FY2017 Environmental Activity Results

Environmental Targets and Results of Kyushu Electric Power (Summary)

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

The specific plans are posted as the Kyuden Group Environmental Action Plan on our website.

Note: t = metric ton (tonne)

	Item		Units	Results			FY2017 Target Value*2
				FY2015	FY2016	FY2017	
Initiatives to Address Global Environmental Issues	CO_2 emission volume per electricity sales volume (post-adjustment)*3 [ ] are basic emission factors		kg-CO_2/kWh	0.528 [0.509]	0.483 [0.462]	**0.463 [0.438]**	Limit as much as possible*4
	(Note)	CO_2 emissions (post-adjustment)*3 [ ] are basic emission volumes	10,000 t-CO_2	4,180 [4,030]	3,750 [3,590]	**3,510 [3,320]**	
		Electricity sales volume	100 million kWh	792	777	**758**	
	CO_2 emissions reductions based on the best available technology (BAT) at new thermal power plants, etc.*5		10,000 t-CO_2	2.6	26.0	**30.4**	Reduce as much as possible*5
	Nuclear power utilization rate		%	20.7	31.9	**36.7**	(wait-and-see stance on target setting and announcements)*6
	Amount of renewable energy facilities installation (total) *7		10,000 kW	–	180	**196**	400 by 2030*8
	Transmission end thermal power total heat efficiency (higher calorific value base) [ ] are lower calorific value base-converted values*9		%	39.6 [42.3]	40.4 [43.3]	**40.4 [43.3]**	(wait-and-see stance on target setting and announcements)*6
	Transmission and distribution loss rate		%	4.58	4.81	**4.24**	(wait-and-see stance on target setting and announcements)*6
	Office power usage		1 million kWh	54	57	**60**	About 54 or less
	Purchased copier paper		t	511	509	**557**	470 or less
	Water supply usage*10		m^3/person	25	29	**31**	26 or less*11
	Electric vehicles introduced (total)*12		vehicles	167	167	**166**	approx. 1,000 by end of FY2020
	General-purpose vehicle fuel consumption rate*13		km/ℓ	12.7	12.7	**12.6**	12.0 or more
	SF_6 recovery rate	During machine maintenance	%	99	99	**98**	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 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	%	97	99	**98**	98 or more
	External landfill disposal of industrial waste		t	44	148	**243**	—*14
	Waste paper recycling rate		%	100	100	**100**	100
	Green procurement rate*15		%	99	approx. 100	**approx. 100**	Procure as much as possible*16
Local Environmental Preservation	SO_x emissions per quantity of thermal power generated*17		g/kWh	0.29	0.19	**0.19**	Limit as much as possible*18
	NO_x emissions per quantity of thermal power generated*17		g/kWh	0.24	0.17	**0.18**	Limit as much as possible*18
	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/environmental education	Eco-mother activity frequency	times	245	253	**200**	200 or more*19
		On-demand course frequency	times	489	479	**529**	Implement proactively
		Kyuden Play Forest frequency*20	times	–	8	**13**	12 times or more
		Environmental education in Kuju Kyuden Forest*20	times	–	19	**24**	20 times or more

*1 The degree to which FY2017 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 FY2017 target value are delineated with a ( ) to show that they are a comparison with the actual values from FY2016.

*2 Underlined items are revised targets.

*3 Adjusted in line with CO_2 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-CO_2 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 of CO_2 per kWh (usage end) by FY2030).

*5 Among other things, we incorporate the best available technology (BAT) that 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 metric tons of CO_2 by 2020 and approximately 11 million metric tons of CO_2 by 2030).

(Note) CO_2 emissions per electricity sales volume for FY2016, CO_2 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).

Specific initiatives for each item are described in the following pages (including environmental data), but items likely to be of particular interest to stakeholders are also listed in the “Highlights” section.

	Assessment*1	Related Pages
—	As a result of such factors as the restarting and safe operation (except for scheduled maintenance) of the Sendai Nuclear Power Station Units 1 and 2; and the decrease in the proportion of total power generation made up by thermal power thanks to increased use of renewables, the CO_2 emissions results for FY2017 were 2.4 million metric tons less than FY2016.	17 I 18
(○)	We have reduced CO_2 emissions through such initiatives as introducing the best available technology into Shin-Oita Power Station Unit 3x4; updating the high-efficiency steam turbine at Matsuura Power Station Unit. 1; and updating the gas turbines at Shin-Oita Power Station Unit. 1.	29
(○)	The utilization rate was increased to 36.7% due to the return to normal operation of Sendai Nuclear Power Station Units 1 and 2 in 2015, and the resumption of power generation at the Genkai Nuclear Power Station Unit 3 in 2018.	18
(△)	By the end of FY2017, renewable energy sources totaling 1.96 million kW had been introduced. For the future, we will do our utmost as a corporate group to develop and introduce renewable energy which can serve as a proven source of electricity.	19
(○)	Heat efficiency was on a par with FY2016 due to factors such as the stable operation (except for scheduled maintenance) of Sendai Nuclear Power Station Units 1 and 2, resumption of power generation at Genkai Nuclear Power Station Unit 3, and a drop in the operation rate of low heat-efficiency, oil-fired thermal power stations.	29
(△)	Due to a drop in power transmission as a result of lower electricity sales volume, factors such as a decrease in transmission and distribution power loss contributed to a decreased transmission and distribution loss rate.	29
△	Despite careful and consistent energy-saving measures, such as proper management of air conditioning usage, reduced lighting and elevator installation and usage; increased air conditioning usage due to elevated average summer temperatures and other factors caused targets to be missed.	–
△	The target was missed despite increased use of electronic documents to promote paperless operations, greater efforts to cut down on unnecessary copier usage and a concentrated push to use both sides of paper before discarding.	–
△	Despite concerted efforts to reduce water use, there was a reduction in greywater supplied to the main building from the Denki Building Kyosokan, and an increase in tap water usage in the main building, due to an increase in tenants moving into the Denki Building Kyosokan. As a result, the target was missed.	–
(△)	The total number of electric vehicles introduced by the end of FY2017 was 166. From the standpoint of medium-to-long-term global warming mitigation, we are working within our budget to introduce more electric vehicles as company vehicles.	–
○	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.	–
○	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.	50
○		
○	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.	50
○	As a result of efforts such as effectively using 100% of coal ash in cement materials and concrete mixtures that exploit its characteristics, and thorough recovery and recycling of industrial waste through company-wide joint recovery efforts, we were able to meet our targets for each recycling rate. However, there was an increase in the amount of industrial waste disposed of at external landfills, and therefore we will continue working hard to always put the 3Rs into practice.	33 I 34
○		
○		
(×)		–
○	Thanks to our ongoing efforts to ensure 100% recycling of waste paper, we were able to meet our target.	34
(○)	Our efforts to perform green procurement as much as possible resulted in roughly 100% green procurement.	–
(○)	As a result of the stable, continuous operation (except scheduled maintenance) of Sendai Nuclear Power Station throughout the year, power generation by oil-fired thermal power plants declined, resulting in SO_x and NO_x results approximately the same as FY2016.	35
(○)		
○	Thanks to proper facilities operation and management of radioactive waste, we were able to meet our target.	–
○	Thanks to events involving daycares and other groups throughout Kyushu, we were able to meet our target.	43
(○)	By proactively seeking out primary schools, junior high schools, etc., around Kyushu, we held more courses than in FY2016.	42
○	The target was achieved by increasing the frequency of these events, and holding them in forests throughout Kyushu.	43
○	The target was met due to proactive efforts led by the Kyuden Mirai Foundation.	42

*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 FY2015, as this is a new target item established in FY2016).
*8 The Kyuden Group aims to develop 4 million kW of renewable energy (current 1.96 million kW + an additional 2.04 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 Value obtained by dividing water use company-wide by the total number of employees (as of the end of the fiscal year in question).
*11 Revised due to increase in water use stemming from restarting of Sendai Nuclear Power Station.
*12 Includes plug-in hybrids.
*13 Excludes electric vehicles.
*14 No target set due to major fluctuations resulting from size, frequency, etc., of repair work.
*15 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.
*16 Qualitative target which is set in light of the fact that this activity is essentially a permanent practice.
*17 Total value of emissions for each thermal power plant (excluding internal combustion power).
*18 Qualitative target due to major fluctuations resulting from utilization rate of oil-fired thermal power plants.
*19 Target revised in light of action plan for FY2017.
*20 Set new targets for initiatives relating to energy and environmental education for the next generation.

1 Initiatives to Address Global Environmental Issues

At Kyushu Electric Power, we pursue a range of initiatives aimed at both reducing greenhouse gas emissions in the supply and use of electricity. On the supply side, these include both making use of nuclear power (with safety as our chief consideration) and the proactive development and adoption of renewable energy, as well as ongoing efforts to improve efficiencies of thermal power generation and reduce losses in the transmission and distribution processes. On the use side, initiatives include cutting back on electricity use in offices and the use of systems like EcoDrive, which promote efficient use of energy and resources.

The Kyuden Group is determined to meet the goals of our electricity business as a whole through an array of actions set forth in our Action Plan for Achieving a Low-carbon Society through the electricity business. These include using nuclear power—again, with a heavy focus on safety—and renewable energy, improving the efficiency of thermal power generation, appropriate maintenance and management, and offering services aimed at reducing use of carbon resources, such as those that promote energy efficiency and CO_2 efficiency.

Reducing CO_2 Emissions

FY2017 Results

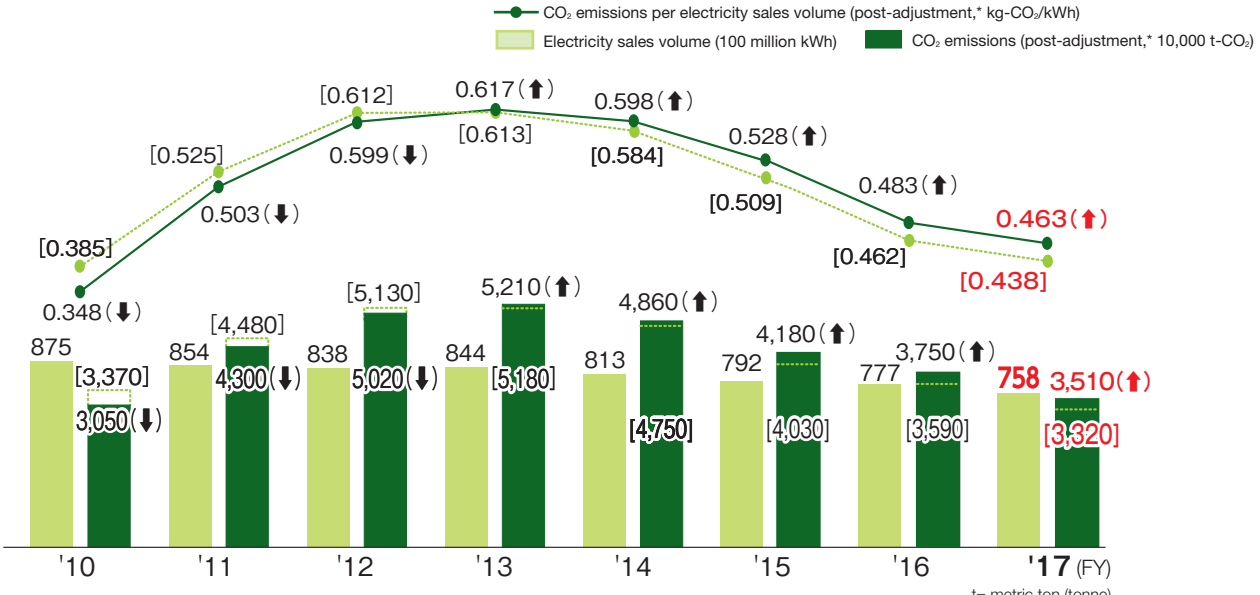
CO_2 emissions were approximately 7% (2.4 million metric tons) lower in FY2017 than FY2016

Our CO_2 emissions for FY2017 were 35.1 million metric tons, with a CO_2 emissions per electricity sales volume of 0.463 kg of CO_2 per kWh* (CO_2 emission factor). In addition to the stable, continuous operation (except during scheduled maintenance) of the Sendai Nuclear Power Station Units 1 and 2, other factors such as lower electricity sales volume and an increase in power generation derived from renewable sources have meant that compared to FY2016, CO_2 emissions have dropped by 7%, and the CO_2 emission factor by 4%.

The high emission factor is a result of the feed-in tariff system (FIT): Kyushu's more rapid uptake of solar power generation than other regions means the area's CO_2 emissions are deemed to be higher than the actual amount of CO_2 emitted when calculating FIT adjustments.

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

■ CO_2 Emissions for Kyushu Electric Power Company



Figures in [ ] are actual emission volumes and emissions factors
(⬆) and (⬇) indicate pre/post-adjustment increases/decreases, respectively, associated with CO_2 emissions credits, feed-in tariffs (FIT) and other considerations
*Adjusted in line with CO_2 emissions credits and feed-in tariffs (FIT).
Note: 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). Total electricity sales volume differs after FY2016 as the government's guidelines for calculating CO_2 emissions were revised to exclude electricity supplied to remote islands (excluding the Goto Islands, which are handled as part of mainland Nagasaki Prefecture).

