

Top Message	Interview to Head of Corporate Environmental Strategy Unit	Special Feature 1: Fujitsu Group Environmental Action Plan Stage VIII	Special Feature 2: Digital Innovation	Chapter I Contribution to Society	Chapter II Reducing Our Environmental Burden	Environmental Management	Data Overview
GHG Emission Reduction through the Provision of ICT	Deploying Sustainability Solutions	Development of Top-Level Energy Efficient Products	Improving the Resource Efficiency of Products	Research and Development of Advanced Green ICT	Collaborating with Communities and Taking Action as a Good Corporate Citizen		

Chapter I | Contribution to Society

Under the Environmental Action Plan (Stage VII), the Fujitsu Group is aiming to expand our contributions to society overall and has globally expanded the scope of our targets, including reduction of GHG emissions through the provision of ICT and social contribution activities by employees. Moreover, Fujitsu has set goals for expanding the provision of solutions that will contribute to global sustainability, as well as for promoting research and development. The company has made efforts to improve the environmental performance of ICT products.

Key Achievements in FY 2015

Contribution to reducing GHG emissions through ICT
39.99 million tons

New products with top-level energy efficiency
52.8%

Resource efficiency of new products
44.8% improvement
(compared to FY 2011)

Hours of social contribution activities by employees
169,000 hours

About Symbols Used ✓ Examined by third-party organization ○ FY 2015 target achieved

Theme	Target items (targets through the end of FY 2015)	FY 2014 Key Performance	FY 2015 Key Performance	Status
Our Society	Contribution to Society by ICT: Reduce Greenhouse Gas Emissions	Reduce greenhouse gas emissions for our customer and society over 38 million tons.*1	Contributed 24.83 million tons (Japan: 15.43 million tons; overseas: 9.40 million tons)	Contributed 39.99 million tons (Japan: 25.64 million tons; overseas: 14.36 million tons) ✓ ○
	Contribution to Society by ICT: Increase Solutions	Increase the deployment of sustainability solutions.	Selected 12 solutions that contribute to sustainability, built out our product lineup in the climate change field, and gathered useful cases	Communicated information inside and outside Japan on 12 solutions (selected the previous fiscal year) that contribute to sustainability ○
	Design and Deliver Eco-efficient Products: Energy Efficiency	Achieve top-level energy efficiency*2 of more than 50% of the newly developed products.	46.0%	52.8% ✓ ○
	Design and Deliver Eco-efficient Products: Resource Efficiency	Increase resource efficiency of newly developed products by 35%*3 compared to 2011.	33.6% improvement	44.8% improvement ✓ ○
	Leading Edge R&D	Develop innovative technologies that enable solutions and products to reduce the environmental load.	Announced 25 key green technologies	Announced 25 key green technologies ○
	Corporate Citizenship: Social Challenges	Support initiatives that address the complex social and environmental challenges, e.g. biodiversity conservation.	Provided funding, technology, and human resource support	Provided funding, technology, and human resource support ○
	Corporate Citizenship: Social Activities	With society, support our employees to volunteer social activities.	Dedicated 145,000 hours to social contribution activities by employees	Dedicated 169,000 hours to social contribution activities by employees ○

*1 38 million tons: Calculate the numeric target by multiplying annual sales of each solution category by a conversion factor of CO2e savings per sales, which is based on around 300 case studies of Environmentally Conscious Solutions in Japan. There was an upward revision of the target at the end of FY 2014.

*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 35%: An upward revision of the target at the end of FY 2014

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GHG Emission Reduction through the Provision of ICT

Our Approach

Through the provision of ICT, the Fujitsu Group is working to create innovations in wide-ranging areas of society, including improvement of efficiency in energy usage, greater efficiency in production activities, and reduction in the movements of people and goods. By doing so, we aim to contribute to the reduction of GHG emissions. We believe that the use of ICT by large numbers of customers will reduce GHGs in society overall, while leading to ongoing business growth for the Fujitsu Group as well.

The Fujitsu Group is working to quantitatively visualize – and also expand – the contribution to GHG reductions from the ICT used by our customers. Between FY 2009 and FY 2012, this ICT usage has contributed to a cumulative reduction of 12.23 million tons of CO₂ emissions. From FY 2013, we extended the scope of our targets overseas, and have aimed to contribute to a global cumulative reduction in emissions of 38 million tons or more over the three years through FY 2015. We achieved that target with a result of 39.99 million tons reduced globally.

Summary of FY 2015 Achievements

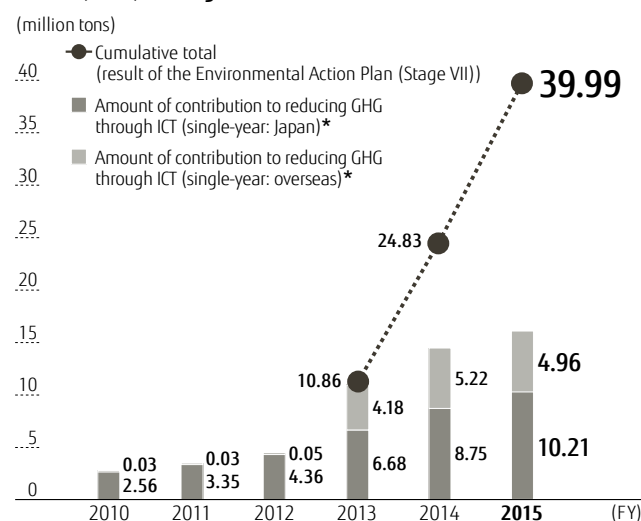
Targets under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)	Reduce greenhouse gas emissions for our customers and society over 38 million tons
Environmental Action Plan (Stage VII) Performance	39.99 million tons [Japan: 25.64 million tons, Overseas: 14.36 million tons]

Performance and Results for FY 2015

Expanding Environmentally Conscious Solutions

To advance the quantitative visualization of GHG reduction effects through ICT, we recognize solutions with an expected reduction effect of 15% or more as “environmentally conscious solutions.” In FY 2015 we moved ahead with recognizing these cases, centered on solutions that we provide to large numbers of customers. Moreover, we leveraged opportunities to propose environmental contribution effects to customers and worked to convey the environmental value of our solutions.

