Environmental Action Plan (Stage VIII)

Contributing to a Sustainable Society Through ICT Services

Our Approach

The Fujitsu Group advocates "Contributing to a sustainable society through ICT services" as one of the goals of our Environmental Action Plan Stage VIII. The United Nations adopted the Sustainable Development Goals (SDGs) in 2015, setting them out as clear international goals. The Fujitsu Group took this as an opportunity to aim for even greater contributions to the sustainability of customers and society.
Achieving a sustainable society will require not only measures to counter global warming by reducing greenhouse gas (GHG) emissions, but we will also need to address a number of other social and environmental problems through efforts such as resource-saving, conservation of biodiversity, stability in food supplies and measures to deal with urbanization, and disaster prevention. Information and communication technology (ICT) that facilitates optimization, efficiency, and automation in a wide variety of fields has the potential to make tremendous contributions toward solving social and environmental problems. Together with our customers, the Fujitsu Group aims to contribute to the SDGs globally through provision of ICT services.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Contribute to the sustainable development of society through provision of ICT services.	18 cases published externally (25 cases of solutions that contribute to a sustainable society)

Publishing Cases of Initiatives that Contribute to the Development of a Sustainable Society Through ICT Services

Eighteen new cases of contributions have been posted on our website, including automated AI analysis of surveillance footage, and also combining this with the large capacity and high-speed processing technology of supercomputers to provide solutions that achieve smart surveillance of entire cities, and solutions that perform simulation analysis of car crash tests to evaluate crash safety performance without needing to produce large numbers of test cars for actual crash tests.

Initiatives Toward a Sustainable Society: Reducing GHG Emissions Through ICT

Implementing ICT reduces the use of energy and resources and the movement of people and things, cuts down on office space and other things that can be made more efficient, which lead to reduced GHG emissions. The Fujitsu Group is quantifying GHG reduction effects through the implementation of ICT, and will be working to help expand the reduction in GHG emissions of customers and society as a whole.

- GHG Emission Reduction through the Provision of ICT
  https://www.fujitsu.com/global/about/environment/society/sustainability/contribution/

Examples of Contributions to SDGs

The Fujitsu Group contributes to the sustainable society advocated by the SDGs through the provision of ICT services.

- SDG-related Activities in Fujitsu
  https://www.fujitsu.com/global/about/csr/sdgs/

Environmental Action Plan (Stage VIII)

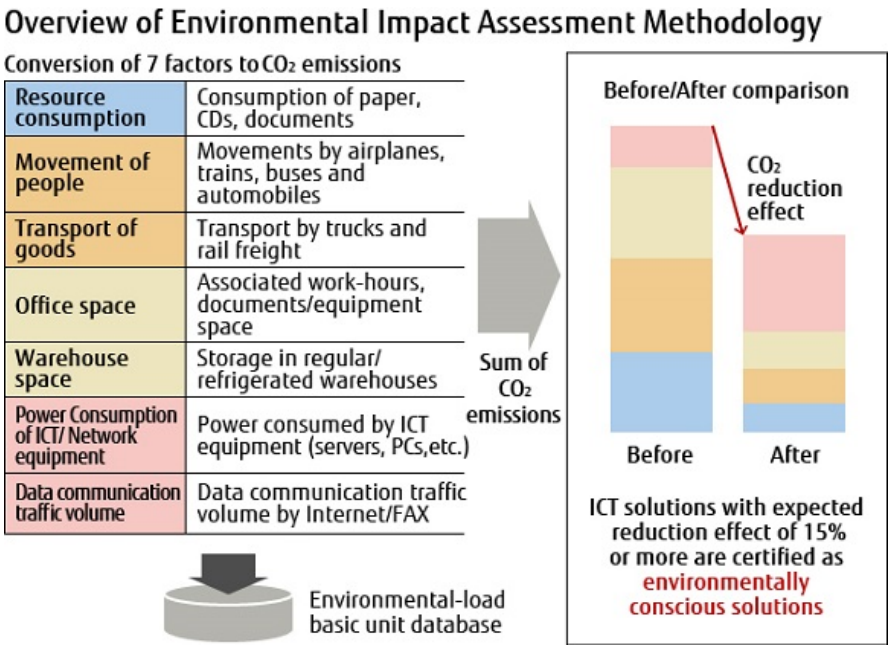
Reducing Greenhouse Gas (GHG) Emissions through ICT

Main Activities in FY 2018

Through the provision of ICT, the Fujitsu Group generates innovations that make energy usage and production activities more efficient and reduce the movement of people and things in a variety of fields in society, with the aim of helping to reduce GHG emissions. We believe that when large numbers of customers use ICT, it reduces GHG emissions for society as a whole while also leading to the sustainable growth of the Fujitsu Group. The Fujitsu Group is working to quantitatively visualize the degree to which its customers' ICT usage contributes to GHG reductions, and to increase this amount, and is working to increase this amount. We recognized 22 new cases of environmentally conscious solutions in FY 2018, bringing the cumulative total to 539 and helping to reduce total CO_2 emissions by 7.35 million tons.

Reference Information **Method to calculate contribution to GHG reduction**

Fujitsu quantitatively assesses the effects of the environmental footprint reduction effects of our ICT implementations in terms of CO_2 emission reductions, using an ICT solution environmental impact assessment method developed by Fujitsu Laboratories Ltd. (at least 500 cases have been assessed to date). Contribution to GHG reduction is calculated in terms of annual reduction amount, using the basic units in the case being assessed plus either the number of users of the solution, the number of clients, or annual sales.



- Environmental Impact Assessment Method for Solution Services
  https://www.fujitsu.com/global/about/environment/society/sustainability/contribution/certification/index.html

Environmental Action Plan (Stage VIII)

Developing Innovative Technologies for Solving Environmental Issues

Our Approach

As the central R&D organization in the Fujitsu Group, Fujitsu Laboratories considers environmental contribution to be a top priority and is pushing forward with R&D activities geared toward the creation of a sustainable society. These R&D activities cover a wide range of fields including advanced materials, next-generation elements, computers, networks, and ICT systems, leading toward the creation of next-generation solutions, services, and business models.
Based on these efforts to develop revolutionary technologies, Fujitsu Laboratories advocates the "development of technologies that help solve social and environmental problems," and is engaged in a variety of environmental initiatives. These include reducing CO_2 emissions by saving energy and making operation more efficient, conserving resources, handling of natural disasters, conserving biodiversity, measures to counteract global warming, and more.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Developing Innovative Technologies that address Environmental Issues	Announced 84 key green technologies (*1) (Press announcements: 25, announcements at exhibitions & academic conferences: 59)

*1 Key green technologies: Technologies for reducing power and energy consumption, improving work-hour efficiency, conserving resources, and solving social problems

Doing More to Announce the Technologies We Develop

As part of our Environmental Action Plan Stage VIII, we aim to further improve our ability to get messages to the outside world about the key green technologies that we have developed. In FY 2018 we promoted the environmental value of ICT to the outside world at press announcements, academic conferences, and exhibitions.
In terms of the SDGs, the technologies that Fujitsu announced externally in FY 2018 contribute primarily to "Ensure healthy lives and promote well-being for all at all ages" (Goal 3), "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" (Goal 9), "Make cities and human settlements inclusive, safe, resilient and sustainable" (Goal 11), "Take urgent action to combat climate change and its impact" (Goal 13), and "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (Goal 15).

Development Achievements in FY 2018 (announced in the press)

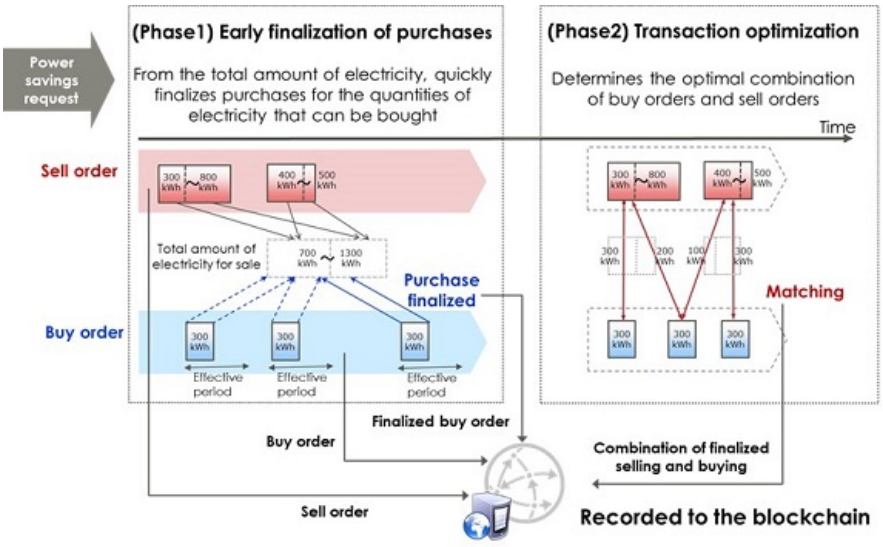
1. Fujitsu and Asahi Shuzo Launch Trial to Brew Sake Using Predictive AI
2. Fujitsu, SMU, and A*STAR Collaborate on Traffic Management Technologies with the Maritime and Port Authority of Singapore
3. Fujitsu Develops Molecular Simulation Technology to Effectively Create New Drug Candidates