Stable operation of nuclear power stations cuts CO_2 emissions by approx. 7 million metric tons

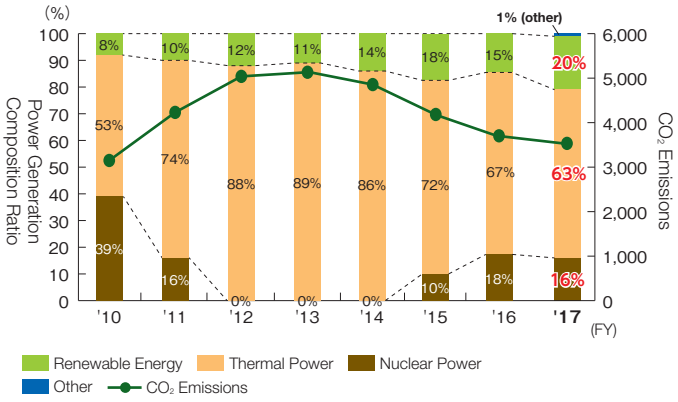
The reduction in CO_2 emissions achieved by our nuclear power stations in FY2017 is calculated to be approximately 7 million metric tons.

The shutdown of nuclear reactors in the wake of the Great East Japan Earthquake in March 2011 caused a major increase in CO_2 emissions, which peaked in 2013 and have trended downwards since then. In FY2017, stable operation of Sendai Nuclear Power Station Units 1 and 2 (except during scheduled maintenance) and the increase in renewable energy generation ensured that thermal power stations accounted for a lower share of all power generated. Consequently, emissions were down approximately 7% (2.4 million metric tons) year-on-year.

Nuclear power generation is similar to renewable energy in that it produces no CO_2 during power generation; thus, it is an excellent means of mitigating global warming and, from an energy security standpoint, remains an important energy option.

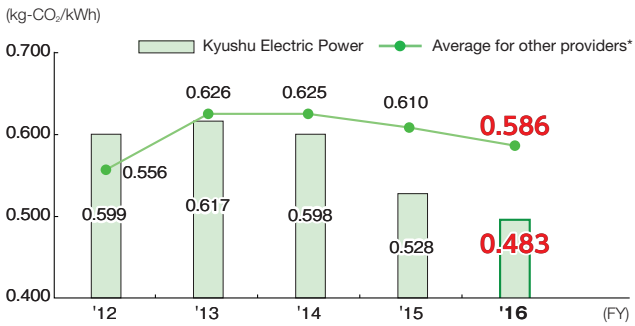
Power Generation Composition Ratio* and CO_2 Emissions Volume Change Over Time

Units: %, 10,000 t-CO_2



*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.

Comparison with Other Providers for CO_2 Emissions per Electricity Sales Volume (post-adjustment)

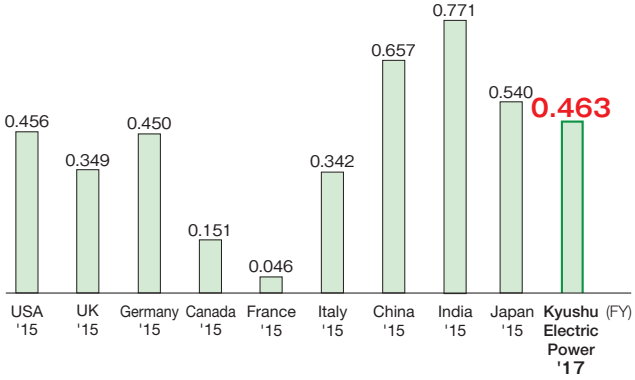


*Average CO_2 emissions volume per electricity sales volume (post-adjustment) of former general power providers (nine companies), excluding Kyushu Electric Power.

*See the section on environmental data (p. 50) for information on emissions of greenhouse gases other than carbon dioxide, and on greenhouse gas emissions (and reductions thereof) by Kyuden Group companies.

CO_2 Emission Factors of Major Countries

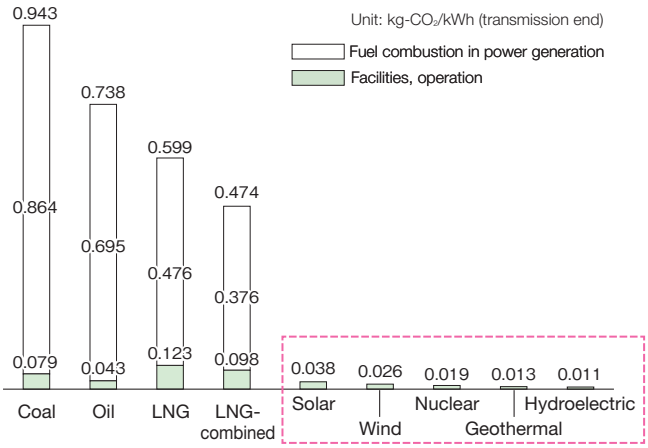
Unit: kg-CO_2/kWh



Source: Created based on CO_2 Emissions from Fuel Combustion 2017 (IEA)

Reference: CO_2 emissions over lifecycle by power source in Japan

Besides the power generation process, CO_2 is emitted not only when burning fuel, but also when using energy at other times, including when constructing the power station; extracting, transporting, and refining fuel; and disposing of spent fuel. Even when these indirect emissions are considered, nuclear power and renewable energy have lower overall CO_2 emissions than other sources.

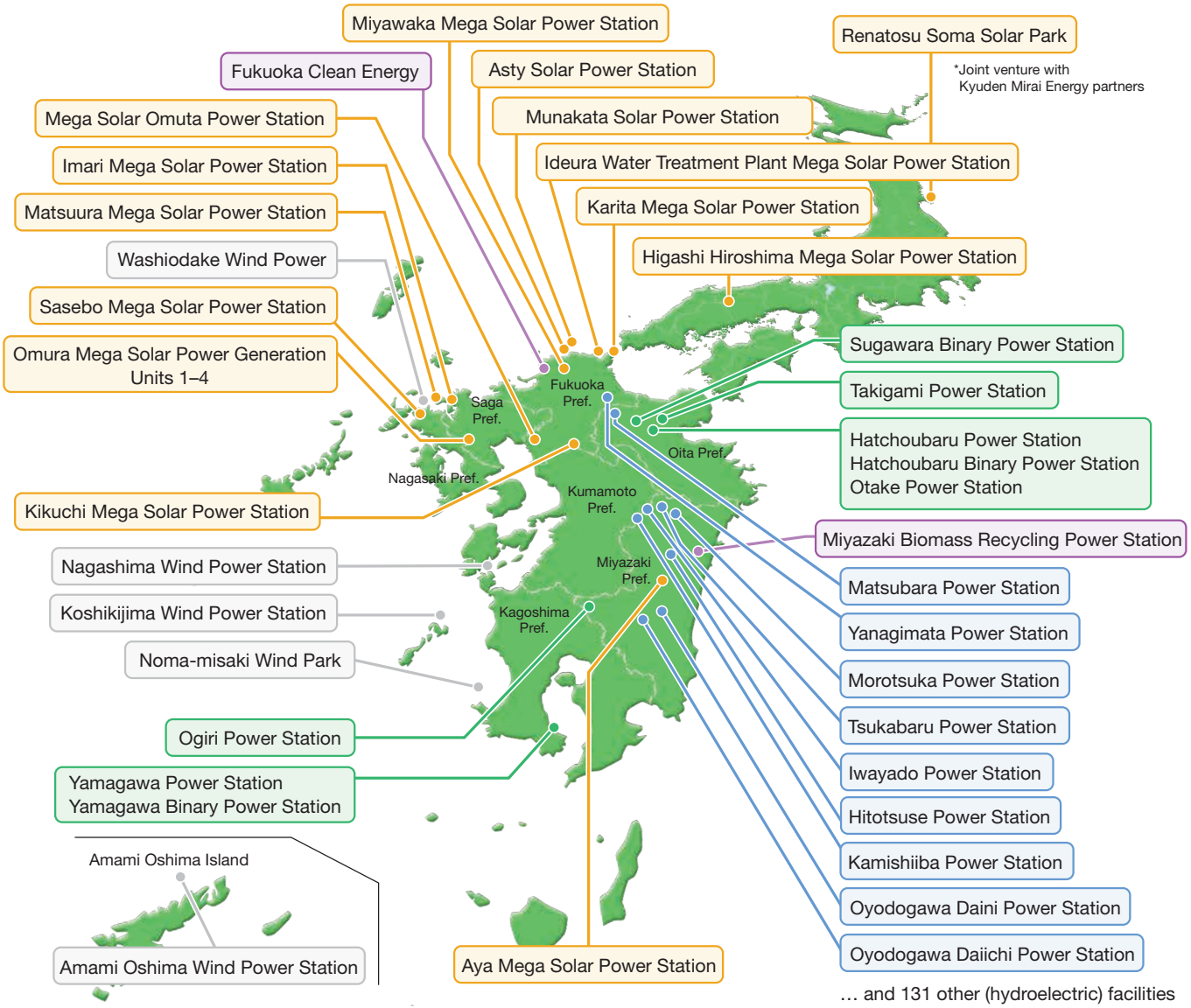


Source: Central Research Institute of Electric Power Industry report

Proactive Development and Full Adoption of Renewable Energy Options

The Kyuden Group is working to develop and 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 (2.04 million kW more than currently) domestically and overseas by 2030, focusing primarily on geothermal and hydroelectric energy.

Kyuden Group Renewable Energy Generation Facility Map



As of March, 2018

Renewable Energy: Advantages & Disadvantages

Advantages	Disadvantages
It produces no CO_2 during power generation.	Output susceptible to weather and other natural conditions (solar, wind).
It is essentially inexhaustible.	High generation costs (solar)
	Limited feasible locations (hydroelectric, geothermal)

Renewable energy development goal

4 million kW
by 2030

CO_2 Emission Reductions Achieved Using Renewable Energy at the Kyuden Group (FY2017)

Geothermal

We operate approx. 40% of facilities nationwide

Existing facilities updated and output increased. Surveying and development of new sites.

520,000 t less CO_2 emitted

Yamagawa Binary Power Station in Kagoshima Prefecture

Solar

Developed on disused power station sites and idle land. We purchase as much solar-generated electricity as possible.

30,000 t less CO_2 emitted

Renatosu Soma Solar Park in Fukushima Prefecture

Wind

Developed on sites identified as having ideal wind conditions. Harmonious with surrounding environments.

40,000 t less CO_2 emitted

Planned Hibiki Wind Energy windmill construction sites in Kitakyushu City

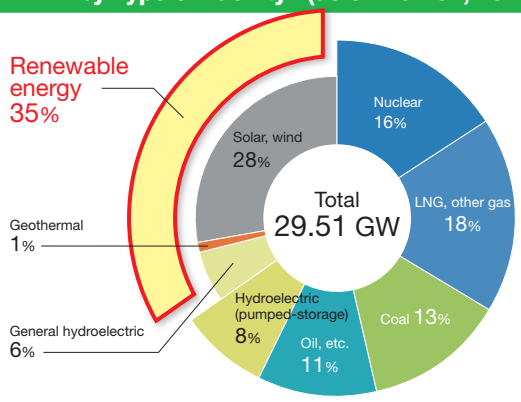
Biomass

A zero-emission power source that helps eliminate waste.

80,000 t less CO_2 emitted

Buzen Biomass Power Station in Fukuoka Prefecture (scheduled to commence operations in 2020)

Composition of Output Capacity (kW) by Type of Facility* (as of Mar. 31, 2018)

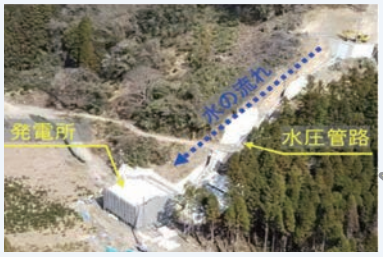


*Includes electricity received from other companies

Note: Shows power supply from Kyushu Electric Power facilities, etc. For details on percentage of each supply within electricity sold in accordance with the Guidelines Concerning the Management of the Electricity Retail Business, see the Kyushu Electric Power website.

Hydroelectricity

New developments to harness untapped energy sources and updating old facilities.



2.15 million t less CO_2 emitted

Kamoshishi Hydroelectric Power Station in Kumamoto Prefecture (scheduled to commence operations in 2018)

*See the section on environmental data (p. 49) for information on CO_2 emission reductions by generation method.

Denotes the amount of CO_2 that would have been emitted if the pertinent method of power generation had not been used

t= metric ton (tonne)

Harnessing Kyushu's Abundant Geothermal Resources

Unlike other forms of renewable energy power generation, such as solar and wind, geothermal facilities are not dependent on weather conditions and times of day. We have long sought to harness the potential of geothermal power generation, and now operate around 40 percent of all geothermal power stations in Japan, including the country's biggest facility: Hatchoubaru Geothermal Power Station in the town of Kokonoe, in the district of Kusu, Oita Prefecture, which is capable of generating 110,000 kW.

The Kyuden Group is working hard to develop facilities in areas with sustainable resources in Kyushu, throughout Japan, and around the world. To that end, we are surveying geothermal resources in the village of Minamiaso in Kumamoto Prefecture, as well as Yufu City, Oita Prefecture and the area to the south of Yamashita Lake in Kusu.

Sarulla Geothermal Power Station, the world's largest, commenced full-scale operation

The Sarulla Geothermal IPP* Project began when Kyushu Electric Power acquired the concession to extract resources in October 2007. Full-scale construction began in Sumatra, Indonesia, in May 2014, and **all three generators were brought online in May 2018, with a capacity of approximately 330,000 kW**.

This project is a prime example of how our technology and expertise, amassed through long experience in the entire geothermal power generation process from development to supply, can be applied for global benefit.

*IPP stands for "independent power producer," a business that generates power and sells it wholesale to distributors. This is in contrast to power companies, which handle all processes from generation through to retail.

