

I. Kyushu Electric Power Company Environmental Management

All members of the Kyushu Electric Power Group work together to pursue environmental management which achieves better business in a better environment in order to contribute to the creation of a more sustainable society.



Kyushu Electric Power Group Environmental Charter

The Kyushu Electric Power Group recognizes, as a corporate group whose operations impact the environment, that we need to demonstrate a sincere commitment to caring for the environment.

That is why environmental preservation is a key business focus and why environmental management is promoted across all of our operations, ensuring that the growth of our business does not come at the expense of the environment. And, in order to concretely express our attitude towards, and guiding principles for, environmental action, we have established the "Kyushu Electric Power Group Environmental Charter."

Kyushu Electric Power Group Environmental Charter

- A Commitment to Environmentally-Friendly Corporate Activity -

The Kyushu Electric Power Group develops globally-focused initiatives geared towards protecting the earth's environment and cultivating harmonious local coexistence in order to achieve a more sustainable society.

- 1 We seek appropriate responses to global environmental challenges and to make effective use of resources so that our business activities will contribute to a better future.
- 2 We strive for harmonious coexistence with society by engaging in activities which will enrich local environments.
- 3 We work to raise environmental awareness and to become a corporate group that earns the trust of its customers.
- 4 We are proactive about disclosing environmental information and facilitating communication with the community.

Enacted April 2008

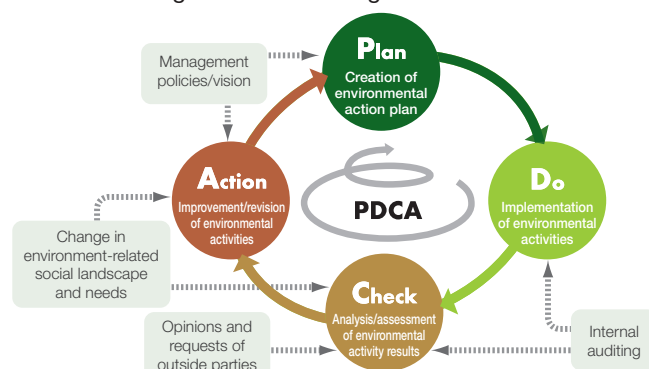


Kyushu Electric Power Group Environmental Action Plan

Every fiscal year we draw together the various initiatives undertaken by the Kyushu Electric Power and its group companies to create a Kyushu Electric Power Group Environmental Action Plan. This plan is based on the Kyushu Electric Power Group Environmental Charter and is comprised of "Environmental Action Policies," "Environmental Targets" and specific "Environmental Action Planning" tailored to that year, and its aim is to promote the steady implementation of environmental management.

The Kyushu Electric Power Group performs PDCA cycle-based analysis, assessment and revision of its environmental activities regularly in order to improve and enhance their content on an ongoing basis.

<< Environmental Management PDCA Diagram >>



[Overall Structure]



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Environmental Action Policies

These are the fundamental, medium-to-longterm policies governing the individual environmental activities which we carry out, and they are built on five basic pillars. Based on these policies, and with full consideration given to biodiversity, we undertake environmental activities which contribute to realize a sustainable society.

	Initiatives	
	Kyushu Electric Power Company	Group Companies
1 Initiatives to Address Global Environmental Issues	<ul style="list-style-type: none"> • Appropriate handling of global warming prevention measures and policies • Reduction of greenhouse gas emissions on both the electrical supply and usage sides • Energy and resource conservation activities • Contribution to international global warming mitigation measures 	<ul style="list-style-type: none"> • Steady efforts to control greenhouse gas emissions • Ozone layer protection
2 Initiatives to Establish a Recycling-Oriented Society	<ul style="list-style-type: none"> • Expansion of waste-related zero emissions initiatives (thorough 3R implementation) • Promotion of green procurement 	<ul style="list-style-type: none"> • Expansion of waste-related zero emissions initiatives
3 Local Environmental Preservation	<ul style="list-style-type: none"> • Formation of environmentally-conscious facilities • Power plant and substation environmental protection 	<ul style="list-style-type: none"> • Promotion of environmental protection • Forest management
4 Collaborating with Communities	<ul style="list-style-type: none"> • Promoting environmental communication • Providing energy and environment-related education for the next generation 	<ul style="list-style-type: none"> • Promoting environmental communication • Promoting local environmental activities
5 Promoting Environmental Management	<ul style="list-style-type: none"> • Compliance with environmental laws and regulations • Raising employee environmental awareness • Utilization of environmental accounting to improve level of environmental management 	<ul style="list-style-type: none"> • Independent operation of the Environmental Management System (EMS) • Compliance with environmental laws and regulations

Environmental Targets

We have established targets for reducing emissions of CO₂ and other greenhouse gases, for controlling waste production and for reducing other areas of environmental load.

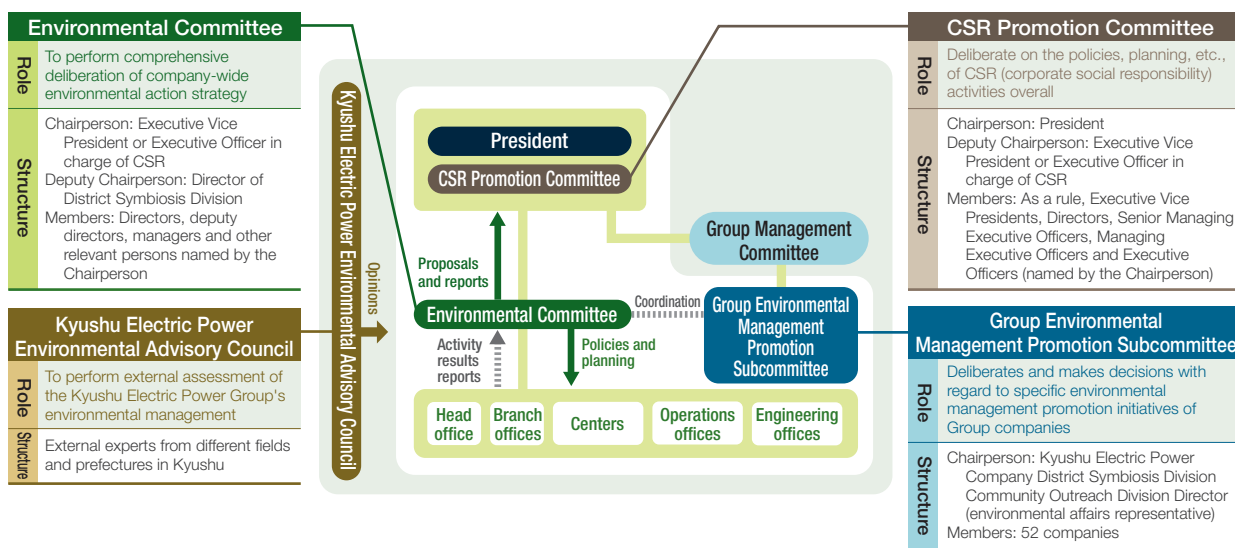
Environmental Action Planning

Based on our Environmental Action Policies, we perform fiscal year-specific environmental action planning and work to achieve the goals created from it.

Implementation System

We have created an implementation system which is linked directly with management, as well as established an assessment system overseen by outside experts.