Amount of Contribution to Reducing Emissions of Greenhouse Gases (GHG) through the Provision of ICT



* Values for FY 2010 to FY 2012 represent performance under the Environmental Action Plan (Stage VI). From FY 2013, we are expanding the scope globally.

Recognizing 51 New Cases Including Cloud-Related and Tablet Utilization Solutions

The Fujitsu Group recognized 51 new cases of environmentally conscious solutions in Japan, bringing the cumulative total to 451. These new cases include the GLOVIA Smart Hotel Cloud Service, which offers total support for hotel management, and the AZCLOUD SaaS teraSpection cloud-based service, which uses tablets to manage inspection data for buildings and condominiums.

Examples of cloud-related solutions

1. FUJITSU Integrated System PRIMEFLEX for Cloud
A vertically integrated virtual cloud platform
2. AZCLOUD SaaS teraServation
A cloud-based service for the maintenance and renovation industry

Examples of tablet utilization solutions

1. AZCLOUD SaaS teraSpection
A cloud-based facility inspection service using tablets
2. Tablet system for financial institution sales offices

FY 2016 Targets and Plans

Maintaining Activities for the Sustainable Development Goals (SDGs) and Working to Boost Accuracy when Reporting Our Contribution

In September 2015, the United Nations announced “Goal 13: Take urgent action to combat climate change and its impacts” in the SDGs at the heart of the UN’s “2030 Agenda for Sustainable Development.” Fujitsu will continue to promote our MetaArc and other cloud-based services in order to help achieve this goal. Additionally, we will review our method for calculating the level of our contribution and will report a more accurate performance figure.

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GHG Emission Reduction through the Provision of ICT

Main Activities in FY 2015

Promoting Growth in Customer Utilization

Inside Japan, Fujitsu is promoting customer utilization of our solutions by, for example, quantitatively assessing the benefits of Yamato Protec Corporation's adoption of AZCLOUD SaaS teraServation. Yamato Protec sees disaster preparedness as part of addressing environmental issues and engages in R&D with the philosophy of "starting from the essentials." The company also promotes the commercialization of environmentally friendly fire extinguishers and equipment, as well as the recycling of extinguishers.

The company's aim in introducing teraServation was to boost the quality and operating efficiency of their maintenance inspections, but it is also contributing to a lower environmental burden from energy savings and other gains in their offices. Although no performance statistics exist yet for the newly adopted system, Fujitsu's calculations suggest an approximate 15% CO₂ reduction, despite greater power consumption by the company's ICT equipment. The company has commented that they "would like to utilize ICT to make work tasks more efficient and reduce environmental burden going forward."



Yamato Protec's fire fighting equipment



Example of the system in use (simulated image)

Strengthening Initiatives Overseas

Accompanying plans to bolster local business using the EcoCalc web tool, Fujitsu conducted workshops in Spain and Finland to share best practices and to create proposals using business cases from these countries. A municipal customer in Finland, Mikkeli City, has published information on their website detailing the adoption and the evaluation of Fujitsu's CaseM Solution. Fujitsu is proceeding in FY 2016 to cultivate and expand new initiatives in Europe alongside leaders in Spain, Finland, the UK, and Ireland.



Team members from Spain, the UK, Ireland, and Japan



Team members from Finland and Japan

Reference Information

Calculation Method for Amount of GHG Reduction Effect

At the Fujitsu Group, we have assessed the quantitative reduction in environmental burdens (in terms of reduced CO₂ emissions) from ICT adoption. In calculating the amount of GHGs reduced annually, we tally CO₂ emission reductions per unit of sales and annual sales for each solution category.

In order to increase the accuracy of our GHG reduction figures in FY 2016, we are changing from conventional categories to calculations made for each recognized solution.

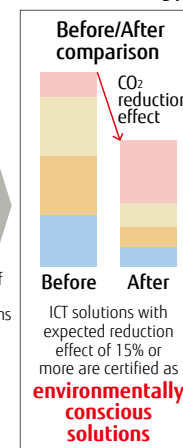
Overview of Environmental Impact Assessment Methodology

Conversion of 7 factors to CO₂ emissions

Resource consumption	Consumption of paper, CDs, documents
Movement of people	Movements by airplanes, trains, buses and automobiles
Transport of goods	Transport by trucks and rail freight
Office space	Associated work-hours, documents/equipment space
Warehouse space	Storage in regular/refrigerated warehouses
Power Consumption of ICT/Network equipment	Power consumed by ICT equipment (servers, PCs, etc.)
Data communication traffic volume	Data communication traffic volume by Internet/FAX

Sum of CO₂ emissions

Environmental-load basic unit database



Comment from Third-Party Verification Body

In continuation with last year, we reviewed, from a third party perspective, the FY 2015 data on the amount of contribution to GHG emission reduction through the provision of ICT. From the fact that all of the basic data used for calculations has undergone checks by the internal Review Meeting, we again confirmed that a calculation framework is in place and functioning effectively. The same calculation method as last year was employed for the FY 2015 tallies, though we observed Fujitsu's active stance toward reviewing and improving their approach in order to increase the accuracy of calculations for the next term.