Units 2 and 3 of the Sarulla Geothermal Power Station, the biggest IPP project in the world

Commenced operation of binary power stations utilizing untapped geothermal energy

In February 2018, Kyuden Mirai Energy, one of the Kyuden Group companies, commenced operation of the **Yamagawa Binary Power Station (4,990 kW)** on the site of our existing Yamagawa Geothermal Power Station in Ibusuki, Kagoshima Prefecture.

The binary power station uses energy that remains unused by the existing geothermal generation facilities and would otherwise be returned underground. We supply the heat (in the form of reinjected hot water) and Kyuden Mirai Energy operates the binary generation facilities—a real group effort!

The Yamagawa Binary Power Station uses untapped energy

Promotion of Solar Power Generation Utilizing Idle Land

Kyuden Group companies are developing our unused land and sites of disused power stations into mega solar facilities.

Commenced Mega Solar operation with a maximum output of 43,500 kW

In June 2017, Kyuden Group companies Kyuden Mirai Energy and Kyudenko teamed up with private-sector partners Orix and two other companies in a joint venture called **Renatosu Soma Solar Park, LLC.,** to build and operate **a mega solar power station** in Soma City, Fukushima Prefecture. The facility has a maximum capacity of 43,500 kW (see p. 20 for photos).

Floating solar power generation facility overseas

Kyuden Mirai Energy, a group company, has begun to make inroads overseas, including **a solar power generation system comprising an array of floating solar cell modules on a reservoir at the Tree Valley Life Science Museum in Tainan, Taiwan**. This project, too, is a joint venture with partners including Kyudenko, Tokyo Century and one other company. The facility, which began operations in April 2018, has a capacity of 1,130 kW.

The floating modules at the Tree Valley Life Science Museum in Taiwan

Promotion of Biomass Generation which Contributes to Waste Reduction

Biomass power generation is economically advantageous, and there is always a steady supply of fuel. We are working with partners concerning the construction of, and other matters related to, woody biomass power stations.

Work begins on one of Japan's largest biomass power generation projects

Buzen Biomass Power Station

In October 2016, Kyuden Mirai Energy and Kyudenko teamed up with Erex to create a joint venture, **Buzen New Energy, LLC.** Together, the participating companies are constructing one of Japan's largest woody biomass power station in Buzen City, Fukuoka Prefecture (photos on p. 20). The facility, which is scheduled to commence operations in January 2020, will have a capacity of 74,950 kW.

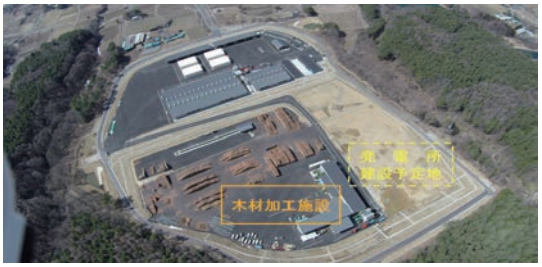
Shimonoseki Biomass Power Station

Shimonoseki Biomass Energy, LLC., a joint venture established by Kyuden Mirai Energy, Nishinippon Plant Engineering and Construction, and Kyuden Sangyo, is planning to construct another woody biomass power station to be counted among Japan's largest. The facility, which is scheduled to commence operations in January 2022, will have a capacity of 74,980 kW.

An impression of how the Shimonoseki Biomass Power Station will look upon completion

Collaboratory initiatives between industry, academia and government use biomass power generation to promote the forestry industry and reforestation

Kyuden Mirai Energy and Kyudenko, together with four partners including Soyano Kenzai, are planning to construct a woody biomass power station in **Shiojiri City**, **Nagano Prefecture**, as part of a partnership involving the prefectural and municipal governments. The facility will seek to generate new demand for wood and promote cyclical use of natural resources **by using the heretofore abandoned waste from forest thinning operations and offcuts from wood processing facilities as biomass fuel**. The facility, which is scheduled to commence operations in October 2020, will have a capacity of 14,500 kW.



The planned site of the power station on the grounds of Soyano Wood Park

Tidal Power Demonstration Project

Technologies that use the incoming and outgoing motion of tides to generate electricity are ideal for an island nation like Japan and have minimal environmental impact. This testing facility is aimed at developing this new form of renewable energy power generation.

Japan's first commercial-scale tidal power generation demonstration project

Kyuden Mirai Energy is part of a consortium with three partners including the Nagasaki Marine Industry Cluster Promotion Association that was selected for the Project for the Promotion of Practical Applications of Tidal Power Generation Technology in 2016. At present, the consortium is designing instruments based on tidal studies with the aim of developing **a commercial-scale (2,000 kW-level) tidal power generation facility at Naruseto off the coast of Goto City, Nagasaki Prefecture**. Testing is scheduled to start in 2019.

Maximal Purchasing of Electricity Generated from Renewable Resources

Configuring to maximize generation and use of renewable energy sources

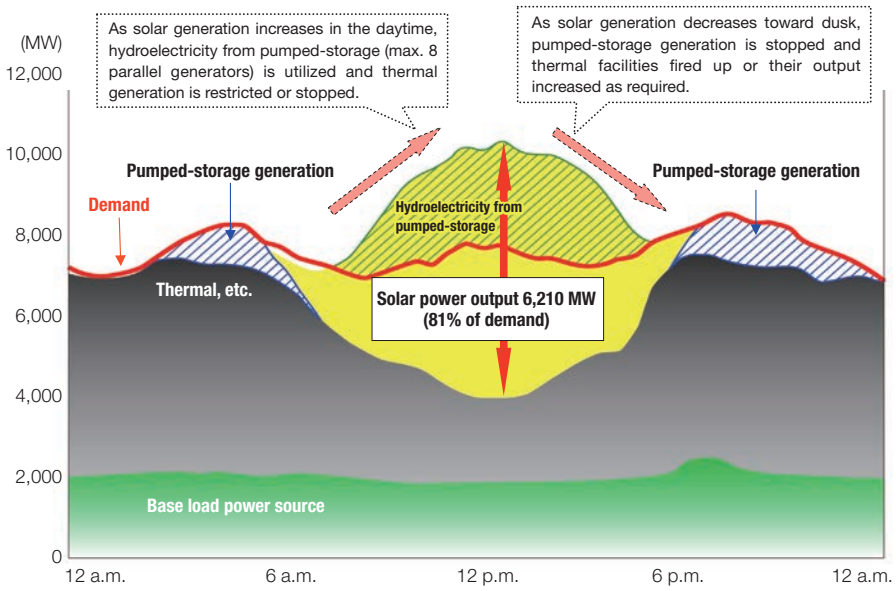
We strive to make and buy as much electricity as possible from renewable energy sources like sunlight and wind, but these are limited by weather conditions and time of day, so where necessary we augment them with in-house thermal and pumped-storage hydro power generation facilities.

Also, the Buzen Power Station is home to the Buzen Storage and Transformer Substation, one of the world's largest-capacity storage battery systems, which is capable of storing 300,000 kWh and has an output capacity of 50,000 kW. The substation was established in March 2016, and helps balance demand and supply by storing energy into the batteries or discharging it in response to solar energy output.

Moreover, in order to make more accurate predictions of generation from renewable energy sources, we use satellite images to estimate sunlight and make output projections, and are developing wind speed models.

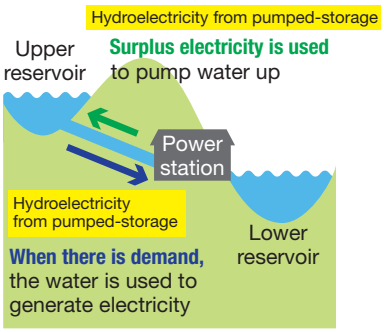
Demand and Supply Results for May 3 (Thurs), 2018

Around 80 percent of the electricity supplied to customers between 12 p.m. and 1 p.m. was solar power, the highest ratio of solar power to overall demand we have achieved so far.



Hydroelectric Pumped-Storage Generation System

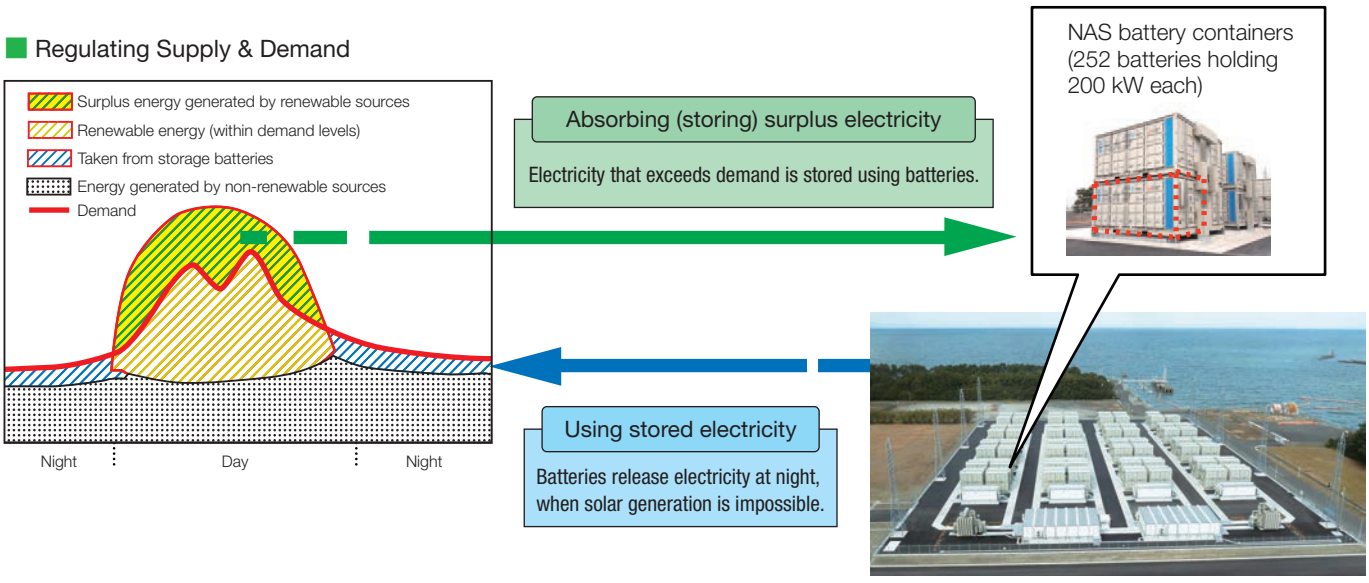
Two large regulating reservoirs are created at a power station, one above and one below the facility. When demand is high, water in the upper reservoir is released, and its momentum as it flows down into the lower reservoir is used to generate electricity. Then, when the supply of electricity is higher than demand, the surplus is used to drive the pumps that return the water to the upper reservoir.



A substation with batteries that can store enough electricity to power 1,000 homes for a month

The **Buzen Storage and Transformer Substation** was built to improve the balance between supply and demand. With 252 sodium-sulfur (NAS) batteries,* the substation is able to store enough electricity to power a thousand regular households for a month (300,000 kWh), and has an output capacity of 50,000 kW.

In practice, electricity is utilized efficiently by storing energy during the hours when solar power generation increases (between 9 a.m. and 3 p.m.), discharging it during darker hours when power consumption, such as for lighting, is higher.

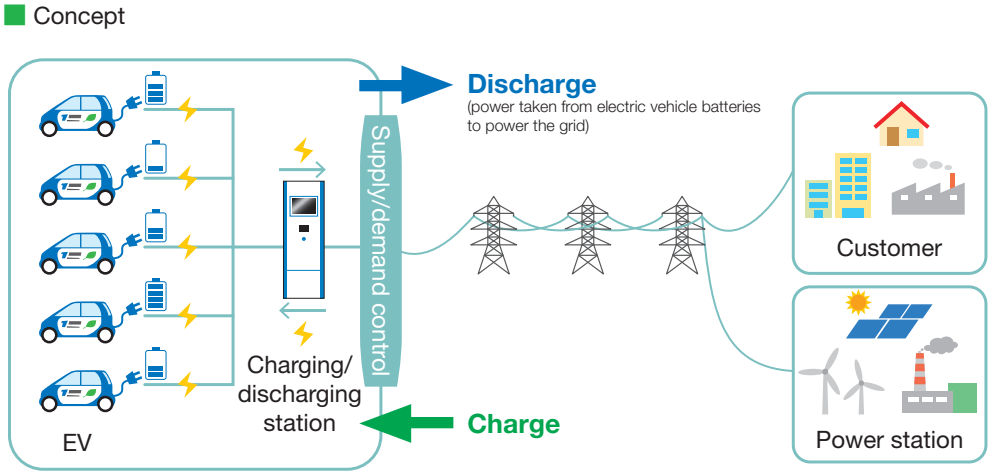


Buzen Storage and Transformer Substation

*NAS batteries are storage (secondary) batteries that use the chemical reactions between sulfur and sodium ions to charge and discharge electricity. They are smaller than lead batteries and last longer.

Demonstration Project Aimed at Improving Demand and Supply Balance

In June 2018, a group of five companies—the Central Research Institute of Electric Power Industry, Nissan Motor, Mitsubishi Motors, Mitsubishi Electric, and Kyushu Electric Power—began **testing*1 "vehicle-to-grid" (V2G)*2 technology**, which seeks to use electric vehicles as a means of regulating the balance between electricity demand and supply.