4. Fujitsu Develops Design Technology Using AI for Magnetic Material Geometries
5. High-efficiency Router-style Substrate Dividing Machine PBS-SH14A Released for Sale (Shinko Electric Industries)
6. Fujitsu Develops Network Control Technology to Minimize Impact of Cyberattacks on IoT Devices
7. Fujitsu Kyushu Systems Exhibits at Interop Tokyo 2018
8. Fujitsu Puts Blockchain to Use for "Virtuora DX" Data Distribution and Utilization Service
9. University of Tokyo's RCAST, Fujitsu, and Kowa Successfully Create Promising New Compounds to Fight Drug-Resistant Cancer
10. Fujitsu-Developed "ABCI" System Takes 5th Place in TOP500, 8th in Green500 Supercomputer Rankings
11. Academic, Corporate Collaboration Succeeds at World's Most Efficient Solar Power-Generated Hydrogen Production
12. Fujitsu Successfully Triples the Output Power of Gallium-Nitride Transistors
13. Fujitsu Technology to Solve Combinatorial Optimization Problems for Medium-Sized Drug Discovery
14. Fujitsu Laboratories and Waseda University Agree to Comprehensively Collaborate on Digital Annealer Research
15. Fujitsu Develops Technology to Improv Reliability of Data Distribution across Industries
16. Fujitsu Develops Novel Technology to Massively Boost Optical Data Transfer Throughput Using Existing Equipment
17. Fujitsu Begins Field Trials on High-Satisfaction Customer Experience Based on Psychological Analysis, Provided on the e-Commerce Website of Himaraya
18. Fujitsu Signs IP License Agreements for Green Technologies with Kyushu University and University of the Ryukyus
19. Fujitsu Releases New Version of "COLMINA" Digital Solution for the Manufacturing Industry
20. The International Gymnastics Federation to Implement Fujitsu's Judging Support System
21. Fujitsu Develops World's First Single-Panel Antenna to Simultaneously Support Multiple 5G Communications
22. Fujitsu Releases Nocria X-Series AI Air Conditioner with Wi-Fi Adaptor
23. Fujitsu Launches Automated Antenna Design Tool for Low-Cost Design of IoT Devices
24. Fujitsu Develops Blockchain-based Exchange System for Electricity Consumers
25. Fujitsu Detects 13 Types of Potential Risks of Enterprise Blockchain System

Major Development Initiatives in FY 2018

Developing a System for Energy Trading Between Consumers on the Blockchain

We developed a system that allows consumers such as factories and stores to trade surplus energy amongst each other. Demand Response (DR), an initiative which adjusts electric power usage through cooperation between electric utilities and consumers, has been attracting attention in recent years. However, it has been hard to control, and has therefore suffered from a low success rate. Fujitsu addressed this problem by applying Blockchain technology to develop mechanisms that facilitate efficient coordination between consumers, which has resulted in a confirmed improvement of around 40% in the DR success rate.



Environmental Action Plan (Stage VIII)

Development of Top-Level Energy Efficient Products

Our Approach

As ICT grows more and more common, we expect there to be an increase in energy demand in proportion to the higher performance and higher-density integration of servers and other ICT products. Various countries and regions are also expanding their energy-related regulations for ICT products, and energy efficiency is taking on increasing social importance as a factor in energy label conformance and green procurement requirements.
Here at the Fujitsu Group, we believe that we should work to improve the energy performance of our products during their use, in order to reduce GHG emissions. As such, we will actively implement energy-saving technologies and continue working to further improve the energy efficiency of products. Through these efforts, we will work to develop products that consume less power during customer usage.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Achieve top-level energy efficiency for 50% or more of new products.	Made 67.9% of new products top-level energy efficient.

Actively Applying Energy-Saving Technologies

We have set division-specific targets for the achievement of top-level energy efficiency based on the number of product series we expect to develop in FY 2016-18. 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 pushing for the aggregation of LSIs, reductions in the numbers of components, and the implementation of eco-friendly devices.

Achieved Top-Level Energy Efficiency for 67.9% of New Products

As a result of applying and expanding energy-saving technologies in our servers, PCs, network devices, and imaging devices, we were able to achieve top-level energy efficiency for 67.9% of new products, against the 50% target value set in the Fujitsu Group Environmental Action Plan (Stage VIII).

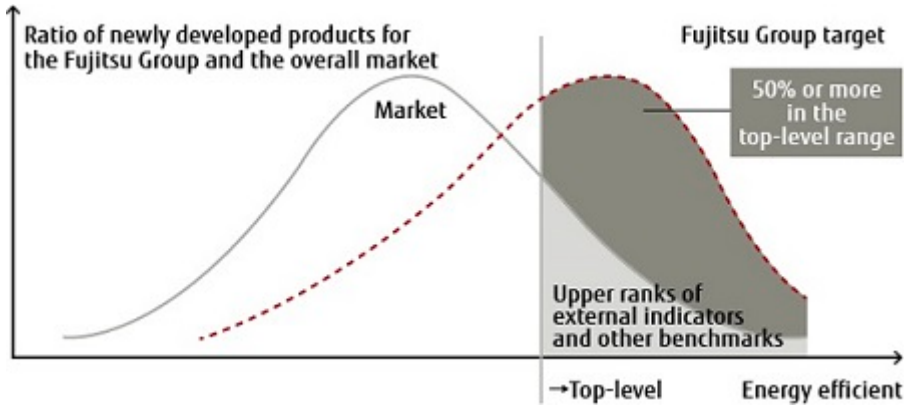
Working Toward Our Targets

In order to achieve the targets set in the Fujitsu Group Environmental Action Plan (Stage Ⅸ), we will continue to advance our efforts to develop products with top-level energy efficiency, starting with the top products in each division. We will also implement advanced energy-saving technologies and expand their application to our products, as part of our cross-Group policy to improve energy efficiency.
Looking toward the future, we aim to push the development of advanced eco-friendly devices, which will contribute to revolutionary improvements in energy efficiency and allow early product development.

Reference Information

Top-Level Energy Efficient Products

These are products, including our top products with regards to energy efficiency (first in the world or industry, best of the world or industry), that meet criteria equivalent to the upper ranks of external indicators and other benchmarks of 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 overall market or with conventional products.
Main Target Standards *1

Standards	Product Categories
ENERGY STAR criteria compliant	PCs, displays, imaging equipment, etc.
Top-level Top Runner achievement rate under the Energy Conservation Law	Servers, storage systems, etc.
Industry-leading energy efficiency	LSIs, products for specified fields, etc.
Industry's highest-level battery life	Smartphones
Reduction in power consumption as compared to prior products/prior performance	Network products *2, electronic components, etc.

*1 Standard values differ even for products within the same category, depending on product specifications.
*2 "Top-level" status for products evaluated under the "Ecology Guideline for the ICT Industry" is shown by the number of stars (multi-stage evaluation).

Main Activities in FY 2018

Next-Generation ScanSnap Combines Energy and Resource Conservation

The ScanSnap iX1500 scans paper documents and stores them as electronic data. It is made to be as easy to use and easy to understand as possible, and aims to make people's lives more "smart" and convenient. The various advantages that come from converting physical data into digital data can help revolutionize work styles and lifestyles, act as a foundation for work-style reform, and even help reduce the environmental burden of such data.

By reevaluating the scanning control process and improving power efficiency, we have been able to speed up the data reading process for this product by 20% (30 pages per minute; high-speed scanning of 60 sides), and reduce power consumption by approximately 15% as compared to previous models, all while maintaining compatibility with Wi-Fi at both 2.4GHz and 5GHz *3 frequency bands. We also added a large 4.3-inch, easy-to-read touch panel onto the product, in order to make it even easier to use and understand, and updated the software (which comes with a learning function) to allow for one-touch controls for everything from the actual scanning to the use of the files scanned.

In light of recent advancements in Internet availability, we have also decided to eliminate the use of data drives to install applications, opting to ask customers to download manuals, etc., from the Internet, and thereby reducing in-box supplemental items to a minimum. We also use recycled plastic sourced from plastic bottles in the components for this product. Through these and other efforts, we have worked to reduce the environmental burden on the component end as well.