Masatoshi Sakaguchi

System Certification Division, Bureau Veritas Japan

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Deploying Sustainability Solutions

Our Approach

Achieving a sustainable society requires that we address a variety of social and environmental issues including: measures against global warming by reducing GHG emissions, adaptation to the effects of climate change, resource efficiency, conservation of biodiversity, food supply security, and urbanization.

In response, the Fujitsu Group is increasing deployment of sustainability solutions as we continue to respond to social and global environmental issues through ICT solutions. We studied and implemented these solutions through the global members of our Environmental Solutions Committee and its constituent working group (WG).

Summary of FY 2015 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)	Increase the deployment of sustainability solutions.
FY 2015 Targets	Uncover case studies to communicate information on solutions that contribute to sustainability.
FY 2015 Key Performance	Communicated information inside and outside Japan on 12 solutions (selected the previous fiscal year) that contribute to sustainability

FY 2015 Performance and Results

Adding “Sustainability” as a Category under the Solutions Menu on the Fujitsu Website

On the Fujitsu website, we have added a “Sustainability” category that introduces solutions related to adapting to and mitigating climate change. Examples include Akisai, SPATIOWL, Enetune-BEMS, disaster preparedness solutions, and Intelligent Dashboard, all sustainability solutions ranging across the categories of food, agriculture, urban transportation, smart energy, disaster preparation, and environmental management.



A section of the website

Contributing to Better Awareness of ICT Solutions at Events and International Conferences

Fujitsu introduced our disaster preparedness and environmental monitoring solutions at events sponsored by GeSI (Global e-Sustainability Initiative) and at the ITU World Conference.

- A side event at the UN Bonn Climate Change Conference (June, Bonn)
- A side event at the UN Climate Summit (September, New York)
- ITU Telecom World 2015 (October, Budapest)
- ITU Green Standards Week 2015 (December, The Bahamas)
- Eco-Products Exhibition, GeSI-sponsored Seminar (December, Tokyo)



Seminar at the Eco-Products Exhibition

FY 2016 Targets and Plans

Leveraging ICT Services to Contribute to Sustainable Societies

The Sustainable Development Goals (SDGs) were adopted in 2015. While Fujitsu's promotion of “GHG emission reduction through the provision of ICT” and the “provision of sustainability solutions” have contributed to achieving SDGs, we have added, from FY 2016, the new objective of “contributing to a sustainable society through provision of ICT services” in Environmental Action Plan (Stage VIII). We are expanding initiatives to develop and provide solutions that, from the SDGs perspective, have value for society and our customers.

In FY 2016, we will test the correlation between these solutions and customers' challenges in meeting the SDGs, and intend to spread the resulting value inside and outside the Company.



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Development of Top-Level Energy Efficient Products

Our Approach

As ICT spreads, an increase in energy demand is expected in proportion to the higher performance and higher-density integration of products. Accompanying this, energy-related regulations for ICT products are increasing in various countries and regions, such that energy efficiency is taking on importance within society in the form of energy label conformance and green procurement requirements.

The Fujitsu Group believes that we also must aim to improve the energy performance of products during their use, in order to reduce GHG emissions. Up to now, we have worked to improve the energy efficiency of products through development of “Super Green” products. As we now seek to further increase energy efficiency, in our Environmental Action Plan (Stage VII) we have set a target of making over 50% of all new products top-level energy efficient.

Summary of FY 2015 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)	Achieve top-level energy efficiency of more than 50% of newly developed products.
FY 2015 Targets	Make 50% or more of new products top-level energy efficient.
FY 2015 Key Performance	Made 52.8% of new products top-level energy efficient.

FY 2015 Performance and Results

Actively Applied Energy-Saving Technology

We have set targets for the achievement of top-level energy efficiency based on the number of product series that are expected to be developed during FY 2013–15.

Applications of energy-saving technologies include new, high-efficiency microprocessors and power supplies, energy-saving displays, optimized energy-saving controls, and the strengthening of power management features. In addition to these, we are actively undertaking the aggregation of LSIs and the reduction of components.

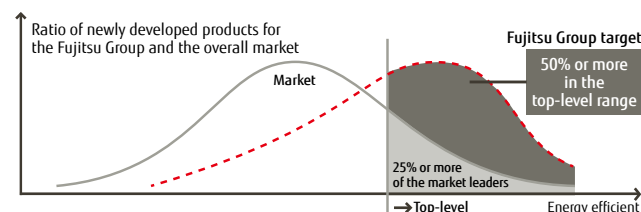
Achieved Top-Level Energy Efficiency for 52.8% of New Products

As a result of applying and expanding energy-saving technologies across our divisions in products including servers, PCs, network devices, and imaging devices, we were able to exceed by over 2.8% our 50% target (vs. FY 2015) for new product top-level energy efficiency.

Reference Information

Top-Level Energy Efficient Products

Products, beginning with “top-runner” products (first in the world or industry, top of the world or industry), that achieve 25% or more of the market benchmark in energy efficiency.



Reference Information

Top-Level Energy Efficient Product Target Standards

Fujitsu sets targets that recognize top-level energy efficiency standards in each product area compared with the market overall or with conventional products.

