

Stop Global Warming

Fuji Electric is promoting the reduction of CO₂ emissions on a global scale and contributing to stop global warming by providing products and services, and striving to conserve energy at our plants and other operational sites.

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Action Plan to Reduce CO₂ Emissions

From 2013 through to 2020, the Kyoto Protocol international treaty aimed at preventing global warming is in its second commitment period. The electrical and electronics industry has instituted its own autonomous Action Plan for Commitment to a Low-Carbon Society for this period and is moving ahead on preventing global warming through improvement of energy efficiency and emission reductions of production processes and contributing to emission reductions through products and services.

Fuji Electric has been involved in the action plan since March 2012 and we continue to move ahead with our activities to realize its goals through our Environmental Vision 2020.

(1) We added improving energy efficiency as a target together with reducing production emissions of CO₂ in 2020 to 20% less than the 381,000 tons they had been in fiscal 2006 and now seek also to improve our energy consumption per base unit by 10% compared with fiscal 2012.

(2) Providing products with the aim of contributing to reducing society's CO₂ emissions by 17 million tons* by 2020.

*Contribution of products shipped since 2009, when calculations began, that have not reached the end of their service lives as of that year, assuming a full year of operation.

Relationship Between Environmental Vision 2020 and Long-term Global Targets for Global Warming Prevention

The IPCC's Fourth Assessment Report concludes that there is no doubt that warming has occurred in recent years due to climate change and that global warming is being caused by human activity. Based on this report, at the 2009 G8 Summit in L'Aquila, Italy, an official declaration was made in support of the goals of reducing global greenhouse gas emissions by 50% by 2050 and by 80% in developed countries by 2050. Achieving the G8's long-term targets starting from the baseline year (FY2006) established in the Environmental Vision, Fuji Electric's medium-term indicator for environmental management, will require annual reductions of 1.56% (for global target) and 3.59% (for developed countries). This is equivalent to reducing emissions by 20% (global) and 40% (developed countries) by fiscal 2020, compared to fiscal 2006.

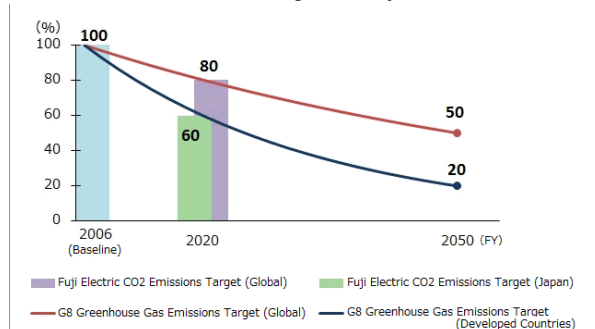
Fuji Electric's Environmental Vision 2020 calls for reduction of CO₂ emissions from energy consumption at global production sites (global target) of 20% and a reduction of 40% in Japan (target for developed countries) by fiscal 2020, compared to fiscal 2006.

Accordingly, our targets for CO₂ reduction are in line with global long-term targets related to the prevention of global warming, as represented by these G8 targets.

In addition, with respect to emissions of non-CO₂ greenhouse gases, Fuji Electric achieved a 92% reduction in fiscal 2009 on a global basis, compared to 1995, and has ended reduction activities. Since 2010, we have sought to manage and maintain this level. As has been shown, we continue to promote activities to prevent global warming based on targets equivalent to the long-term targets formed through international consensus.

* Intergovernmental Panel on Climate Change. The IPCC is an intergovernmental institution that compiles and assesses the views of experts on global warming to provide scientific criteria for making judgments related climate change. The Fourth Assessment Report was produced through the participation of over 2,000 experts from 130 countries and affirmed by government representatives in 195 countries. It compiles predictions made on changes in air and water temperatures, the impact on water resources and ecosystems, and the damage to human society, stating that global warming is a potential threat to the existential foundation of human life and other living organisms.