(as of March 31, 2017)

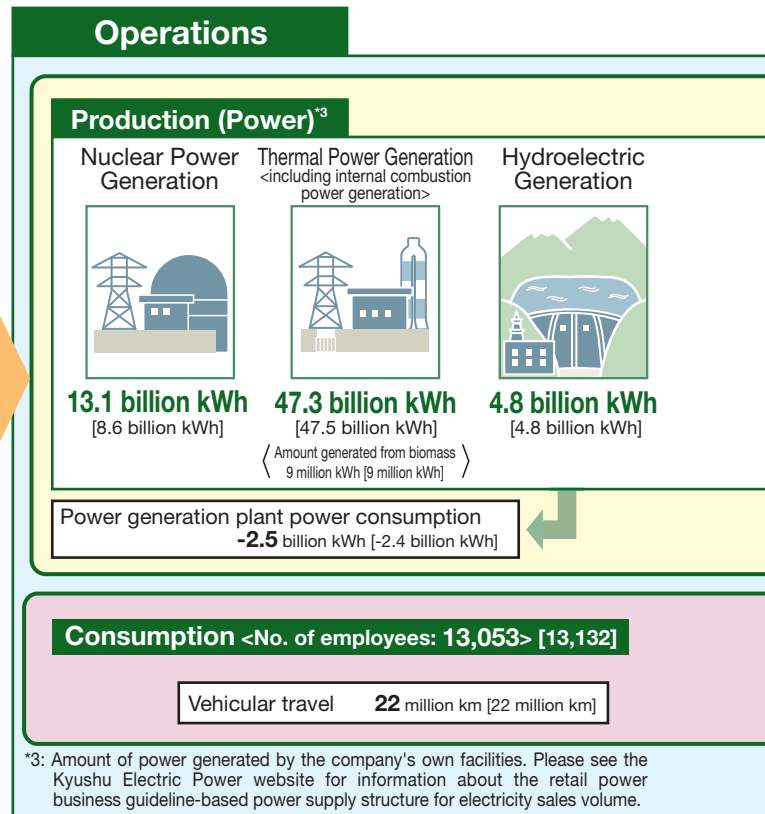




Business Operations and Environmental Load Status (FY2016)

Resource Input			
Power Generation-Related			
Fuel for thermal power generation (including internal combustion power generation)	Coal	6.26 million tons [5.69 million tons]	
	Heavy oil	500,000 kℓ	[1.15 million kℓ]
	Crude oil	140,000 kℓ	[400,000 kℓ]
	LNG	4.05 million tons [3.81 million tons]	
	Diesel	17,000 kℓ	[19,000 kℓ]
	Biomass <woody>	5,000 tons	[5,000 tons]
	Biomass <sewage sludge>	763 tons	[768 tons]
Fuel for nuclear power generation ¹	Nuclear fuel	29 tons	[19 tons]
<small>*1: Uranium and plutonium allowance <converted from calorific value>.</small>			
Water for power generation ²		5.73 million tons [6.05 million tons]	
<small>*2: Does not include seawater used as cooling water</small>			
Materials	Ammonia	9,000 tons	[8,000 tons]
	Limestone	135,000 tons	[125,000 tons]
Other (Office, etc.) Activities			
Fuel for vehicles	Gasoline and diesel	2,000 kℓ	[2,000 kℓ]
Expendable supplies, etc.	Copier paper	509 tons	[511 tons]
	Water consumption	357,000 tons	[316,000 tons]

(Note) Figures within [] are actual values for FY2015.



(Note) Figures within [] are actual values for FY2015. Power amounts may not match up with total values, as they have been rounded to the nearest whole number.

[Calculation of Expected Reductions]

CO₂ Reduction Amount

- Reduction due to power generation and purchasing: Calculated using CO₂ emissions (post-adjustment) per electricity sales volume for Kyushu Electric Power in FY2016 and compared against a baseline which assumes all power is produced via renewable energy (excluding pumping for hydroelectric).
- Facilities efficiency improvement: Calculated using thermal efficiency and power transmission/distribution loss rate for FY2013 as a baseline
- From FY2016, the calculation coefficient for CO₂ emission reduction volume due to nuclear power generation is changed from the thermal power CO₂ emissions coefficient (excluding internal combustion power) to the total power supply average CO₂ emissions coefficient (changed to the calculation approach used by the Federation of Electric Power Companies of Japan)

SF₆ Recovery Amount

Calculated using baseline which assumes SF₆ is not recovered from machinery into which it is injected during inspection and removal.

CO₂ Emissions Reduction from Introduction of Low Pollutant Company Vehicles

Calculated using a baseline which assumes electric vehicles (including plug-in hybrid cars), hybrid vehicles and fuel-efficient vehicles are not introduced.

SO_x Reduction Amount

Calculated using a baseline which assumes no desulfurization is performed and no low sulfur fuels are used at power plants.

NO_x Reduction Amount

Calculated using a baseline which assumes no denitrification is performed at power plants.

*5: For corporate operations, a baseline is used which assumes an environmental load level resulting from the use of no environmental load mitigation measures, and the numerical difference between this and the actual environmental load level is calculated.

*6: Calculated using "CO₂ emissions (post-adjustment) per electricity sales volume for Kyushu Electric Power in FY2016."

*7: The reduction in volume achieved by incinerating, compressing or otherwise disposing of the low-level radioactive waste generated is converted into an equivalent number of 200 ℓ drums.

Environmental Load Reduction

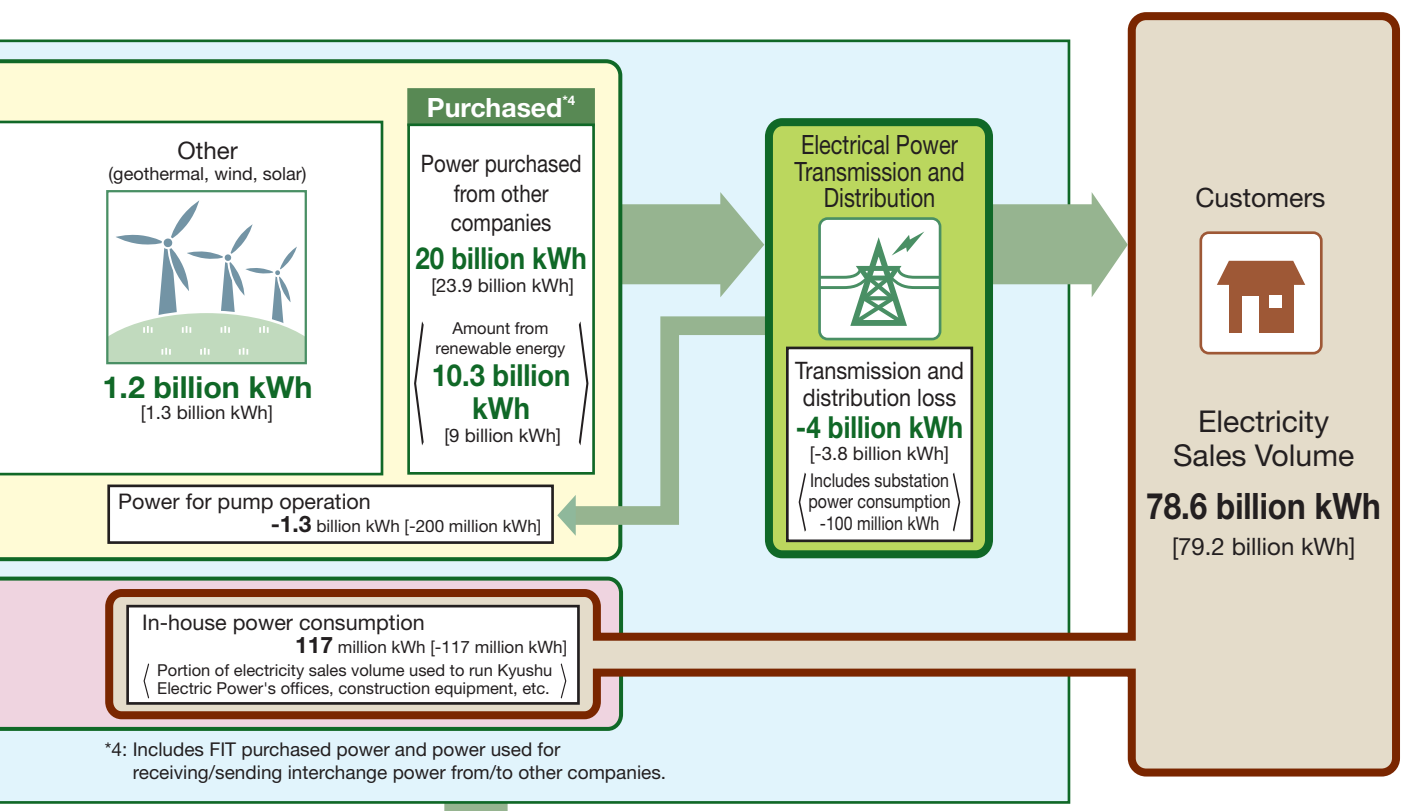
Assumed Reduction Amount^{*5}

CO ₂ emissions reduction	14.4 million tons - CO₂ [13.5 million tons - CO ₂]
[For ref.] FY2015 CO ₂ emissions reductions calculated using the total power supply average CO ₂ emissions coefficient	[12.6 million tons - CO ₂]
(due to nuclear power generation, renewable energy use, thermal power plant heat efficiency improvement, etc.)	
SF ₆ recovery amount	240,000 tons - CO₂ [280,000 tons - CO ₂]
CO ₂ emissions reduction from introduction of low pollutant company vehicles	671 tons - CO₂ [500 tons - CO ₂]
SO _x reduction amount	57,000 tons [61,000 tons]
NO _x reduction amount	24,000 tons [24,000 tons]

Actual Reduction Amount

Recycled industrial waste	938,000 tons [847,000 tons]
	<small>(Recycling rate approx. 100%) (Recycling rate approx. 100%)</small>
Low-level radioactive waste reduction ^{*7} (200 ℓ drum equivalent)	5,115 drums [3,447 drums]
Recycled paper (in addition to copier paper, includes newspapers, magazines, cardboard, confidential documents, etc.)	1,104 tons [1,136 tons]
	<small>(Recycling rate of 100%) (recycling rate approx. 100%)</small>
Recycled water/rainwater utilization	40,000 tons [39,000 tons]

(Note) Figures within [] are actual values for FY2015.



