# Fiscal 2015 Report – Environment

Efforts to protect the global environment are a key management issue for Fuji Electric, and, following the establishment of our Basic Environmental Protection Policy, we continue to promote environmental management with the goal of contributing to global environmental protection through our business activities.

In fiscal 2012, we began the Smart Factory Initiative to optimize energy usage by coordinating electrical and thermal energy technologies with production planning. In fiscal 2015, this initiative was extended to seven new factories, adding to the four model factories (Kawasaki, Tokyo, Yamanashi, and Mie) at which it was previously introduced, and the benefits of the energy usage visualization implemented are already apparent.



Energy usage visualization implemented through energy monitoring terminal (Fukiage Factory)

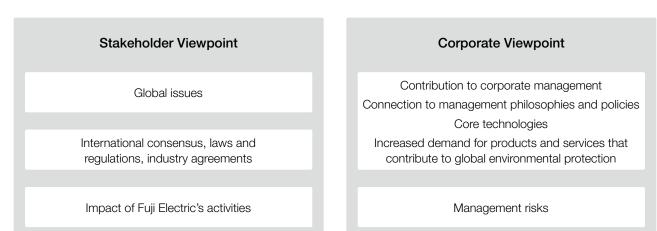
#### **Basic Environmental Protection Policy**

- 1. Offering products and technologies that contribute to global environmental protection
- 2. Reduction of environmental burden throughout product life cycles
- 3. Reduction of environmental burden in business activities
- 4. Compliance with laws, regulations, and standards
- 5. Establishment of environment management systems and continuous improvements of the systems
- 6. Improvement of employees' environmental awareness and social contribution
- 7. Promotion of communication

# Environmental Vision 2020

In 2009, Fuji Electric formulated Environmental Vision 2020 to guide its medium-to-long-term environmental activities as it promotes environmental management. The vision was established based on the perspectives of stakeholders and relevant companies through a process that entailed identifying material issues needing to be prioritized and then formulating concrete initiatives and targets in relation to these issues. We are forging ahead with these initiatives. This vision is centered on three specified material issues of stopping global warming, creating a recycling-oriented society, and meeting our corporate social responsibilities. In addition to reducing the environmental footprint of our own production activities, we seek to help achieve sustainable societies by providing products and technologies that leverage our strengths in electrical and thermal energy technologies.

# Viewpoints Incorporated in Identifying Material Issues



# **Environmental Vision 2020**

Our main initiatives under the issue of stopping global warming are to reduce  $CO_2$  emissions during production by 20% in fiscal 2020 compared with the fiscal 2006 level of 381,000 tons, while reducing society's  $CO_2$  emissions by 17 million tons by expanding sales of energy-saving and energy-creating products.

Under the issue of creating a recycling-oriented society, our key measures with respect to production resources are to lower ratio of waste sent to landfills by reducing waste and recycling resources. For water resources, we are endeavoring to cut the use of water resource inputs per unit of production. We are particularly stepping up efforts to increase water reusage rates at production facilities that consume a lot of water and at overseas facilities where there are significant water supply risks.

In this report, we present our main initiatives to stop global warming and to create a recycling-oriented society.\*

\* Unless otherwise specified, environmental activity targets and results in this report encompass domestic consolidated subsidiaries and overseas consolidated production subsidiaries.

# 1. Stop Global Warming

- Reduce CO<sub>2</sub> emissions during production by 20% (compared with fiscal 2006 levels).
- Raise the energy efficiency of products, reducing CO<sub>2</sub> emissions by 17 million tons through energyconserving and energy creating products.

Environmental Vision 2020

# 2. Create a Recycling-Oriented Society

- Increase our number of eco-products by promoting the 3Rs (reuse, reduce, recycle) in our products.
- Achieve zero emissions at operational sites by reducing waste and the use of energy and chemical substances.

# 3. Meet Our Corporate Social Responsibilities

 Strive to enhance environmental awareness through environmental citizen movements, activities to protect the natural environment, and environmental education.

# Fiscal 2015 Report

# **Environmental Management Three-Year Rolling Plan**

To achieve the goals of Environmental Vision 2020, Fuji Electric has formulated an Environmental Management Three-Year Rolling Plan, designed to promote ongoing efforts.

In this initiative, we verify each year that the environmental management strategy is addressing societal changes and establish detailed targets in various areas, such as the enhancement of environmental management governance, measures to prevent global warming, and measures to address the use of chemical substances. Fuji Electric will continually make revisions to the targets and action plans for each fiscal year up to three years in advance, and it aim to achieve the goals of Environmental Vision 2020 with certainty.



