Measures for Stable Supply of Electricity and Environmental Preservation

The J-POWER Group operates power stations that it owns in Japan, engages in long-term wholesale power supply to electric power companies (general electric utilities) in various regions of the country, engages in the wheeling business using its own power transmission and substation facilities, conducts independent power producer (IPP) business, and supplies wholesale power-to-power producers and suppliers (PPS).

Based on the principle of achieving harmony between energy and the environment, the entire Group takes action to contribute to the stable supply of electricity throughout Japan through these business activities and to preserve the natural environment by minimizing the impact of its business activities.

Outlook for Electric Power Industry in Japan

Wholesale Power Supply Business and Wheeling Business

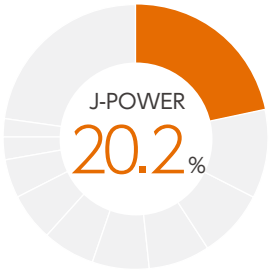
Thermal Power

Coal-Fired Power Stations Account for the Largest Share of Primary Baseload in Japan

Our seven locations throughout Japan have a total output of 8.37 GW, making our share of coal-fired power facilities the largest in the country. Electric power sold in the 2013 fiscal year was 54.3 billion kWh.

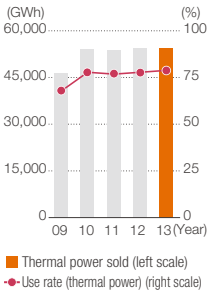
J-POWER's coal-fired power generating facilities are highly cost competitive compared to oil, LNG, and other fuels and are a key power supply for electricity demand baseload, and as a result are power supplies that offer high use rates and excellent economic efficiency.

J-POWER Share of Output from Japan's Coal-Fired Power Facilities (as of the end of March 2014)



Source: Based on Federation of Electric Power Companies, "Electric Power Industry Handbook" and Agency for Natural Resources and Energy, "Electric Power Statistics"

Thermal power: Electricity sold/use rate



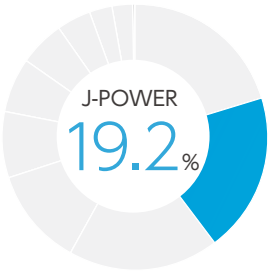
Hydroelectric power

Essential Power Source for Meeting Peak Demand

With 58 locations throughout Japan and a total output of 8.56 GW, we have the second-largest share of hydroelectric power facilities in the country. Electric power sold in the 2013 fiscal year was 8.8 billion kWh.

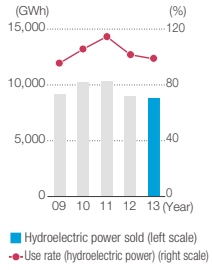
J-POWER's hydroelectric power facilities are valuable CO_2-free power sources that can respond quickly to changes in electricity demand. In addition, the facility output of each power station is high, so hydroelectric power facilities are used primarily as peak power supplies to respond to daily and seasonal changes in electricity demand, contributing to the stability of electricity supply and the grid in regions throughout Japan.

J-POWER Share of Output from Japan's Hydroelectric power Facilities (as of the end of March 2014)



Source: Agency for Natural Resources and Energy, "Electric Power Statistics"

Hydroelectric power: Electricity sold/use rate



Power Transmission, Substation (Wheeling), and Communications

Key Infrastructure Supporting Japan's Electric Power Grid

J-POWER owns approximately 2,400 km of backbone transmission lines including trunk lines that connect the different regions of Japan, four substations that supply power to major urban areas, four AC/DC conversion stations that provide interconnections within regions, and one frequency converter station that links eastern and western Japan, which use different frequencies. Our electric power security communication facilities include microwave radio circuits throughout Japan that extend over a total distance of approximately 5,900 km. These are extremely important facilities for comprehensive operation of Japan's electricity grid.

Other Electric Power Business

Developing Power Generation Businesses that Respond to Industry Liberalization and Support Low-Carbon Society Needs

In the wholesale power supply business, J-POWER has three IPP facilities with total capacity of 520 MW located in different areas of Japan and three facilities with total capacity of 320 MW used in the wholesale power supply business with PPSs located in different regions. We own 19 wind farms throughout Japan with a total capacity of 380 MW, giving us the number-two share of wind power generation capacity in Japan. All these businesses are operated through J-POWER subsidiaries or affiliates.