G8 Greenhouse Gas Reduction Targets and Fuji Electric CO₂ Emission Reduction Targets



Reducing Greenhouse Gas Emissions During Production

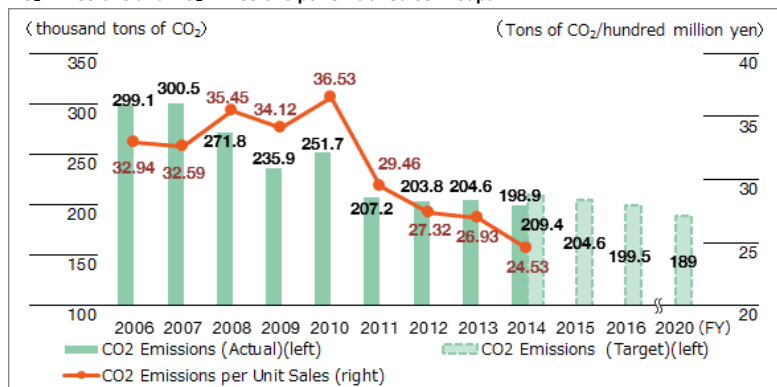
Fiscal 2014 CO₂ Emission Reduction Targets and Achievements

In Japan, we have been moving ahead with activities to reduce CO₂ emissions to conserve energy and curb energy costs since fiscal 2012.

Power consumption has been cut by upgrading clean room air conditioning systems and compressor systems while efforts have also been made to limit peak power consumption by revamping production processes and introducing co-generation systems. The effective reduction in energy expenses in fiscal 2014 working out to be equivalent to a saving of 6.3% compared to fiscal 2013. As a result, in fiscal 2014 we aimed to reduce CO₂ emissions from production to 209,000 tons (a 30.0% reduction from the fiscal 2006 level), and achieved this goal by cutting down to 199,900 tons, a 33.6% reduction compared to fiscal 2006. Emissions decreased by around 10,300 tons from the previous year, owing to energy-conservation efforts, but this was offset by an increase in production volumes and the CO₂ emissions reduction year on year was about 6,000 tons.

Overseas, we conserved energy through redesigning steam production systems and reused residual heat. In fiscal 2014, overseas production volume, which includes Thailand, Shenzhen, China and other sites, increased by 23% overall, so CO₂ emissions fell short of the target of 122,000 tons (reduction of 6.4% from fiscal 2010), amounting to 127,000 tons (down 2.5% from fiscal 2010). While the total emissions reduction target for overseas was not met, worldwide we achieved the target in fiscal 2014 of Environmental Vision 2020, 20% reduction in fiscal 2020 over 2006 levels, which is 332,000 tons, or a 12.9% reduction from fiscal 2006, with emissions totaling 326,000 tons, for a 14.4% reduction despite the increase in production.

CO₂ Emissions and CO₂ Emissions per Unit of Sales in Japan

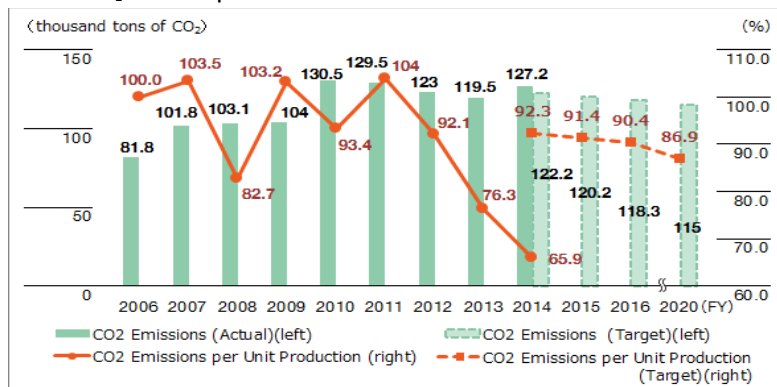


* Emissions per unit of sales is calculated by dividing the CO₂ emission amount by consolidated net sales.

Notes:

1. Collation of figures from the production bases and offices of all domestic consolidated subsidiaries, including Fuji Electric's offices.
2. Calculated using the Federation of Electric Power Companies of Japan's fiscal 2006 average power CO₂ emission coefficient (4.10 t-CO₂/10,000kWh) arranged for the targets in Environmental Vision 2020.