#### Fiscal 2015 Efforts to Stop Global Warming

# Reduction of CO<sub>2</sub> Emitted during Production

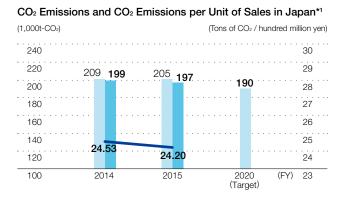
In Japan, we have been moving ahead with activities to reduce  $CO_2$  emissions since fiscal 2012 to conserve energy and curb costs.

We continued to advance the Smart Factory Initiative in fiscal 2015, enhancing the efficiency of clean room air-conditioning systems and factory compressed air systems to reduce electricity consumption. We also stepped up activities for boosting employee awareness by creating and distributing posters and booklets promoting energy conservation. In fiscal 2015, these and other energy-saving activities resulted in economic benefits equaling 6.1% of fiscal 2014 energy costs as well as CO<sub>2</sub> emission reductions totaling 11,014 tons.

Fiscal 2015  $CO_2$  emissions from production were 197,000 tons (a 34.2% reduction from fiscal 2006), which surpassed the target of 205,000 tons (a 31.6% reduction from fiscal 2006).

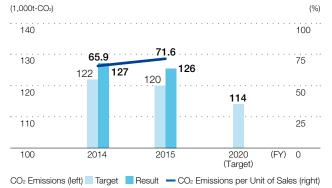
Overseas, we switched over to air-conditioning equipment using inverters, revised standard temperature settings at bases, and took other energy-saving steps. As a result, CO<sub>2</sub> emissions decreased 927 tons in fiscal 2015, amounting to 126,000 tons (down 3.8% from fiscal 2010), which did not meet the target of 120,000 tons (down 7.9% from fiscal 2010).

While the total CO<sub>2</sub> emissions reduction target for overseas was not met, we achieved the worldwide target (worldwide Environmental Vision 2020 target: 20% reduction from fiscal 2006 levels by fiscal 2020) of emissions of 325,000 tons, or a 14.7% reduction from fiscal 2006, with emissions totaling 322,000 tons, for a 15.3% reduction.



CO<sub>2</sub> Emissions (left) Target Result - CO<sub>2</sub> Emissions per Unit of Sales (right)
\*1 Emissions per unit of sales is calculated by dividing the CO<sub>2</sub> emissions amount by consolidated net sales.

# Overseas CO $_2$ Emissions and CO $_2$ Emissions\* $_2$ per Unit of Sales in Japan



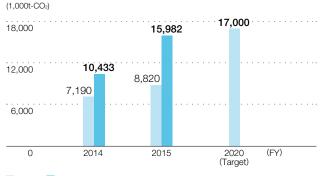
\*2 The amount of  $CO_2$  emitted by production volume (presented taking the value for FY2006 to be 100).

#### Reduction of Society's CO<sub>2</sub> Emissions through Products

In fiscal 2015, the contribution to CO<sub>2</sub> emission reductions from products was up 5,548,000 tons from fiscal 2014, to 15,982,000 tons, clearing our target of 8,820,000 tons. This reflected, among other factors, increased sales of inverters and electronic devices and deliveries of hydro power and biomass power generation facilities.

The products supplied during fiscal 2015 are anticipated to contribute to  $CO_2$  emission reductions totaling 75,014,000 tons, if used for their average lifespans.

#### Reduced CO<sub>2</sub> Emissions through Products\*3



#### Target Result

\*3 Amount of CO<sub>2</sub> reduction based on one year of operation of products shipped for each fiscal year after fiscal 2009.

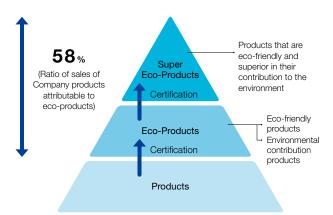
(Calculated making reference to the quantification method of GHG emission reductions stipulated in the Electrical and Electronics Industries' "Action Plan for Commitment to a Low-Carbon Society.")

#### **Eco-Product Certification System**

Fuji Electric is developing eco-friendly products, which enhance energy efficiency and reduce the use of chemical substances, and environmental contribution products, which help reduce society's overall impact on the environment. We continue to promote the spread of these products.