Example of Target Standards*1

Reference Level	Product Categories
ENERGY STAR criteria (in effect) compliant	PCs, imaging equipment, etc.
Top-level achievement rate of the Top Runner Program (FY 2011) under the Energy Conservation Law	Servers, storage systems, etc.
Industry-leading energy efficiency	LSI, products for specified fields, etc.
Industry's highest-level battery life	Smartphones
Power consumption reductions over prior products/prior performance	Network products*2, electronic components, etc.

*1 Depending on product specifications, standard values differ even for products within the same category.

*2 A larger number of stars designate the top-level, concerning the products which are assessed by Ecology Guideline For the ICT Industry.

FY 2016 Targets and Plans

Deploying Outstanding Energy-Saving Technology and Expanding Its Application

In Environmental Action Plan (Stage VIII), Fujitsu revised the definition of top level products to be “products that meet standards comparable to those at top places in external indicators” and will continue to proceed with top-level product development to achieve our target. In addition, we will deploy outstanding energy-saving technology and expand its application to products. Looking toward the future, we aim to push the development of advanced technology, which will contribute to revolutionary improvements in energy efficiency.

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Development of Top-Level Energy Efficient Products

Main Activities in FY 2015

High Performance Servers Able to Operate in 45°C Environments Due to Super Efficient Cooling Design

PRIMERGY RX2540M2



Fujitsu's PRIMERGY RX2540M2 is designed to run in high temperature environments as hot as 45°C. Examples of these cooling features include placing heat-producing components (such as CPUs, memory, and HDD) closer to cooling fans, and using heat sinks as well as power supply units with high cooling efficiency. The power supply unit in the server has received 80 PLUS® Titanium certification. It achieves power conversion efficiency as high as 96% and minimizes power loss and heat from AC/DC conversion. Furthermore, airflow within the server is optimized by using a fan inside the power supply to provide focused cooling for the supply unit.

ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) has stipulated environmental classes depending on the temperature and humidity ranges for a device's normal operation. Devices operating in 45°C environments fall into class A4, the highest class defined by ASHRAE. Since PRIMERGY RX2540M2 can operate in a hotter environment than previous 35°C models, the new product contributes to energy conservation and reduced CO₂ emissions.

High-Performance Waterproof Tablets with Energy-Saving Designs for Long Battery Life

ARROWS Tab Q736/M



The Windows-equipped ARROWS Tab Q736/M for corporate clients uses the latest Intel® Core™ i processor and an IGZO energy-saving display to achieve approximately 9.1 hours*¹ of battery life. The tablet is Energy Star compliant and achieves an energy efficiency rate of 500% or more (vs. FY 2011) based on the Law Concerning the Rational Use of Energy.

Furthermore, by using hybrid molded components made of magnesium alloy and glass fiber reinforced plastic for the internal cover, it was possible to create the sturdy screen while maintaining trimming weight. Post-consumer recycled materials*² are employed in the glass fiber reinforced plastic. Additionally, the new tablet's internal cover can be reused instead of being disposed of when refurbished. The device's technology includes a fan and heat pipe without sacrificing the waterproof design, thereby enabling efficient cooling of the high-performance internal CPU and also reducing resources used and size.

*¹ Measured based on the JEITA battery operating time measuring method (Ver. 2.0); battery life is approximately 15.2 hours when using the additional battery.

*² Material recovered and reused from post-consumer products.

Developing the World's Smallest and Most Efficient AC Adapter



GaN-HEMT AC adapter

Fujitsu Laboratories Ltd. has developed an AC adapter that allows rapid charging of smartphones and other devices. By using gallium nitride (GaN)*¹ High Electron Mobility Transistors (HEMT)*² (GaN-HEMT) with low dynamic resistance to switching elements, the adapter limits current loss during high speed operation and emits current with optimal timing. When charging from a home outlet, the charging time is approximately one-third*³ that of conventional adapters. The new product is the smallest 12-watt AC adapter (15.6 cm³) in the world and has a world-leading 87% power supply efficiency.

Use of this AC adapter will help limit wasteful electricity consumption and will contribute to reducing CO₂. Current plans aim to commercialize the product in FY 2017 and promote its use in laptop computers and other devices.

*¹ **Gallium nitride (GaN):** A wide band-gap semiconductor material that operates with a higher breakdown-voltage than semiconductor technologies based on previous materials, such as silicon (Si)- or gallium-arsenide (GaAs)-based technologies.

*² **High Electron Mobility Transistor (HEMT):** A field-effect transistor that takes advantage of operation of the electron layer at the boundary between semiconductor materials with different bandgaps, which is relatively rapid compared to that within conventional semiconductors.

*³ Data vary depending on the device being charged.

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Improving the Resource Efficiency of Products

Our Approach

Amid the strains on nature from excessive mining and the depletion of resources, rapid rise and fall of international resource prices, uncertain supply of rare metals, and other growing threats to the sustainability of companies and society, there is also a growing view worldwide of the importance of resource efficiency. An example can be seen in the EU's designation of resource efficiency as a growth strategy and its establishment of the Resource Efficiency Flagship Initiative.

The Fujitsu Group believes in the importance of efficiently using resources in the ICT products that we provide to customers. We have engaged in "3R design" that draws on the principles of reduce, reuse, and recycle, and have developed our products with technology that is effective in reducing the use of resources. We are making efforts to improve resource efficiency, which is made possible by designing products to be lighter and smaller, using recycled plastics, reducing the number of parts, enhancing ease of disassembly, and improving recyclability. Our goal is to offer outstanding products that provide customers with benefits including compactness, light weight, and space savings.

