

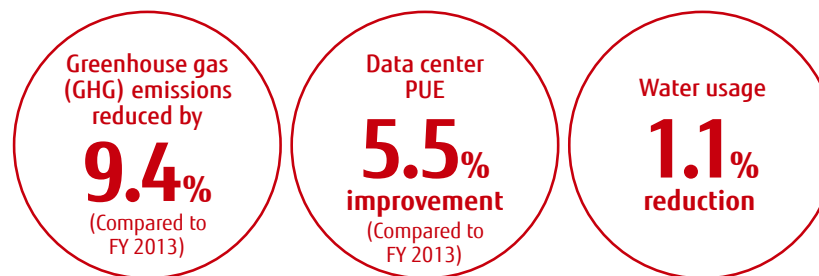
Top Message	Message from the Head of Corporate Environmental and CSR Strategy Unit	Special Feature 1: The Fujitsu Group Medium/Long-term Environmental Vision	Special Feature 2: Digital Co-creation	Fujitsu Group Environmental Action Plan Stage VIII	Chapter I Contribution to Society	Chapter II Our Business	Environmental Management	Data Overview
Reducing Greenhouse Gas (GHG) Emissions and Boosting Energy Intensity at Our Business Sites	Improve Power Usage Effectiveness (PUE) at Our Data Centers	Expand the Use of Renewable Energy	Drive Activities to Reduce CO <sub>2</sub> Emissions in the Supply Chain	Reduce CO <sub>2</sub> Emissions from Transportation	Reducing the Amount of Water Used	Reducing Chemical Substances Emissions	Limiting Amounts of Waste Generated	

## Chapter II | Our Business

Continuing from Environmental Action Plan (Stage VII), Environmental Action Plan (Stage VIII) turns on two points, namely, “contributing to society” and reducing the environmental burden of “our business activities.”

In our business activities, we strive to reduce greenhouse gas emissions in the entire value chain in an aim to achieve the long-term zero emissions advocated in the Paris Agreement, and engage in efforts to reduce water usage, chemical emissions, generation of waste, and other environmental burdens.

### Key Achievements in FY 2016



About Symbols Used ✓ Examined by third-party organization ○ FY 2016 target achieved ✕ Target not achieved

Theme	Target items (targets through the end of FY 2018)	FY 2016 Target	FY 2016 Key Performance	Status	
Our Business	Reduce greenhouse gas emissions in our business facilities				
	Reduce greenhouse gas emissions by 5% or more compared to FY 2013.	Limit increase to 1.6%	Reduction of 9.4%	✓ ○	P. 32
	Improve PUE* <sup>1</sup> of our major data centers by 8% or more compared to FY 2013.	Improvement of at least 4.8%	5.5% improvement	✓ ○	P. 33
	Improve energy intensity by an average of 1% or more each year.	Improvement of at least 1%	0.9% worse	✓ ✕	P. 32
	Increase usage of renewable energy to at least 6%.* <sup>2</sup>	Usage rate: 5.5% or higher	Usage rate: 5.2%	✕	P. 35
	Drive activities to reduce CO <sub>2</sub> emissions* <sup>3</sup> in the supply chain.	Ask secondary business partners to conduct reduction activities via business partners.	Asked secondary business partners (more than 37,000 companies) to conduct reduction activities via our major business partners (approximately 1,600 companies).	○	P. 36
	Reduce CO <sub>2</sub> emissions per sales from transport by an average of 2% or more each year.	Reduction of 2% or more	Reduction of 3.4%	✓ ○	P. 37
Reduce environmental impact	Reduce water consumption by 1% in total (128,000 m <sup>3</sup> ).	0.1% (10,000 m <sup>3</sup> ) reduction	1.1% (139,000 m <sup>3</sup> ) reduction	✓ ○	P. 38
	Reduce chemical pollutant (PRTR) release to less than the average level of FY 2012–2014 (20.7 t).	* No annual target	17.3 tons	✓ ○	P. 39
	Reduce the amount of waste to less than the average level of FY 2012–2014 (25,568 t).	* No annual target	22,432 tons	✓ ○	P. 40

\*1 PUE (Power Usage Effectiveness): An indicator of the efficiency of electric power usage by the Data Center. It is a value calculated by dividing the Data Center's total electric power consumption by the electric power consumption of servers and other ICT devices. Values indicate higher efficiency the closer to 1.0 they become.

\*2 The goal at the time the Environmental Action Plan (Stage VIII) was formulated was to “expand the usage of renewable energy,” but it was subsequently changed to a quantitative target.

\*3 CO<sub>2</sub> emissions: Conversion of the amount of energy used to the amount of CO<sub>2</sub> released.

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

### Our Approach

The Fujitsu Group believes that prevention of global warming is a priority issue. Accordingly, we have formulated the "FUJITSU Climate and Energy Vision," Fujitsu's medium/long-term environmental vision, and aim to eliminate all CO<sub>2</sub> emissions from our business activities by 2050.