Overseas CO₂ Emissions per Unit of Production



* The amount of CO₂ emitted by production volume (presented taking the value for FY2006 to be 100).

Notes:

1. Total of figures for production sites at overseas consolidated subsidiaries (added Fuji Electric (Zhuhai) Co., Ltd. and Shanghai Electric Fuji Electric Power Technology (Wuxi) Co., Ltd.).
2. Overseas energy and electric power conversion coefficients obtained from the JEMA website (Ver. 3, March 2006).
3. Fiscal 2013 and 2014 figures adjusted to reflect credits traded from the China Emissions Exchange.

Third Party verification of CO₂ Emissions and Emissions Trading System

In accordance with regulations, Fuji Electric receives third-party verification through emissions trading systems with regard to the total emissions of CO₂ from its use of energy (fuel and electricity), at its two domestic production bases (Tokyo and Saitama Prefecture) and one overseas production base (Shenzhen, China). In fiscal 2014, the volume of CO₂ emissions receiving third-party verification accounted for 14.2% of total CO₂ emissions from the Company.

■Emissions trading system

In Japan (Tokyo, Saitama Prefecture)

Emission volume standards were set for both Tokyo and Saitama Prefecture in consideration of past CO2 emissions levels, based on which first-phase government reduction targets for total emissions volumes were established.

The first-phase reduction period for Tokyo and Saitama Prefecture ended in 2014, and total reduction goals were met for the period at both locations. In 2015, we acquired emissions credits based on third-party verification of the difference between actual emission reductions and reduction targets, which were carried over to the second phase (from fiscal 2015 to fiscal 2019).

Overseas (Shenzhen, China)

The City of Shenzhen has asked about 1,000 companies and public organizations to reduce CO2 emissions per production unit in fiscal 2015 by 32% compared with 2010. Accordingly, Fuji Electric's Shenzhen Factory has been assigned the goal of reducing its CO2 emissions per production unit by approximately 6.1% each year. China's emissions trading system calls for differences between actual emission reductions and reduction targets to be identified via third-party verification and for insufficiencies to be reconciled by procuring emissions credits from the market. The Shenzhen Factory purchased emissions credits when conducting two reconciliations prior to 2014, and these credits were rolled over to subsequent years. In 2014, favorable increases in production volumes drove reductions in CO2 emissions per production unit, resulting in a substantial decrease in the amount of lacking emission credits. As a result, amortization of emissions credits declined from 7,282 t-CO2 in 2013 to 520 t-CO2 in 2014.

Emissions trading system

District	1st-phase reduction period	Emission volume verification organization	Reduction target
Tokyo (Tokyo Factory)	FY2010-FY2014	JACO, CDM	7% reduction from emission volume standards
Saitama Prefecture (Fukiage Factory)	FY2011-FY2014	JACO, CDM	6% reduction from emission volume standards
Shenzhen, China	FY2013-FY2015	深圳市宗兴环保科技有限公司	6.1% annual reduction in emissions per production unit

Performance of Emissions trading (The first-phase reduction period)

(tons of CO2)

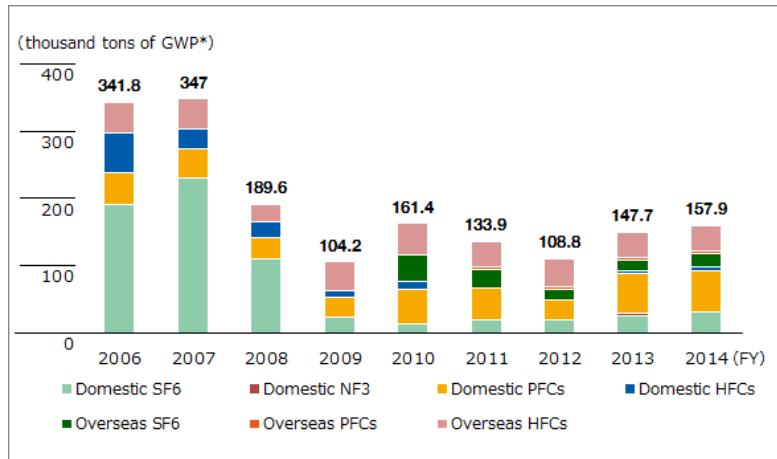
District	Acquired emissions credits	Purchased	Amortized	Sold	Remaining (rolled over)
Tokyo (Tokyo Factory)	4,917	0	0	0	4,917
Saitama Prefecture (Fukiage Factory)	15,665	0	0	0	15,665
Shenzhen, China	0	10,611	7,802	0	2,809