In this initiative, Fuji Electric has established the common Fuji Electric Eco-Product Certification System. We evaluate the degree of product eco-friendliness on a Companywide platform. Products meeting fixed criteria are certified as "eco-products," while those that are at the top of the industry for environmental benefits and contributions and that have received external awards recognized on the national level for environmental superiority are labeled "super eco-products."

In fiscal 2015, we investigated the connection between factory production volume and sales for each product segment to establish a better understanding of the amount of sales of Company products, which provides the denominator for calculating the ratio of sales attributable to eco-products. The fiscal 2015 ratio of sales attributable to eco-products (ratio of sales of Company products attributable to eco-products) was 58%, exceeding our target of 48%. In fiscal 2016, we will target a ratio of 70% by identifying products that qualify as eco-products and proceeding with their certification. Furthermore, an additional three products were designated as super eco-products in fiscal 2015, making for a total of 27.



**Eco-Friendly Products:** Products that have a reduced environmental impact over the entire product lifecycle. These products are superior to traditional products in at least four of six standard areas, including energy conservation, resource conservation, and recyclability.

Environmental Contribution Products: Products that contribute to environmental preservation during use. Products that contribute to the environment by utilizing natural energy or information and communication technology.

## Fiscal 2015 Super Eco-Products

# **Aerosol Analyzers**

#### Awarded 2015 (58th) 10 Greatest Innovations Prize by NIKKAN KOGYO SHIMBUN, LTD.

Fuji Electric's aerosol analyzers decipher the content of airborne PM2.5 particles, contributing to air pollution prevention by elucidating previously unseen truths.

- Employing a combination of several cutting-edge measurement methods, these analyzers continually and simultaneously record the size and number of aerosols as well as their chemical content (nitrate, sulfate, and black carbon) with high accuracy.
- Previously, sampling and analyzing aerosol chemical content was a process that had to be conducted by hand and could take more than eight hours. Our analyzers, however, have greatly cut the time required for such analyses by measuring content automatically in 15-minute cycles and almost in real time.
- The analyzers are primarily controlled via a touch panel on their front, which also displays measurement data, operational status information, and alerts.

#### Case Example New Air-Conditioning Control System at the Tokyo Factory

# Air-Conditioning Control System Reduces Energy Consumption by up to 23% and Increases Comfort and Energy Savings

Fuji Electric has developed air-conditioning control technologies based on discomfort indexes and introduced these technologies into its building management system (BAS). As a result, we were able to reduce energy consumption for air-conditioning inside buildings at the Tokyo Factory by as much as 23% per day during summer 2015, with average daily reductions of 7%. Even on days when temperatures exceeded 35°C, we were still able to achieve energy savings of 9%. The previous air-conditioning control system sought to decrease temperatures by measuring inside temperatures alone, resulting in significant energy lost to dehumidification. The new system, however, achieves optimal control based on discomfort indexes that account for both temperature and humidity levels, effectively reducing unnecessary dehumidification to maintain a comfortable environment while saving energy.

We aim to utilize this technology in the future to contribute to the 40% reduction target for building greenhouse gas emissions the government of Japan set to be achieved by fiscal 2030.



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#### Fiscal 2015 Initiatives to Create a Recycling-Oriented Society

#### Waste Reduction

In addition to efforts to curb waste, Fuji Electric works to promote resource recycling and has established a goal of zero waste emissions—a ratio of waste sent to landfills to total waste of no more than 1%.

In Japan, efficient use of resources (reduce, reuse, recycle) has enabled Fuji Electric to achieve its goal of zero waste emissions every year since fiscal 2004. In fiscal 2015, we once again achieved our goal of reducing the ratio of waste sent to landfills to below 0.5%.

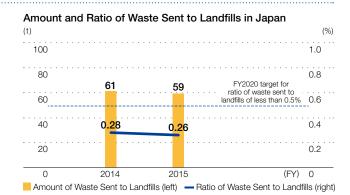
Moreover, we are working reduce and recycle waste overseas. In fiscal 2015, we were able to cut total waste production 2,000 tons. However, we also instituted a change to the treatment process for wastewater at a factory in Malaysia aimed at decreasing the environmentally hazardous materials contained in this wastewater (reducing the release of metallic components). Due to this change, we are no longer able to recycle the sludge created during wastewater treatment processes. Accordingly, the amount of waste sent to landfills increased approximately 700 tons, resulting in a ratio of waste sent to landfills of 17.29%.