The primary GHG emissions from our business sites (plants, offices, and datacenters) are CO<sub>2</sub> accompanying energy (electricity, fuel oil, and gas) usage, and perfluorocarbon (PFC), hydrofluorocarbon (HFC), sulfur hexafluoride (SF<sub>6</sub>), and nitrogen trifluoride (NF<sub>3</sub>) used in semiconductor manufacturing. In addition to complying with relevant laws, we have set reduction targets for these and are striving to decrease and control the amounts we use and emit.

### Summary of FY 2016 Achievements

<b>Targets</b> under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Reduce greenhouse gas emissions by <b>5% or more</b> (compared to FY 2013)	Improve energy intensity by an average of <b>1% or more each year</b>
<b>FY 2016 Targets</b>	Keep the increase of greenhouse gas emissions at <b>1.6% or less</b> (compared to FY 2013)	Improve energy intensity <b>1% or more</b> (compared to previous fiscal year)
<b>FY 2016 Performance and Results</b>	Reduced greenhouse gas emissions by <b>9.4%</b> (compared to FY 2013)	Energy intensity worsened by <b>0.9%</b> (compared to previous fiscal year)

### FY 2016 Performance and Results

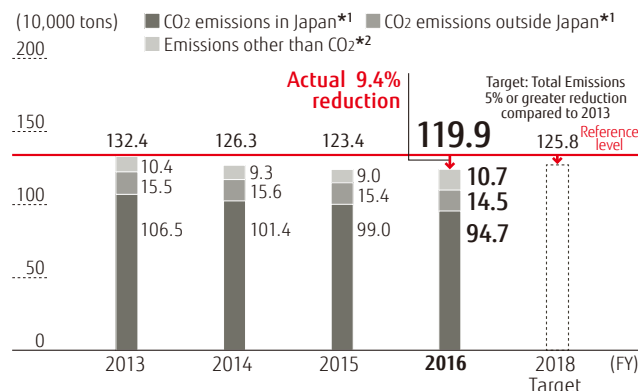
#### Promoted Reductions of CO<sub>2</sub> Emissions Accompanying Energy Consumption

In fiscal 2016 as well, we are introducing and upgrading BAT\* at each business site, streamlining manufacturing, making energy consumption "visible," and utilizing measurement data, etc.

GHG emissions in fiscal 2016 totaled approximately 1,199,000 tons (specific consumption/sale: 26.6 tons/100 million yen), down 9.4% since fiscal 2013. Despite increased production in Japan, we implemented measures to reduce approximately 20,000 tons. However, energy intensity worsened by 1.0% year on year. We will optimize specific consumption indicators in addition to conducting energy-saving activities.

\* BAT (Best Available Technologies): Usable state-of-the-art technologies to reduce GHG.

#### Trends in Total Greenhouse Gas Emissions



\*1 CO<sub>2</sub> emissions in/outside Japan: CO<sub>2</sub> conversion factor for purchased electric power has been calculated with a fixed value of 0.570 tons of CO<sub>2</sub> per MWh from FY 2013 to FY 2015, and a fixed value of 0.534 tons of CO<sub>2</sub> per MWh for FY 2016 for performance reports in our Environmental Action Plan.

\*2 Emissions other than CO<sub>2</sub>: These are converted to equivalent amounts of CO<sub>2</sub> using the global warming potential (GWP) of each gas.

### Reports on Main Activities in FY 2016

#### Participation in Demand Response Verification Testing

Fujitsu's Numazu Plant participated in "Demand Response (Negawatt Trading) Verification Testing" conducted by the Ministry of Economy, Trade and Industry. In the verification testing, the company cooperates in suppressing the demand for power during a set period of time when requested (advance notification) by a power company. Incentives (monetary subsidies in the case of verification testing) are given according to amount of decrease and other results.

At the Numazu Plant, the methods of suppressing the demand for power (peak cut) included adjusting the operational output of gas engine generators in light of the plant's forecasted demand and utilizing smart switch (Comverge, U.S.) remote operation/control to stop air-conditioning devices, adjust temperatures, etc. In fiscal 2016, we were able to accommodate requests twelve times for a total of 124 MW.



Gas-engine power generator

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## Improve Power Usage Effectiveness (PUE) at Our Data Centers

### Our Approach

With the spread of cloud computing, energy use by data centers is on an upward trend and society is showing more concern over the environmental performance of data centers. Data centers comprised 24% of FY 2015 CO<sub>2</sub> emissions in the Fujitsu Group, with emission rates increasing 6.5% over the three years from FY 2012–15 at our 18 main data centers in Japan. Furthermore, our data center CO<sub>2</sub> emissions are expected to continue to rise as our cloud business grows, making environmentally conscious data centers a social responsibility for the Group, as well as a critical theme to address in strengthening our business foundation over the long term.

In the Fujitsu Group, we are targeting\*<sup>1</sup> approximately 80% of our data centers (based on server room floor space) and we are working to boost environmental performance.

