration.	Cis-1, 2-dichloroethylene	0.055	0.04
			Trichloroethylene	0.12	0.03
FDK Washizu Plant	Washizu, Kosai City, Shizuoka Prefecture	We are counting to clean up VOCs by pumping and aeration.	Trichloroethylene	0.17	0.03
			Tetrachloroethylene	0.06	0.01

*1 Suzaka Plant :
Contamination was confirmed at the Suzaka Plant in FY 2011. However, because countermeasures were scheduled to begin in FY 2012, it was not included in the number of business sites with ongoing cleanup and countermeasures.

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 Systems

Along with ensuring legal compliance with environmental regulations, the Fujitsu Group vigorously promotes environmental activities at its business offices, including efforts to save energy, achieve zero waste emissions and contribute to society.

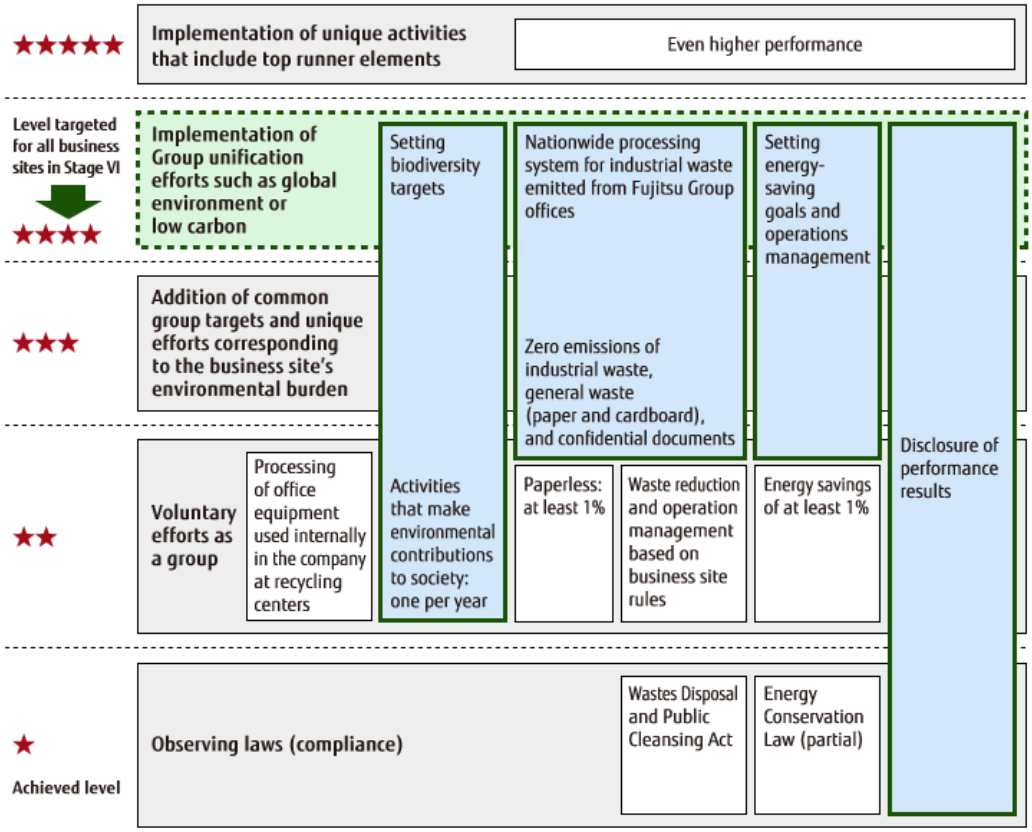
As part of this effort, we initiated our Green Office system in FY 2007. This system comprehensively evaluates aspects such as the level of environmental consideration and independent efforts at each office, and renders visible this evaluation by assigning one of three levels in the Fujitsu Group Environmental Protection Program (Stage V). We established the goal of achieving a level of two stars (★★) or more at every office in Japan covered by this system by the end of FY 2009, and worked to continuously improve and increase our level of environmental awareness. As a result of this effort, all of the offices at 371 sites had achieved the three star (★★★) level by the end of FY 2009. At the same time, we also achieved zero waste emissions*1 of waste materials from all 371 sites, in what was the largest effort of its kind in Japan.

In the Fujitsu Group Environmental Protection Program (Stage VI), which started in FY 2010, we set achieving a level of four stars (★★★★) or higher at every office in Japan covered by this system by the end of FY 2012. In addition to the three star (★★★) level conditions, the following items were added to the four star (★★★★) level conditions: biodiversity conservation activities, disclosure of environmental information to stakeholders, and unification of industrial waste processing for office emissions. Furthermore, there are now five achievement levels. At every office, in tandem with initiating activities to achieve this goal, we sought to create opportunities to discuss issues common to all offices and promote environmental activities intimately linked to the local community. For our overseas sites, we initiated surveys of current conditions in FY 2010. In FY 2011 we collected system proposals based on the results of this survey and are looking into implementing trials based on those proposals in FY 2012.

By operating this system, we plan to render visible the details of the activities carried out by our offices, construct databases that allow the activities to be shared with and rolled out to other offices, and thereby 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

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

The major environmental law to which all offices in Japan are subject is the Waste Management and Public Cleansing Act.

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.

- 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°C in summer and 20°C 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

Case Study

Fujitsu Finland Head Office Granted the WWF Green Office Logo

The head office of Fujitsu Finland Oy has been granted the WWF Green Office logo. To meet the qualifications for this recognition the company had to conduct environmental assessments, establish environmental targets, demonstrate tangible environmental achievements and take an active stance in internal environmental communication. Moreover, before being granted the Green Office diploma, the company had to pass an office inspection by a WWF Green Office expert.

Fujitsu Finland remains committed to taking assertive action to contribute to the global environmental activities of the Fujitsu Group.

Green Office Logo

Case Study

Videoconferencing System Brings Good Global Communication

Fujitsu Technology Solutions, based in Germany, has installed videoconferencing systems in 49 of its key offices, connecting its businesses across the European continent, the Middle East, Africa, and India. This move is intended to improve global communications, and reduce the time and carbon footprint required for business travel.

Over 2,000 video conferences have been held since the system began operating on December 1, 2011, through the end of April 2012. Use of the system has grown steadily since its introduction, and employees participating in video conferences have experienced better communications, while improving day-to-day productivity without having to actually visit distant offices.

The company's domestic German sales division used the system for its FY 2012 kick-off meeting, with over 600 people at 11 locations participating by video conference. This event is designed to raise employee motivation and build team cohesion, and the system helped the speech by CEO Rolf Schwirz come alive for the participants. The system has thus been extremely useful not only in improving communications, but in enhancing cooperation among teams scattered across multiple locations.

- Reducing CO2 Emission in Offices : Case Study Archives