Environmental Load		
Power Generation-Related		
Greenhouse gas reductions	CO₂ 37.5 million tons - CO ₂ [41.8 million tons - CO ₂] (* includes 57,000 tons* from in-house power consumption * includes portion due to purchasing power from other companies)	
	SF₆ 47,000 tons - CO ₂ [35,000 tons - CO ₂]	
	N₂O 60,000 tons - CO ₂ [53,000 tons - CO ₂]	
	HFC 1,100 tons - CO ₂ [1,800 tons - CO ₂]	
Ozone-depleting substance emissions ⁸	0.06 ODP tons	[0.06 ODP tons]
Air pollutant emissions ⁹	SOx 16,000 tons [20,000 tons]	
	NOx 24,000 tons [27,000 tons]	
Discharged water load ¹⁰	92 tons	[127 tons]
COD emissions ¹¹	6 tons	[6 tons]
Industrial waste landfill disposal (excluding coal ash for effective utilization)	2,000 tons	[4,000 tons]
Low-level radioactive waste generation ¹² (200 ℓ drum equivalent)	1,621 drums	[1,968 drums]
Other (Office, etc.) Activities		
Vehicular CO ₂ emissions	5,000 tons - CO ₂	[5,000 tons - CO ₂]
Waste paper disposal	0 tons	[0 tons]
Water supply usage	317,000 tons	[278,000 tons]

(Note) Figures within [] are actual values for FY2015.

- *8: The individual fluorocarbon ozone depletion coefficients were used to convert into the equivalent CFC-11 weight.
- *9: "Total exhaust gas × concentration in exhaust gas" for each thermal power plant (including internal combustion power) was converted into a weight value and combined for the total value.
- *10: Concentrations and discharged water volumes were used to calculate the load for each water pollutant contained in the discharged water treated by the discharged water treatment equipment at thermal (including geothermal) and nuclear power generation plants, and these loads were multiplied by Kyushu Electric Power's own weighting coefficients, converted into COD (chemical oxygen demand) weight equivalents and totaled.
- *11: Total for COD (chemical oxygen demand) contained in discharged water treated by the discharged water treatment equipment at thermal (including geothermal) and nuclear power generation plants.
- *12: This is the 200 ℓ drum equivalent for the net amount found by subtracting the reduction amount (*) from the actual amount produced.



Environmental Targets and Results

We set numerical targets for all of our key environmental activities as we continually strive to decrease our environmental load.

Item	Units	Results			FY2016 Target Value		
		FY2014	FY2015	FY2016			
Initiatives to Address Global Environmental Issues	CO ₂ emission volume per electricity sales volume (post-adjustment) ³ [] are actual emission factors	kg-CO ₂ /kWh	0.598 [0.584]	0.528 [0.509]	0.483 [0.462]	<u>Limit as much as possible</u> ⁴	
	(Note) CO ₂ emissions (post-adjustment) ³ [] are actual emission volumes	x10,000 tons-CO ₂	4,860 [4,750]	4,180 [4,030]	3,750 [3,590]		
	Electricity sales volume	x100 million kWh	813	792	777		
	CO ₂ emissions reductions based on the best available technology (BAT) at new thermal power plants, etc. ⁵	x10,000 tons-CO ₂	-	2.6	26.0	<u>Reduce as much as possible</u> ⁵	
	Nuclear power utilization rate	%	0	20.7	31.9	- ⁵	
	Amount of renewable energy facilities installation (total) ⁷	x10,000 kW	-	-	180	400 by 2030 ⁸	
	Transmission end thermal power total heat efficiency (higher calorific value base) [] are lower calorific value base-converted values ⁹	%	39.5 [42.2]	39.6 [42.3]	40.4 [43.3]	- ⁶	
	Transmission and distribution loss rate	%	4.7	4.58	4.81	- ⁶	
	Office power usage	x1 million kWh	55	54	57	54 or less ¹⁰	
	Purchased copier paper	tons	471	511	509	470 or less	
	Water supply usage ¹¹	m ³ /person	25	25	29	24 or less	
	Electric vehicles introduced (total) ¹³	vehicles	169	167	167	approx. 1,000 by end of FY2020	
	General-purpose vehicle fuel consumption rate ¹⁴	km/ℓ	12.7	12.7	12.7	12.0 or more	
	SF ₆ Recovery Rate	During machine maintenance	%	99	99	99	98 or more
		During machine removal	%	99	99	99	99 or more
Recovery implementation rate during machine maintenance for fluorocarbons subject to regulation		%	100	100	100	100	
Initiatives to Establish a Recycling-Oriented Society	Industrial waste recycling rate	%	approx. 100	approx. 100	approx. 100	99 or more	
	Coal ash recycling rate	%	100	100	100	100	
	Non-coal ash recycling rate	%	98	97	99	98 or more	
	External landfill disposal of industrial waste	tons	27	44	148	- ¹⁵	
	Waste paper recycling rate	%	100	100	100	100	
	Green procurement rate ¹⁶	%	98	99	approx. 100	Procure as much as possible ¹⁷	
Local Environmental Preservation	SOx emissions per quantity of thermal power generated ¹⁸	g/kWh	0.36	0.29	0.19	Limit as much as possible ¹⁹	
	NOx emissions per quantity of thermal power generated ¹⁸	g/kWh	0.26	0.24	0.17	Limit as much as possible ¹⁹	
	Dose assessment for public in nuclear power plant vicinity (per year)	millisieverts	under 0.001	under 0.001	under 0.001	under 0.001	
Collaborating with Communities	Energy and Environmental Education	Eco-mother activity frequency ²⁰	times	214	245	253	<u>250 or more</u> ²⁰
		On-demand course frequency ²⁰	times	366	489	479	<u>Implement proactively</u> ²⁰

*1: The degree to which FY2016 targets were met is rated on a three-tier scale: "🟢": achieved, "🟡": mostly achieved (80% or more achieved), "🔴": unachieved (under 80% achieved). Items for which there is no FY2016 target value are delineated with a () to show that they are a comparison with the actual values from FY2015.

*2: Underlined items are revised targets (discussed in "II. Building on the Results of FY2016").

*3: Adjusted in line with CO₂ emissions credits and feed-in tariffs (FIT).

*4: Amongst other activities, we strive to ensure that safety is our chief consideration for nuclear power, that we utilize renewable energy, that we improve the already high efficiency of our thermal power plants, that we undertake appropriate maintenance and management and that we provide energy-saving and reduced-CO₂ services which contribute to a low-carbon society, all for the purpose of achieving the targets which have been set for the electric power industry as a whole (emissions factor of approximately 0.37 kg-CO₂/kWh (usage end) by FY2030).

*5: Among other things, we incorporate the best available technology (BAT) which is economically feasible into our new thermal power plants in order to reduce our environmental load and fully pursue the targets set for the electric power industry as a whole (maximum reduction potential of approximately 7 million tons-CO₂ by 2020 and approximately 11 million tons-CO₂ by 2030).

*6: The outlook for nuclear power is unclear within supply planning, and a wait-and-see stance has been adopted on target setting and announcements.

*7: Amount of facilities introduced by Kyushu Electric Power and its group companies (target results are omitted for FY2014 and FY2015, as this is a new target item established in FY2016).

(Note) CO₂ emissions per electricity sales volume for FY2016, CO₂ emissions volume and electricity sales volume show only results for retail electricity providers; results are not included for isolated islands overseen by general transmission power providers (excluding the Goto Islands, which are handled as part of mainland Nagasaki Prefecture).