\*<sup>1</sup> **Activity targets:** Global data centers 1,000 m<sup>2</sup> or larger, in principle, or specific data centers requested by data center business units.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Improve PUE of our major data centers by <b>8% or more.</b> (Compared to FY 2013)
FY 2016 Targets	PUE 1.62 Improvement rate <b>4.8%</b> (Compared to FY 2013)
FY 2016 Key Performance	PUE 1.61 Improvement rate <b>5.5%</b> (Compared to FY 2013)

### FY 2016 Performance and Results

#### Promoting Activities to Achieve the Targets

Continuing from Environmental Action Plan (Stage VII), Fujitsu is moving forward with the improvement of PUE\*<sup>2</sup> at its data centers inside and outside Japan. Primary initiatives include improving the cooling efficiency of air-conditioning systems, expanding the hours when external ventilation is used, and maximizing utilization of free cooling options. This has led to an average yearly improvement of 2% or more.

Environmental Action Plan (Stage VIII), which started in fiscal 2016, will require further effort in the future to achieve improvements. In addition to continuing and expanding operational improvements that have been made up to this point, we will also reduce the power used for facilities and ICT by making energy more efficient through introduction of innovative technologies. Further, we will strive to increase the use of renewable energy, aiming for a carbon-free society as stipulated in the Paris Agreement\*<sup>3</sup>.

\*<sup>2</sup> **PUE (Power Usage Effectiveness):** an indicator showing the energy saving performance of data centers. PUE is obtained by dividing the energy usage of an entire data center by the energy usage of its servers and other ICT equipment. A PUE closer to 1.0 indicates better energy efficiency.

\*<sup>3</sup> **Paris Agreement:** A new framework for measures against global warming to reduce greenhouse gases through international cooperation, with more than 190 countries from the developed and developing world participating. It came into force in November 2016.

#### PUE Values and PUE Calculation Method

PUE values	PUE calculation method, etc.
Range: 1.32–2.21 Applicable DCs: 34 centers	- The Green Grid's method used - Implementation of improvement initiatives using the organization's DCMM

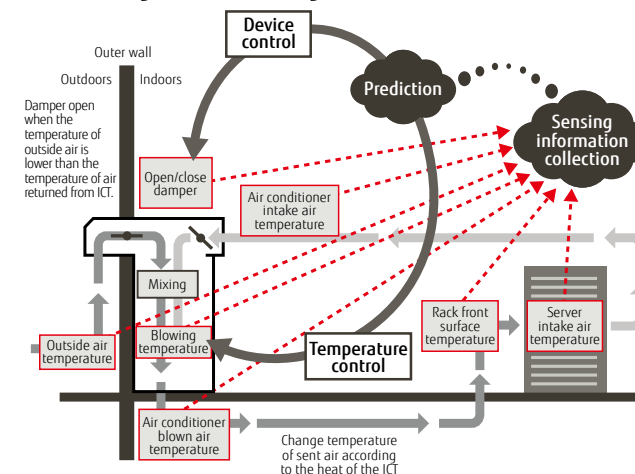
### Air-conditioning Equipment Control through AI

Continuing from fiscal 2015, we improved air-conditioning energy efficiency inside and outside Japan, reaching the yearly target. We are improving efficiency through new technologies to achieve Environmental Action Plan (Stage VIII) targets.

For example, we are verifying Fujitsu's innovative just-in-time modeling air-conditioning controls, predicting temperatures and humidity an hour ahead from temperature, humidity, and power data for outside air environment and inside servers, then controlling outside air cooling and air-conditioning equipment air temperature.

Verification of AI-driven learning control technology is also currently underway. We are improving power efficiency with an AI learning wind volume, processing heat, outside air temperature, ICT device load, etc., and automatically model air conditioning properties. We will confirm effectiveness and implement measures at data centers in fiscal 2017.

#### JIT modeling air-conditioning control



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## Improve Power Usage Effectiveness (PUE) at Our Data Centers

### Main Activities of FY 2016

#### Data Center Goal of “Extreme Energy Conservation: Working Toward PUE 1.0”

Expansion of high-performance computing (high-performance, high-heat-generating servers used for big data and AI) increases energy used to cool data centers. Accordingly, Fujitsu participated in the Ministry of the Environment’s FY 2016 Low Carbon Technology Research, Development and Demonstration Program, and is working on fundamental reduction of CO<sub>2</sub> at data centers.

We are focusing on cooling methods suited to ICT device heating levels, working particularly on high-heat-generating servers. Using a liquid-immersion cooling method in which ICT devices are submerged in fluorinated inert liquid (Fluorinert) with high thermal transport efficiency and insulating properties, we are challenging the “PUE 1.00 wall” with Fujitsu’s new proprietary natural convection technology for Fluorinert circulation. AI-driven improvement of cooling efficiency is also being verified.



Liquid-immersion cooling technology to cool servers by submerging them in Fluorinert

#### Establishment of a Laboratory for Low-carbon Next-generation Cloud Infrastructure

In April 2017, Osaka University, Fujitsu Limited, and Fujitsu Laboratories Ltd. established the “Next Generation Cloud Research Alliance Laboratories” in Osaka University’s Cybermedia Center.

The Laboratory will be used for research on energy-saving technology and security technology toward development of a next-generation cloud infrastructure that will be compatible with the future low-carbon society. In addition, it will be used to train the next generation of technicians, mainly for Osaka University students. In the future, the three organizations will conduct proof-of-concept testing based on research findings, at the Laboratory and on test beds (verification platform) built internally and externally by consortiums in which the Laboratory participates. Further, the developed energy-saving technologies will be utilized in an effort to make the next-generation cloud infrastructure and next-generation AI infrastructure more energy-conserving and low-carbon. Fujitsu will strive to apply the results of development in its AI technology “Zinrai.”