*1 The testing project is partially funded by the government through the Ministry of Economy, Trade, and Industry, Agency for Natural Resources and Energy's Project for Testing Virtual Power Plants*3 that Use Demand-Side Energy Resources.
*2 Vehicle-to-Grid systems take energy stored in electric vehicle batteries to power the grid.
*3 Virtual Power Plants are systems that use high-level aggregation technology to manage the discrete energy sources in homes, factories, and other such facilities remotely via the Internet of Things in order to regulate the balance of electricity demand and supply.

Initiatives Toward "Low-Carbon" Coal-Fired Thermal Power Generation

We continue to promote the development of technologies aimed at creating a "low-carbon" method of coal-fired thermal power generation, which remains an economically superior option and has plentiful resources available.

Utilizing State-of-the-Art Technology and Promoting Technical Development

New technologies will give our new coal-fired thermal power generator potential for further reductions in environmental impact

Matsuura Power Station Unit 2, which is currently under construction and scheduled to commence operations in December 2019, uses ultra-supercritical pressure milled coal, which involves new technology that boasts high thermal efficiency and reduces fuel consumption, thereby making it possible to reduce the facility's environmental impact.

Construction of Unit 2 is well underway (photo taken May 10, 2018)

■ Overview of Matsuura Power Station Unit 2 Development

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

Reference: Developing technologies pave the way for "low-carbon" coal-fired power generation

Advanced ultra-supercritical (A-USC) pressure coal-fired power generation

Higher temperatures and higher steam pressures in the coal burning process result in thermal efficiency levels 4 to 6 percent higher than conventional methods. Using these methods, we can greatly reduce fuel consumption and CO_2 emissions.

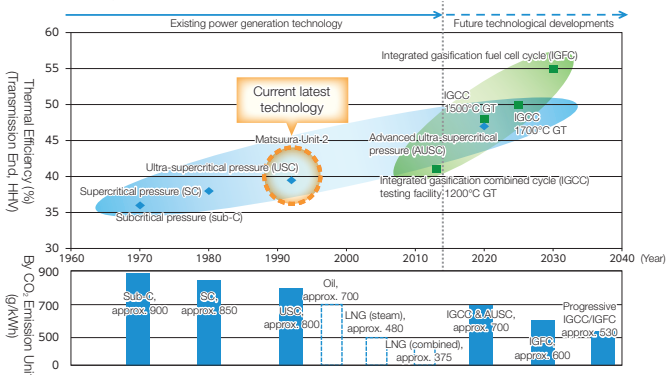
Integrated gasification combined cycle

This method combines two methods of generating electricity. First, coal is converted into gas, which is ignited to drive gas turbines. Second, the exhaust heat from the turbines is used to create high-temperature, high-pressure steam, which drives steam turbines. It is predicted that this method will achieve a generating efficiency level of between 46 and 50 percent, whereas conventional coal-fired generation reaches only about 39 to 42 percent.*

Meanwhile, work is underway to develop integrated gasification fuel cell cycle technology that combines IGCC with fuel cells to separate and recover the CO_2 prior to combustion, thus improving efficiency and environmental performance.

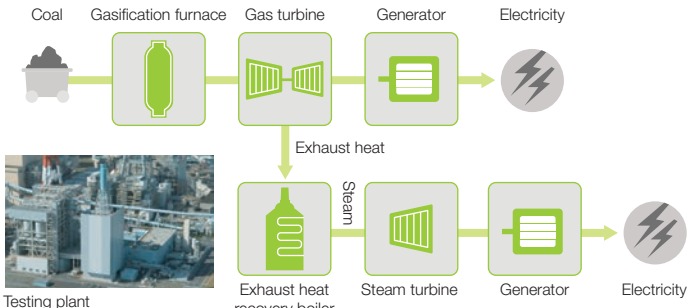
*Lower calorific value standard at the transmission end.

■ Improving Efficiency of Coal-fired Thermal Power Generation



Source: Compiled by Kyushu Electric Power based on materials from the Advisory Committee for Natural Resources and Energy, an organ of the Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy

■ IGCC system



Testing plant
(source: Central Research Institute of Electric Power Industry Review, Vol. 57)

Carbon Capture and Storage (CCS)

This is a technique for capturing the CO_2 generated by burning fossil fuels before it is released into the atmosphere, and storing it deep underground. Hopes are high that this innovative technique will be an effective weapon in the fight against global warming, but there are many challenges to overcome before it can be implemented. Research and technology development is promoted through national demonstration projects and other initiatives.

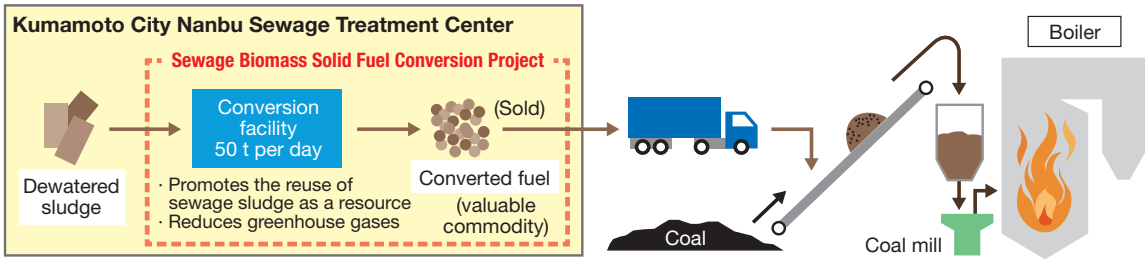
*For results of research into state-of-the-art coal-fired thermal power generation technologies, see the Central Research Institute of Electric Power Industry website.

CO_2 Emission Reduction through Operational Technology

Biomass-mixed combustion helps coal-fired thermal power stations reduce CO_2 emissions

Sewage Sludge Fuel Combustion at the Matsuura Power Station

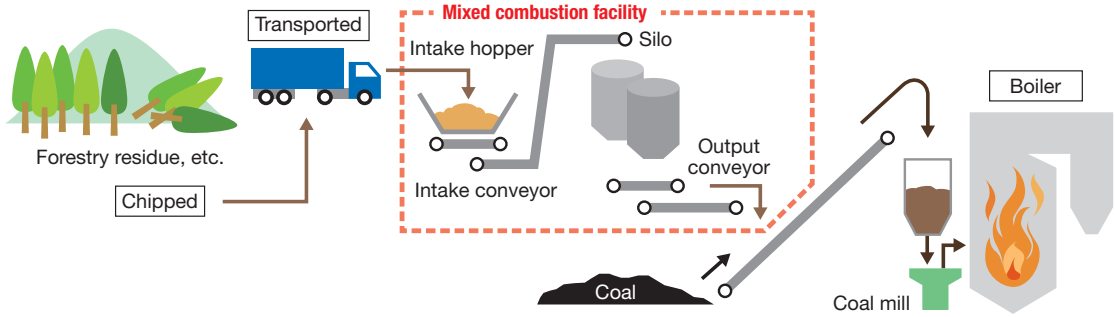
Since April 2013, dewatered sewage sludge from the sewage biomass fuel conversion project undertaken in Kumamoto City has been mixed into the coal used to generate electricity at the **Matsuura Power Station** in Matsuura City, Nagasaki Prefecture. In FY2017, the annual reduction in CO_2 emissions reached approximately 1,000 metric tons.



Woody Biomass Mixed Combustion at Reihoku Thermal Power Station

The **Reihoku Thermal Power Station** in Kumamoto Prefecture hosted a demonstration project* between FY2010 and FY2014 trialling mixed combustion featuring woody biomass (i.e., mainly unused resources such as forestry residue). Today, woody biomass is added to the coal (up to one percent of overall weight) used to generate electricity and, in FY2017, the annual reduction in CO_2 emissions reached approximately 9,000 metric tons.

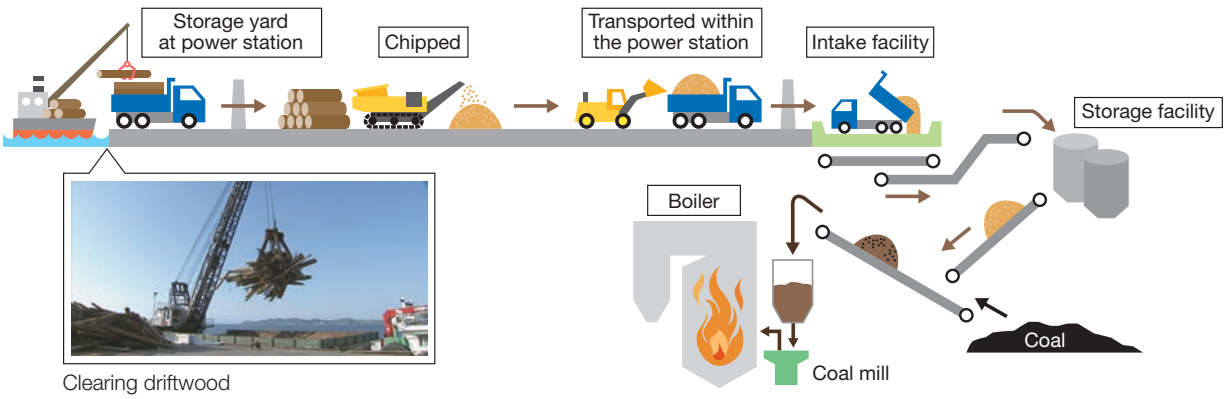
*The Demonstration Project for Testing Forestry Residue Woody Biomass and Coal Mixed Combustion Power Generation in FY2009 was the recipient of a government grant.



Community Activities | Landslide Debris Converted to Woody Biomass at Reihoku

The northern Kyushu area was devastated in July 2017 by torrential rains. The resulting landslides created a massive amount of driftwood. At Kyushu Electric Power, our Reihoku Thermal Power Station is helping to clear the mountains of logs by accepting these, chipping them on site, and using them for woody biomass-mixed combustion power generation.

■ Receiving, Processing, and Using Driftwood



Clearing driftwood

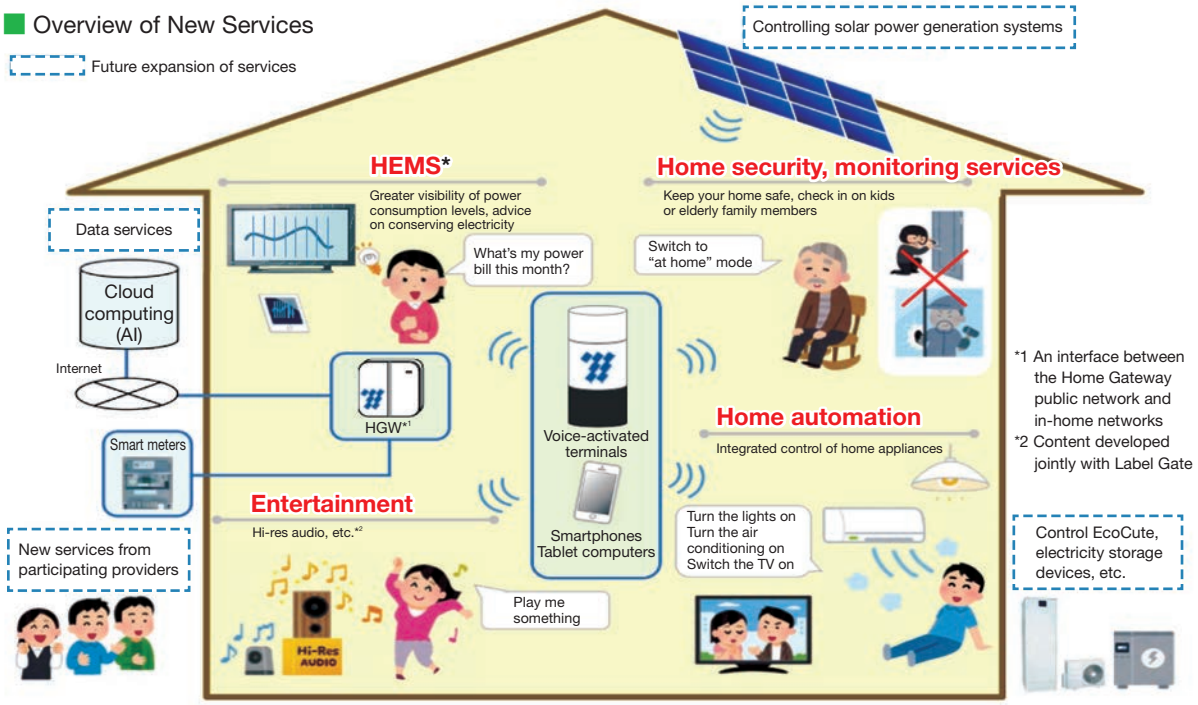
New Services to Conserve Energy and Reduce CO_2 Emissions

AI and the IoT (Internet of Things) power the development of environmentally friendly services that deliver new levels of home comfort

One example of the ways we offer eco-friendly comfort is our comprehensive, integrated support for customers to operate their HEMS,* home automation, and *Ouchi no Mimamori* monitoring services using smart speakers and smartphones.

This service enables customers to do many things, such as operating home appliances by speaking instructions to their smart speaker, or causing AI devices to learn from sensors and IoT-based data, thus enabling appliances to be operated in accordance with customers' preferences.

*HEMS stands for "home energy management system," which connects home appliance and other electric devices to, for instance, show electricity and gas usage levels or automatically control home appliances, thus promoting energy conservation in the home.