Reducing Greenhouse Gases other than CO2 including SF6

Apart from CO2, greenhouse gases that cause global warming also include various alternatives for chlorofluorocarbon. In fiscal 2009, we completed the countermeasures of shifting to alternative gases and installing abatement apparatus for irreplaceable gases in some production lines of the semiconductor segment, where emissions of greenhouse gases were relatively large. (Fiscal 2009 emissions were 92% lower than 1995.) Since fiscal 2010 we have switched our objective to maintenance of the status, and we continue our emission reduction activities with all newly established production lines equipped with abatement apparatus. Eight types of gas were added to the scope of calculations for HFC and PFC due to revisions to the Act on Promotion of Global Warming Countermeasures. Of these, Fuji Electric has added two additional types of HFC that the Company uses for calculations as of fiscal 2014.

Fiscal 2014 emissions increased by 10,250 tons (6.9%) compared to fiscal 2013 due to increased production volume (equivalent to approximately 6,000 tons) and from adding two new types of HFC to the scope of calculations.

Emissions Other than CO2



* GWP: Global Warming Potential. A measure of the relative greenhouse effect caused by a gas, compared with the effect of CO₂, which is expressed with a GWP value of 1.

Notes:

1. Collation of consolidated subsidiaries for Japan and production bases of consolidated subsidiaries for overseas.
2. The global warming coefficient has been changed from fiscal 2013 to the IPCC Fourth Assessment Report in accordance with a COP17 decision.
3. Fiscal 2014 totals include figures for two additional types of HFC (equivalent to 4,000 tons) that were included in the scope of calculations for the first time.

Promoting Smart Factory Initiatives

Fuji Electric promotes the Smart Factory Initiative at production sites to optimize energy use through coordination between electric and thermal energy technologies and production planning to use energy more efficiently.

In fiscal 2014, energy management systems were built at model factories and monitored to verify their effectiveness. At other factories (in Japan), we continue to make energy consumption more visualized and are accelerating the Smart Factory Initiative.

Case Example from Smart Factory Initiatives

TOPICS

■Saving Energy by Optimized Electrical and Thermal Energy Use Linked with Production Planning

Because the Yamanashi Factory produces semiconductors 365 days a year, stable power supplies and energy conservation are essential. The Smart Factory Initiative is thus being promoted both as a way to avoid energy risk and to reduce energy consumption.

As part of energy risk avoidance, in fiscal 2013 we installed four of our fuel cell units, and in fiscal 2014 added a gas-engine driven generator, bringing the factory's energy self-reliance rate to 100%. With the additional introduction of low-voltage uninterruptible power supply systems (UPS) units, the factory is also protected against instantaneous voltage drops.

In terms of reducing energy consumption, inverters were applied to fans and pumps or motors were replaced with highefficiency motors, while the factory also makes effective use of fuel cells and generator exhaust heat as part of a cogeneration system. The factory works to optimize electrical and thermal energy use through an energy management system, resulting in a cut in energy consumption of about 30% in fiscal 2014 compared to fiscal 2010