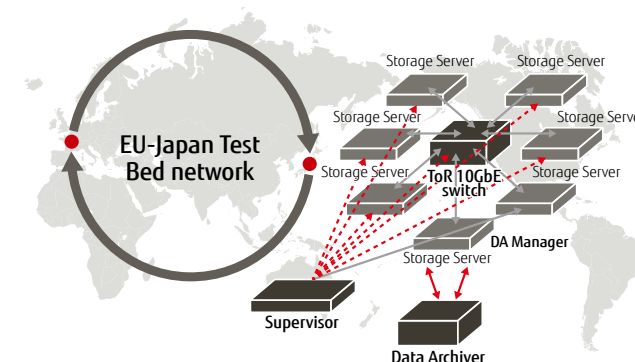
#### Cold Storage Geo Replication Technology

Currently, coordination between data centers is conducted via two methods: low-delay short-range synchronous communication and long-range asynchronous communication backup. With the former, it is highly possible that multiple data centers would suffer damage in a large-scale disaster, and with the latter, there is increased data delay, so it was only possible to use a standby redundant connection.

On the other hand, “cold data,” mainly images and video, which is rarely updated, constitutes the majority of data. This means that there is an increasing need to accumulate new data and share data between multiple sites. However, issues hindering data center coordination between multiple sites include synchronization between data centers and increasing data reading response speed.

In that context, we have been working since November 2016 to conduct joint verification testing on intercontinental data center coordination, focusing on cold data storage, between a data center inside Osaka University and a data center of Paris-based AntemetA. We have built a long-range coordination storage infrastructure, which, in addition to improving throughput and disaster resilience, excels at lowering costs by eliminating redundancy within individual data centers, and are verifying the effects.

#### Cold Storage Geo Replication



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## Expand the Use of Renewable Energy

### Our Approach

Widespread use of renewable energy in society has reached a new level of importance from the perspectives of addressing global warming, securing stable energy supplies through diversifying our energy sources, and growing our economy with energy as a pillar of support.

The Fujitsu Group has established its environmental vision aimed at achieving a decarbonized society. Under this vision, we proactively promote renewable energy use as well as thorough energy saving. 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 expansion of purchasing and use of green power (electric power generated with 100% renewable energy) at overseas business sites at which costs are particularly reasonable.

### Summary of FY 2016 Achievements

<b>Targets</b> under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Expand the renewable energy usage rate to <b>6%</b> or higher.
<b>FY 2016 Targets</b>	Expand the renewable energy usage rate to <b>5.5%</b> or higher.
<b>FY 2016 Performance and Results</b>	Expand the renewable energy usage rate to <b>5.2%</b> .

### FY 2016 Performance and Results

#### New Usage Rate Target of 6% or Higher

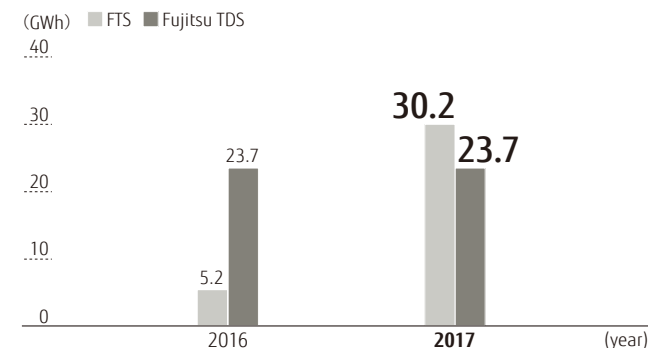
Although numerical targets for the use of renewable energy were not originally set in the Environmental Action Plan (Stage VIII), we have set a new target: increasing the usage rate by 6% or higher in an effort to increase purchasing and use of renewable energy, mainly in overseas regions in which it is possible to procure with economic rationality. In an effort to expand purchasing and use more, we are utilizing the Guidelines for Adopting Renewable Energy and the Optimum Installation Maps & Power Generation Estimation Tools, both created in fiscal 2013, and promoting implementation at our business sites.

In fiscal 2016, approximately 133 GWh of renewable energy was used, constituting 5.2% of the total amount of power usage.



Fujitsu Technology Solutions (FTS) Green Power Certificate

### Trend of FTS group Green Power Yearly Contract Amount



### TOPICS

#### Efforts to Expand Usage of Renewable Energy in the Future

The technical innovation in the electric power industry has been remarkable in recent years, with decreased costs for solar panels, wind power turbines, and storage cells giving a significant push to the use of renewable energy. Overseas in particular, there are regions in which 60% or more of the power supply consists of renewable energy.

In the future, Fujitsu will strive proactively to increase its use of renewable energy starting with overseas business sites at which it is easy to procure such energy. In addition, we are engaged in the development of a simulator to check the results of regional energy collaboration and research into high-efficiency charge/discharge control for storage cells, in order to increase the efficiency of using renewable energy.