*3 Japan/North America/China Only

- ScanSnap
  https://scansnap.fujitsu.com/jp/

- Case Studies
  https://www.fujitsu.com/global/about/environment/society/energyefficiency/casestudy/index.html

Environmental Action Plan (Stage VIII)

Improving the Resource Efficiency and Resource Circulation of Products

Our Approach

In recent years, we have seen a rise in the risks that threaten the sustainability of companies and society in general, from environmental destruction due to resource shortages and excessive mining, to severe fluctuations in resource costs worldwide, and anxieties surrounding the supply of rare metals. Resource efficiency is thus taking on growing importance worldwide. Examples can be seen in the EU's designation of resource efficiency as a growth strategy and its establishment of the Resource Efficiency Flagship Initiative. We believe it is important for us to make efficient use of the resources in the ICT products that we provide to customers. We have engaged in a 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 amount of resources we use. We are also making efforts to improve resource efficiency and reduce our environmental burden 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 such products so that they provide even the customer with benefits, whether it be by making these products smaller, more lightweight, or designing them so they take up less space.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last Fiscal Year (FY 2018 results)
Promote eco design for resource saving and circulation and increase resource efficiency of newly developed products by 15% or more (Compared to FY 2014).	Improved by 25%

Improving the Resource Efficiency of New Products

In FY 2012, the Fujitsu Group created its own definition of resource efficiency, as the Group had previously not had a system that could comprehensively and quantitatively evaluate improvements in resource efficiency, and due to the fact that there were as of yet no public indices that could measure resource efficiency.
In FY 2018, we continued to use our indicators to evaluate products newly developed by Fujitsu *1, and worked to reduce product part quantities and reduce product size through smaller, thinner, and lighter parts and higher-density mountings.

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

Achieved 25% Improvement in Resource Efficiency

By reducing the size and weight of our PCs, smartphones, mission critical x86 servers, POS tenant devices, and mobile phone radio base stations, and more, we were able to achieve an improvement in resource efficiency of 25%, against the 15% target value we set in the Fujitsu Group Environmental Action Plan (Stage VIII).

Working Toward Our Targets

To improve new product resource efficiency by at least 15%, Fujitsu will continue current initiatives, while expanding development of new lightweight, rigid materials and the use of recycled materials. We will also widely publicize the eco-friendliness of our products in order to expand sales.

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.

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

Environmental burden from resource usage = Σ (Resource burden coefficient x Resource usage volume)

Environmental burden from resource disposal = Σ (Resource burden coefficient x 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".

Main Activities in FY 2018

The High-Performance SR-S352TR1/SR-S752TR1 Layer 2/Layer 3 Switch Combines Compact Size with Energy Conservation

The SR-S352TR1 and SR-S752TR1 is a 52-port (10G x 4 / 1G x 44 / SFP/SFP+x4) Layer 2/Layer 3 network switch that comes equipped with a 10G interface. The Layer 2 switch in particular qualifies as a Category A product under Japan's Energy Conservation Law.

The SR-S352TR1 and SR-S752TR1 are made with the latest ASIC switches, with their high performance and low power consumption, and as such require only one ASIC switch for features that previously required two ASIC switches. This, as well as the use of many components with low power consumption, allowed us to reduce power consumption during this product's use by 45% as compared to previous models).

SR-S752TR1

All of the Ethernet ports, other than the SFP/SFP+ ports, also come with a power-saving Ethernet technology called Energy Efficient Ethernet (EEE) *2 that reduces power consumption during standby (not sending or receiving data) by 42% (compared to previous products). The product also comes with a technology that can limit the speed with which the cooling fans spin in multiple stages, depending on the temperature of the surrounding environment, helping save even more energy.

Previous models had the redundant power supply attached to the outside of the product (2U*2, including the body of the product). By reevaluating the product substrate and the structure of the components, however, we were able to redesign the product with high-density mounting, and install a hot swappable redundant power supply on the 19-inch rack, 1 U *3 case. In doing so, we were able to make the product smaller as a whole. The new model is also only 12% heavier than previous models, even with the redundant power supply now located within the main body, and is a step forward with regard to making the product more lightweight. The product is also now completely free of lead, as we have opted for lead-free soldering to mount the electronic components onto the printed circuit board.
We also improved cooling efficiency within the case, and incorporated a front intake air panel/rear exhaust air flow system in order to allow more efficient cooling when installed within the same rack as the server. This allowed us to equip the cooling system on the rack without wasting space, thus allowing us to make the product smaller in general.

*2 Compatible with IEEE802.3az, the IEEE standard specification.
*3 1U = The size of one unit in EIA specifications (height of 44.45 mm)

- Case Studies
  https://www.fujitsu.com/global/about/environment/society/energyefficiency/casestudy/index.html

Environmental Action Plan (Stage VIII)

Product Recycling

Our Approach

The Fujitsu Group's product recycling programs are based on Extended Producer Responsibility (EPR) and Individual Producer Responsibility (IPR). EPR holds that producers bear responsibility for products, from design and manufacturing to disposal and recycling. IPR holds that producers bear responsibility for their own products. IPR in particular has been a major challenge for the Fujitsu Group as we expand our business globally. However, we believe that responding to this challenge, and that of EPR, in collaboration with industry associations and governments, will allow us to help create a recycling-minded society that meets the requirements and demands of all stakeholders.
The Fujitsu Group thus carries out recycling programs that comply with the laws and regulations of the various countries in which it operates.
In Japan, Fujitsu is certified under the Industrial Waste National Permit System, which is based on the Act on the Promotion of Effective Utilization of Resources, and as such, accepts industrial waste and puts them through appropriate processing at Fujitsu recycling centers across Japan. We also try to do as much collection, reuse, and recycling as we can, even in countries where recycling is not obligatory.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Maintain over 90% resource reuse rate for business ICT equipment at Fujitsu recycling centers.	Achieved a 91.7% resource reuse rate.

Promoting Recycling of ICT Products

The Fujitsu Group has built a recycling system that covers the entire country of Japan. We have worked steadily to implement Extended Producer Responsibility, providing safe and secure services with high resource reuse rates in order to promote the recycling of ICT products. We have, at the same time, also ensured thorough traceability and security of these processes.

Achieved a 90% or Higher Reuse Rate

We processed 3,436 tons of recycled ICT products (used ICT products for business applications) from corporate customers in Japan, and achieved a resource reuse rate of 91.7%. We have now also collected a total of 53,481 end-of-life PCs from individual customers.

Changes in Resource Reuse Rates of End-of-Life Business ICT Products (Japan)

FY	2015	2016	2017	2018
Resource reuse rate*1 (%)	92.0	92.0	91.5	91.7
Amount processed (tons)	5,203	4,185	3,844	3,436

*1 Weight percent ratio of recycled parts and materials to end-of-life products.

Changes in Numbers of End-of-Life PCs Collected from Individual Customers (Japan)

FY	2015	2016	2017	2018
End-of-life PCs collected (units)	69,801	61,435	59,144	53,481

- Case Studies
  https://www.fujitsu.com/global/about/environment/society/recycle/casestudy/index.html

Environmental Action Plan (Stage VIII)

Reducing Greenhouse Gas (GHG) Emissions and Boosting Energy Intensity at Our Business Sites

Our Approach

The Fujitsu Group considers the prevention of global warming an important issue. We have, therefore, formulated our medium- to long-term environmental vision, the FUJITSU Climate and Energy Vision, and aim to eliminate all CO_2 emissions from our business activities by 2050.
Among GHGs, our business sites (plants, offices and datacenters) primarily emit CO_2 when energy (electricity, fuel oil, gas) is used, and perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) during the semiconductor manufacturing processes. We are striving to decrease and control the volume of emission of these gases by complying with relevant laws and setting reduction targets.

Reducing CO_2 Emitted During Energy Consumption

About 90% of the Fujitsu Group's total GHG emissions arise from CO_2 emissions due to energy consumption. Therefore, we continuously promote the following energy-saving measures to reduce CO_2 emissions.