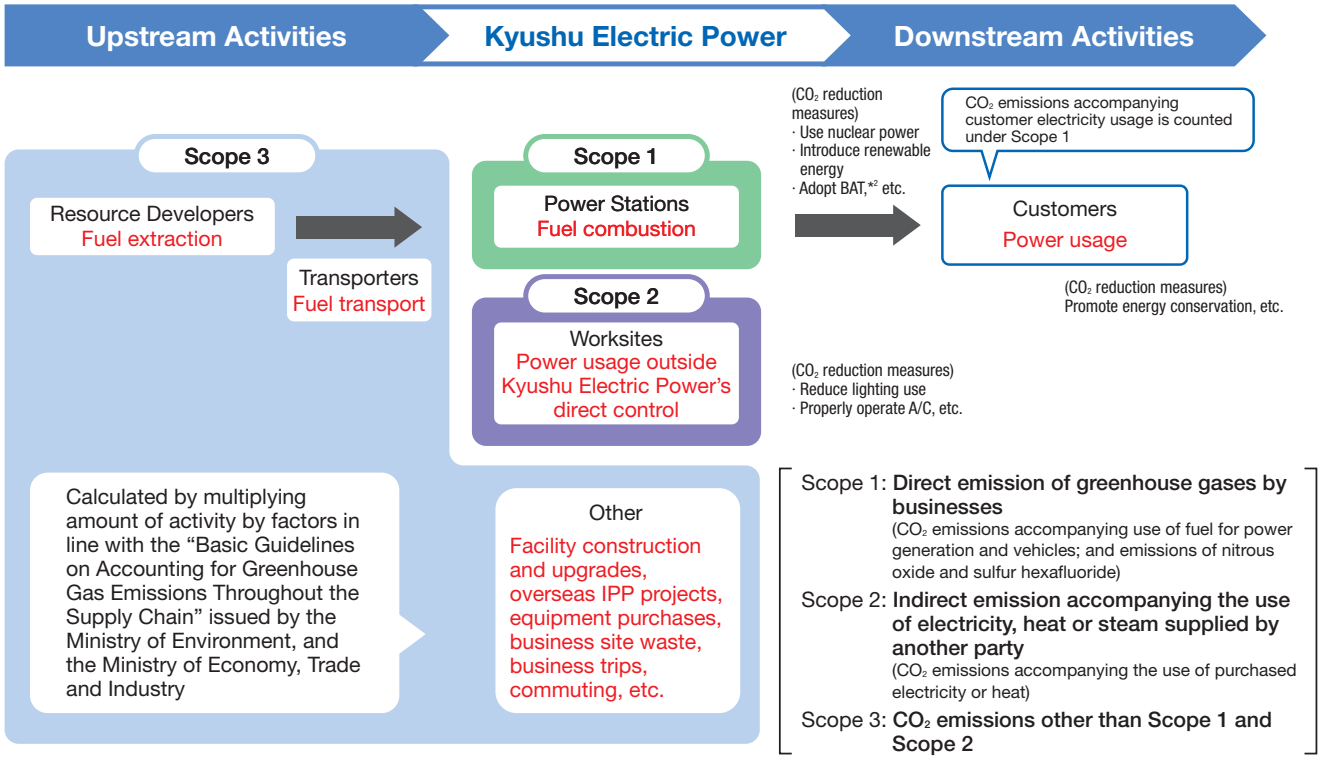


Greenhouse Gas Emissions for the Overall Supply Chain*1

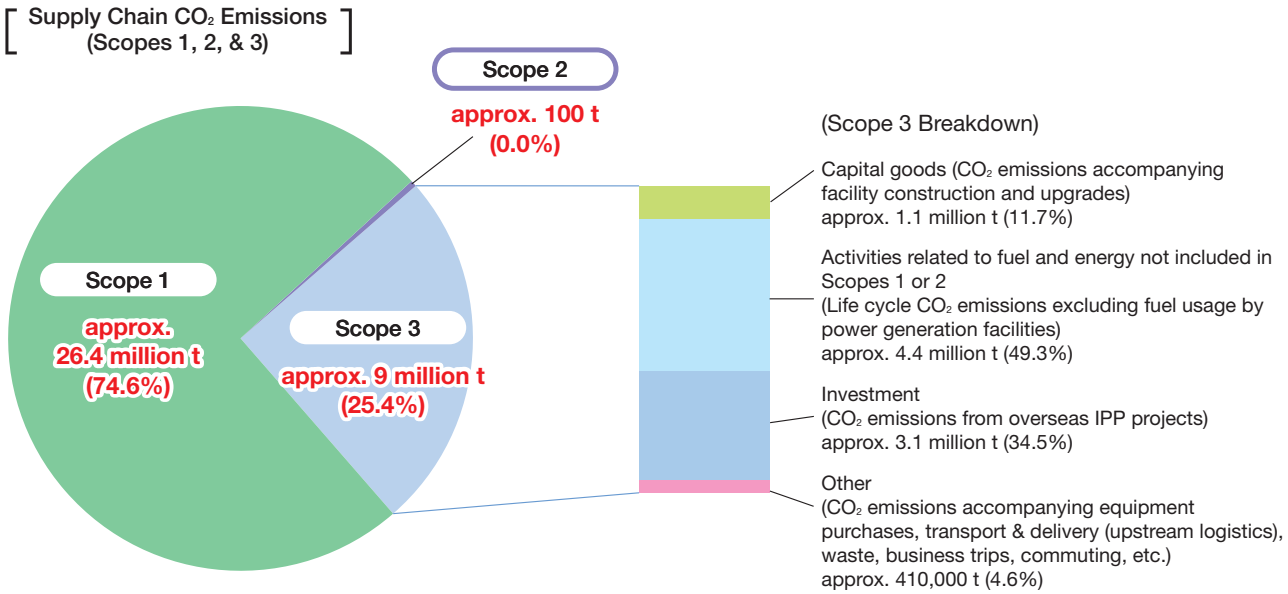
*1 All connected processes from the raw materials phase to delivery of products and services to consumers

State of Greenhouse Gas Emissions for Scopes 1–3

We approach relevant suppliers (partners, group companies, etc.) on how to properly manage direct emissions of greenhouse gases (Scope 1), as well as indirect emissions (Scopes 2 and 3)



*2 Best Available Technology (from an economic standpoint)



Note: FY2017 results. Totals may not match due to the effects of rounding.
t = metric ton (tonne)

Efficient Facilities Operation

Sustain and Improve Efficiency of Coal-Fired Thermal Power Generation

Coal-fired thermal power generation thermal efficiency (both at the generating end and the transmission end) was sustained at the same level as the previous year

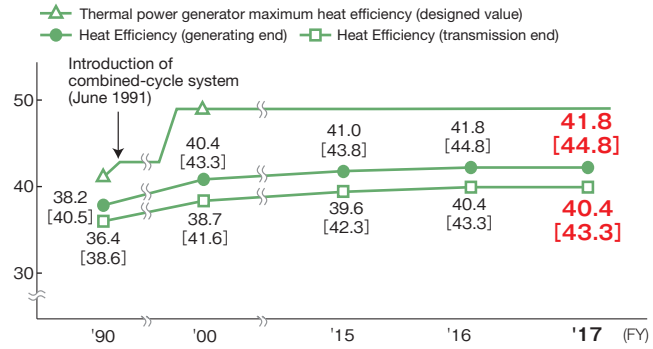
In terms of the amount of fuel consumed and the limiting of CO_2 emissions, we are working to sustain and improve the total thermal efficiency of coal-fired thermal power generation.

In FY2017, performance was equal to FY2016 at 41.8% (at the generating end) due to two factors: a reduced capacity utilization rate of oil-fired thermal power plants with low thermal efficiency that was attributed to the Sendai Nuclear Power Station's steady operation (excluding routine inspections); and the completion of a gas turbine upgrade at Shin-Oita Power Station Unit 1.

High calorific value: calorific value where water vapor produced by combustion is condensed and the latent heat held within recovered.
Low calorific value: calorific value where heat held in water vapor is not condensed and recovered but instead remains.

■ Thermal Power Total Heat Efficiency (Higher Calorific Value Base)

Unit: %



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

Reducing Transmission & Distribution Loss

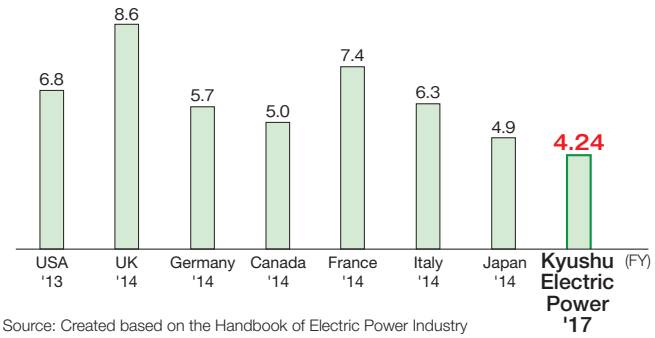
T&D loss ratio steady at a low rate of 4.24%

If we can deliver electricity efficiently through efforts to reduce electricity lost along transmission and distribution lines that leads to lower fuel usage and limits CO_2 emissions at coal-fired thermal power stations.

As a result of efforts to increase transmission voltage, introduce low-loss transformers, and other initiatives, the transmission and distribution loss rate for FY2017 was 4.24%, among the best in the world.

■ Country Comparison for Transmission/Distribution Loss Rates

Unit: %



Source: Created based on the Handbook of Electric Power Industry

Reference: Benchmark indicators under the Energy Conservation Law, non-fossil power source ratio under the Act on Sophisticated Methods of Energy Supply Structure

(Efficiency Improvements of Thermal Power Generation [Benchmark Indicators])

The Energy Conservation Law calls on energy producers to achieve a specified energy mix by FY2030 with thermal efficiency standards for installing new power generation equipment, as well as by decommissioning aging equipment and improving the overall thermal efficiency of facilities.

In response, we have worked to improve the thermal efficiency of thermal power plants and are responding appropriately to achieve the 2030 targets. The efforts include: the development of Matsuura Power Station Unit 2 through use of the latest technology; lower capacity utilization, planned shutdowns, and decommissioning of oil-fired thermal power plants with low thermal efficiency; commencement of operation at Shin-Oita Power Station No. 3x4 using the high-efficiency combined-cycle power generation system; a gas turbine upgrade at Shin-Oita Power Station Unit 1 (using an LNG combined-cycle power generation system).

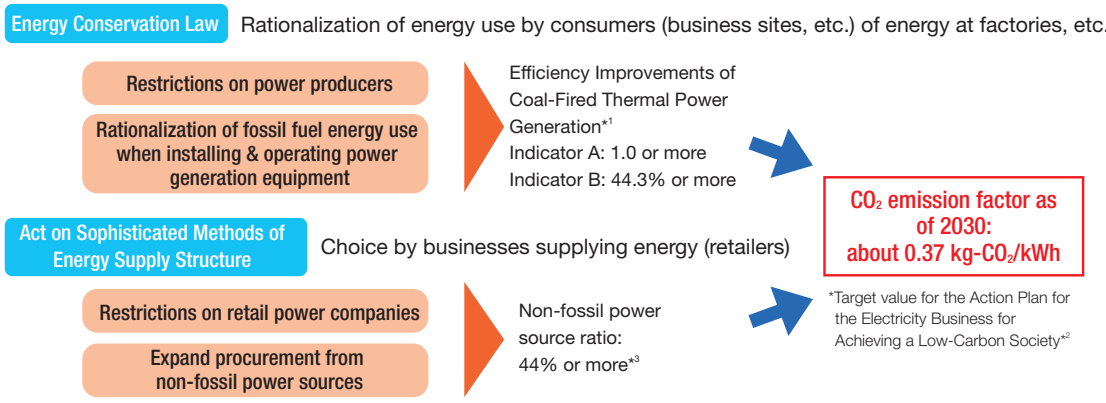
(CO_2-Free Power Supply Structure [Non-Fossil Power Source Ratio])

The Act on the Use of Non-Fossil-Fuel Energy Sources by Energy Suppliers and the Promotion of the Effective Use of Fossil Energy Sources (Act on Sophisticated Methods of Energy Supply Structure) calls on electricity retailers*1 that supplied 500 million kWh or more of electricity in the previous business year to use non-fossil-fuel sources*2 to supply at least 44% of their electricity in FY2030.

In response we are taking appropriate action to achieve FY2030 targets by working to raise the percentage of non-fossil fuel sources as a proportion of power sold. These efforts include the use of nuclear power generation with a heavy focus on safety and the proactive development and introduction of renewable energy.

*1 Electricity retailers, general electricity transmission and distribution utilities, and registered specified electricity transmission and distribution utilities under the Electricity Business Act
*2 Nuclear power, renewable energy, and large-scale hydroelectricity

■ Role of Energy Conservation Law and Act on Sophisticated Methods of Energy Supply Structure Toward Achieving the Energy Mix



*1 Indicator A: expresses success rate of performance efficiency for generating efficiency target for each fuel type: coal, LNG, oil, etc.
Indicator B: total generating efficiency of thermal power generation considering the power source structure of, and conformity to, the national energy mix
*2 Medium-to-long-term plan for independent action by the electric power industry to mitigate climate change, formulated in 2015 by 12 Federation of Electric Power Companies and proposed new entrants
*3 Target procurement share for electricity generated with non-fossil fuels (nuclear power, renewable energy, large hydropower) by retailers for a power source structure that conforms to the national energy mix

Contribution to International Global Warming Mitigation Measures

Each year, we release the Kyushu Electric Power Company Group Environmental Action Plan (issued in June 2017 last fiscal year; renamed the Kyuden Group Environmental Action Plan from FY2018 onward). This plan is the basis of efforts to prevent global warming in Japan and abroad through such action as our overseas energy business and consulting.