Generator



Fuji Electric high-efficiency inverter



Energy monitor displays the energy being used

Reducing Society's CO₂ Emissions through Products

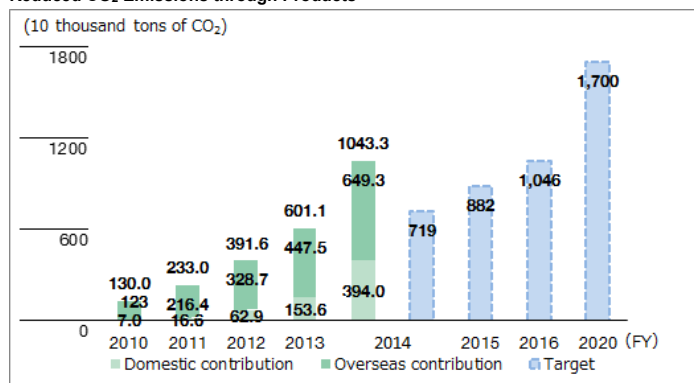
Fuji Electric is aiming to reduce society's CO₂ emissions by innovation in electric and thermal energy technology.

Fiscal 2014 CO₂ Emission Control Targets and Achievements through Products

In fiscal 2014, the contribution to CO₂ emission reductions from products was up 4,422,000 tons from fiscal 2013, to 10,433,000 tons, we achieved our fiscal 2014 target of 7,190,000 tons..

This was primarily due to expanded sales of inverters, mega solar power conditioners, solar power systems and electronic devices.

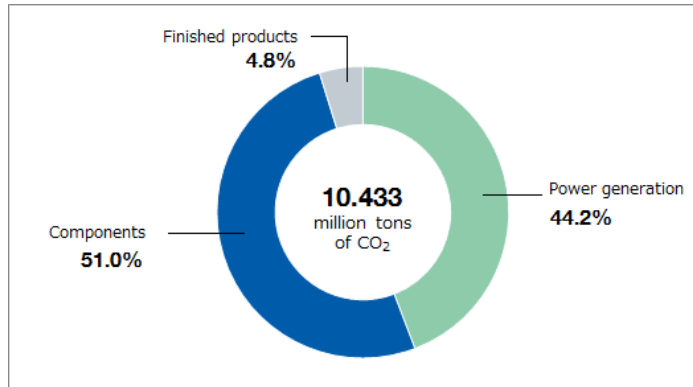
Reduced CO₂ Emissions through Products



* Amount of CO₂ emission reduction contribution 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.)

Fiscal 2014 Breakdown of CO₂ Emissions Reduction Contribution Amount



Power generation: Thermal, geothermal, hydraulic, solar, fuel cells, biomass, wind power generation systems



Components: Power semiconductors, inverters, motors

Finished products: Vending machines, uninterruptible power supply systems, transformers, power conditioners and various types of power supply systems

Products that Contribute to Reducing CO₂ Emissions

Here, we will introduce some of Fuji Electric's eco-products that help prevent global warming by reducing CO₂ emissions.

[[Related Link : Eco-Product Certification System](#)]

<p>Power Plants</p>	
<p>Geothermal Power Generation Facilities</p>	
<p>Geothermal power is energy generated using the geothermal steam created by subterranean magma. As geothermal power generation does not require the burning of oil or coal, CO₂ emissions are substantially lower than those from thermal power generation. Furthermore, this power source is able to provide supplies of electricity that are more stable than other renewable energy sources.</p> <p>CO₂ emissions reduction: approx. 552,000 tons / year</p> <p>(Compared to thermal power generation) Effect calculated under typical operating conditions (when product in use) Geothermal steam turbine: output 147MW, utilization rate 90% CO₂ emission factor 0.476kg-CO₂/kWh</p>	 <p>Wayang Windu Geothermal Power Station in Indonesia</p>
<p>Factories</p>	
<p>Inverters</p>	
<p>Inverters are used in a wide variety of equipment, including elevators, building air conditioning systems, and factory manufacturing facilities. By optimally controlling the rotation speed of the motors that move such equipment, inverters eliminate energy loss during operation and contribute to energy savings.</p> <p>CO₂ emissions reduction: approx. 11.9 tons / year (50.0% reduction)</p> <p>(Compared to damper control) Effect calculated under typical operating conditions (when product in use) Operating conditions: Motor output 15kW, air flow 85% (operation 2,000 hours), air flow 60% (operation 2,000 hours) Damper control: Air flow 85% (load 91%), air flow 60% (load 76%) Inverter control: Air flow 85% (load 61%), air flow 60% (load 22%) CO₂ emission factor 0.476kg-CO₂/kWh</p>	
<p>Data Centers</p>	
<p>Module Type Data Centers</p>	
<p>Significant reductions in electricity consumption were realized by using a hybrid air conditioner unit which uses both external air-cooling and an air conditioner using refrigerant at the same time. Also, the centers use a dedicated facility operation management system, to centrally manage electricity, heat source, air conditioning, and the environment for optimal operation.</p> <p>CO₂ emissions reduction: approx. 156 tons / year (60.0% reduction)</p> <p>(Compared to Non-hybrid Air Conditioner) Effect calculation for when product is in use is based on typical operating conditions. Operating conditions: Annual operation time 8760 hours Conventional product: Average annual power consumption 62.4 kW Current product: Average annual power consumption 25.0 kW CO₂ emission factor 0.476kg-CO₂/kWh</p>	