- Appropriate operation of equipment, improvement in management, and energy-saving measures focused on motive-power facilities (introduction of free cooling, inverters and energy saving equipment, fuel conversion, etc.)
- Increasing efficiency by reviewing the manufacturing process (innovations in production, development of green production technology)
- Maintaining appropriate room temperature for office air conditioning, saving electricity used in lighting and office automation equipment
- Measuring energy consumption for visualization and promoting use of the data so collected

Reducing Emission of GHGs Other Than CO_2

As for GHGs other than CO_2, the Fujitsu Group mainly uses perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) at the semiconductor divisions. We are taking continuous steps to switch to gases with lower global warming potential (GWP) and install equipment to remove harmful gases in our new and existing production lines.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Reduce GHG emissions by 5% or more(compared to FY 2013)	Reduced by 30.3%
Improve energy intensity by an annual average of 1% or more	Improvement of 1.1%

Promoting Reduction in CO_2 Emitted During Energy Consumption

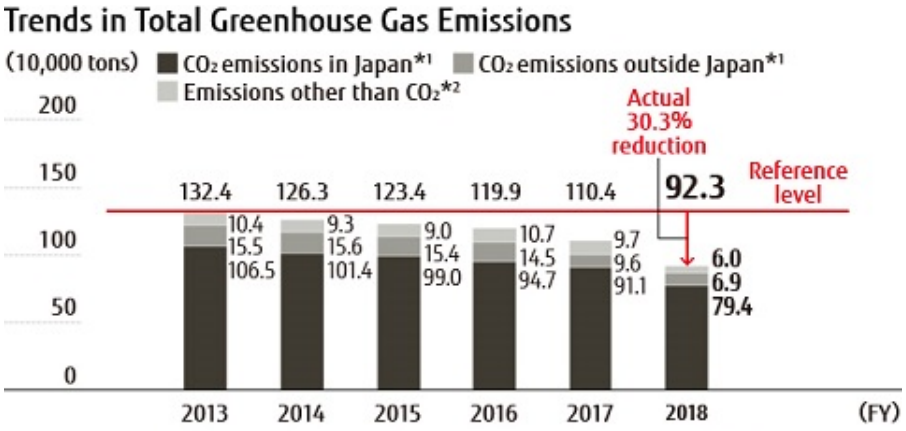
We continue to invest in energy-saving equipment (introduction and upgrade of BAT*1 equipment, mainly for air conditioning and lighting) and ensure their appropriate operation at the facilities at all business sites. We are also streamlining our production processes, saving electricity used for air conditioning, lighting and automation in offices, making energy consumption visible, and leveraging measurement data.

For instance, we improved facility operations (2,300 tons) at the Tatebayashi System Center by controlling the number of air conditioners, reviewing their operation, suspending operation of devices and taking other measures. We also reviewed the appropriateness of the position of production devices (980 tons) at Fujitsu Interconnect Technologies Limited.

As a result of these efforts, the total emission of GHGs in FY 2018 was about 923,000 tons (specific consumption/sales revenue: 218,000 tons/100 million yen), which is 30.3% less in comparison to FY 2013. Although part of this decrease is attributable to transfer of business and other factors, we also reduced another 25,000 tons or so through measures implemented.

The energy intensity improved to an annual average improvement of 1.1% from FY 2016 to FY 2018.

*1 BAT (Best Available Technologies): Usable state-of-the-art technologies to reduce GHGs



***1 CO_2 emissions in Japan and abroad:** The CO_2 conversion factor for purchased electric power has been calculated with a fixed value of 0.570 tons-CO_2/MWh from FY 2013 to FY 2015, 0.534 tons-CO_2/MWh for FY 2016, 0.518 tons-CO_2/MWh for FY 2017 and 0.497 tons-CO_2/MWh for FY 2018 for performance reports in our Environmental Action Plan.

***2 Emissions other than CO_2:** These are converted to equivalent amounts of CO_2 using the global warming potential (GWP) of each gas.

- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/activities/casestudy/index.html

Environmental Action Plan (Stage VIII)

Improve Power Usage Effectiveness (PUE) at Our Data Centers

Our Approach

Energy consumption at data centers is increasing due to the spread and growth of cloud computing, and society is paying greater attention to the environmental performance of data centers.
Data centers account for 25% of the CO_2 emissions (FY 2018) for each business in the Fujitsu Group, and the annual rate of increase for CO_2 emissions at our 34 main data centers in Japan and around the world has been around 2.0% over the five years from FY 2013 until FY 2018. Since data center CO_2 emissions are expected to continue increasing along with the growth of cloud business, it is the social responsibility of the Fujitsu Group to work toward having environmentally-friendly data centers. At the same time, it has also become an important topic to look at from a long-term perspective in terms of enhancing our business infrastructure.
The Fujitsu Group has designated roughly 80% of all Group data centers (relative to the area of server rooms) for this activity*1, and is working to achieve better environmental performance.

*1 Data centers for the activity
Globally, data centers with area of 1,000m2 or more, or data centers for which business divisions have requested for inclusion.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last Fiscal Year (FY 2018 results)
Improve PUE*2 at data centers by 8% or more.(compared to FY 2013)	PUE 1.59 - Improvement of 6.7%

*2 PUE (Power Usage Effectiveness):
An index for power usage effectiveness at data centers. Expresses overall power consumption at data centers as a value divided by the power consumption of servers and other ICT devices. The closer the number is to 1.0, the greater the efficiency.

Actions to Achieve the Goal

Activities to improve PUE are under way at data centers in Japan and around the world, based on the Fujitsu Environmental Action Plan. With effects from the global heat wave in FY 2018 also a factor, we were unable to reach the target improvement rate with the scope and speed of improvements thus far, but improvements have consistently been at least 1% each year. Working mainly on improving the efficiency of air conditioning, energy use has been made more efficient and power usage by facilities and ICT has been continuously reduced thanks to fine-tuning type operational improvements such as longer hours using outdoor air and maximum use of free cooling, plus the implementation of revolutionary AI technologies.
We are also working to expand our use of renewable energies to make progress toward the “carbon-free society” sought under the Paris Agreement.*3

*3 Paris Agreement:
A new framework to counteract global warming by reducing greenhouse gases through international cooperation, with participation by over 190 developed and developing countries. The agreement entered into effect in November 2016.

PUE values and calculation methods

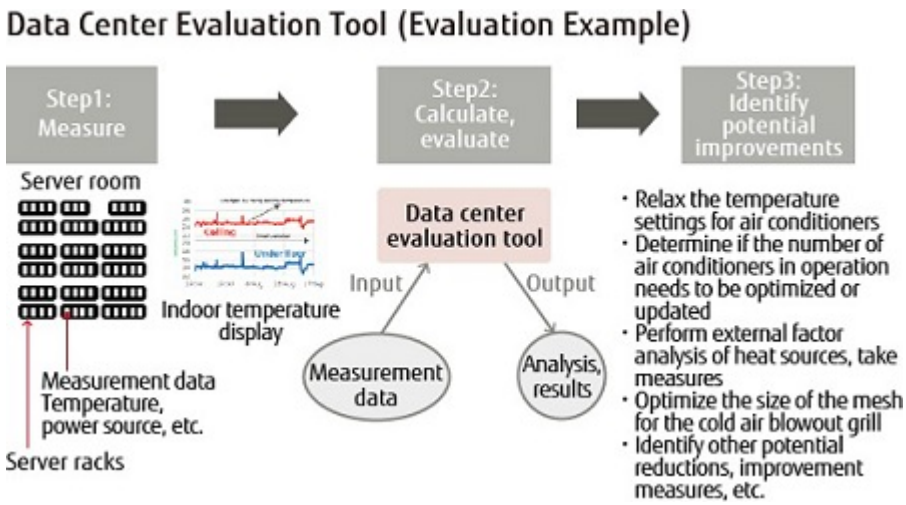
PUE Value	PUE calculation method, other
Range: 1.31 to 3.04 No. of data centers: 34	• Apply The Green Grid • Work to implement improvements using DCMM

Examples of Initiatives in FY 2018

Driving Improvements by Enhancing Information Linkage with Overseas Data Centers

We developed the *4 Data Center Evaluation Tool which analyzes whether the cooling energy for ICT devices at data centers is being managed efficiently.
This initiative had been conducted before at data centers in Japan, but in FY 2018 it was rolled out to main data centers overseas, and optimization proposals were made. Additionally, information is being shared on company intranet websites and face-to-face meetings are also being held in order to connect and bolster improvement activities with overseas locations.
To facilitate smoother improvements, we are planning to compile evaluation methods and expertise gained at each site into guidelines which we plan to share with the Fujitsu Group.

*4 Data Center Evaluation Tool:
A tool that uses analysis based on heat and airflow balance from the structural and equipment specifications of data centers to calculate potential energy reduction amounts, as well as optimization proposals for PUE improvements and the related effects



Expanding Use of Renewable Energy

We are also currently working to shift in stages toward the use of renewable energies to supply the power used in our data centers, based on our in-house environmental vision for the creation of a carbon-free society which we published in May 2017. Implementations are particularly progressing in overseas locations where green power procurement is possible. Renewable energy now accounts for 19% of all the power used at our 34 main data centers in Japan and around the world.
Most of those are overseas data centers, and we plan to continue to actively increase usage of renewable energies at overseas data centers.

- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/pue/casestudy/index.html

Environmental Action Plan (Stage VIII)

Expand the Use of Renewable Energy

Our Approach

The popularization and widespread use of renewable energy is becoming increasingly necessary as a way of addressing global warming, securing stable energy supplies through the diversification of our energy sources, and as an energy-based foundation for economic growth.
The Fujitsu Group has established an environmental vision aimed at realizing a decarbonized society. The main pillars for this vision are a dedication to energy conservation, and the active implementation of renewable energy. To achieve this vision, we have set new quantitative targets in the Environmental Action Plan, and are actively promoting the installation of solar power generation equipment at our business sites, as well as the use, purchase, and expansion of green power (electric power generated with 100% renewable energy) at overseas business sites, where costs are relatively reasonable.

FY 2018 Performance and Results

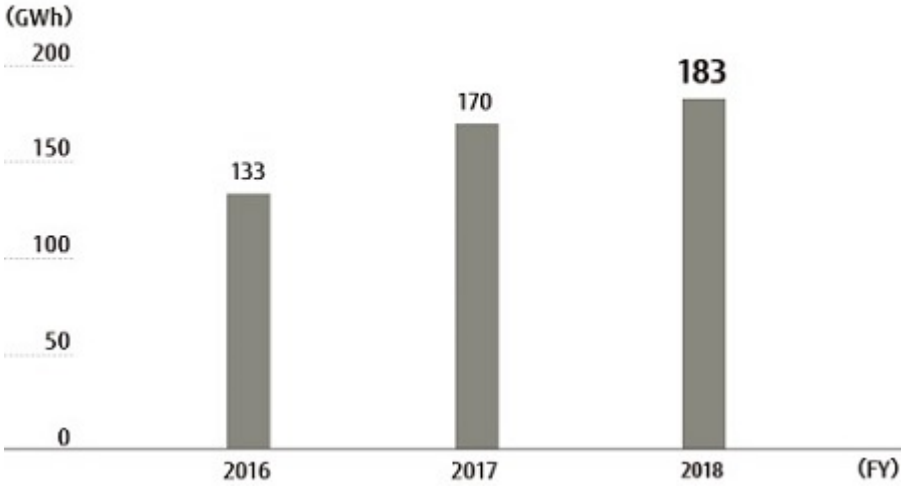
Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Expand the renewable energy usage rate to 6% or higher.	8.6%

Usage Rate Target Increased to 8.6%

The amount of renewable energy we used in FY 2018 was approximately 183 GWh, due to our purchase of green energy, solar power generation through solar panels, etc. This made up 8.6% of our entire energy consumption, and meant we achieved the target value set in the Fujitsu Group Environmental Action Plan (Stage VIII).
We will continue to work toward the implementation of renewable energy in both our domestic and overseas business offices, in order to further our purchase and usage of renewable energy.

Fujitsu Finland Ltd. Green Power Certificate

Change in Amount of Renewable Energy Used by the Fujitsu Group



- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/renewable-energy/casestudy/index.html

Environmental Action Plan (Stage VIII)

Drive Activities to Reduce CO_2 Emissions in the Supply Chain

Our Approach

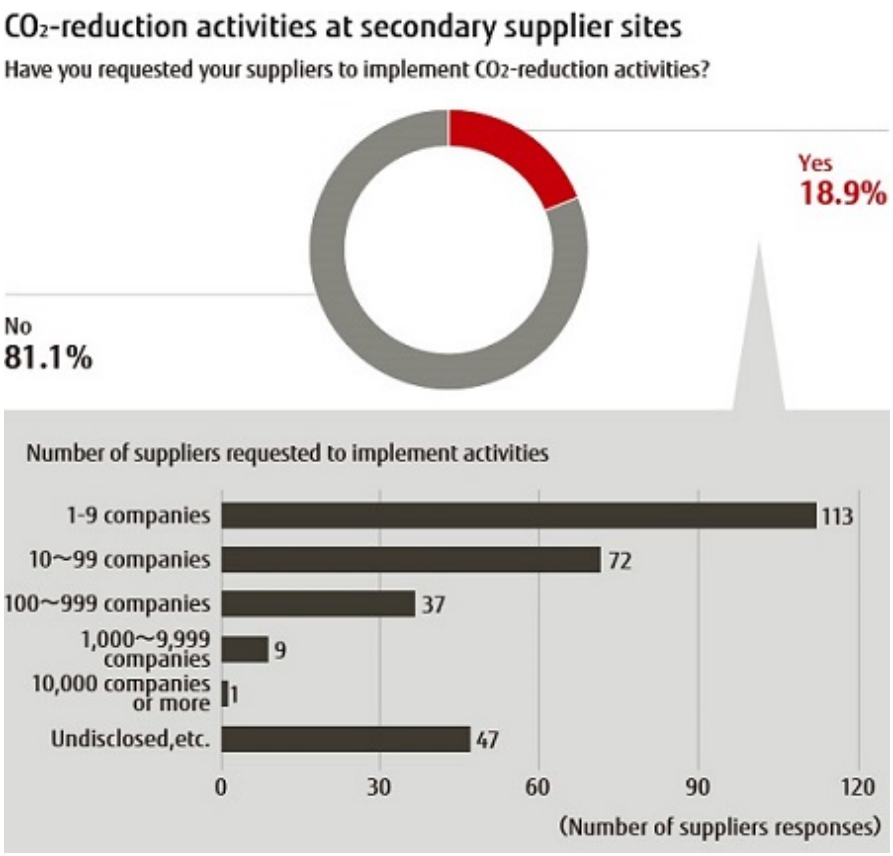
In addition to reducing our own emissions, as a green procurement initiative the Fujitsu Group has also been requesting its suppliers to act toward reducing their own CO_2 emissions in order to help contain global warming. As a result, all of our main suppliers have undertaken efforts to reduce their CO_2 emissions. Starting in FY 2016, we have also been expanding these efforts further upstream in the supply chain by including efforts by the suppliers of those companies (secondary suppliers from the perspective of the Fujitsu Group) in our requests.
We expect that having the supply chain as a whole work toward reducing emissions can produce even greater reduction effects (synergies), while also expanding the network of these activities through the supply chain to cover an even wider area spreading beyond national boundaries. Through efforts such as these, the Fujitsu Group hopes to help create a carbon-free future society.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Drive Activities to Reduce CO_2 Emissions in the Supply Chain	Requested emission reductions action by secondary suppliers (46,000 companies or more) via main suppliers of the Fujitsu Group (approximately 1,500 companies)

Requesting and Supporting the Expansion of Activities to Secondary Suppliers

The Fujitsu Group communicated requests to its main suppliers who account for at least 98% of the Group's procurement volume to engage in activities to reduce their CO_2 emissions, and to expand these efforts to also include their own suppliers (the Fujitsu Group's secondary suppliers). We also conducted our own environmental survey to ascertain the activity status of these suppliers. As a reference for their future activities, we then provided suppliers who responded to the survey with feedback in the form of a report that analyzed survey responses to show trends in emissions reduction activities, while also requesting further activities and expansion to the activities of their own suppliers.
As of the end of FY 2018 only 18.9% of suppliers responded that they had requested their own suppliers to engage in emissions reduction activities, but this still amounted to a total of at least 46,000 secondary suppliers receiving such requests