Report Incident Concerning the No. 2 Unit at the Matsuura Thermal Power Station (Fall of Low-Pressure Turbine Rotor)

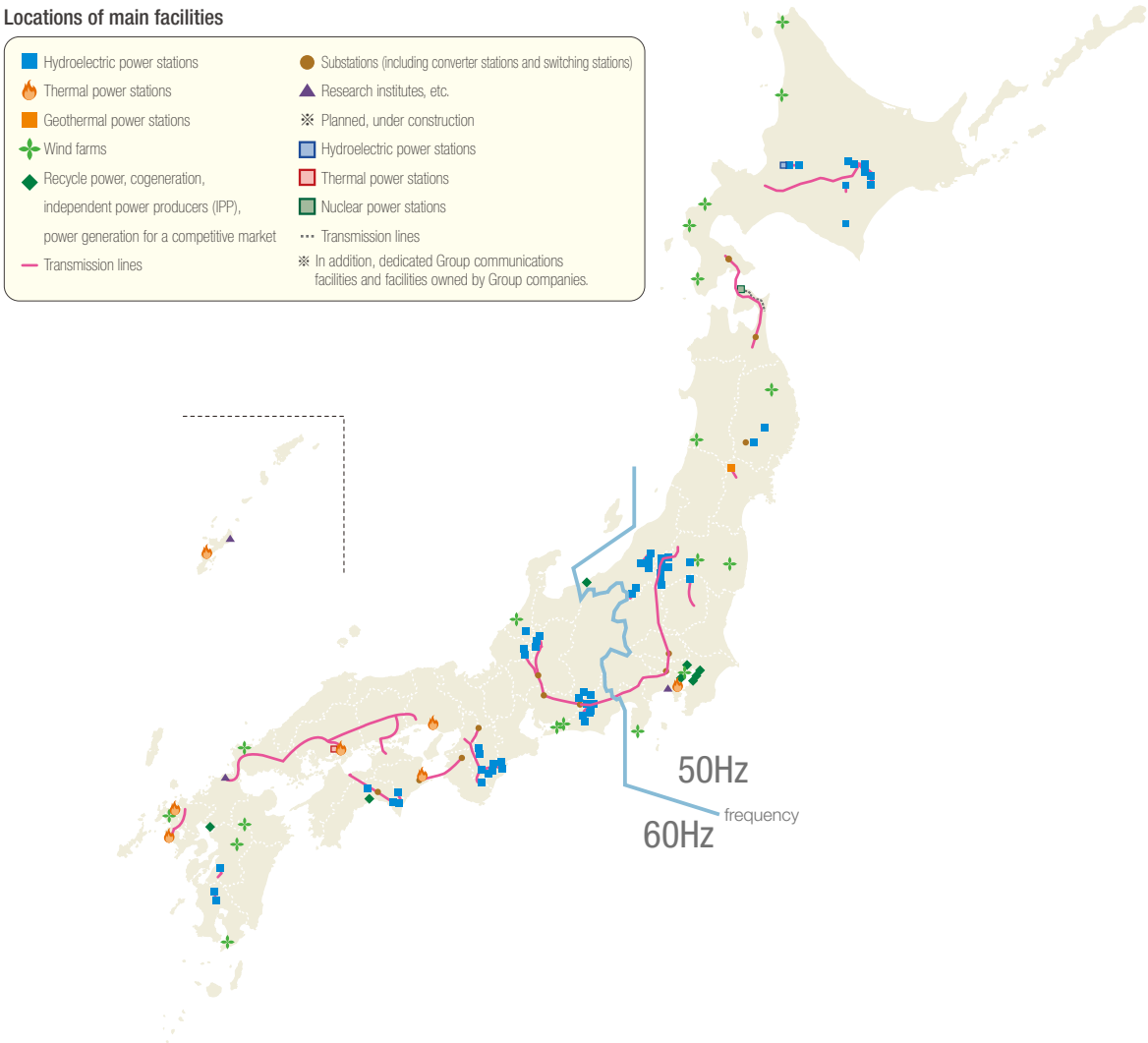
During a periodic inspection of the Matsuura Thermal Power Station No. 2 Unit (rated capacity: 1 GW; located in Matsuura City, Nagasaki Prefecture) on March 28, 2014, a low-pressure turbine rotor weighing approximately 100 tons that was suspended fell, causing damage. This incident had a significant impact on electricity supply, and J-POWER apologizes for the inconvenience and concern that it has caused to its customers and others.

Immediately after the incident occurred, a companywide task force headed by J-POWER's president was established to take action concerning the earliest possible restoration of operation and identification of the cause of the incident. Based on its investigations of an early restoration of operations, a plan that anticipates resumption of operations and full restoration at about the end of June 2015 by manufacturing a new low-pressure turbine rotor and provisional restoration through partial loading starting in about mid-August 2014 (with a capacity of approximately 400 MW) to supply power until full restoration can be achieved is being implemented (these details were announced May 29, 2014).

To identify the cause of the incident and prevent reoccurrence, J-POWER established an Expert Assessment Committee including outside experts to incorporate the opinions and verifications of the situation. The Committee is conducting an extensive investigation of the causes and will take measures to prevent reoccurrence.