Summary of FY 2015 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)	Increase resource efficiency of newly developed products by 35% or more (compared to FY 2011)
FY 2015 Targets	Increase resource efficiency of new products by 35% or more (compared to FY 2011)
FY 2015 Key Performance	Increased resource efficiency of new products by 44.8% (compared to FY 2011)

FY 2015 Performance and Results

Improving the Resource Efficiency of New Products

In FY 2012, the Fujitsu Group created its own definition of "resource efficiency" since no official indicator existed.

In FY 2015 as well, we continued to use our indicators in the evaluation of products newly developed by Fujitsu*, while also undertaking initiatives aimed at reducing the number of parts in products and reducing the size of products through smaller, thinner, and lighter parts and higher-density mountings.

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

Achieving 44.8% Improvement in Resource Efficiency

Fujitsu has achieved a 44.8% improvement in FY 2015 resource efficiency, against a target of 35%. This is the result of smaller

size and lighter weight, primarily in tablets, PCs, PC servers, mission-critical IA servers, and mobile phone base stations.

FY 2016 Targets and Plans

Further Improvements in Resource Efficiency in Our Sights

In Environmental Action Plan (Stage VIII) for FY 2016-18, we have stated the target of "Promoting eco design for resource saving and circulation and increasing resource efficiency of newly developed products by more than 15% (over FY 2014)." Toward achieving this target, Fujitsu is continuing current initiatives, while expanding development of new lightweight, rigid materials and the use of recycled materials. We also seek to widely publicize our products' environmental performance to increase recognition of this factor, which we will link to sales growth.

Reference Information

Definition and Calculation of Resource Efficiency

Resource efficiency is evaluated by dividing the value of a production, by the environmental burden (in terms of use and disposal) of the elements (resources) comprising the products.

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

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

Definition of Each Item

Product value	To place emphasis on the valuation of reduction 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 improvements)
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 (excluding the mass of recycled plastic used).
Resource disposal volume	Mass of each resource disposed of (not reused) in connection with a post-use product (design value). Activities will begin with this figure set to a value of "0."

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Improving the Resource Efficiency of Products

Main Activities in FY 2015

Tablet-shaped Handheld Terminal Only 70% the Thickness of Previous Models

FUJITSU Handheld Terminal Patio 720



9.9%
resource efficiency improvement
(over conventional models)

The FUJITSU Handheld Terminal Patio 720 is shaped like a tablet and ideal for worksite tasks such as placing orders and inspecting products. It features an easy-to-read screen, user friendliness, and a sturdy design, while also being only 18 mm thick (approx. 70% the size of conventional models).

The internal frame, which is the supportive skeleton of the device, was switched from plastic to magnesium alloy in order to make the terminal thinner, yet more robust. Additionally, adopting the Intel Z3745 1.3 GHz (4 core) chip in the CPU greatly reduced the number of components, allowing the double-sided printed circuit board to be concentrated onto a single side.

The battery and external connectors were upgraded as well. The new model adopts a thin, square battery that eliminates unused space. External connectors such as the USB ports have fixed height. Cutting indentations into the printed circuit board allowed the connectors to be seated lower in the board and placed more freely in the vertical plane.

Smartphones Featuring Both Thinner and High Strength Designs

arrows NX F-02H



17.1%
resource efficiency improvement
(over conventional models)

Smartphone "arrows NX F-02H" launched in the winter of 2015, has been reduced the thickness by 0.9 mm (approx. 10%) compared to previous models. In addition to saving the overall parts by 8%,. And this model has used the cutting-edge materials, called nanotech fiber that is as approximately 1.5 times strong as previous resin-based material. As a result, arrows NX F-02H has a greater strength than any other conventional smartphones in spite of thinner design.

The space gained by reducing components enables to put the high-capacity 3390-mAh battery inside. Despite built-in high-resolution display, energy-saving innovations in the display itself and the drawing process minimize battery drain down to the same level as full-HD models. As a result, arrows NX F-02H has been achieved the top-notch actual use time, 99.6 hours.*

* Battery life assumes typical smartphone use of approx. 187 min./day, including app use while charging (NTT Docomo research).

Advancing 3R Design

Through our proprietary product environmental assessments and green product evaluations, the Fujitsu Group is working toward the application of reduced resource usage, improved recyclability, and other technologies that take into account the 3Rs. Examples of the effective resource-saving technologies that we are deploying in our products include reductions in the number of components and cables, performance enhancements, space savings through higher-density integration, and digital product manuals. Furthermore, we are using Fujitsu's own 3-D Virtual Product Simulator (VPS), which is popular with many of our customers during their product design processes, to test the steps involved and the convenience of product assembly and disassembly before creating prototypes.

From 2010, we have also conducted regular study tours for designers at the Fujitsu Group recycling centers. In addition to hands-on experience with dismantling used products, designers gain feedback from staff in charge of recycling through idea exchanges and explanations of the obstacles to ease of dismantling. From FY 2015, the Fujitsu Group has been summarizing examples of the obstacles to ease of dismantling that we have learned from some 90 case studies at 5 recycling centers. Results are distributed in a systematic collection complete with pictures.