Limiting CO_2 Emissions with the Overseas Energy Business

Limiting of approx. 1.3 million metric tons of CO_2 emissions accompanying the overseas power generation business

In FY2017, high-efficiency thermal power plants overseas and the steady operation of wind power and geothermal power stations*1 contributed to the suppression of approximately 1.3 million metric tons*2 of CO_2 emissions. This is equivalent to roughly 4% of our CO_2 emissions in Japan.

*1 Investments in nine IPP projects in eight countries; equity ownership in output of 1.5 million kW (as of the end of FY2017)
*2 Figures for CO_2 emissions are independent estimates by our company based on emission factors by country and region listed in "World Energy Balances 2017."

Overseas Power Generation Business (see the Sarulla Geothermal IPP Project in Indonesia on p. 21)

Participation in combined-cycle* power plant construction in the USA

This project will build and operate a new thermal power plant with a combined-cycle power generation system for the Birdsboro gas-fired thermal power plant in Pennsylvania. The system will use a high-efficiency gas turbine with cutting-edge performance. The plant will have an output of 488,000 kW. Our participation in the project was finalized in December 2017. Construction is now underway, with operations to commence in 2019.

In Connecticut, we have become involved in a power generation project by obtaining a roughly 20% equity share in Kleen Energy Holdings, LLC, which operates the Kleen Energy gas-fired power plant.

*A power generation system that combines a gas turbine with a steam turbine. Latent heat from the gas turbine's gas emissions boil water that turns to steam and spins a steam turbine.

Birdsboro gas-fired thermal plant under construction

Overseas Consulting

Contributions to international solutions with the group's combined strength

We apply the combined strength of the Kyuden Group to apply the technology and knowledge we have built up in the electricity power business both in Japan and abroad to work on a wide array of solutions for the energy sector, from the formulation of basic energy plans to solutions for power generation, transmission, and distribution, as well as renewable energy and the environment. We thus help countries provide a stable power supply and improve the earth's environment.

Technological prowess cultivated in power supply and geothermal generation on remote islands applied abroad

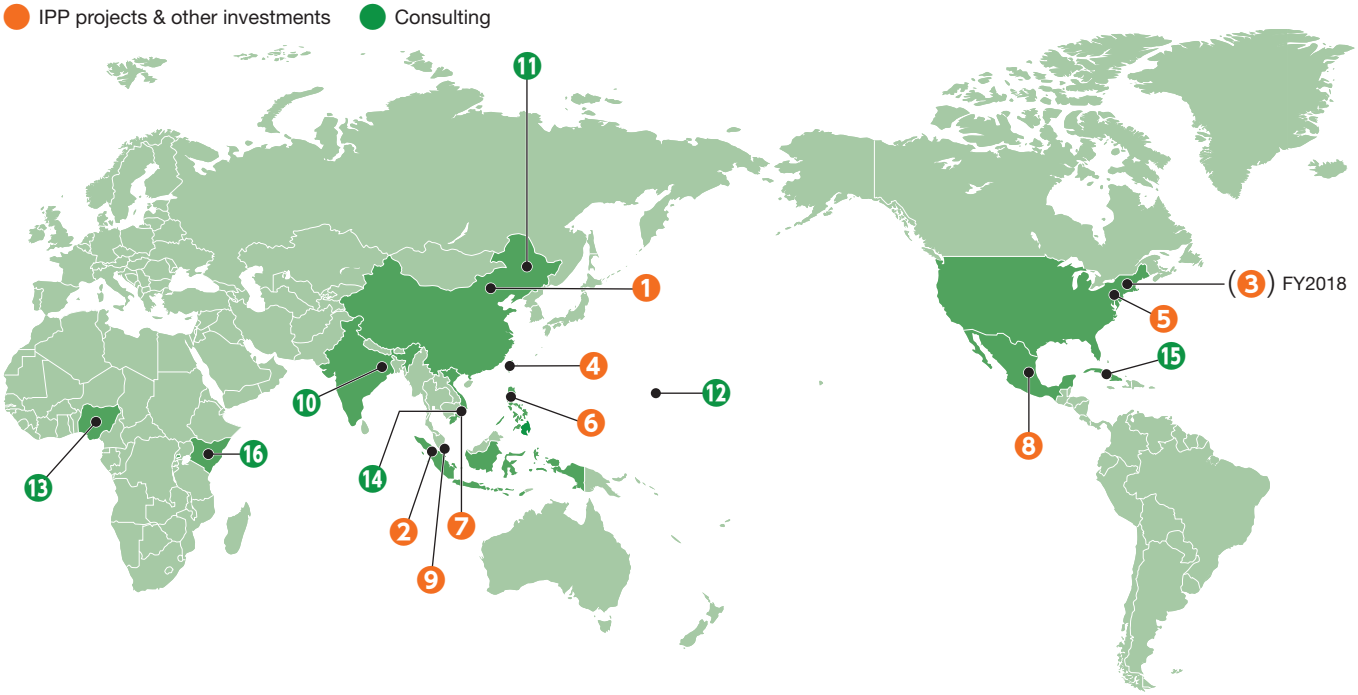
In FY2017, we used the engineering skill built up from our work in supplying power to remote islands and in geothermal power generation—both distinctive strengths of the Kyuden Group—to provide consultation on the installation and expansion of solar power stations in Cuba and the Marshall Islands, as well as improving the operational performance of the Olkaria Geothermal Power Station (output: 430,000 kW) in Kenya, which is one of the largest such plants in East Africa.

In future, Kyuden will continue to promote environmentally friendly energy use through proposing effective solutions for the countries we support.

Survey at the Olkaria Geothermal Power Station in Kenya (a JICA survey to assess operational status)

Overseas Project Implementation (FY2017)

IPP projects & other investments　Consulting



		Country	Project	Overview
IPP projects & other investments	Renewable Energy ❶	China	Inner Mongolia Wind Power	Output: 50,000 kW, commenced operation in September 2009
	Renewable Energy ❷	Indonesia	Sarulla Geothermal	Output: approx. 330,000 kW, operation of all units commenced in May 2018 (see p. 21)
	Natural Gas (Combined) (❸)	USA	Kleen Energy Gas-Fired Thermal Power Project	Output: 620,000 kW, operation commenced in July 2011, equity shares acquired in May 2018 (see p. 31)
	Natural Gas (Combined) ❹	Taiwan	Shin Tao Power Corporation	Output: 600,000 kW, operation commenced in March 2002, equity shares acquired in November 2010
	Natural Gas (Combined) ❺	USA	Birdsboro	Output: 488,000 kW, operation to commence in 2019 (see p. 31)
	Natural Gas (Combined) ❻	Philippines	Ilijan	Output: 1.2 million kW, operation commenced in June 2002
	Natural Gas (Combined) ❼	Vietnam	Phu My III	Output: 744,000 kW, operation commenced in March 2004
	Natural Gas (Combined) ❽	Mexico	Tuxpan Unit 2	Output: 495,000 kW, operation commenced in December 2001
			Tuxpan Unit 5	Output: 495,000 kW, operation commenced in September 2006
	Natural Gas Oil ❾	Singapore	Senoko Energy Pte. Ltd.	Output: 3.3 million kW, equity shares acquired in September 2008
Consulting	❿	India	Feasibility Survey on Installation of Environmental Equipment at Coal-Fired Thermal Power Plant	———
	⓫	China	Textile Industry Energy Conservation Promotion Scheme Development	———
	⓬	Marshall Islands	Ebeye Island Solar Power Generation System Development	Plan preparation survey, solar power plant construction (see p. 31)
	⓭	Nigeria	Electrical Power Master Plan	Creation project in-country support studies and personnel training
	⓮	Vietnam	LNG Thermal Power Generation Project	Feasibility study
	⓯	Cuba	Data Collection and Identification Survey on Introducing Renewable Energy (see p. 31)	———
	⓰	Kenya	Data Collection and Identification in Support of Olkaria Geothermal Power Plant Operation and Maintenance (see p. 31)	———

2 Initiatives to Establish a Recycling Society

Expanding Waste-Related Zero Emissions Initiatives

We are involved in zero emissions activities which focus on appropriate waste management and disposal, together with implementation of the 3Rs (reduce, reuse and recycle), to help promote a recycling society.

Industrial Waste Management and Disposal

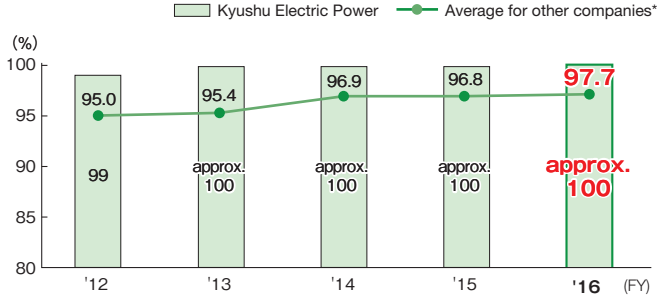
The main types of industrial waste that we produce are byproducts (coal ash and gypsum) from thermal power plant operations and construction-related waste materials. We are careful to appropriately manage and dispose of this industrial waste, as well as to implement 3R measures which will reduce the 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 (FY2017)

		Amount produced (t)	Amount recycled (t)	Recycling rate (%)	Main recycling uses
Coal ash		726,672	726,672	100	Cement materials Concrete mixtures
Other industrial waste	Heavy crude oil ash	219	219	100	Vanadium recovery
	Gypsum	108,220	108,220	100	Cement materials
	Sludge	4,097	1,790	44	Cement materials
	Waste oil	1,818	1,806	99	Reuse in fuel oil
	Waste plastic	299	275	92	Combustion aid materials
	Scrap metal	18,013	17,893	99	Metallic materials
	Waste concrete poles	11,845	11,845	100	Subbase, construction aggregate
	Glass, ceramic waste	114	82	72	Glass product materials
	Industrial waste requiring special treatment*	492	414	84	Cement materials
	Other	140	140	100	Combustion aid materials
	Subtotal	145,257	142,684	98.2	
Total Industrial Waste		871,928	869,293	approx. 100	

*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.
Note: Totals may not match due to the effects of rounding.
Note: t = metric ton (tonne)

Waste Recycling Rate Comparison with Other Companies



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

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

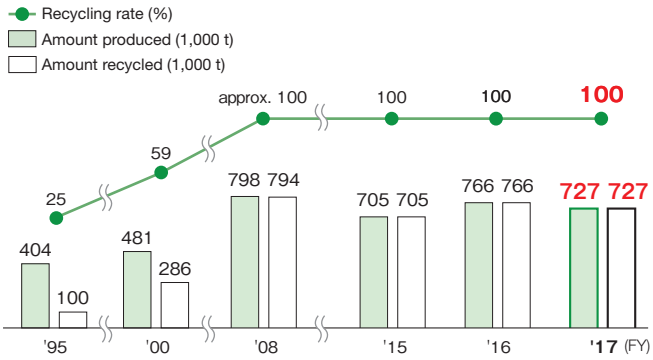
Whenever power generation equipment and materials are removed during power distribution construction or other work, we appropriately assess whether or not their performance and quality meets the required threshold for reuse and, if they do, we reuse them.

Efforts to Recycle Waste

In FY2017, we recycled nearly 100% of the roughly 870,000 metric 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.

Reference: See the section on environmental data (p.51) for information on trends for industrial waste production and recycling rates; the reuse of power distribution equipment; and the production, and recycling rates and amounts of industrial waste by power plant.

Coal Ash Production Amount and Recycling Rate



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.

Reference: See the section on environmental data (p.51) for details on the re-collection of old paper.

Waste Paper and Other General Waste Production Amounts and Recycling Rates (FY2017)

	Amount produced (t)	Amount recycled (t)	Recycling rate (%)	Main recycling uses
Waste paper	1,153	1,153	100	Recycled paper
Shells	44	1	3	Subbase
Dam driftwood	704	697	99	Substitute for straw litter

Note: t = metric ton (tonne)

Regarding paper recycling, since our initiative began in FY2002, we have recycled 100% of our paper with recovered paper remade into photocopier or toilet paper by our group company, Records & Intelligence Management Co., Ltd.

3 Local Environment Preservation

To conserve the local environment, we conduct proper environmental assessments when building electric power facilities; we control air pollutants such as SO_x and NO_x emitted from thermal power stations; and manage radiation levels at nuclear power stations.

Environmental Conservation Measures at Power Stations

When we operate our power stations and other facilities, we comply not only with national laws and regulations but also with the environmental protection agreements that we make with related 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 authorities.

Tackling Air Pollution

We do our best to remove sulfur oxide (SO_x)*1 and nitrogen oxide (NO_x)*2 emissions that inevitably arise with the generation of electricity as much as possible.

In FY2017, our SO_x and NO_x emissions per quantity of thermal power generated were 0.19g and 0.18g per kWh respectively, and both of these figures represent a reduction from FY2016.

■ SO_x and NO_x Emissions by Thermal Power Station* (FY2017 figures)

Unit: t
t = metric ton (tonne)

Thermal power station (Fuel)	SO_x	NO_x
Shin-Kokura (LNG)	0	249
Karita (Coal/heavy oil/crude oil)	79	426
Buzen (Heavy oil/crude oil)	1,713	945
Matsuura (Coal)	1,397	887
Ainoura (Heavy oil/crude oil)	118	66
Shin-Oita (LNG)	0	2,001
Reihoku (Coal)	3,427	2,900
Sendai (Heavy oil/crude oil)	1,789	503
Total	8,522	7,976

*Excludes internal combustion power stations

*1 SO_x: Generic term for sulfur oxides, including SO_2 (sulfur dioxide) and SO_3 (sulfuric trioxide). Generated when fossil fuels such as coal and petroleum are burned and the sulfur content in the fuel oxidizes, they cause air pollution and acid rain.