Assessment ¹		FY2017 Target ²
-	In the wake of the Great East Japan Earthquake, the Genkai and Sendai Nuclear Power Plants were shut down, and the lost electrical generation was largely made up for through expanded thermal power generation. This resulted in a significant increase in CO ₂ emissions compared with before the earthquake (FY2010). As a result of such factors as the restarting and safe, year-long operation (except for periods of scheduled maintenance) of the Sendai Nuclear Power Plant Reactor #1 and #2, CO ₂ emission for FY2016 declined by approximately 4.3 million tons compared with FY2015. For the future, we are doing our utmost to control CO ₂ emissions by relying on proven, safe nuclear power, developing and incorporating renewable energy, improving the already high efficiency of our thermal power plants, undertaking appropriate facilities maintenance and management, and providing energy-saving and reduced-CO ₂ services contributing to a low-carbon society.	Limit as much as possible ¹⁴
(B)	We have reduced CO ₂ emissions through such initiatives as introducing BAT into Shin-Oita Power Plant No.3x4 and updating the high-efficiency steam turbine at Matsuura Power Plant Unit 1.	Reduce as much as possible ¹⁵
(B)	We have increased the utilization rate to 31.9% by returning Sendai Nuclear Power Plant Reactor #1 and #2 to normal operation for the duration of FY2015.	(wait-and-see stance on target setting and announcements) ¹⁶
(B)	By the end of FY2016, a total of 1.8 million kW was introduced. For the future, we are doing our utmost as a corporate group to develop and introduce renewable energy which can serve as a reliably proven source of electricity.	400 by 2030 ¹⁷
(B)	The drop in operation rate of low heat efficiency oil-fired thermal power plants as a result of the restarting of Sendai Nuclear Power Plant, coupled with such factors as the start of operations for the high-efficiency Shin-Oita Power Plant No.3x4, saw figures improve above FY2015 to 40.4%.	(wait-and-see stance on target setting and announcements) ¹⁸
(B)	Despite a drop in power transmission as a result of lower electricity sales volume, factors such as an increase in transmission and distribution power loss contributed to a greater transmission and distribution loss rate.	(wait-and-see stance on target setting and announcements) ¹⁹
(B)	Despite careful and consistent power-saving measures, such as proper management of air conditioning usage and reduced lighting and elevator installation and usage, increased air conditioning usage due to elevated average temperatures during summer months and other factors cause targets to be missed.	Approx. 54 or less
(B)	Despite increased use of electronic documents to promote paperless operations, greater efforts to cut down on careless copier usage and a concentrated push to use both sides of paper before discarding it, factors such as the re-launch of our push for "all-electric operations" necessitated the purchase of more paper, causing us to miss our target.	470 or less
(B)	Despite concerted efforts to reduce water use, factors such as the increased number of personnel needed for regular inspections at Sendai Nuclear Power Plant Reactor #1 and #2 created an increase in water usage which resulted in our target being missed.	26 or less ²⁰
(B)	The total number of vehicles introduced by the end of FY2016 was 167. From the standpoint of medium-to-longterm global warming mitigation, we are working within what our budget allows to introduce more electric vehicles as company vehicles.	approx. 1,000 by end of FY2020
(B)	Thanks to careful operation and management, such as vehicle fuel efficiency management and "eco-drive" implementation, as well as performing a planned switch to higher fuel efficiency vehicles, we were able to meet our target.	12.0 or more
(B)	Thanks to such factors as the careful use of vacuum-type SF ₆ recovery equipment during inspection and removal, we were able to meet our target.	98 or more
(B)		99 or more
(B)	By carefully performing recovery of fluorocarbons subject to regulation, reducing them to the level required by law (i.e., the pressure required by law during removal), we were able to meet our target.	100
(B)		99 or more
(B)	As a result of our careful implementation of the 3Rs, such as by using raw cement materials which make use of the properties of coal ash, ensuring 100% effective utilization of coal ash into concrete mixtures, and ensuring the thorough recovery and recycling of industrial waste by all members of our corporate group, we were able to meet our targets for each recycling rate. However, the fact that there was an increase in the amount of industrial waste disposed of at external landfills shows us that we still have a target to meet, and we are working to achieve this by improving our 3R efforts aimed at building a recycling-oriented society.	100
(B)		98 or more
(X)		- ²¹
(B)	Thanks to our ongoing efforts to ensure 100% recycling of waste paper, we were able to meet our target.	100
(B)	Our efforts to perform green procurement as much as possible resulted in nearly 100% green procurement.	Procure as much as possible ²²
(B)	As a result of the stable, continuous operation (except during the schedule maintenance period) of Sendai Nuclear Power Plant, power generation by oil-fired thermal power plants declined, resulting in lower SO _x and NO _x results than for FY2015. We will continue to ensure that we comply with the environmental partnership agreements we have concluded with local communities by maintaining and improving heat efficiency to decrease the volume of our emissions.	Limit as much as possible ²³
(B)		Limit as much as possible ²⁴
(B)	Thanks to proper facilities operation and management of radioactive waste, we were able to meet our target.	under 0.001
(B)	Thanks to events involving daycares and other groups throughout Kyushu, we were able to meet our target.	200 or more ²⁵
(B)	By proactively seeking out primary schools, middle schools, etc., around Kyushu, we held almost exactly the same number of courses as FY2015.	Implement proactively

⁸: The Kyushu Electric Power Group aims to develop 4 million kW of renewable energy (current 1.8 million kW + an additional 2.2 million kW) domestically and overseas by 2030, focusing primarily on geothermal and hydroelectric.

⁹: Converted using the Comprehensive Energy Statistics calorific conversion factor, etc.

¹⁰: Ambitious development on past results from the standpoint of thorough energy conservation.

¹¹: Value obtained by dividing water use company-wide by the total number of employees (as of the end of the fiscal year in question).

¹²: Revised due to increase in water use stemming from restarting of Sendai Nuclear Power Plant.

¹³: Includes plug-in hybrids.

¹⁴: Excludes electric vehicles.

¹⁵: No target set due to major fluctuations resulting from size, frequency, etc., of repair work.

¹⁶: From among general-use products (office products, miscellaneous goods, etc.), the purchasing ratio of products conforming to socially-recognized standards is included as a reference value.

¹⁷: Qualitative target which is set in light of the fact that this activity is essentially a permanent practice.

¹⁸: Total value of emissions for each thermal power plant (excluding internal combustion power).

¹⁹: Qualitative target due to major fluctuations resulting from utilization rate of oil-fired thermal power plants.

²⁰: Added in order to motivate and foster greater awareness among employees with regard to energy and environmental education initiatives which are of great interest to customers.

²¹: Target revised in light of action plan for FY2017.



(1) Initiatives to Address Global Environmental Issues

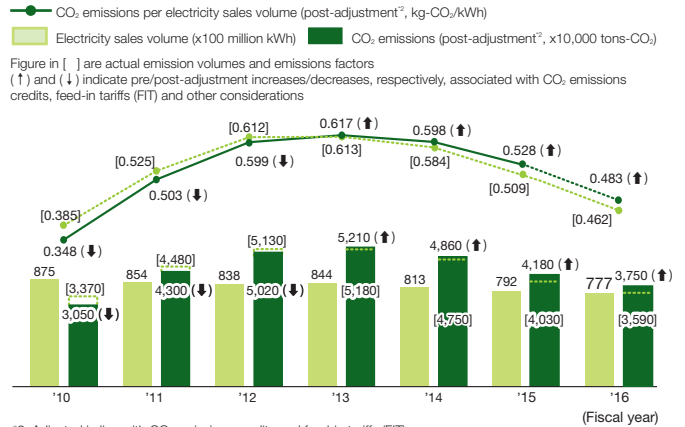
1. Greenhouse Gas Emissions for FY2016

CO₂ Emissions Results

Our CO₂ emissions for FY2016 were 37.5 million tons, with a CO₂ emissions per electricity sales volume of 0.483 kg-CO₂/kWh¹ (CO₂ emissions factor). This shows a reduction of approximately 10% in CO₂ emissions from FY2015 and a reduction of approximately 9% for CO₂ emissions factor. In addition to the stable, continuous operation (except during the schedule maintenance period) of reactors #1 and #2 of the Sendai Nuclear Power Plant, other factors such as lower electricity sales volume and an increase in power generation derived from renewable energy sources are responsible for this decline; however, CO₂ emissions are still high compared with before the Great East Japan Earthquake. Further reductions in CO₂ emissions can be expected when Genkai Nuclear Power Plant Reactors #3 and #4 go back online.

*1: These are provisional values; the national government will officially release finalized values based on the Act on Promotion of Global Warming Countermeasures.