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## Drive Activities to Reduce CO<sub>2</sub> Emissions in the Supply Chain

### Our Approach

The Fujitsu Group takes many steps to combat global warming. In addition to working to cut its own emissions, the Group also requests its business partners to implement CO<sub>2</sub>-reduction activities as part of its green procurement efforts. As a result, all of the Group's major business partners have launched CO<sub>2</sub>-reduction activities.

The Group began extending the scope of the activities further up the supply chain in FY 2016. In addition to asking business partners to take reduction-oriented steps, the Group is now also requesting its business partners to encourage similar initiatives at their own suppliers (the secondary suppliers to the Fujitsu Group).

Engaging in activities across the entire supply chain could help us not only expand our reduction effects (through synergy) but also enlarge the scope of the activities internationally, given the border-crossing scale of the supply chain. By pursuing these initiatives, we will keep striving to establish a decarbonized society for future generations.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Drive activities to reduce CO <sub>2</sub> emissions in the supply chain.
FY 2016 Targets	Through business partners, request secondary suppliers to implement CO <sub>2</sub> -reduction-oriented activities.
FY 2016 Key Performance	Through major business partners (approximately 1,600 companies), requested secondary suppliers (over 37,000 companies) to implement CO <sub>2</sub> -reduction activities.

### FY 2016 Performance and Results

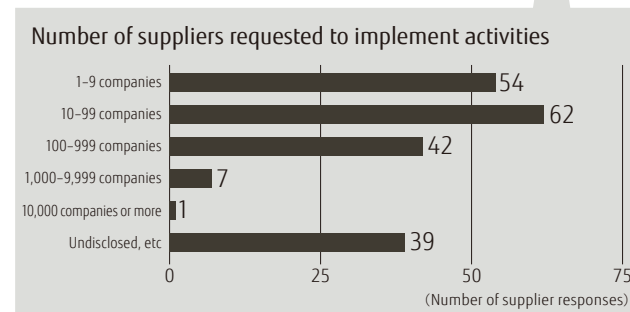
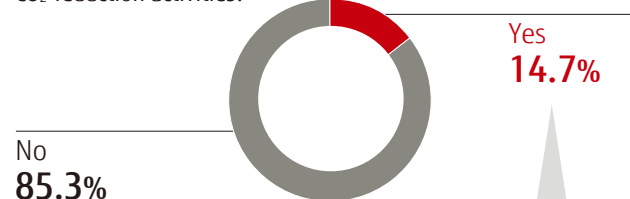
#### Requests/Support for Activity Development at Secondary Suppliers

We asked our major business partners, which account for over 98% of the Group's total procurement value, to ask their own suppliers (secondary suppliers) to comply with the Group's requests for the implementation of CO<sub>2</sub>-reduction activities. We also assessed the status of activities at our business partners using a unique Environmental Survey Sheet.

After analyzing the survey responses and creating a report outlining activity trends, we provided the results to the partners that submitted survey responses as a form of feedback that they could reference when developing and

#### CO<sub>2</sub>-reduction activities at secondary supplier sites

Have you requested your suppliers to implement CO<sub>2</sub>-reduction activities?



implementing future activities, urged the partners to continue engaging in activities, and asked them to extend the scope of activities to their own suppliers.

Although the number of the Group's business partners that had asked their own suppliers to implement activities came to less than 15% of the total as of the end of FY 2016, the number of secondary suppliers that received requests topped 37,000—a promising beginning for substantial awareness-raising initiatives.

The Fujitsu Group will continue to provide unique informational materials and take other steps to help its business partners appreciate the importance of CO<sub>2</sub>-reduction activities in the supply chain. In addition, the Group will work to bring a growing number of business partners into the effort.

#### Informational materials for business partners

**2 Implementing activities (1/3): Setting goals**

**1. Design activities**

(1) Identify candidate efforts that you can implement in-house

(2) Select candidates for implementation

**2. Set progress goals**

(using numerical data for measuring activity progress)

Select CO<sub>2</sub> emissions data or data with direct links to CO<sub>2</sub> emissions (power usage, etc.)

\* If you have difficulty selecting CO<sub>2</sub> emissions data

**3. Set numerical targets**

Establish an activity plan

\* If you have difficulty setting numerical targets

Focus	Activities (ex.)	Progress-management indicators (ex.)
Saving energy (reducing lighting power consumption)	Switch off unnecessary lighting/ install LED	Implementation rate/ installation rate/ energy-saving rate
Saving energy (reducing common use facility power consumption)	Turn off lights during break times	Time with lights off/ implementation rate
Saving energy (reducing air-conditioning power consumption)	Stop servers on holidays	Stoppage period/ stoppage rate
Saving energy (reducing common use facility power consumption)	Reduce overtime hours/ specify days on which all employees leave work at the same time	Implementation rate per department
Saving energy (reducing common use facility power consumption)	Phase time limits on reception/ conference room usage	Time used/ energy-saving rate
Saving energy (reducing air-conditioning power consumption)	Set air-conditioning systems to appropriate temperatures	Implementation rate/ implementation rate
Saving energy (reducing common use facility power consumption)	Install rooftop greening/ wall greening	Implementation rate/ greening area per building
Saving energy (promoting renewable energy)	Install green electricity systems	Installation rate
Saving energy (changing lifestyles)	Encourage employees to bike to work	Number of employees taking part in the initiative/ implementation rate
Promoting biodiversity (preserving CO <sub>2</sub> -absorbing resources)	Promote eco-driving	Implementation rate/ EVV installation rate
Promoting biodiversity (preserving CO <sub>2</sub> -absorbing resources)	Implement forest-preservation activities	Number of activities/ number of participants/ forestation land area/ number of trees planted
Conserving paper resources	Promote efforts to go paperless	Reduction volume/ implementation rate
Promoting environmental awareness	Take steps to raise awareness through in-house education	Attendees/ attendance rate/ test pass rate