Gaining experience in dismantling at recycling center study tour

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Research and Development of Advanced Green ICT

Our Approach

The Fujitsu Group pursues its business activities with an aim to solving social and environmental problems by driving forward research and development (R&D) in a multitude of domains. Working from the standpoints of environmentalism and sustainability, we use leading-edge technologies as our foundation and expand outward into materials and devices used in products, as well as facilities and system solutions.

At Fujitsu Laboratories Ltd., the core company shouldering R&D in the Fujitsu Group, two key approaches are being undertaken: “Green of ICT,” which seeks to reduce energy and resources consumed by ICT equipment and infrastructure, and “Green by ICT,” which seeks to reduce environmental burdens through the use of ICT. Within these approaches, Green by ICT has a significant ripple effect in society and we are aiming to drive green ICT in the domain of Social Innovation, the core of the Fujitsu Group’s growth strategy.

Summary of FY 2015 Achievements

Targets

under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)

Develop innovative technologies that enable solutions and products to reduce the environmental loads

FY 2015
Key
Performance

Announced **25** key green technologies

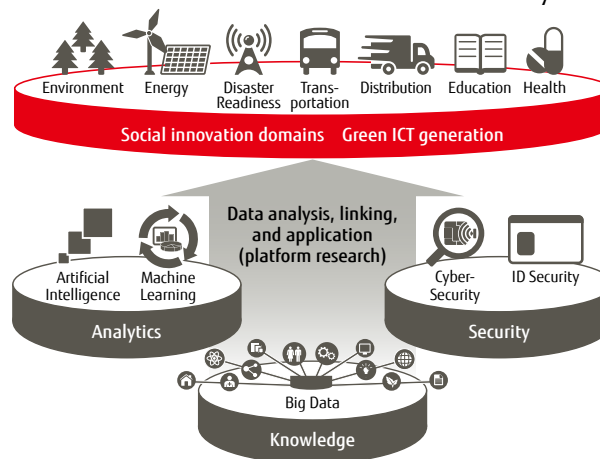
FY 2015 Performance and Results

Positioning and Highlighting Fujitsu Laboratories’ Key Green Technologies

To disseminate the Fujitsu Group’s advanced green ICT throughout society, and to support its early deployment in businesses, we positioned as our key green technologies “best-in-class” and “world-first” technologies, as well as technologies with notably high environmental contribution. We are also highlighting our technological capabilities by advancing our R&D for these key green technologies and assertively promoting them through press announcements.

In addition, in the domain of creating social innovation, which connects and leverages heterogeneous information such as that generated by corporations, governments, individuals, and sensors, we strengthened our generation of green ICT and communicated its contributions to the environment.

Social innovation research domains in the laboratory



Announcement of 25 Key Green Technologies

In FY 2015, the Fujitsu Group announced 25 technology development achievements, including 18 in the domain of Green by ICT and 7 in the domain of Green of ICT, with the former category comprising 5 achievements in the domain of Social Innovation.

Research Achievements

- Software that analyzes service quality while monitoring transmission at a world-record 200 Gbps
- Web OS technology for easy connections between smartphones and peripheral devices
- Technology that visualizes the complexity of business logic
- Development of virtualization technology that brings security and operability to Web applications
- Development of millimeter-wave wireless devices for 5G networks
- Platform services utilizing IoT data
- Technology for high-speed data transmission from remote sites
- Using supercomputers for real-time disaster-recovery scheduling
- Dispersed device connection technology
- Technology to visualize the energy required to execute software
- Technology for fast, automated setup of virtual networks
- Wireless transmission technology for 5G networks
- Technology to accelerate comprehensive analysis of data
- Ultra high frequency transmission and sensing technologies
- Development of non-insulated 100A DC-DC power modules
- Technology for automatically generating image inspection programs
- Development of the world’s smallest and most efficient AC adapter
- Development of touch sensors to capture touch data during Kampo doctor exams
- Technology for predicting potential sewer system overflow from torrential rains
- Development of the world’s largest-scale magnetic-reversal simulator for (dysprosium-free) neodymium magnets
- Technology trial to predict the population of Japanese sika deer
- Development of technology to detect “back-and-forth-type” targeted e-mail attacks in real time
- Development of gallium nitride transmitter power amplifiers
- Development of technology for instantaneous searches of a target image from a massive volume of images
- Commencement of a trial to test an output control system for photovoltaic power generation

FY 2016 Targets and Plans

Accelerating Development of Innovative Technologies for Solving Environmental Issues

Fujitsu is accelerating the development of innovative technologies for solving various environmental issues such as energy and work task efficiency improvements for reducing CO₂ emissions, countermeasures for natural disasters, and preservation of biodiversity.

Top Message	Interview to Head of Corporate Environmental Strategy Unit	Special Feature 1: Fujitsu Group Environmental Action Plan Stage VIII	Special Feature 2: Digital Innovation	Chapter I Contribution to Society	Chapter II Reducing Our Environmental Burden	Environmental Management	Data Overview
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Research and Development of Advanced Green ICT

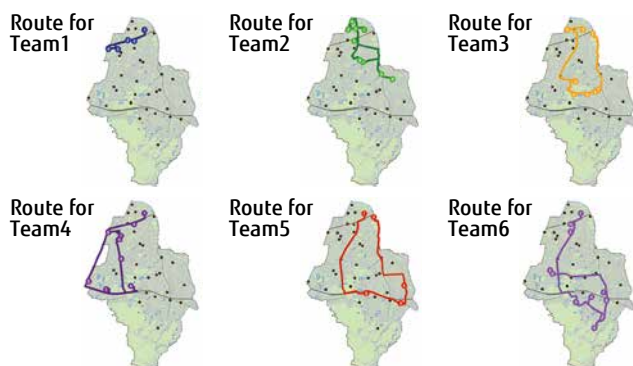
Main Activities in FY 2015

Scheduling Disaster-Recovery with Supercomputers

During a large-scale natural disaster, recovery schedules for essential services, etc. must be formulated quickly. However, since conditions can change even as plans are being formulated, it is difficult to perform the calculations based on massive volumes of data in real time needed to propose an ideal plan that reflects those changing conditions.