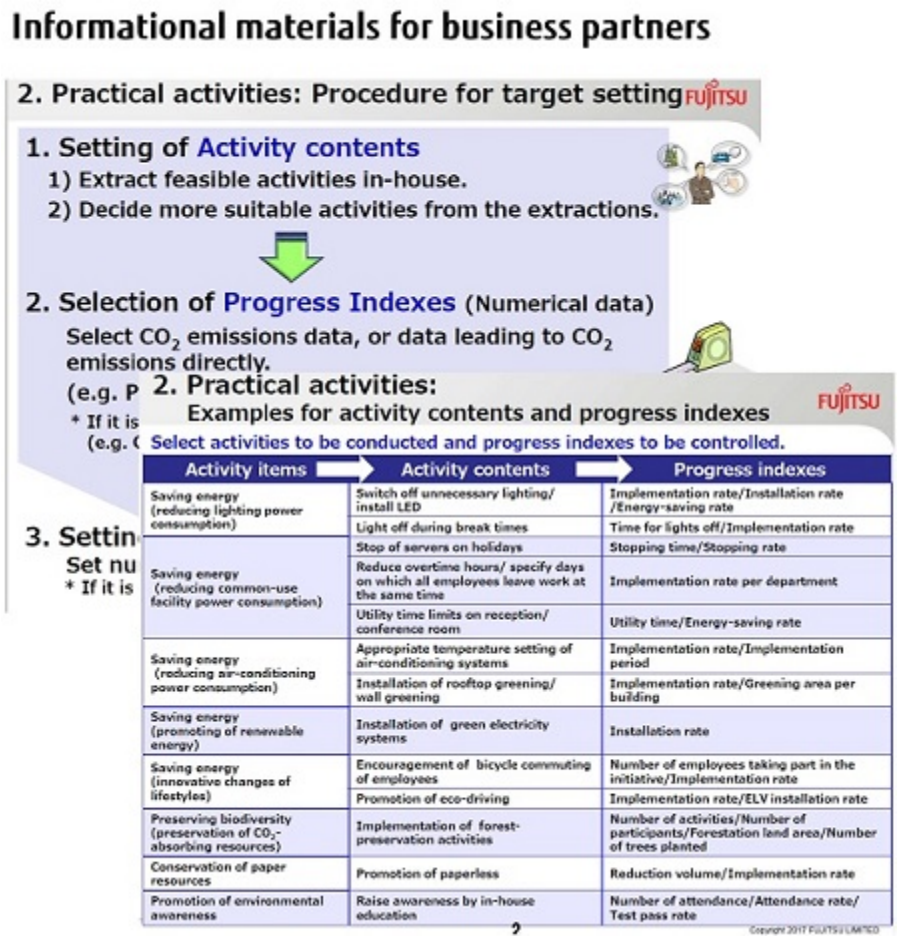


Providing guideline for activities for reducing CO_2 emissions

In order to facilitate the spread of CO_2 emissions reduction activities throughout the entirety of our supply chain, the Fujitsu Group produced an original set of explanatory materials and began providing these to suppliers. The purpose of these materials was not only to give suppliers a greater understanding of the importance of these activities taking place in the supply chain, but also to serve as something they could use to request and assist such activities amongst their own suppliers. The materials have had a strong response, including over 1,200 accesses since they were posted on our website at the end of November 2017. To fulfill our responsibilities as a global enterprise, the Fujitsu Group will continue to think about what must be done to contain global warming and will continue to take action.

"Guideline for activities for reducing CO_2 emissions" can be downloaded from the following sites.

- Japan
  https://www.fujitsu.com/jp/about/procurement/material/green/
- Global
  https://www.fujitsu.com/global/about/procurement/green/



Informational materials for business partners

2. Practical activities: Procedure for target setting

1. Setting of Activity contents
1) Extract feasible activities in-house.
2) Decide more suitable activities from the extractions.

2. Selection of Progress Indexes (Numerical data)
Select CO_2 emissions data, or data leading to CO_2 emissions directly.

2. Practical activities:
Examples for activity contents and progress indexes

Select activities to be conducted and progress indexes to be controlled.

Activity items	Activity contents	Progress indexes
Saving energy (reducing lighting power consumption)	Switch off unnecessary lighting/ install LED	Implementation rate/Installation rate /Energy-saving rate
	Light off during break times	Time for lights off/Implementation rate
Saving energy (reducing common-use facility power consumption)	Stop of servers on holidays	Stopping time/Stopping rate
	Reduce overtime hours/ specify days on which all employees leave work at the same time	Implementation rate per department
	Utility time limits on reception/ conference room	Utility time/Energy-saving rate
Saving energy (reducing air-conditioning power consumption)	Appropriate temperature setting of air-conditioning systems	Implementation rate/Implementation period
	Installation of rooftop greening/ wall greening	Implementation rate/Greening area per building
Saving energy (promoting of renewable energy)	Installation of green electricity systems	Installation rate
Saving energy (innovative changes of lifestyles)	Encouragement of bicycle commuting of employees	Number of employees taking part in the initiative/Implementation rate
	Promotion of eco-driving	Implementation rate/ELV installation rate
Preserving biodiversity (preservation of CO_2-absorbing resources)	Implementation of forest-preservation activities	Number of activities/Number of participants/Forestation land area/Number of trees planted
Conservation of paper resources	Promotion of paperless	Reduction volume/Implementation rate
Promotion of environmental awareness	Raise awareness by in-house education	Number of attendance/Attendance rate/ Test pass rate

Examples of initiatives in FY 2018

Starting activities to reduce CO_2 emissions together with Suppliers

Without stopping at providing customers with the "Guidance on activities for reducing CO_2 emissions," the Fujitsu Group also began sending its employees with extensive practical experience in CO_2 reduction activities to visit factories of Suppliers and engage in problem-solving efforts together with them. Utilizing the "diagnostic for CO_2 reduction potential"*1 which incorporates Fujitsu's expertise, they are engaging in activities to help Suppliers reduce their CO_2 emissions. These efforts are reducing the CO_2 emissions from materials procurement in the Fujitsu Group, while also helping reduce environmental impact throughout the supply chain as a whole.

Supplier collaboration example

Collaborative efforts began on reducing CO_2 in the production process for products at one of the Fujitsu Group's main Suppliers, Atago Manufacturing Co., Ltd. Based in the city of Midori in Japan's Gunma Prefecture, Atago Manufacturing produces air blowers, heat exchangers, and other equipment.

In order to get an understanding of the circumstances at Atago Manucacturing's production plant, their people in charge worked with experts from Fujitsu to conduct a diagnostic for CO_2 reduction potential. The results of the diagnostic revealed that the production facilities had high potential for CO_2 reduction. Efforts are currently under way to decide on reduction measures through mutual consultations, and subsequently achieve them.

Supplier testimonial (Noboru Otomo, Managing Director, Atago Manufacturing)

Since our company has trouble visualizing the cost-effectiveness of our environmental initiatives, we understood them from a social perspective but had been slow to act and hardly accomplished any real progress. Speaking with Fujitsu, we were able to get a logical understanding, with the effects also clearly expressed numerically. As a result, we decided to go ahead and work together with them. If we can also reduce manufacturing costs even a little by focusing in on our high energy cost electrical furnaces, we will be killing two birds with one stone.

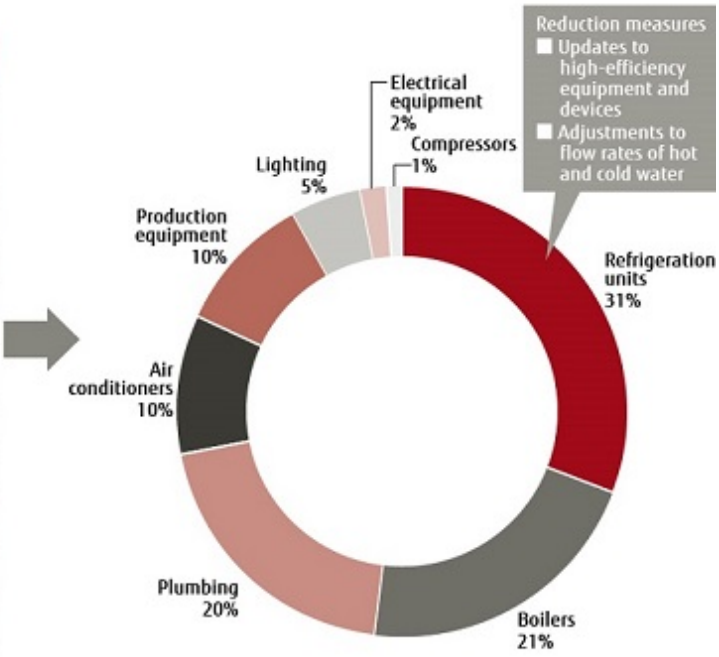
*1 Diagnostic for CO_2 reduction potential

This is a diagnostic method using the Energy Conservation Measure Implementation Status Diagnostic Sheet which reflects the Fujitsu Group's in-house practical expertise, based on the CO_2 Reduction Potential Diagnostic Guidelines (Ministry of the Environment). In four stages it determines the implementation status for 128 items pertaining to eight types of equipment that emit large amounts of CO_2 at production plants (boilers, refrigeration units, air conditioners, production equipment, compressors, electrical equipment, lighting, and plumbing). The results can be used to calculate reduction potential and at the same time point the way toward reduction measures that can be effective.