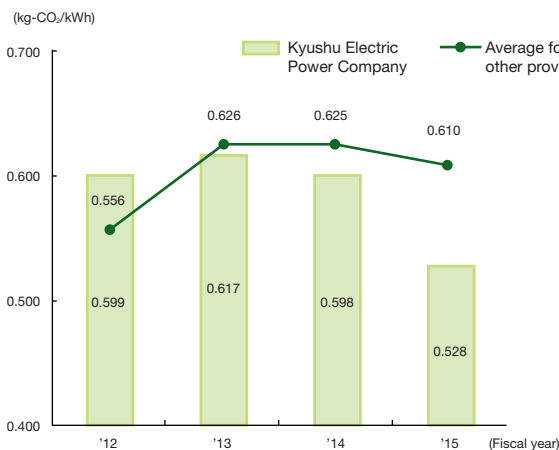
《CO₂ Emissions for Kyushu Electric Power Company》



*2: Adjusted in line with CO₂ emissions credits and feed-in tariffs (FIT).

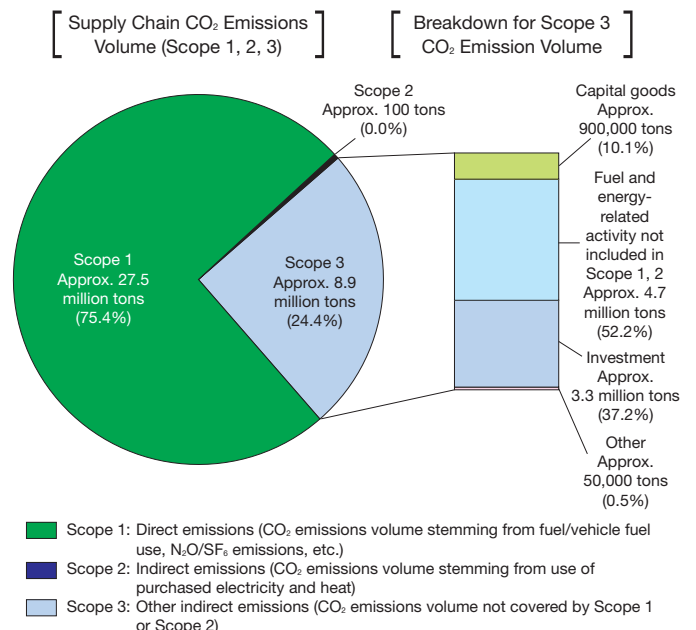
- (Note 1) Calculated according to the "Calculation and Announcement of Actual Emission Factors and Post-adjustment Emission Factors for Each Power Provider" released by the national government in accordance with the Act on Promotion of Global Warming Countermeasures (includes portion due to purchasing power from other companies)
- (Note 2) Due to the fact that FIT-adjusted CO₂ emissions volume increases surpassed reductions from CO₂ emissions credits (no results for FY2016), post-adjustment emission factors from FY2013 to FY2016 surpassed actual emission factors.
- (Note 3) In line with the full-scale liberalization of electrical power retail, the FY2016 results display CO₂ emissions volume per electricity sales volume, CO₂ emissions volume and electricity sales volume for retail electricity providers only (results are not included for isolated islands handled by general transmission power providers (excluding the Goto Islands, which are handled as part of mainland Nagasaki Prefecture)).

《Comparison with Other Providers for CO₂ Emissions》 per Electricity Sales Volume (post-adjustment)



*Average CO₂ emissions volume per electricity sales volume (post-adjustment) of former general power providers (nine companies), excluding Kyushu Electric Power.

《Greenhouse Gas Emissions Volume for the Overall》 Supply Chain



Note) Results are for FY2016. Figures may not match up with total values, as they have been rounded to the nearest whole number.

2. Initiatives Aimed at Electrical Supply

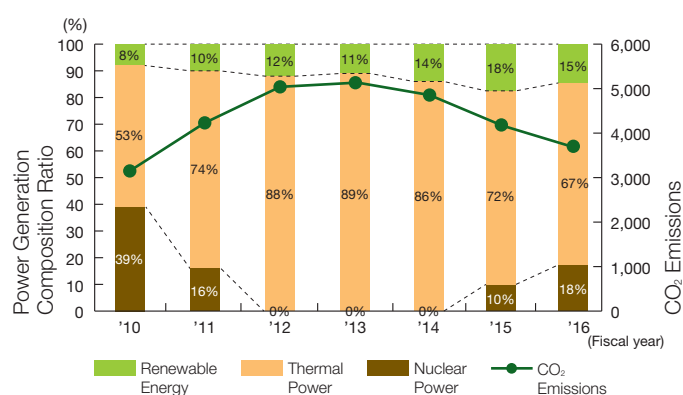
We are working to help realize the low-carbon society by undertaking a variety of initiatives, including pursuing proven and safe nuclear power generation, proactively developing and fully embracing renewable energy options, and working to improve the heat efficiency of our thermal power plants.

Pursuing Proven and Safe Nuclear Power Generation

Our CO₂ emissions volume has risen significantly compared with before the Great East Japan Earthquake (FY2010); however, as a result of such factors as the stable, continuous operation (except for periods of scheduled maintenance) of the Sendai Nuclear Power Plant Reactor #1 and #2 reducing the percentage of overall power generation derived from thermal power generation, CO₂ emissions for FY2016 were approximately 4.3 million tons less than they were in FY2015.

Nuclear power generation is similar to renewable energy in that it produces no CO₂ during power generation; thus, it is an excellent means of mitigating global warming and, from an energy security standpoint, remains an important energy option.

《 Power Generation Composition Ratio* and CO₂ Emissions Volume Change Over Time 》 Units: x10,000 tons-CO₂*



*: Power received from other companies does not include unspecified fuel types. The composition ratio shown here differs from the power source composition ratio for electricity sales volume.

Proactive Development and Full Incorporation of Renewable Energy

We in the Kyushu Electric Power Group are working proactively to develop and fully incorporate renewable energy as part of our operations, recognizing its terrific potential as a source of domestically produced energy which can be effectively utilized, as well as a means of fighting global warming. We are undertaking a variety of renewable energy projects through which we seek to develop 4 million kW of renewable energy (current 1.8 million kW + an additional 2.2 million kW) domestically and overseas by 2030, focusing primarily on geothermal and hydroelectric.

[Tidal Power Demonstration Project]

Kyuden Mirai Energy, the Nagasaki Marine Industry Cluster Promotion Association and two other companies have joined together to create a consortium which has been chosen by the Ministry of the Environment to carry out its Tidal Power Technology Commercial Application Promotion Project in the Strait of Naru-seto near Goto City in Nagasaki Prefecture. The consortium has begun tidal studies in preparation for carrying out demonstration testing of Japan's first commercial-scale, large tidal power project (2,000kW). (Demonstration period: planned for 2016 - 2019)



Tidal power electrical generator

[Basic Specifications]

- Type: Ocean floor installation and open center system
- Output: 2,000 kW
- Diameter: Approx. 16 m
- Height: Approx. 27 m
- Weight: Approx. 1,200 t
- Speed: 10-16 rotations/min.

Approach to Renewable Energy Adoption

We take a well-balanced approach to adopting renewable energy which involves capitalizing on the specific characteristics of each type of energy to incorporate them as fully as possible, but without compromising on the stability of power delivery. This means that we tailor our supply-demand operating policies in response to renewable energy's significant, weather-dependent variations in power output.

[Start of Large Capacity Accumulator System Operation]

We are undertaking a variety of renewable energy adoption initiatives which rely on a well-balanced approach that capitalizes on the specific characteristics of each type of energy to incorporate them as fully as possible, but without compromising on the stability of power delivery.

One such initiative is the establishment in March 2016 of the Buzen Accumulator Substation, which was constructed as part of the national government's project to demonstrate the use of large capacity accumulator systems as a means of better balancing power supply and demand. Demonstration at this substation was conducted to show how accumulators, which charge and discharge depending on the status of solar power generation, can be used to improve the balance between supply and demand, as well as to show how a large capacity accumulator system can be efficiently run. (FY2015 - FY2016)

For the future, we will apply the findings and technology obtained from this demonstration testing to the reduction of output control volume during actual operation.