Fujitsu Laboratories and the Institute of Mathematics for Industry at Kyushu University have developed a numerical-optimization technology that runs on a supercomputer to efficiently formulate large-scale recovery plans while taking into account complex conditions on the ground, creating real-time scheduling for recovery work. When used with 506 recovery sites and 64 work teams, this technology was able to formulate an appropriate recovery-work schedule in roughly three minutes.

Output result for a case with 37 recovery sites and 6 work teams



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Technology to Visualize the Energy Required to Execute Software

Fujitsu Laboratories Ltd. has developed technology that precisely calculates the energy consumed by software. Servers equipped with Intel-made CPUs can measure power consumption for the CPU as a whole. Until now, however, it was not possible to calculate the energy required to execute software on a core-by-core basis, so it has been difficult to take a software-based approach to reducing power consumption.

Now, Fujitsu Laboratories has developed technology that uses information that can be tracked at the individual core level, such as clock cycles and cache-hit percentages, to estimate energy consumption in detail, down to the program module level. This technology can be used in energy-efficient programming reducing overall server energy usage and, by using spare power and increasing parallelism, boosting software performance.

Software energy analysis based on energy distribution and performance indices

Performance indices	App A	App B	RAPL
	Core 0	Core 1	Core power overall
Core power index	70	30	20J
	Memory		Memory power overall
Memory power index	20	80	10J

	App A	App B
Core	14J	6J
DRAM	2J	8J

Software energy analysis based on energy distribution and performance indices

Technology Predicting the Population of Japanese Sika Deer

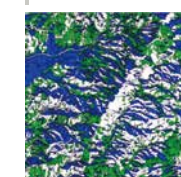
In recent years, the rapid increase in the population of sika deer has led to forest damage from the deer's feeding habits and there are concerns about a loss of biodiversity. Developing countermeasures requires forecasts on the growth of animal distribution. However, it is difficult for researchers to investigate broad and hard-to-reach areas, which has made surveys challenging.

Fujitsu Laboratories has developed a software technology to predict maximum possible mammal populations without a field survey, using publicly available information, such as vegetation maps that display the types and distribution of plants, topographical maps, and climate information, as well as information about the animal's basic biology. In this trial to apply the technology to sika deer, the habitable areas that are suitable for deer to live are calculated. By applying the relationship between sika deer population density and their weight, the maximum possible population number for each square kilometer area is estimated.

Predictions of maximum Japanese sika deer populations (Koshu region, Yamanashi prefecture)

57,000 m² of habitat are needed for each 60-kg sika deer

Habitat derived through information from vegetation and topographical maps



- **Habitable area**
 - Gently sloping broad-leaved forests, meadows, etc.
- **Uninhabitable area**
 - Urban and residential districts
 - Steeply sloped broad-leaved forests, meadows, coniferous forests, etc.
- **Corridors**
 - Gently sloping coniferous forests, wetlands, etc.

Predicted maximum population (Units: deer/km²)



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Collaborating with Communities and Taking Action as a Good Corporate Citizen

Our Approach

Fujitsu Group deploys its funds, technology (ICT), and people (expertise) to support the activities of NPOs, NGOs, educational institutions, local governments, citizens' groups, and other diverse bodies that seek to resolve social issues. Specific examples include technological support for citizen enlightenment and studies for biodiversity strategies by local governments; funding support for rare species protection by NPOs and global warming countermeasure projects; technological support for monitoring and other systems; and support for human resources participating in the social contribution programs of international institutions. We determine the targets and content of support based on the needs and issues of local communities.

In addition, we support the social contribution activities undertaken by employees, encouraging each and every employee to maintain high awareness of social and environmental issues and to take an active involvement in resolving these.

Summary of FY 2015 Achievements

	Corporate Citizenship: Social Challenges	Corporate Citizenship: Social Activities
Targets under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)	Support initiatives that address the complex social and environmental challenges, e.g. biodiversity conservation	With society, support our employees to volunteer social activities
FY 2015 Key Performance	Funding: Donated to a children's advocacy center and provided support to disaster areas through the Red Cross Technology: Provided software engineering opportunity Human resources: Carried out professional training and other activities	Dedicated 169,000 hours to social contribution activities by employees

FY 2015 Performance and Results

Building a Platform for Sharing Information About Social Contribution Activities around the World

Since FY 2011, the Fujitsu Group has been using its Act Local System to share information about social contribution activities around the world. In the beginning, the system was mainly used inside Japan. In line with promoting Environmental Action Plan (Stage VII), we enhanced the system so that it would be easier to include activity reports from different countries and regions.

Furthermore, we promoted information sharing through use of the system globally by having social contribution managers in each region to encourage one other to start using the platform.

The result, with a total of 14 countries posting on the platform, has been an increase in the number of overseas activity reports compared to three years prior.