3-level IGBT Modules

IGBT modules are a type of power semiconductor. They are used in UPSs and solar power generation facilities, and are essential to realizing energy savings.

CO₂ emissions reduction: approx. 987 kg / year (23.4% reduction)

(Comparison of 2-level and 3-level IGBT Module)

Effect calculation for when product is in use is based on typical operating conditions.

Operating conditions: With a 100 kW inverter annual operation time 2920 hours

CO₂ emission factor 0.476kg-CO₂/kWh



Stores

Building Energy Management Systems

Building energy management systems are used to monitor and efficiently control energy usage in stores and other buildings. By employing combinations of renewable energy systems and storage batteries, these management systems help equalize electric power loads.

CO₂ emissions reduction: approx. 23 tons / year (8.0% reduction)

(Benefit from introducing Fuji Electric's building energy management systems)

Current status: Introducing electric power monitoring system, taking measurements and conducting survey of waste from operational aspect

Measures: Monitoring of PC operations during lunch breaks, reduction to standby power at night

Measures firmly entrenched: E-mail sent out asking for reasons why PCs were used at lunchtime, responses collated and corrective action taken

Effect: CO₂ emissions reduced 8.1%, lunchtime PC users reduced by half, nighttime standby power reduced by two-thirds



Vending Machines

Fuji Electric's vending machines employ innovative hybrid heat pump technologies that utilized external air heat when heating for beverages in vending machines, non-fluorocarbon refrigerants, and state-of-the-art vacuum insulation panels. By combining these features with LED displays, we have created ultra-energy-efficient vending machines that realize substantial reductions in electricity consumption.

CO₂ emissions reduction: approx. 342 kg / year (78.2% reduction)

(Comparison between models released in fiscal 2002 and those released in fiscal 2014)

Effect calculated under typical operating conditions (when product in use)

Operating conditions: In accordance with vending machine test method JIS B 8561:2007

CO₂ emission factor 0.476kg-CO₂/kWh



Energy Conservation Initiatives in Logistics

To reduce CO₂ emissions in logistics, specified consigner whose annual tonnages exceed 30 million ton-kilometers have been required to measure and improve their energy consumption since April 2006.

Fuji Electric has established the Guidelines for Consigner's Obligations to enable each business site to comply with these laws and regulations smoothly and appropriately. The guidelines centrally manage data using FeSMART* to ascertain the environmental burden due to logistics activities.

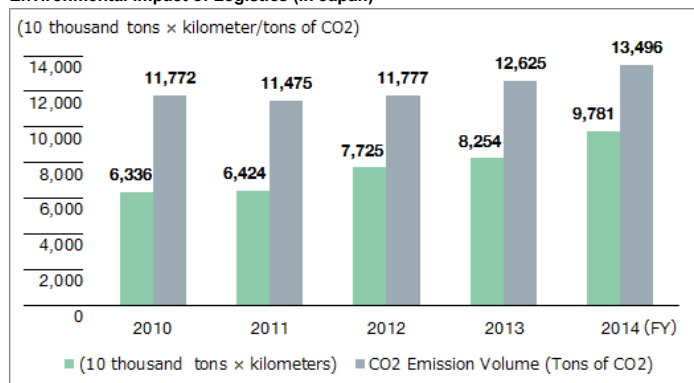
In fiscal 2014, there was an increase in the transport of parts and products accompanying an increase in net sales. As a result, there was a year-on-year rise in CO₂ emissions from logistics, but CO₂ emissions were reduced more than enough to offset the transport volume increase.