Aerial view of the Buzen Accumulator Substation

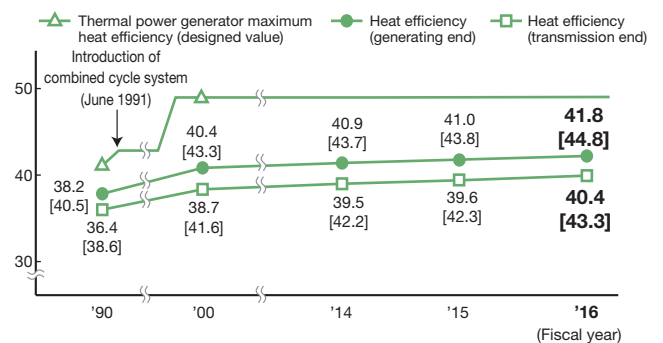
Maintenance and Improvement of Thermal Power Plant Heat Efficiency

We are working to maintain and improve the overall heat efficiency of our thermal power plants in order to better control fuel consumption and CO₂ emissions.

As a result of the continuous, stable operation (excluding periods of scheduled maintenance) of Sendai Nuclear Power Plant causing the operation rate of low heat efficiency oil-fired thermal power plants to drop, coupled with such factors as the start of operations for the high-efficiency Shin-Oita Power Plant No.3×4, results for FY2016 surpassed those for FY2015, reaching 40.4% (transmission end).

Additionally, we are currently constructing Matsuura Power Plant Unit 2 (which is scheduled to start operation in December 2019), and the cutting-edge "ultra-supercritical (USC) pulverized coal combustion" technology it will utilize for power generation will provide improved efficiency while lowering fuel consumption and environmental load.

Thermal Power Total Heat Efficiency (higher calorific value base) Unit: %



(Note) Figures in [] are lower calorific value base-converted values for which Comprehensive Energy Statistics conversion factors, etc., have been used.

Overview of Matsuura Power Plant Unit 2 Development

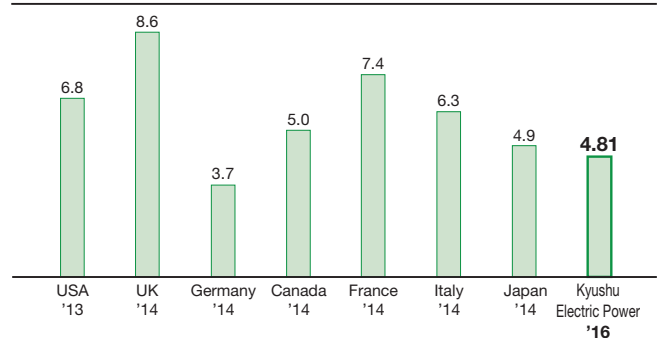
Output	1 million kW	
Power generation method	Ultra-supercritical pulverized coal combustion	
Fuel	Coal	
Thermal efficiency (generating end)	Higher calorific value standard	43% or more
	Lower calorific value standard	45% or more

Reduction of Transmission/Distribution Loss

Efforts to reduce the amount of power lost via transmission and distribution lines (transmission/distribution loss) are not only important to ensure efficient power delivery but also to reduce the amount of fuel used by thermal power plants and the amount of CO₂ which is produced.

As a result of efforts to increase transmission voltage, introduce low-loss transformers and other initiatives, our transmission/distribution loss rate for FY2016 was 4.81%, which is among the best in the world.

Country Comparison for Transmission/Distribution Loss Rates Unit: %



Source: Created based on the Hand Book of Electric Power Industry (2016 ed.).

3. Initiatives Aimed at Electrical Use

We are engaged in the promotion of initiatives aimed at reducing power usage among customers as well as at our offices.

Helping Customers to Conserve Electricity

[Providing Energy-Saving Information]

Through our membership website, "Kirei Life Plus," we provide customers with handy information about how they can save energy. The site offers a variety of fun and easy-to-understand articles, images and videos by experts who share their insights and tips on how to reduce electricity usage in our daily lives.

In addition, users who register as Kirei Life Plus members have access to resources which allow them to objectively check and evaluate their household's energy-saving efforts, such as by comparing average electrical usage among similarly priced power plans and by checking "Energy Conservation Rankings" which let them compare their electrical use with other, similarly-sized households.



Energy Conservation Ranking

[Power Meter Data Notification Service]

We provide a service enabling electrical usage data measured by a smart meter every 30 minutes to be sent to a HEMS (home energy management system) installed in the customer's home. This lets customers check their electricity usage in real-time and then explore more energy-efficient means of saving electricity.

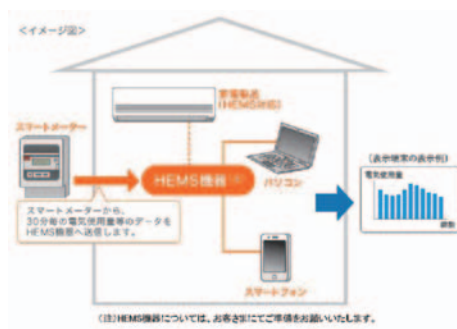


Image of Power Meter Data Notification Service

4. Contribution to International Global Warming Mitigation Measures

[Contributing to CO₂ Emissions Reduction via IPP Project Implementation]

We are helping to control CO₂ emission not only in Japan but also overseas thanks to our involvement in IPP projects centered mainly in Asia, such as the construction of high-efficiency, natural gas thermal power plants in Vietnam and the Philippines and the construction of wind power generation facilities in China.

In March 2017, Sarulla Geothermal Power Plant Unit 1 (106,000 kW), which represents one of the largest geothermal IPP projects in the world, went online. When Unit 2 (scheduled to start operation in 2017) and Unit 3 (scheduled to start operation in 2018), which are currently being built, also go online, the total power output for the plant is expected to be approximately 320,000 kW.



Aerial view of Sarulla Geothermal Power Plant Unit 1

[Reducing CO₂ Emissions via IPP Projects]

The contribution to CO₂ emissions reduction for FY2014 as a result of high-efficiency thermal power plant and wind power plant operations overseas (six countries, seven projects^{*1}: equity ownership in output of 1.5 million kW) is estimated at approximately 380,000 tons^{*2}. This is roughly equivalent to 0.8% of Kyushu Electric Power's domestic CO₂ emissions volume.

*1: IPP projects: six projects / General power providers: one project

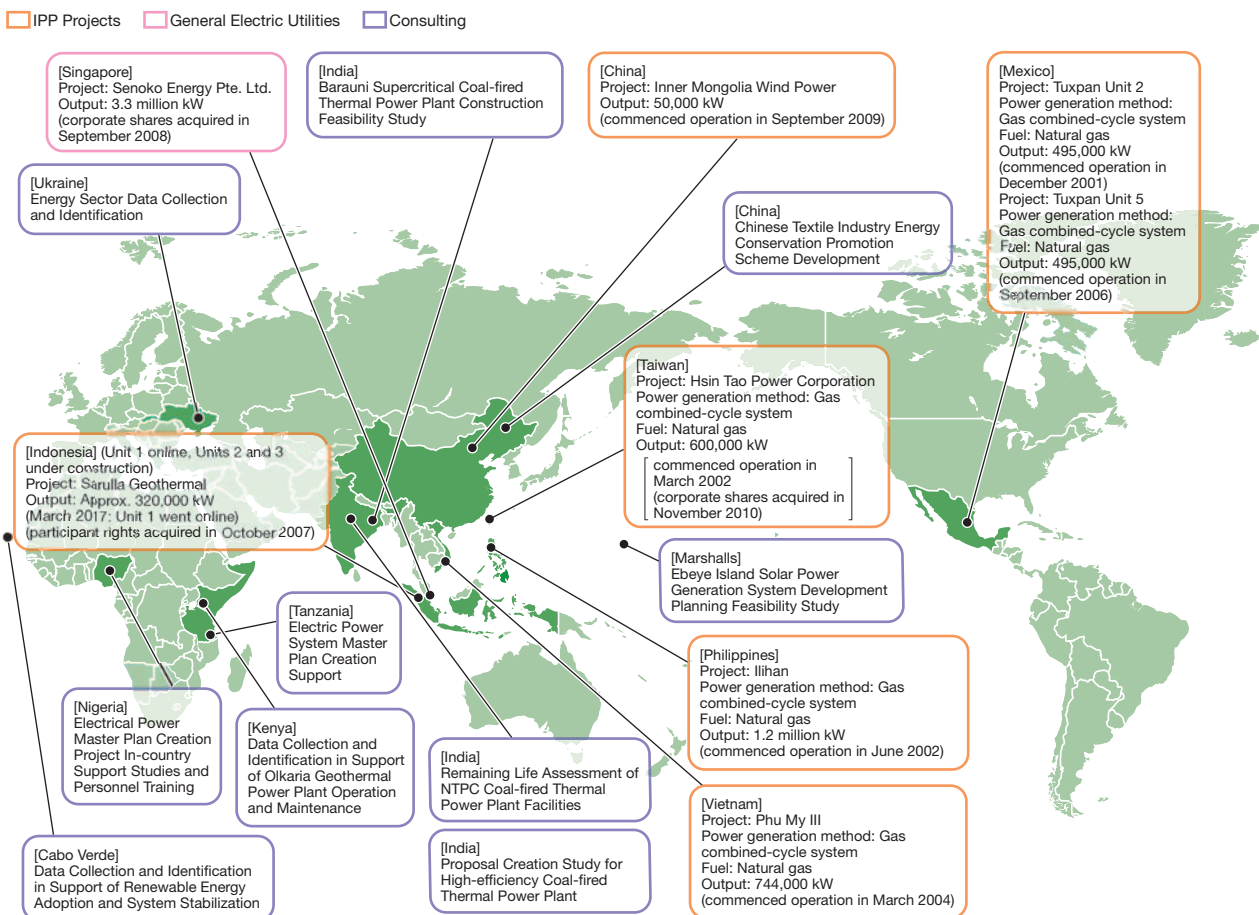
*2: CO₂ emissions factors for the countries in question were calculated using values obtained from the "CO₂ EMISSIONS FROM FUEL COMBUSTION 2016 EDITION (IEA)" (because the latest data is from 2014, calculation was performed using figures for 2014).