Act Local System screen

Conducting 169,000 Hours of Social Contribution Activities in Japan and Overseas

Through the provision of funding, technology, and human resources, Fujitsu has worked to address many needs in different regions, including supporting conservation of biodiversity and education for the next generation in Europe, Middle East, India, Africa, and Asia (EMEIA), and local community service in the U.S.A.

Furthermore, in Japan and overseas, employees spent 169,000 hours in social contribution activities, which was

24,000 hours more than last fiscal year.

Over the three years of Environmental Action Plan (Stage VII), our platform and implementation of social contribution activities at many countries and regions has taken hold, such that each part of the organization is proactively carrying out initiatives in FY 2016 and going forward.

Examples of Social Contribution Activities

• Charity Cycling Event / Fujitsu UK & Ireland

The company planned a charity fundraising event in-house and 25 employees cycled 540 miles. The event raised over £2,400, which was donated to Fujitsu's charity partner Action for Children.



• Support for educational events / Fujitsu Technology Solutions S.A. (Belgium)

The company gave tools to experience software development technology at an event attended by 1,200 children.



• Participation in the Green Corridor Run and Water Challenge / Fujitsu Asia Pte. Ltd. (Singapore)

More than 20 employees of the company participated in the Green Corridor Run 2016, which was held in March, while 6 employees and family members took part in the Water Challenge, which was held concurrently and aimed to contribute to improved access to safe water. Through the event, S\$1,800 were raised and donated to the NGO Charity: Water.



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Collaborating with Communities and Taking Action as a Good Corporate Citizen

Main Activities in FY 2015

Support for Grape Cultivation Using a Multi-Sensing Network

Since June 2011, Fujitsu has been providing a multi-sensing network to Okunota Winery, Inc., which Fujitsu employees visit as part of an agricultural outreach experience. The network automatically collects temperature, precipitation, and humidity data from the vineyard, which helps produce high quality wine. The timing of the grape harvest and careful monitoring of pigment levels are essential for expert viticulture, which is apparently assisted by an understanding of temperature fluctuations in the vineyard. Previously, data collection was managed by manual checking and analysis. Using the multi-sensing system, however, allows constant collection of data in 10-minute intervals every day and night of the year.

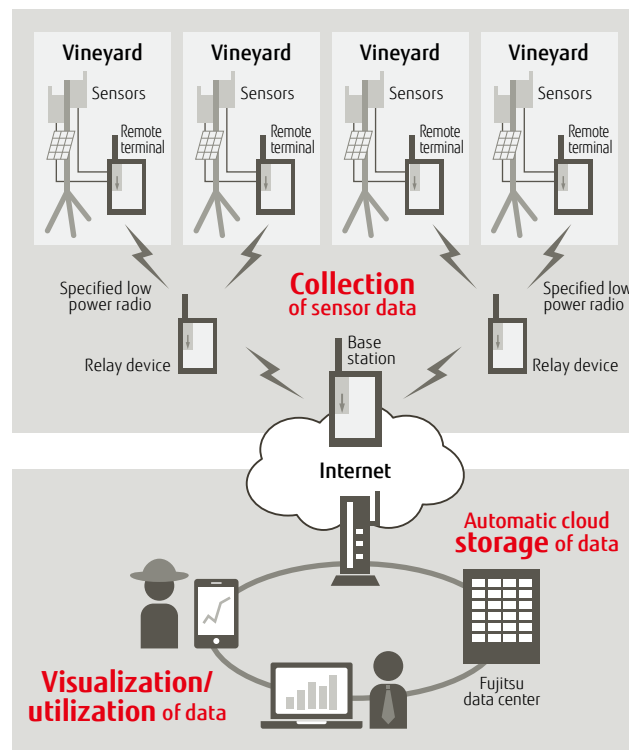
Statistical analysis of data collected over four years has identified temperature and humidity conditions that encourage growth of microbes and mold, major detrimental factors to grapes. By configuring the system so that it judges long periods of these temperature and humidity conditions as a dangerous environment, alerts are sent to the smartphones of vineyard staff allowing them to take the necessary disease prevention and pest control countermeasures at the right time. This has led to less frequent sprayings of agricultural chemicals and shorter person-hours for the viticulturists.

Leveraging ICT in this way helps increase the quality management of wine. In August 2015, the winery's Wine Venus Sakurazawa Chardonnay was selected as one of The Wonder 500™ ("local products that are the pride and joy of

Japan but not yet known outside of Japan") by the Ministry of Economy, Trade and Industry.

Working with universities and fruit tree research stations in FY 2016, the winery plans to verify the commercialization of this system with the aim of increasing the efficacy of disease prevention and pest control and reducing labor.

Schematic of the multi-sensing network system at Okunota Winery, Inc.



Giving On-Site Environmental Classes to over 10,000 Students

In order to have the young generation of the future understand the importance of the environment, the Fujitsu Group is sending employees to schools as lecturers to conduct on-site environmental classes. In FY 2015, lecturers visited 195 elementary and junior high schools, teaching classes to 12,779 students.

Employee Comment

As more and more companies start sending employees to teach classes as part of their social contribution activities, Fujitsu has started to offer students a class that focuses on environmental issues from the perspective of "craftsmanship."

I have participated in this project because I want to communicate with young students about environmental problems. I want to do this in my own words and from my viewpoint as a manufacturing employee. Each class is enjoyable. Students listen to the instructor intently and many of them respond to questions with a level of rich creativity that adults often miss.

I hope to continue these environmental classes in the future

so that students will be encouraged to take action in whatever way they can after thinking more deeply about our planet's environmental challenges.



Jyunichi Misonou
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