Going forward, Fuji Electric will continue to reinforce its energy conservation activities in its logistics operations and work to reduce its environmental footprint, including reducing transportation weight by minimizing product size and changing the mode of line-haul transportation.

* FeSMART: (Fuji electric Sustainable MAnagement suppoRT system)

Enables registration of and access to all environmental data relating to the Company's factories and operating sites using a web browser on the Company's Intranet.

Environmental Impact of Logistics (In Japan)



CO₂ Emissions Reductions from Raising Transport Efficiency of Large Vending Machines

The Mie Factory is focusing on reducing CO₂ emissions by raising the transport efficiency of vending machines, which is its mainstay product.

Among the vending machines the factory produces, its mainstay large-size machines cannot be loaded into three rows on a standard 10-ton truck, so loading efficiency per truck had been low. The factory introduced new-model 10-ton trucks (with a truck floor width of 2,400 mm) and modified the packing materials to allow the machines to be loaded in three rows. This started recently in fiscal 2015 and is expected to reduce the environmental impact of vending machine transport.

Scope 3 Emissions

Greenhouse gases emitted indirectly upstream to downstream on Fuji Electric's supply chain (Scope 3) have been calculated since fiscal 2012 based on guidelines*1 issued by the Ministry of the Environment. As a result, we found that emissions from use of products sold were highest and confirmed this as an important item to address. It was affirmed that raising the energy efficiency of products and contributing to more efficient electricity use within society is an important activity*2 for Fuji Electric tied to preventing global warming.

*1: Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain Ver. 2.0 issued by the Ministry of the Environment.

*2: For 2020 activity targets, refer to the section "Reducing Society's CO₂ Emissions Through Products."

Scope of Calculations for Greenhouse Gas Emissions

- Scope 1: Direct emissions from fuel use and production processes at the Company
- Scope 2: Indirect emissions from use of electrical and thermal energy purchased by the Company
- Scope 3: Indirect emissions from upstream/downstream on the Company's supply chain

Scope 3 Emissions

(unit: tons of CO₂)

segment	category	fiscal 2013	fiscal 2014	coverage
upstream	1 Products and services purchased	170,555	164,333	Emissions related to production of raw materials purchased by domestic factories
	2 Capital goods	77,203	83,230	Emissions related to construction/manufacture of capital facilities domestically and oversea
	3 Fuel and energy purchases (outside Scope 1/2)	31,156	30,555	Emissions related to fuel procured domestically and to production of fuel necessary for generation of electrical energy
	4 Transport and delivery (upstream)	12,625	13,496	Emissions related to company transport (domestic) (same as reported for environmental impact from logistics activities)
	5 Waste discharged from business operations	4,589	5,050	Emissions related to processing waste discharged from domestic factories
	6 Business travel	1,964	1,956	Emissions related to business travel by domestic employees
	7 Commuting	8,395	8,137	Emissions related to commuting to domestic business sites
	8 Use of lease assets (upstream)	0	0	Transport from product delivery (Category 4) sites is marginal, so excluded from scope of calculations.
downstream	9 Transport/delivery (downstream)	-	-	Transport from product delivery (Category 4) sites is marginal, so excluded from scope of calculations.

segment	category	fiscal 2013	fiscal 2014	coverage
	10 Processing of sold products	-	-	Intermediate products requiring downstream processing are not sold, so excluded from the scope of calculations.
	11 Use of products sold	2,492,335	2,781,797	Emissions assuming that products for the consumer sector* shipped domestically and overseas during the fiscal year are used until the end of their service lives.
	12 Waste processing of products sold	-	-	Fuji Electric products have high metal ratios and emissions at recycling are assumed to be low, so this is excluded from the scope of calculations.
	13 Use of lease assets (downstream)	0	0	No applicable emissions
	14 Franchise	0	0	No applicable emissions
	15 Investment	0	0	No applicable emissions
total		2,798,321	3,088,554	

*Products for industries are not worked out so as to be counted among emission in our customers.