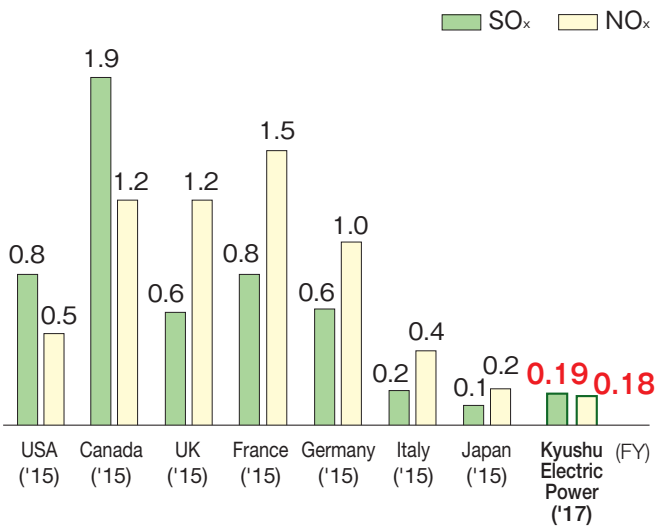
*2 NO_x: Generic name for nitrogen oxides, including NO (nitric oxide) and NO_2 (nitrogen dioxide). Generated from the combustion of nitrogen-containing fuel, and also from the oxidation of nitrogen in the air during combustion, they cause air pollution and acid rain.

■ SO_x and NO_x Emissions per Quantity of Thermal Power Generated

Unit: g/kWh

■ SO_x and NO_x Emissions per Quantity of Thermal Power Generated, by Country

Unit: g/kWh



Source (Overseas/Japan): Federation of Electric Power Companies' pamphlet "Energy and Environment 2017"

Tackling Water Pollution

We properly treat wastewater generated at thermal or nuclear power stations using wastewater treatment equipment. In addition, our water intake and discharge method for seawater used for cooling water condensers, adapts the discharge according to the characteristics of the surrounding sea area to reduce impact on the sea.

Wastewater is properly treated with wastewater treatment equipment, and the oil content and hydrogen ion concentration (pH) are confirmed to be within standard tolerances.

At the dam reservoir of the hydroelectric power station we regularly conduct water quality surveys, carry out eutrophication countermeasures and red tide treatment, and try to mitigate turbid water early through selective intake. We also strive to preserve water quality by cooperating with maintenance projects for degraded forests in the surrounding area.

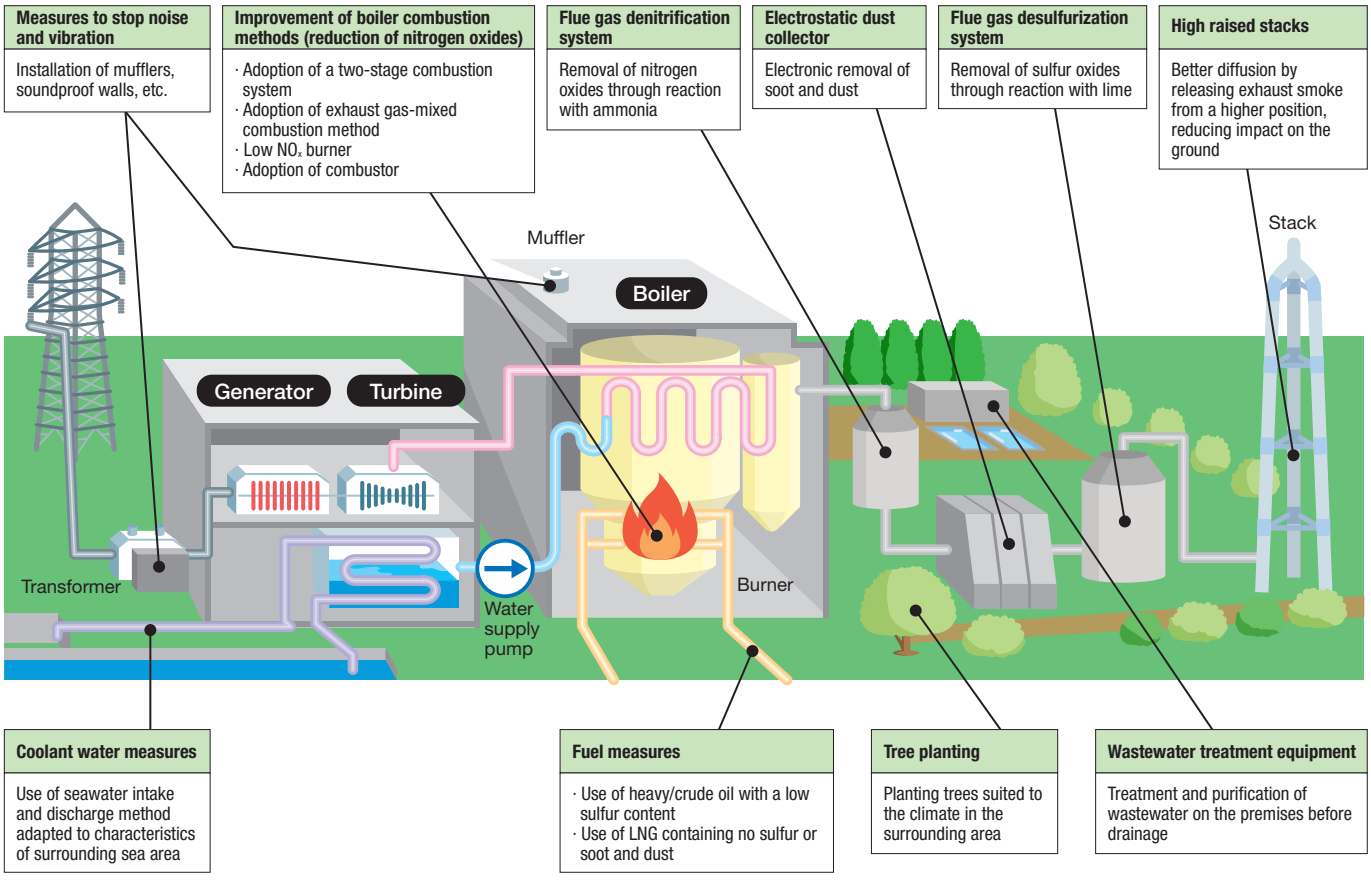
Preventing Noise and Vibration

We utilize low noise/low vibration equipment, install mufflers and soundproof walls, and install equipment indoors as part of our countermeasures. In construction work, we also select low-noise, low-vibration construction machinery.

Preventing Soil Contamination

We try to ensure no releases or leakages of hazardous substances into the soil. In addition, we voluntarily carry out soil contamination surveys when selling company-owned land and when buying land.

■ Environmental Conservation Measures Taken at Thermal Power Stations



Environmental Considerations When Building Facilities

When we build power generation facilities, we conduct proper environmental assessments according to the characteristics of the facilities and the local environment as part of our commitment to environmentally conscious action and integrating our facilities into the surrounding environment.

Performing Environmental Impact Assessments

When we construct power stations 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. Based on those results we take appropriate steps to protect the environment.

Implementation of Environmental Assessments

Type	Site name	Power generation method	State of implementation
Autonomous* Assessment	Shin-Kikai Power Station Units 7 and 8 Facility Expansion Plan (Kikai, Oshima District, Kagoshima Pref.)	Internal combustion power	Ended March 31, 2018
	Shin-Yoron Power Station Unit. 4 Facility Expansion Plan (Yoron, Oshima District, Kagoshima Pref.)		
	Akusekijima Power Station Unit. 2 Facility Refurbishment Plan (Toshima, Kagoshima District, Kagoshima Pref.)		

*Target scale of the Environmental Impact Assessment Act and the Local Environmental Impact Assessment Ordinance does not apply; assessments are voluntarily implemented for the purpose of environmental conservation

An Example of Environmental Conservation Measures

We performed an environmental impact assessment as part of a plan to refurbish the Otake Power Station (completed in July 2016). The survey revealed the presence of globe thistle* and other rare plants within the power station construction area, so experts were consulted and the plants were relocated. After the relocation, monitoring has been carried out periodically to check if the plants are blooming and bearing seeds.

In addition, we carried out a voluntary environmental assessment (completed in March 2017) accompanying the plan to expand Unit 7 at Shin-China Power Station in Kagoshima Prefecture. A type of hermit crab that had been nationally designated as a natural monument was discovered, so experts were consulted and the hermit crabs were moved to a suitable location off the company premises.

*Scientific name: Echinops setifer; a wild plant in the daisy family Asteraceae that grows on grassy meadows of volcanic mountains. Endangered in Japan due to changes to its habitat.

Globe thistle, flowering post-relocation

A hermit crab discovered on site

Management of Water in Power Generation

Water Management

Industrial water used in power generation is drawn from rivers and other sources within usage limitations. We are working to reduce the amount of freshly supplied water we use when power generation facilities are shut down or in normal operation through such measures as water recirculation.

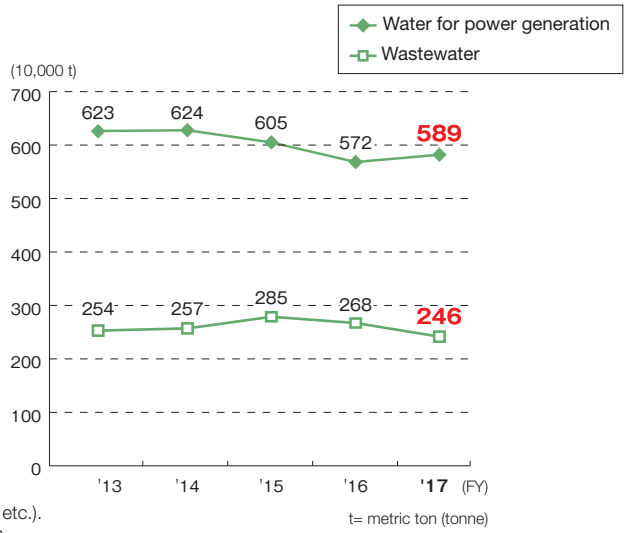
Water Usage for Power Generation and Wastewater Volume at Thermal and Nuclear Power Stations (FY2017)

Unit: 10,000 t

Power station		Water for power generation*1	Wastewater*2
Thermal power	Shin-Kokura	30	14
	Karita	51	8
	Buzen	21	14
	Matsuura	103	38
	Ainoura	10	6
	Shin-Oita	51	37
	Reihoku	205	62
	Sendai	27	8
Nuclear power	Genkai	52	29
	Sendai	39	30
Total		589	246

*1 Amount of consumption deducted for daily use from external input (city water, well water, etc.). Does not include seawater used for cooling water or water circulating in the power station.
*2 Amount of wastewater properly treated by wastewater treatment equipment at each power station.

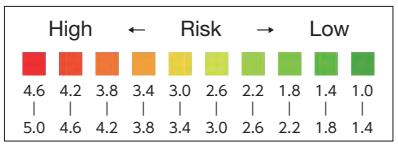
Water Usage for Power Generation and Wastewater Volume at Thermal and Nuclear Power Stations

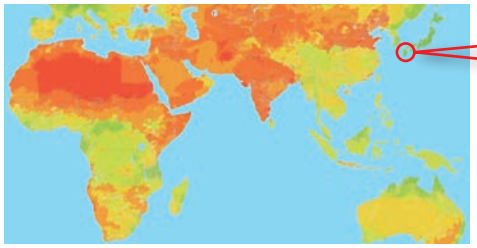


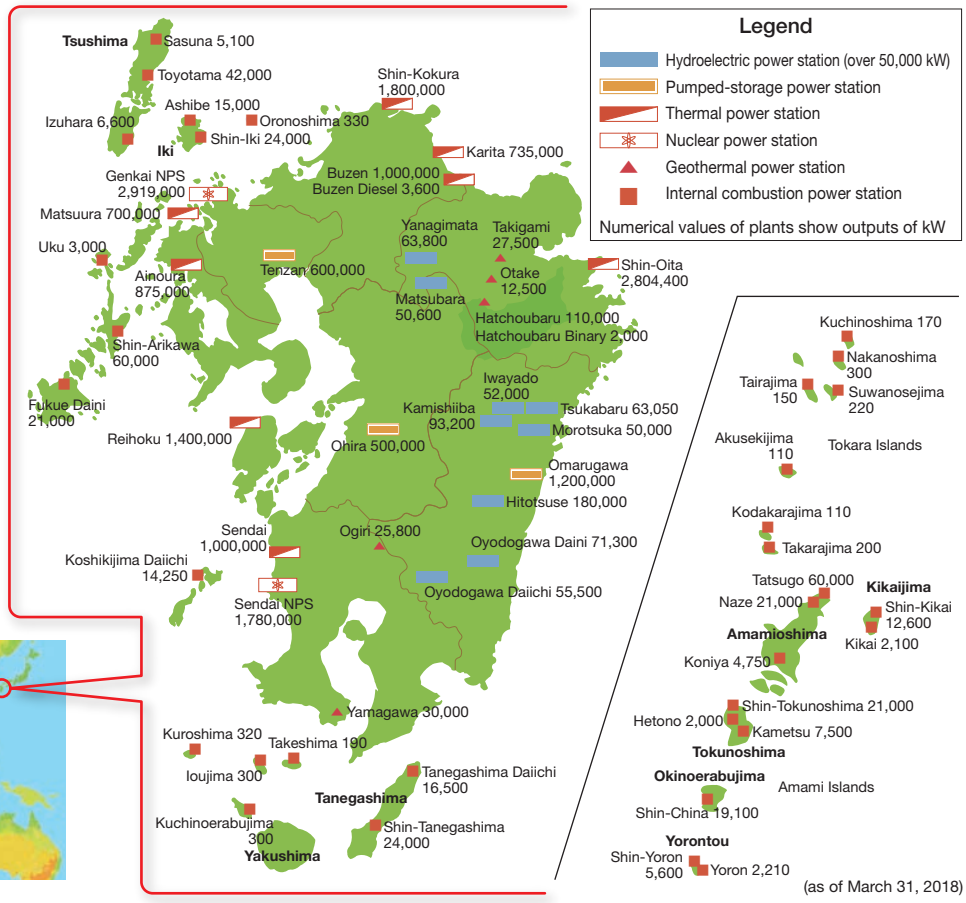
t= metric ton (tonne)

Water Risk Assessment

According to the Water Risk Filter of the World Wide Fund for Nature (WWF), in the Kyushu area where we have installed power stations that use freshwater or seawater, there is no danger of water shortage. We also endeavor to manage water used in power generation and wastewater properly.