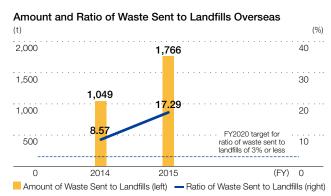
#### Efficient Use of Water Resources

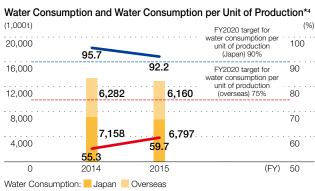
In view of the problem of global water resource depletion, in addition to its efforts to comply with wastewater quality requirements and reduce wastewater, Fuji Electric launched an initiative aimed at more efficient use of water resources.

Using fiscal 2010 levels as a standard, this initiative aims to reduce both total water intake and water consumption per unit of production at our domestic manufacturing sites by 1% each, with the goal of reducing those levels by 10% in fiscal 2020.

Using fiscal 2011 levels as a standard, since fiscal 2013 we have established a goal for our overseas production sites of reducing water consumption per unit of production by 25% in fiscal 2020, and are conducting activities to reach that target. Beginning in fiscal 2016, we will pursue a reduction in water consumption of 25% to be achieved by fiscal 2020.







Water Consumption per Unit of Production: - Japan - Overseas

\*4 Water consumption per unit of production (For Japan, presenting FY2010 level as 100; for overseas, presenting FY2011 level as 100).

#### Case Example Effective Utilization of Water Resources at Matsumoto Factory

#### **Drive to Preserve Water Resources**

The Matsumoto Factory uses large amounts of pure water in semiconductor manufacturing processes and also consumes massive quantities of water for cooling production equipment and other applications. For this reason, efforts to reduce use of water resources and utilize these resources more effectively are being advanced at the factory.

As one facet of these efforts, we separate out exhaust water from production processes that is still of relatively high quality to be recycled into pure water. For use in manufacturing pure water with ion exchange resins, the Matsumoto Factory introduced an electric pure water manufacturing device. With this device, the factory is now able to continually create pure water without needing to use chemicals to regenerate ion exchange resins. Accordingly, the factory is no longer required to treat chemical-containing wastewater, an accomplishment that helped reduce usage volumes of electricity, water resources, and chemicals. For final treatment of wastewater from factories, the Matsumoto Factory installed wastewater recovery systems

to conduct recycling processes (filtration via coagulation sedimentation) for wastewater to enable this water to be reused in factory cooling towers, toilets, and other facilities. Approximately 1,000 tons of water are reused in this manner each day.

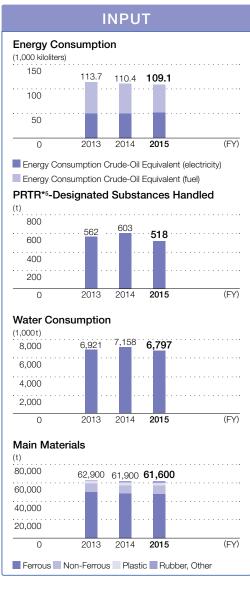


Integrated Water Management (IWM)

**33** Fuji Electric Report 2016

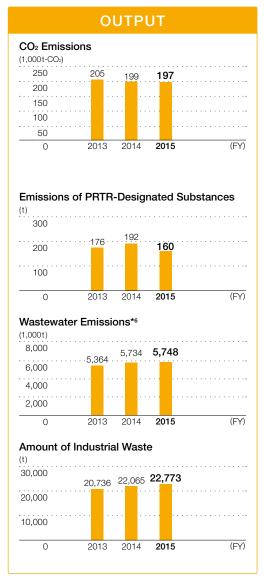
# Mapping the Interplay between Business Activities and Environmental Impact

Fuji Electric is constantly working toward more efficient use of resources and energy and the reduction of waste throughout all of its business activities. We are also proactive in our efforts to be more environmentally conscious across the entire product and service life cycle. The following graphs contain environmental impact data from the fiscal years 2013 to 2015.

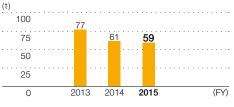


\*5 Pollutant Release and Transfer Register Law

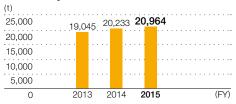
- \*6 Wastewater emissions refer to volume of water discharged into rivers and other natural environments.
- \*7 The amount of waste sent to landfills and the amount of waste recycled are internal figures from the amount of waste generated.



## Industrial Waste Sent to Landfills\*7



## Waste Recycled\*7



#### Scope: Domestic production base