Decision Process for CO_2 Reduction Measures

Equipment	Measure
Boiler	Adjust the routes of the heating pipes
	Implement efficient operation management
	…
Air conditioner	Install heat exchangers
	Shut off air conditioning in empty rooms and when away
	…
Refrigeration unit	Update to high efficiency equipment and devices
	Adjust the flow rates of hot and cold water
	…
Production equipment	Save energy from air conditioning by fitting heating devices with insulating jackets
	Reduce air leaks
	…
Compressor	Implement systems to control number of compressors, etc.
	Manage the discharge pressure of compressors
	…
Electrical equipment	Implement demand control
	Reduce contracted power
	…
Lighting	Install LED lighting
	Install control devices for lighting
	…
Plumbing	Shift to inverters, such as plumbing pumps
	Adjust temperature of hot water being supplied, and amount of circulating water
	…

Examples of Questions on the Energy Conservation Measure Implementation Status Diagnostic Sheet



Reduction Potential Diagnostic Results (illustration)

Environmental Action Plan (Stage VIII)

Reduce CO_2 Emissions from Transportation

Our Approach

With Group companies and business sites worldwide, and materials/parts sourced from a significant number of business partners, reducing CO_2 emissions accompanying logistics and transportation activities is a priority for the Fujitsu Group.
The Fujitsu Group has worked toward its targets for reducing CO_2 emissions from domestic transport. Since the establishment of our Environmental Action Plan (Stage VII), we have expanded the scope of reductions to transport within regions overseas, as well as international transport. Stage VIII also drives more streamlined, efficient global logistics. The Group is working toward lowering the environmental impact of our logistics throughout the supply chain, for instance by distributing copies of the Fujitsu Group Green Logistics Procurement Directions to our business partners , to strengthen our partnerships and work toward our efforts together . Lastly, as an initiative in our overall distribution process, the Group is working toward the 3Rs (Reduce, Reuse, Recycle) in packaging products and materials/parts.

- Fujitsu Group Green Logistics Procurement Direction Edition1.0 [In Japanese]
  https://www.fujitsu.com/downloads/JP/archive/imgjp/jeco/products/logistics_guide.pdf

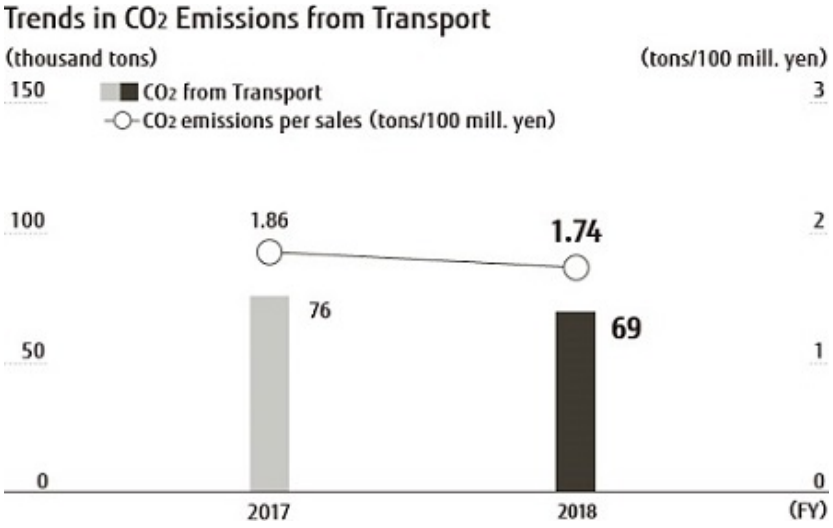
FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan(Stage VIII)	Last fiscal year (FY 2018 results)
Reduce by over 2% on average every year CO_2 emissions per sales*1 from transport (compared to previous fiscal year).	6.2%

*1 Net sales: Excludes the impact of exchange rates

Reduced by 6.2% Compared to Previous FY; FY 2018 Results Met Targets

The amount of CO_2 emissions produced from transportation in FY 2018 was 69,000 tons. Of that amount, 22,000 tons of CO_2 were emitted during transport in Japan, while 47,000 tons were emitted during transport overseas and transport in foreign regions. The amount of CO_2 emissions per sales was reduced by 6.2% compared to FY 2017, which means that the Group succeeded in meeting its targets for FY 2018.



Initiatives in FY 2018

Promoting Modal Shifts

Fujitsu Technology Solutions GmBH in Germany has been working to streamline their logistics, and are actively promoting a modal shift from air shipment to ocean shipments for international transport. Group companies in Japan have also switched from trucks to railways for transport between plants, and have succeeded in reducing their transport-related CO_2 emissions.

Reducing Transport Distances

Fujitsu managed to cut down the transport distance for the export of laptop computers*2 to overseas Group companies, by switching the airport for export from Narita International Airport to Kansai International Airport. In doing so, Fujitsu managed to reduce their transport-related CO_2 emissions. They also switched from route-based delivery to direct delivery for the delivery of products to major clients, and in doing so cut down on the transport distance for their products.

*2 Manufactured in Shimane Prefecture (Shimane Fujitsu Limited)

Reducing the Amount of Transportation CO_2 Emissions through Various Measures for Increasing Efficiency

Under the "Green Logistics Case Studies handbook of Transportation CO_2 Reductions" created in FY 2016, Group companies in Japan and overseas actively engaged in efforts to reduce the amount of CO_2 emissions produced through transport. This included revising transportation plans, formulating measures for increased loading rate, and revising packaging materials.

- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/logistics/casestudy/index.html

Environmental Action Plan (Stage VIII)

Reducing the Amount of Water Used

Our Approach

The risk of a global water shortage is on the rise, due to such factors as climate change, the destruction of forests, and the economic growth and population boom in emerging and developing countries. Such a water shortage is a risk for companies as well, since it may very well affect the survival of their businesses. As such, it is important for us to recycle and reduce the amount of water we use.

Since the Fujitsu Group uses particularly large amounts of water in the manufacture of semiconductors and printed circuit boards, we believe it is necessary to reduce our water consumption in these areas especially. In addition to our general water conservation efforts, we have also worked to reuse and recirculate water, through methods such as pure water recycling and the reuse of rainwater. Under the Environmental Action Plan (Stage VIII), we have strengthened our efforts to use water resources even more effectively than in the past.

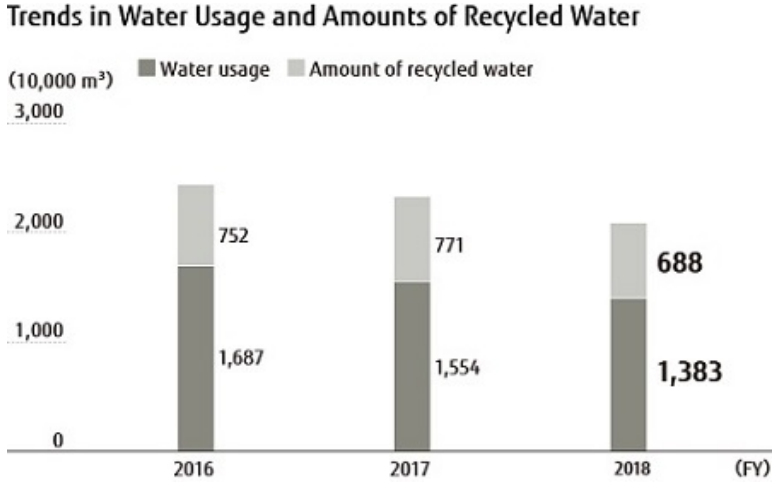
FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Reduce water consumption by 1% in total (compared to FY 2013 128,000 m^3).	Cumulative Water Usage: 2.6% reduction (326,800 m^3 reduction compared to FY 2013)

326,800 m^3 Cumulative Reduction in Water Usage from FY 2013

The policies we established in FY 2018 to reduce water usage include reducing the amount of water used in coating and cleaning processes and optimizing the water supply for our scrubbers. These policies and various others were implemented at each business site, plant, etc., so that we could make more efficient use of our water resources. As a result, we were able to reduce our total water usage by 326,800 m^3 (FY 2016: 139,300 m^3 / FY 2017: 108,200 m^3 / FY 2018: 79,300 m^3), which is significantly more than the target value of 128,000 m^3 that was set in the Fujitsu Group Environmental Action Plan (Stage VIII).

The amount of water we used in FY 2018 was 13.83 million m^3 (output level per sales amount: 349.9 m^3/million yen), an 11.0% reduction as compared to FY 2017. Recycled water also comprised 49.8% of our total water usage—a 0.2% increase from FY 2017.



- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/water/casestudy/index.html

Environmental Action Plan (Stage VIII)

Reducing Chemical Substances Emissions

Our Approach

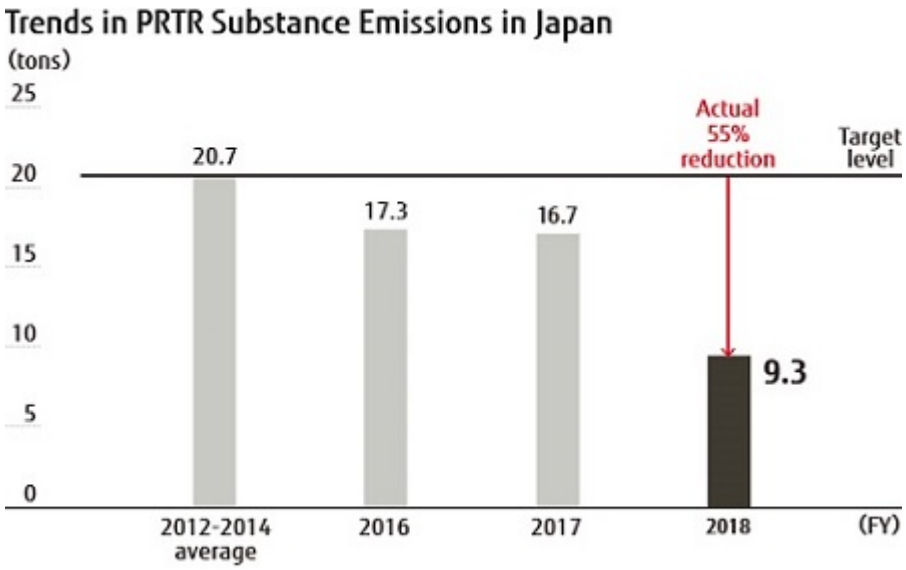
Here at the Fujitsu Group, we manage approximately 1,300 types of chemical substances, in order to prevent the risks associated with the use of toxic chemical substances (health issues, pollution of the natural environment, etc.).
We operate a chemical information system called "FACE," which we use to register and monitor chemicals at every site, manage Safety Data Sheet (SDS), control income and expenditures using purchasing data and inventory data, and boost our level of management and efficiency with respect to chemical usage.

FY 2018 Performance and Results

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII)	Last fiscal year (FY 2018 results)
Reduce chemical pollutant (PRTR) release to less than the average level of FY 2012-2014 (20.7 tons).	PRTR: 9.3 tons

Achieved Current PRTR Substance Emission Target

In FY 2018, we were able to limit our Group-wide chemical substance emissions to 9.3 tons of PRTR, which is under the target value set in the Environmental Action Plan (Stage VIII).



- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/chemical/casestudy/index.html

Environmental Action Plan (Stage VIII)

Limiting the Amount of Waste Generated

Our Approach

The Fujitsu Group considers wastes as valuable resources and has continued to work toward recovering resources from its waste or using the waste as a source of energy. In Japan, our volume of final waste disposal has been decreasing every year. However, the environment surrounding waste disposal remains challenging as building new disposal sites is difficult and the existing ones have limited lifespans.
We are actively working to install new equipment and reuse waste with the objective to reduce the amounts of waste acid, waste alkali and sludge generated in the production of semiconductors and printed circuit boards. These efforts are in line with Japan's Fundamental Law for Establishing a Sound Material-Cycle Society to (1) reduce waste generated, (2) reuse it, (3) recycle it and (4) recover heat from it.
We have also established the company-wide Standards for Consignment of Waste Disposal to properly dispose waste, based on the Waste Management and Public Cleansing Law.

On-site Audits for Outsourcing Contractors

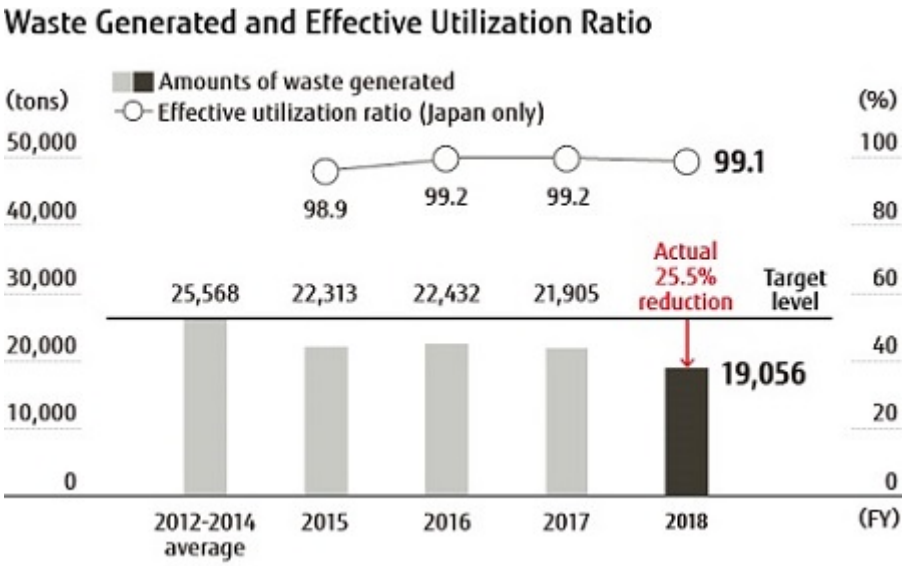
We conclude contracts with waste processing companies. These contracts are common for the whole Fujitsu Group. We conduct on-site audits of the waste processing companies with which we have contracts to periodically confirm that waste is being appropriately processed. If multiple business sites have contracts with the same processing company, then a representative business site conducts on-site audits based on the representative auditing regulations. In other cases, each business site individually conducts audits to confirm that waste processing is appropriate.

FY 2018 Performance and Results

Targets of the Fujitsu Group Environmental Action Plan (Stage VIII)	Last Fiscal Year (FY 2018 results)
Reduce the amount of waste generated to less than the average level of FY 2012-2014 (25,568 tons)	19,056 tons

Promoting Measures to Reduce Waste Generation and Plastic Waste

At our Nagano Plant, we had been subcontracting the processing of organic renewal effluents as industrial waste to a waste processing company. However, we can now process this waste in-house and have reduced effluents by 206 ton/year.
Such efforts have enabled us to achieve our target by reducing the amount of waste generated to 19,056 tons (generation rate/sales revenue: 0.48 tons/100 million yen).
From 2018, China has prohibited the import of waste plastic. This is gradually turning waste plastic, which was being sold as a valuable product until now, into industrial waste. To deal with this issue, we are striving to reduce plastic waste by taking various measures, such as collaborating with external reuse companies to partially reuse parts trays used at the time of delivery of procured parts.



Waste Generated, Effective Use, and Final Disposal (tons)

Waste Type	Waste Generated	Effective Utilization	Final Disposal
Sludge	4,015	3,963	52
Waste oil	1,023	987	35
Waste acid	3,211	3,211	0
Waste alkali	3,848	3,597	251
Waste plastic	3,055	3,005	50
Waste wood	789	777	12
Waste metal	477	477	0
Glass/ceramic waste	386	383	3
Other (*1)	2,252	1,952	299
Total	19,056	18,353	703

*1 Other includes general waste, wastepaper, septic tank sludge, cinders, rubble, textile waste, animal and plant residue, and infectious waste

- Case Studies
  https://www.fujitsu.com/global/about/environment/operation/waste/casestudy/index.html

Environmental Data

Environmental Accounting and Environmental Liabilities

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

Basic Environmental Accounting Elements in FY 2018

- 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

Purpose of Introducing the Environmental Accounting System

- Applicable period
  April 1, 2018 to March 31, 2019
- 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 their 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.
    - Benefits of reducing environmental impact related to resources used in business activities
    - Benefits of reducing environmental impact related to environmental loads and waste emissions resulting from business activities
    - Benefits of reducing environmental impact related to goods and services produced by business activities
    - Benefits of reducing 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 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 site due to non-compliance with laws and regulations
  The Fujitsu Group recognizes the avoidance of operation 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 environment, but it must 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 = Cost of advertising through newspapers, magazines and TV x Number of advertisements ran and programs broadcast.
- R&D benefits
  The Fujitsu Group calculates the amount of additional earnings resulting from the contributions of R&D achievements for environmental protection purposes, such as Super Green Products and environmental solutions.

*1 Major consolidated subsidiaries worldwide:
FUJITSU ISOTEC LIMITED, FUJITSU IT PRODUCTS LIMITED, Fujitsu I-Network Systems Limited, Fujitsu Interconnect Technologies Limited, Ecolity Service Limited, FDK CORPORATION, FUJITSU OPTICAL COMPONENTS LIMITED, FUJITSU KASEI LIMITED, FUJITSU CLIENT COMPUTING LIMITED, Fujitsu Laboratories Limited, FUJITSU CONNECTED TECHNOLOGIES LIMITED, FUJITSU COMPONENT LIMITED, Shimane Fujitsu Limited, FUJITSU PERIPHERALS LIMITED, SHINKO ELECTRIC INDUSTRIES CO., LTD., Fujitsu Telecom Networks Limited, TRANSTRON Inc., PFU Limited, FUJITSU FRONTECH LIMITED, MIE FUJITSU SEMICONDUCTOR LIMITED, AIZU FUJITSU SEMICONDUCTOR WAFER SOLUTION LIMITED, AIZU FUJITSU SEMICONDUCTOR MANUFACTURING LIMITED (currently ON Semiconductor Aizu Co., Ltd.), Fujitsu Network Communications Inc., FUJITSU TECHNOLOGY SOLUTIONS (HOLDING) B.V.

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