(as of March 31, 2018)

Created internally, based on "The Water Risk Filter" from the World Wildlife Fund (WWF) website

4 Collaborating with Communities

Kuju Bogatsuru Marshland Environmental Preservation Activities

The Kuju Bogatsuru Marshlands are located in western Oita Prefecture and contain approximately 53 hectares (131 acres) of high-altitude marshlands surrounded by the Kuju Mountains.

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. Hiijidake (on land owned by the Kyushu Electric Power).

The ecosystem was registered in 2005 through the Ramsar Convention, an agreement which seeks to protect globally important wetlands.

Kyuden Mirai Foundation website (Japanese only)
(www.kyuden-mirai.or.jp)

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 FY2017, a group of 345 volunteers made up of people from the local community, Kyuden Group employees, their families and others, took part in the controlled burning activities.

Cutting grass to prepare a fire protection zone

Controlled burning—the entire wetland is covered in flames

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 Kyuden 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 FY2017, approximately 20 Kyuden Group employees took the course.

Practical instruction in the use of a grass cutter

Safety instruction to raise awareness of safety

Kyushu Azalea Conservation and Mountain Trail Improvement Activities

We clear away trees and plants (such as panicled hydrangea) which hinder the growth of the Kyushu azalea (a species classified as Near-Threatened 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 activities held in April and November of 2017 were carried out with the help of 184 volunteers, including current and former Kyuden Group employees.

Clearing obstructing trees

Mountain trail improvement

Bogatsuru Leaflet Production and Distribution

In addition to ongoing activities in the Kuju Bogatsuru Marshlands, to follow the "conservation and utilization" principles of the Ramsar Convention, we laid down mats with brush bristles at trailheads that hikers are requested to wipe the bottom of their shoes on before hiking to prevent the seeds of non-native plant species from entering the area. We also produce and distribute rules for protecting the marshland, an area guide map, and leaflets about seasonal flowers.

Bristled mat to remove non-native plant seeds from hikers' shoes

Leaflet

Preserving Biodiversity

To continue preserving the abundant nature of Kyushu with due consideration for biodiversity, we manage company-owned forest land and green belts at our power stations. We also engage in efforts to protect the familiar plants and animals of Kyushu that are threatened with extinction.

Proper Management of Company-Owned Forests and Land

To ensure stable supplies of water for hydroelectricity generation, Kyushu Electric Power manages 4,447 hectares (10,988 acres) of company-owned forest land, mainly in the Aso–Kuju National Park area. Through headwater conservation, CO_2 absorption, and other means, we are working to maintain and enhance the public functions of our forest holdings. In March 2005, we acquired forest management certification* from the Forest Stewardship Council (FSC), confirming that appropriate forest management is being conducted. This was a first for an electric power company in Japan.

We are supplying some of the corporate forest's Japanese cedar wood as material for a large wooden roof to cover the stands at the New National Stadium (which will host the 2020 Summer Olympics).

*Certification issued by the Forest Stewardship Council (FSC, headquartered in Germany) for environmentally conscious forest management

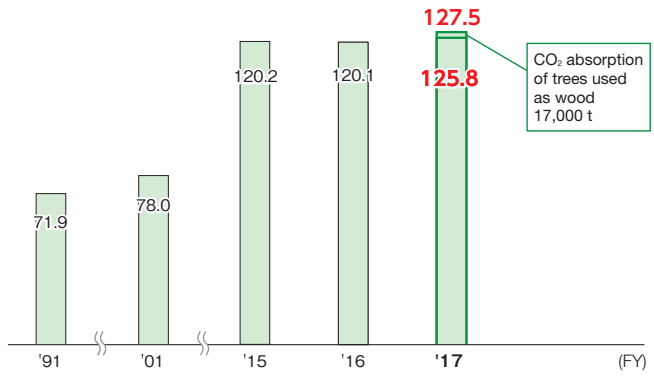
CO_2 Absorption and Fixation by Company-Owned Forests

The CO_2 absorbed and fixed by company-owned forests is calculated to be 1,258 thousand metric tons for company-owned forest land as a whole, even if we subtract 17,000 metric tons of CO_2 absorbed by trees harvested for use as timber.

Company-owned forest (Lake Yamashita in Yufu City, Oita Prefecture)

CO_2 Absorption and Fixation by Company-Owned Forests

Unit: 10,000 t-CO_2 t = metric ton (tonne)



Note 1: Calculated based on measured values from forest survey according to Japan's national greenhouse gas inventory calculation method

Note 2: The amount of CO_2 absorption until FY'01 does not include trees younger than 15 years

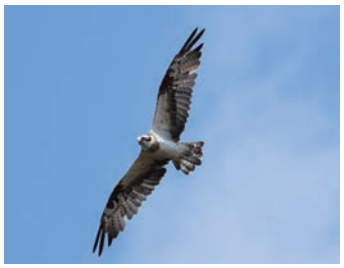
Biodiversity Survey on Diversity at the Kuju Kyuden Forest (Kyushu Rinsan Co., Inc.)

Kuju Kyuden Forest* is the name of our company-owned forest in Yufu City, Oita Prefecture (by Lake Yamashita). This is where the Kyuden Mirai Foundation conducts environmental education activities, aiming to ensure an environment filled with biodiversity. Here, our group company Kyushu Rinsan Co., Inc. began a field survey to help in this effort. (*More details on p. 42)

For the field survey, we brought in experts to give advice on creating an environment where diverse species of creatures can thrive. In addition, we have confirmed a wide range of species, including species classified as Near-Threatened such as the spotless grass yellow*1 butterfly and the osprey*2 in Oita Prefecture.

We will conduct the biodiversity survey throughout the four seasons and use the results as indicators to visualize the results of our efforts.

Spotless grass yellow butterfly



Osprey

Surveying the area

*1 Spotless grass yellow: a small butterfly of the family Pieridae that lives in riverbeds and on grassy embankments. Although it was considered to be commonplace in the past, its numbers have declined sharply due to work on riverbanks, and extinction is a nationwide concern.

*2 Osprey: A bird in the hawk family native to coastlines, estuaries, lakes and the like; it nests atop big trees and rocks, and on cliffs. Due to chemical contamination of the fish it feeds on, osprey numbers are declining worldwide.

Biodiversity Survey at Facilities Administered by Our Group (Kyushu Rinsan Co., Inc.)

Kyushu Rinsan Co., Inc., a group company, has been designated by the city of Fukuoka as the administrator of Kanatake-no-Sato Park in the Nishi-ku district, and is working with the Wild Bird Society of Japan's Fukuoka branch to conduct surveys in the park, primarily to monitor wild birds.

Surveys are also being conducted on flowering plants, animals, insects, and other organisms. In FY2017, 12 surveys were conducted, confirming the existence of 136 types of flowering plants and 62 species of wild birds, including two species found for the first time on the park grounds, including the dark-sided flycatcher, a small passerine bird.

Also, egg-laying by the Japanese brown frog was confirmed in the marshy areas and waterways of the park. The frog is a species designated as Vulnerable in Fukuoka Prefecture. A survey of egg masses is being carried out, along with conservation. In FY2017, 349 egg masses were confirmed in the park.

Brown hawk-owl
(Helped to get untangled from string in a field.)

Egg mass of the Japanese brown frog

Energy and Environmental Education for the Next Generation

We are carrying out activities throughout Kyushu aimed at the next generation to foster interest in energy and the environment.

Environmental Education at Kuju Kyuden Forest in Yufu City, Oita Prefecture

We manage a headwater conservation forest to ensure stable supplies of water for hydroelectricity generation. The rich natural environment of Lake Yamashita (Yufu City, Oita Prefecture) located in this vast forest is the location for an experiential environmental education program run by the Kyuden Mirai Foundation together with our group company, Kyushu Rinsan Co., Inc. A total of 24 sessions with a total of 1,280 participants were conducted in FY2017.

Through this type of environmental education, we aim to raise environmental conservation awareness among children and teach them through classroom lectures about the current global warming situation and the role of forests. The program's objective is to protect the environment in Kyushu into the future. The hands-on program combines a look into the fun of the forestry profession, observing the forest, and working with wood.

Learning how to cut down a tree

Observing the forest, in the midst of nature

Woodworking—the struggle of working with hard wood

Environmental Education for the Next Generation

We offer visiting school talks on energy and environmental issues throughout Kyushu for fun learning.

In FY2017, 529 classes were conducted in elementary and junior high schools, reaching 16,000 children and getting them to think about energy and the environment.

Children fully engaged in a class

Awe-inspiring tour of the Sendai Nuclear Power Station

“Eco-Mother” Activities Support Environmental Education

We carry out “Eco-mother” activities to support environmental education for children and to provide environmental information to their parents and guardians.

These activities involve mothers in various parts of Kyushu visiting nursery schools and others as “Eco-mothers” to read picture books with environmental themes, instilling in young children the importance of valuing the environment.

In FY2017, 200 sessions were held, with the participation of approximately 16,000 children, parents and guardians.

In addition, over the past 15 years, we have conducted more than 3,600 sessions in total, reaching about 250,000 kids and adults.

“Eco-mother” activities communicate the importance of the environment

Kyuden Play Forest Activities Across Kyushu

To foster a love of forests in children, we have been conducting hands-on environmental events we call Kyuden Play Forest in various places around Kyushu since FY2016. In FY2017 we increased the frequency of the events, expanding them to other parts of Kyushu.

At such an event, in collaboration with environmental groups, employees from various companies set up booths in the forest for kids and their families to have fun with things like making their own chopsticks, playing nature games, cutting logs, and more.

Making chopsticks from thinned hinoki cypress

A nature game to generate excitement about contact with plants and forest creatures

Cutting a log with a handsaw

Environment Month Initiatives

June has been designated “Environmental Month,” and every year a variety of environmental activities are carried out in different parts of Kyushu. Based on the Kyuden Group’s brand message of each employee working to “make a brighter future for generations to come,” we pursue environmental activities that increase communication with local citizens at each business site.

In FY2017, we enhanced and expanded collaborative efforts with local communities, holding such events as releasing sweetfish fry (juvenile fish) into the Mimikawa river system and harvesting sweet potatoes (and planting them) on power station premises.

Joining in with Local Citizens

At 103 of our business sites, the Kyuden Group joined together with citizens in cleanup activities or flower planting run by local authorities, as well as exhibiting at environmental events.

Planting flowers with daycare children (Kumamoto Higashi Power Distribution Business Sites)

Cleaning the beach with local citizens (Sendai Power Station)

Environmental Education for the Next Generation

We carried out a range of next generation-focused environmental education activities at 21 business sites aimed at local daycare and elementary school children. Among the various activities were environmental and energy-related school talks, sweet potato harvesting (and planting) and sweetfish fry river releases.

Children getting dirty planting sweet potatoes (Karita Power Station)

Releasing fry and hoping they grow (Mimikawa Hydropower Development Office)

Green curtains of goya (bitter gourd) and morning glory plants (Asahi Kindergarten, affiliated with Nakamura Gakuen University)

5 Promoting Environmental Management

Preventing Violations of Environmental Laws/Regulations and Environmental Accidents

In FY2017 no recommendations or orders for improvement were received, nor any penalties applied, based on environmental laws and regulations.

Raising Employee Environmental Awareness

Meetings for Environmental Management Officers

We have appointed environmental management officers to be responsible for environmental activities at all of our business sites. We hold a Meeting for Environmental Management Officers once a year to give these managers the opportunity to review environmental trends in Japan and abroad and find out about and discuss our Environmental Action Plan for that fiscal year, which covers plans for environmental activities throughout the company.

Meeting for environmental management officers from business sites

Training and Lectures for Environmental Management Officers

We carry out general environmental affairs-related in-house training, such as providing instruction in knowledge needed to carry out and comply with environmental management standards, aimed at the environmental management officers in our Group offices. Four sessions were held in FY2017, and were joined by 114 employees.

Employees also actively participate in outside training and lectures related to the environment, with a total of 216 employees from 23 business sites attending such events in FY2017. Additionally, in-house and external instructors ran courses for employees at 10 business sites during Environment Month, attended by a total of 138 employees.

Environmental management officers train through group discussions

Cultivating Environmental Experts

We promote and support employees who want to acquire environment-related qualifications to become energy managers, pollution control managers, etc.

■ Number of Qualifiers (March 31, 2018)

Unit: people

Qualification	No. of qualifiers
Qualified Person for Energy Management	740
Energy Manager for Type 2 Designated Energy Management Factory	52
Pollution control managers (including pollution prevention chief managers)	718
Waste treatment facility technology managers	179
Specially-controlled industrial waste management officers	585