[Utilizing Kyushu Electric Power Group Technology and Expertise for Overseas Consulting]

We are actively involved in overseas consulting on basic energy plans, on energy generation, transmission and conservation and on environmental initiatives which put to use the technology and expertise that we as a group have cultivated in the course of our domestic and international electrical power operations, helping other countries to improve the stability, eco-friendliness and human resources infrastructure of their power generation industries.

In FY2016, we performed a study in support of the installation of a solar power generation system on Ebeye Island, part of the Marshall Islands located in the western central Pacific Ocean, as well as performed a study in relation to the operation of a geothermal power plant in Kenya.

Overseas Project Implementation (FY2016)





(2) Initiatives to Establish a Recycling-Oriented Society

1. Expanding Waste-Related Zero Emissions Initiatives

In addition to performing appropriate waste management and disposal, since 2001 we have undertaken waste-related zero emissions activities which promote the 3Rs (reduce, reuse and recycle), with the aim of helping build a more recycling-oriented society.

Industrial Waste Management and Disposal

The main types of industrial waste that we produce are byproducts (coal ash and gypsum) from thermal power plant operations and construction-related waste materials. We are careful to appropriately manage and dispose of this industrial waste, as well as to implement 3R measures which will reduce the amount of it that we produce, reuse as much of it as we can, and recycle what we cannot reuse.

《Industrial Waste Production Amounts and Recycling Rates (FY2016)》

	Amount produced (tons)	Amount recycled (tons)	Recycling rate (%)	Main recycling uses	
Coal ash	766,274	766,274	100	Cement materials Concrete mixtures	
Other industrial waste	Heavy crude oil ash	365	365	100	Vanadium recovery
	Gypsum	106,733	106,733	100	Cement materials
	Sludge	4,212	1,866	44	Cement materials
	Waste oil	2,749	2,701	98	Reuse in fuel oil
	Waste plastic	542	481	89	Combustion aid materials
	Scrap metal	46,816	46,765	Approx. 100	Metallic materials
	Waste concrete poles	12,474	12,474	100	Subbase, construction aggregate
	Glass, ceramic waste	169	166	98	Glass product materials
	Industrial waste requiring special treatment*	369	312	85	Cement materials
	Other	128	75	59	Combustion aid materials
Subtotal	174,557	171,938	99		
Total Industrial Waste	940,831	938,212	Approx. 100		

(Note) Individual values may not match up with total values, as they have been rounded to the nearest whole number.

*: Sludge, asbestos, waste oil, waste alkali and waste acid designated as industrial waste requiring special treatment, according to the Waste Management and Public Cleansing Act, due to the risk they pose to human health and living environments.

《Efforts to Reduce Waste》

At our power generation sites, we undertake careful maintenance risk management of the power generation facilities, and we use this as the basis for creating and implementing appropriate construction planning that reduces the amount of waste we produce.

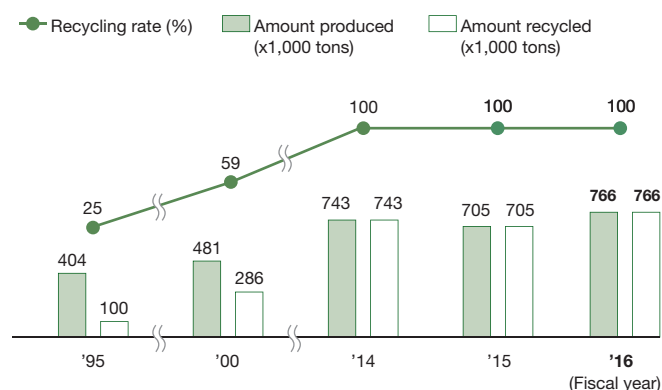
《Efforts to Reuse Waste》

Whenever power generation equipment and materials are removed during power distribution construction or other work, we appropriately assess whether or not their performance and quality meets the required threshold for reuse and, if they do, we reuse them.

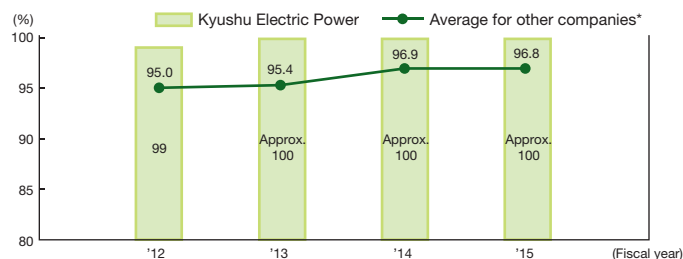
《Efforts to Recycle Waste》

In FY2016, we recycled nearly 100% of the roughly 940,000 tons of industrial waste that we produced. And with regard to coal ash, which constitutes the majority of our industrial waste, we are able to recycle 100% of it by putting it to effective use in such application as creating cement materials which utilize its distinctive properties.

《Coal Ash Production Amount and Recycling Rate》



《Waste Recycling Rate Comparison with Other Companies》



*: Average waste recycling rate of former general power providers (nine companies), excluding Kyushu Electric Power.

General Waste Management and Disposal

The main types of general waste that we produce are office byproducts, such as waste paper, shells from power plants and dam driftwood. We are careful to appropriately manage and dispose of this general waste, as well as to implement 3R measures.

《Waste paper and Other General Waste Production Amounts and Recycling Rates (FY2016)》

	Amount produced (tons)	Amount recycled (tons)	Recycling rate (%)	Main recycling uses
Waste paper	1,104	1,104	100	Recycled paper
Shells	17	2	9	Subbase
Dam driftwood	2,825	2,825	100	Substitute for straw litter



(3) Local Environmental Preservation

1. Environmentally-Conscious Facilities Creation

When we create power generation facilities, we conduct appropriate environmental assessments suited to the characteristics of the facilities and local environment as part of our commitment to being environmentally-conscious and integrating our facilities into the surrounding environment.

Performing Environmental Impact Assessments

When we construct power plants and other facilities, we first conduct environmental impact assessments and other surveys of the natural environment (air, water quality, flora and fauna), in line with the Environmental Impact Assessment Act and other relevant legislation, in order to predict what effects the facilities and their operation will have on the surrounding environment, and we then use these results to take appropriate steps to mitigate these effects.

[Environmental Assessment in Otake Power Plant Renewal Planning]

The aging of the Otake Power Plant (Kokonoe Town, Kusu District, Oita Prefecture), Japan's first commercial geothermal power plant, prompted planning to be undertaken to renew and upgrade the facilities (from 12,500 kW to 14,500 kW output). As part of this, environmental impact assessment procedures in line with the Environmental Impact Assessment Act and other relevant legislation were begun in 2013 and were finished up in July 2016. The plant life survey revealed the presence of globe thistle, Aso yarrow and other rare plants within the power plant construction area, and after discussion with an expert, appropriate environmental protection measures will be devised, including relocating the plants prior to the start of construction.