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## Reduce CO<sub>2</sub> 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<sub>2</sub> emissions accompanying logistics and transportation activities is a priority for the Fujitsu Group.

The Fujitsu Group has worked toward its targets for CO<sub>2</sub> emission reductions from domestic transport. Since 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 streamlining and greater in global logistics.

The Group is working toward lowering environmental impact throughout the supply chain, such as displaying copies of the Fujitsu Group Green Logistics Procurement Directions, to strengthen our partnerships. Lastly, as an initiative in our overall distribution process, the Group is devoting effort to the 3Rs (Reduce, Reuse, Recycle) in packaging products and materials/parts.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Reduce by over <b>2%</b> on average every year CO <sub>2</sub> emissions per sales* from transport (compared to previous fiscal year)
FY 2016 Targets	Reduce by over <b>2%</b> CO <sub>2</sub> emissions per sales from transport (compared to FY 2015)
<b>FY 2016 Key Performance</b>	<b>Reduced by 3.4%</b> CO <sub>2</sub> emissions per sales from transport (compared to FY 2015)

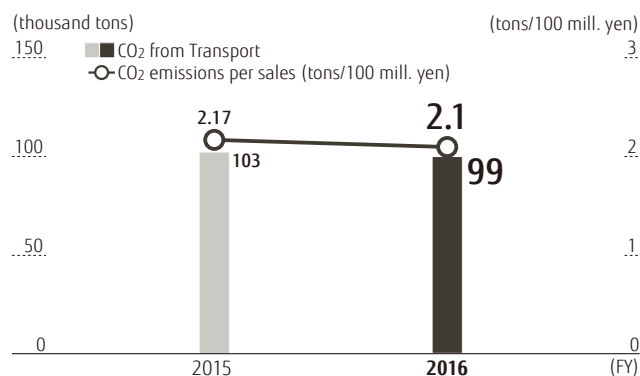
\* Net Sales: Excludes the impact of exchange rates

### FY 2016 Performance and Results

#### Reduced by 3.4% Compared to Previous FY; FY 2016 Results Broadly Surpassed Targets

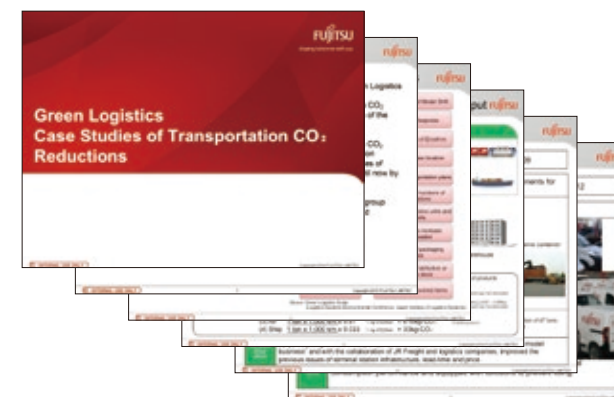
FY 2016 CO<sub>2</sub> emissions from transport were 99,000 tons. Of that amount, 21,000 tons were from domestic transport, while 78,000 tons were from international and overseas local transport. CO<sub>2</sub> emissions per sales were reduced 3.4% compared to FY 2015, which broadly surpassed our targets for FY 2016.

#### Trends in CO<sub>2</sub> Emissions from Transport



### Example Initiatives in FY 2016

- **Promoting modal shifts (switching from air to ferry shipments)**  
For shipping of computers and PC servers, Fujitsu Ten Limited is actively switching to ferry shipments which have lower environmental burdens and lower costs than shipments by air.
- **Sharing the "Case Studies of Transportation CO<sub>2</sub> Reductions" with domestic and overseas group companies**  
We created and distributed the "Case Studies of Transportation CO<sub>2</sub> Reductions," which is a collection of activities that have been held by domestic and overseas group companies. This publication serves as guidance for group companies.



Case Studies of Transportation CO<sub>2</sub> Reductions (Image)

- **Joint transportation with other companies (Fujitsu)**  
Fujitsu is promoting joint transportation by combining Fujitsu cargo with the cargo of other companies. Applying to shipments between logistics terminals and from terminals to customers, this collaboration has allowed a reduction in the number of trucks used.