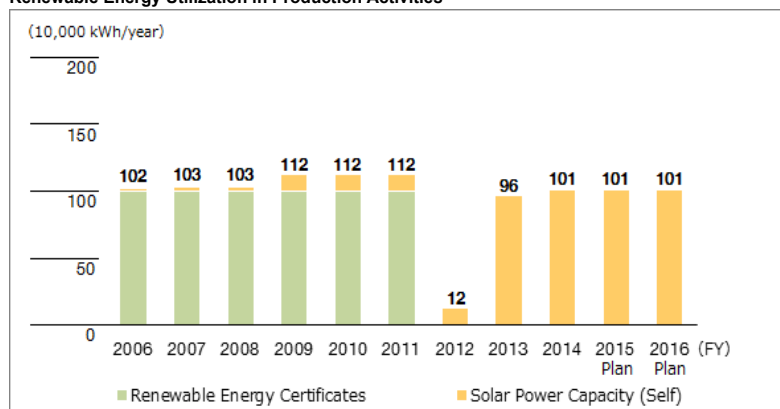
Initiatives for Utilizing Renewable Energies

Fuji Electric promotes use of renewable energies through development and supply of geothermal and hydropower facilities and solar and wind power systems, all of which have low environmental impact, to contribute solutions to increasingly diverse global energy issues. We have supplied 71 geothermal facilities domestically and overseas to date.

■Utilization of Renewable Energies in Production Activities

With respect to power consumed at the Company, we purchased renewable energy certificates of 1 million kilowatts each year for seven years from 2005 to 2011. We are currently promoting power generation using our own products, and installed large-capacity power systems at the Mie Factory and a new factory in Thailand in fiscal 2013 and a 50-kW solar power system at the Fukiage Factory in fiscal 2014. As a result, self-generated power capacity as of the end of fiscal 2014 totaled 957 kilowatts.

Renewable Energy Utilization in Production Activities

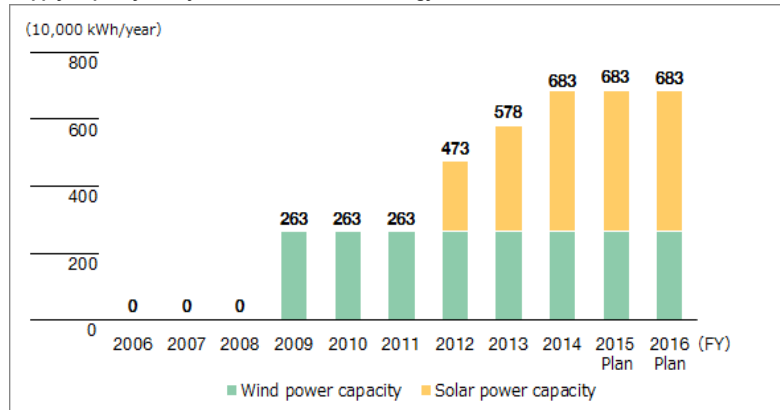


Note: Solar power capacity is average capacity utilization multiplied by total capacity installed as of the end of the fiscal year. (12%)

■Renewable Energy Supply Initiatives

Fuji Electric contributes to the prevention of global warming by participating in power projects and supplying renewable energies. Subsidiary Fuji Green Power Co., Ltd. built the Nishime wind power plant, which went online in fiscal 2009, and a mega solar power facility (2 megawatts) on the premises of our Yamanashi Factory. In fiscal 2012, it began selling the total amount of power produced by these systems.

Supply Capacity of Fuji Electric's Renewable Energy Business



Note: Wind power and solar power capacity is average capacity utilization multiplied by total capacity installed as of the end of the fiscal year. (Wind power 20%; Solar power 12%)

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