Conceptual drawing



Globe thistle



Aso yarrow

2. Power Plants that Protect the Environment

Preventing Air, Water and Noise Pollution

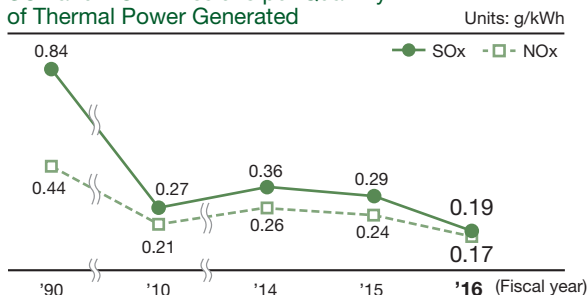
When we operate our power plants and other facilities, we not only ensure that we comply with national laws and regulations but also the environmental protection agreements that we make with local government stakeholders. We perform strict management of exhaust gas, drainage and other emissions that affect the local environment, and this includes reporting our monitoring results to local government stakeholders.

[Tackling Air Pollution]

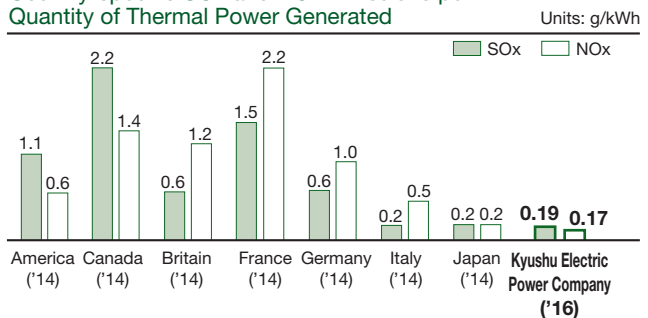
Electricity generation at thermal power plants entails the emission of sulfur oxide (SOx), nitrogen oxide (NOx) and other gases; however, we utilize flue gas desulfurization systems, flue gas denitrification systems and other systems to remove these harmful gases as completely as possible in order to prevent polluting the air.

In FY2016, our SOx and NOx emissions per quantity of thermal power generated were 0.19 g/kWh and 0.17 g/kWh respectively, and both of these figures represents a reduction from FY2015. These reductions are due to a decrease in the amount of electricity generated via oil-fired power plants, and this was thanks to such factors as the stable, year-round operation (except during schedule maintenance) of Sendai Nuclear Power Plant.

SOx and NOx Emissions per Quantity of Thermal Power Generated



Country-specific SOx and NOx Emissions per Quantity of Thermal Power Generated



Source: [Overseas] (Emissions volumes) OECD, OECD. StatExtracts (Environment, Air and Climate) (Power generation amounts) IEA, ENERGY BALANCES OF OECD COUNTRIES 2016 EDITION [Japan] Research conducted by the Federation of Electric Power Companies of Japan (ten power companies + Electric Power Development Co., Ltd.)



(4) Collaborating with Communities

1. Environmental Preservation Activities in the Kuju Bogatsuru Marshlands

Kuju Bogatsuru Marshland Environmental Preservation Activities

The Kuju Bogatsuru Marshlands are located in western Oita Prefecture and contain approximately 53 ha of high-altitude marshlands surrounded by the Kuju Mountains. Reflective of the varied topography and terrain, the ecosystem is home to rare flora and fauna for which it was registered in 2005 within the Ramsar Convention, an agreement which seeks to protect globally important wetlands.

In order to protect the Kuju Bogatsuru Marshlands and the rare plants found in and around it, Kyushu Electric Power joined with the Ministry of the Environment, the Taketa City government, the "Kuju Nature Preservation Society" and other members of local communities in 2000 to recommence long-neglected controlled burning activities. At present, our activities are primarily administered by the Kyuden Mirai Foundation (established in May 2016), which oversees not only the controlled burning activities but various other environmental preservation activities, such as invasive species eradication and Kyushu azalea conservation on adjacent Mt. Hijiidake (on land owned by the Kyushu Electric Power).

[Controlled Burning Activities]

We carry out controlled burning which maintains the marshland environment by removing shrub and weed overgrowth and promoting new budding plants.

Every year between August and September, we perform perimeter clearing and burning around the main controlled burning area in order to prevent the controlled burn from spreading beyond its intended area, and then in March of the following year, we carry out the main controlled burn within the marshlands.

In FY2016, a group of 414 volunteers made up of people from the local community, Kyushu Electric Power Group employees, their families and others took part in the controlled burning activities.



Perimeter clearing



Main burning (controlled burning)

[Activity Expansion Efforts]

In anticipation of a potential shortage of controlled burning leaders in the future, the Kyuden Mirai Foundation began a controlled burning leadership training course in FY2016 which is aimed at Kyushu Electric Power Group employees. This course is comprised of practical training in such skills as grass cutter operation and classroom lectures about the activity history, safety instruction and the like. In the first year, approximately 30 Kyushu Electric Power Group employees took the course.



Practical instruction



Safety course instruction

[Kyushu Azalea Conservation and Mountain Trail Improvement Activities]

We clear away trees and plants (such as panicked hydrangea) which hinder the growth of the Kyushu azalea (a near-threatened species in Oita Prefecture) and perform other activities aimed at protecting biodiversity.

We also maintain and improve mountain trails so that mountain wildflowers do not get trampled underfoot.

The activity held on November 3, 2016 was carried out with the help of 73 volunteers, including current and former Kyushu Electric Power employees.



Clearing obstructing trees



Mountain trail improvement

2. Environmental Month Initiatives

June has been designated "Environmental Month," and every year a variety of environmental activities are carried out nationwide over the course of the month. We, too, host environmental communication events, and in FY2016 we undertook a variety of community-based activities throughout Kyushu, including promoting environmental education amongst the next generation under the slogan of "Kyuden Environmental Month Eco-Challenge 2016 - Spread the Word! Our Commitment in Our Communities."

[Environmental Education for the Next Generation]

We carried out a range of the next generation-focused environmental education activities aimed at local kindergartners, elementary and junior high school children. Among the various activities were environmental and energy-related on-demand courses, sweet potato harvesting (and planting) and sweetfish fry (juvenile fish) release activities at 22 offices around Kyushu.



Kindergartners and daycare children plant sweet potatoes (Shin-Oita Power Plant)



Juvenile fish release activity (Mimi River Hydro-Power Development Office)



My Environmental Action

"Sweet Potato Harvest Experience"

Hiyoko-no-Kuni Land Daycare
Principal

Hitomi Sasaki



At our daycare we understand how essential it is that children have a zest for life, and we pursue activities that will impart it to them. Two of our annual activities, that we do with the help of Kyushu Electric Power, are sweet potato planting and harvesting, the latter of which is done by parents and children together. The children love being out under a blue sky in the open field, experiencing its colors, smells and textures as they pull sweet potatoes from the dirt, exclaiming, "Look! Look! I got a potato!" And the joy they feel as they open their dirt-black hands, beaming proudly, is shared equally by their parents and all the other adults.

Their harvesting experience gives them a sense of the significance of the grace they say before their meals. It makes them that much more grateful for the food they eat and for the work done to prepare it. And it gives them a deeper appreciation of the value of life.

I hope we can continue these activities so that, through them, we can continue to teach our children about the importance of nature and the value of life.





(5) Promoting Environmental Management

1. Status of Compliance with Environmental Laws and Regulations

In FY2016 no recommendations or orders for improvement were received, nor any penalties applied, which are based on any environmentally-related law or regulation.

2. Raising Employee Environmental Awareness

We take a proactive approach to raising the environmental awareness of each and every employee by implementing such activities as environmentally-related training and environmental education courses run by in-house and external instructors.

[Training and Lectures Aimed at Environmental Affairs Representatives]

We carry out general environmental affairs-related in-house training, such as providing instruction in knowledge essential to environmental management promotion and compliance, which is aimed at the environmental affairs representatives in our Group offices. In FY2016, we conducted eight training sessions for new environmental affairs representatives, and total attendance was 97 people. Employees also actively participate in outside environmentally-related training and lectures, with a total of 216 employees from 23 offices attending such events in FY2016. Further, in-house and external instructors ran courses aimed at employees in 13 offices during Environmental Month, and these were attended by a total of 493 employees.



Environmental lecture conducted by an outside instructor (Kanoya Customer Service Office)

[Cultivating Environmental Experts]

We support employees who are seeking to obtain environmentally-related qualifications, such as for becoming an energy manager or pollution control manager.