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Reducing Greenhouse Gas (GHG) Emissions and Boosting Energy Intensity at Our Business Sites	Improve Power Usage Effectiveness (PUE) at Our Data Centers	Expand the Use of Renewable Energy	Drive Activities to Reduce CO <sub>2</sub> Emissions in the Supply Chain	Reduce CO <sub>2</sub> Emissions from Transportation	Reducing the Amount of Water Used	Reducing Chemical Substances Emissions	Limiting Amounts of Waste Generated	

## Reducing the Amount of Water Used

### Our Approach

Global water shortage risks are increasing along with climate change, destruction of forests, and economic and population growth in emerging and developing countries. For companies, as well, water shortages bear risks toward business continuity.

Reducing water usage and recycling water are critical issues. Since the Fujitsu Group uses especially large amounts of water in our semiconductor and printed circuit board manufacturing, we believe it is particularly necessary to reduce our water consumption in these areas. In addition to general water saving, to date we have been continuously striving to recirculate and reuse water by recycling pure water and reusing rainwater. Under our Environmental Action Plan (Stage VIII), we have strengthened our efforts to use water resources effectively even more than in the past.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Reduce water consumption by <b>1%</b> in total. <b>(128,000 m<sup>3</sup>)</b>
FY 2016 Targets	Water usage: <b>10,000 m<sup>3</sup></b> reduction <b>0.1%</b> reduction (compared to FY 2013)
FY 2016 Key Performance	Water usage: <b>139,000 m<sup>3</sup></b> reduction <b>1.1%</b> reduction (compared to FY 2013)

### FY 2016 Performance and Results

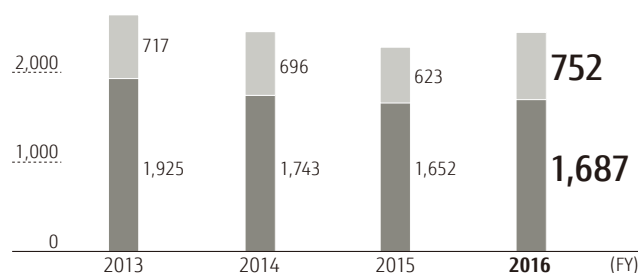
#### 139,000 m<sup>3</sup> Reduction in Water Usage from FY 2013

In regard to the target for reduction of water usage stipulated in the Environmental Action Plan (Stage VIII), we achieved 139,000 m<sup>3</sup>, far exceeding the FY 2016 target of a 10,000 m<sup>3</sup> reduction.

Water usage for FY 2016 was 16,870,000 m<sup>3</sup> (specific consumption per sale: 374.1 m<sup>3</sup>/100 million yen), which was a 2.1% increase compared to FY 2015, with increased production in addition to other factors. However, the proportion of water usage consisting of recycled water overall was 44.6%, a 6.9% increase compared to FY 2015, as a result of various efforts at each office and plant to use water resources effectively.

#### Trends in Water Usage and Amounts of Recycled Water

(10,000 m<sup>3</sup>) ■ Water usage ■ Amount of recycled water  
3,000



### Main Activities in FY 2016

#### Repurposing Plant Wastewater as Recovered Water

Fujitsu Component Limited worked to reuse washing wastewater from the scribing process on the touch panel manufacturing line. In the past, all pure water used for washing became wastewater, but in cooperation with Fujitsu Facilities Limited, regular cleaning of the washing wastewater tank, installation of recovery piping, improvement of the quality of the pure water, and a variety of other efforts were implemented. This resulted in reuse of approximately 18% as recovered water, and a 12,000 m<sup>3</sup> reduction of water usage for the year.



Water usage reduction activities through reuse of washing wastewater in the touch panel scribing process (Fujitsu Component Engineering and Development Center)



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## Reducing Chemical Substances Emissions

### Our Approach

We manage the amounts used for about 1,300 chemicals in the Fujitsu Group in order to prevent environmental risks that could lead to environmental pollution or adverse health effects due to our use of harmful chemical substances. 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 in conjunction with purchasing data and inventory data, and strengthen our management and efficient use of chemicals.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)

Reduce chemical pollutant (PRTR) release to less than the average level of FY 2012–2014

**(20.7 tons).**

FY 2016 Key Performance

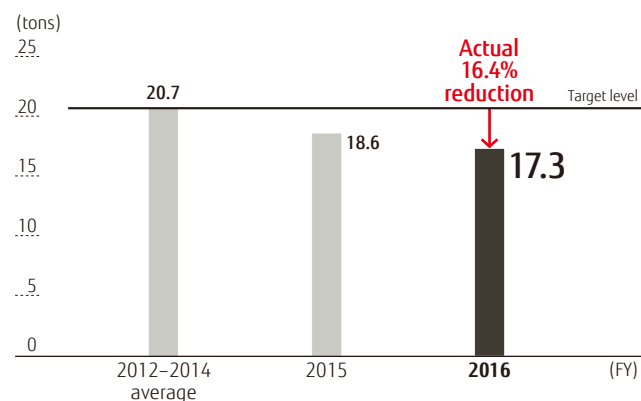
PRTR: **17.3 tons**

### FY 2016 Performance and Results

#### Achieved On-Going PRTR Substance Emission Target

Group-wide chemical substance emissions for FY 2016 came to 17.3 tons for PRTR, within the target value in the Environmental Action Plan (Stage VIII).

#### Trends in PRTR Substance Emissions in Japan



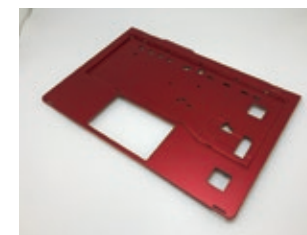
### Main Activities in FY 2016

#### Reducing Prtr Emissions through Improvements in Production Yield and Changes to Raw Materials

In FY 2016, Fujitsu Kasei Limited worked to improve the quality of the base materials for computer casing components and the working environments for various processes. The changes not only boosted production yield in the company's painting process but also helped reduce the amount of PRTR-targeted substances in its paints by bringing overall paint consumption down.

Switching to paint materials containing fewer PRTR substances and implementing technological measures to improve paint coating film thickness, among other efforts, reduced the amount of PRTR emissions under chemical substance management by a total of 1.4 tons (7.0 tons to 5.6 tons): Toluene levels fell by 0.9 tons, xylene by 0.2 tons, and ethylbenzene by 0.2 tons.

At the beginning of the fiscal year, the company identified the issues that it would need to address in its efforts to make yield improvements and also reduce paint consumption. The various improvement measures resulted in the above achievements. In FY 2017, the company will continue to reduce PRTR emissions to address more issues.



Computer casing painting: Improvements in quality



Painting process: Improvements in the work environment

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## Limiting Amounts of Waste Generated

### Our Approach

The Fujitsu Group sees waste as a valuable resource and continuously works to recover resources from our waste, or to use that waste as an energy source. In Japan, we have been reducing our final disposal amounts every year. However, given the difficulty of building new disposal sites, and the limited lifespans of existing sites, the environment surrounding our waste disposal is as challenging as ever.

By proactively installing equipment and reusing waste, we are working to follow the stipulations in Japan's Fundamental Law for Establishing a Sound Material-Cycle Society to 1) reduce waste generated, 2) reuse waste, 3) recycle waste, and 4) recover heat from waste. We do this in order to reduce the amounts of waste acid, waste alkali, and sludge generated in our production of semiconductors and printed circuit boards.

Furthermore, in order to properly dispose of waste, we have established the Standards for Consignment of Waste Disposal as company-wide standards. These standards are based on the Waste Management and Public Cleansing Act.

### Summary of FY 2016 Achievements

Targets under the Fujitsu Group Environmental Action Plan (Stage VIII) (toward FY 2018)	Reduce the amount of waste to less than the average level of FY 2012–2014 <b>(25,568 tons)</b>
<b>FY 2016 Key Performance</b>	<b>22,432 tons</b>

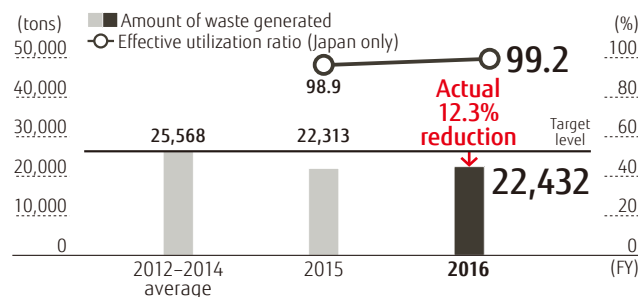
### FY 2016 Performance and Results

#### Internal Processing for Reducing Waste Amount and Converting Waste to Value-Added Material

The Fujitsu Nagano Plant reduced waste (427 tons) by internally manufacturing organically regenerated liquid waste. Mie Fujitsu Semiconductor Limited converted alkali liquid waste to a value-added material (95.6 tons).

This achieved our waste generation target of 22,432 tons (generation rate/unit of sales: 0.50 tons/100 mill. yen).

#### Waste Generated and Effective Utilization Ratio



#### Waste Generated, Effective Use, and Final Disposal

Waste Type	Waste Generated	Effective Utilization	Final Disposal
Sludge	4,449	4,333	117
Waste oil	1,186	1,157	29
Waste acid	3,204	3,198	6
Waste alkali	3,358	2,815	544
Waste plastic	3,557	3,416	141
Waste wood	997	997	0
Waste metal	735	734	1
Glass/ceramic waste	437	431	5
Other*	4,508	3,207	1,301
<b>Total</b>	<b>22,432</b>	<b>20,288</b>	<b>2,144</b>

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

### Main Activities in FY 2016

#### Reducing Amount of Glass Waste by Using Large Mother Glass

The touch panel manufacturing process at Fujitsu Component Limited had problems including a tendency for film to warp. The company established a working group to solve these problems. The group implemented these improvements:

- (1) A manufacturing line and manufacturing conditions with small bending even for large glass and no film warping.
- (2) Printing technology and film bonding supporting multi-surface printing on products.
- (3) Manufacturing/implementation new jigs for large glass.

These activities suppressed remnant material generated per sheet of mother glass. Since adopting large mother glass in the second half of FY 2014, glass waste dropped 150 tons in three years.

#### Changes in waste amount of ITO-coated glass