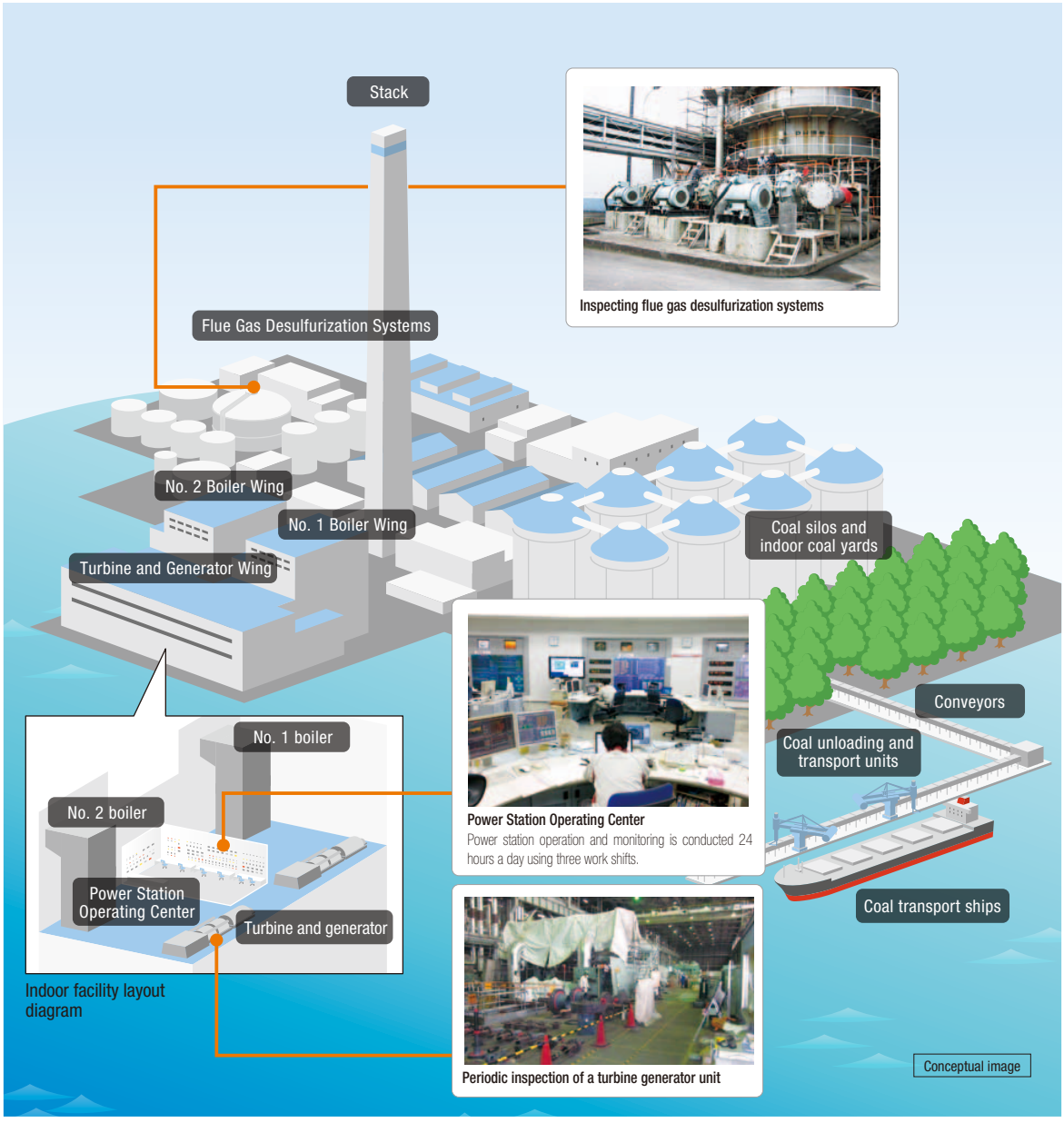
In consideration of the seriousness of this incident, the J-POWER Group will make every effort for the earliest possible restoration of full operation and will take additional measures to ensure the reliability of its facilities and recover the trust of its stakeholders.

Locations of main facilities



Thermal Power

The J-POWER Group's coal-fired power generating facilities maintain high use rates as economical and stable base power supplies. To achieve this, appropriate maintenance of generating facilities is reliably conducted and we make efforts to limit declines in thermal efficiency in conjunction with aging and the occurrence of problems with facilities and to maintain and enhance facility reliability.



Inspecting flue gas desulfurization systems

Power Station Operating Center
Power station operation and monitoring is conducted 24 hours a day using three work shifts.

Indoor facility layout diagram

Periodic inspection of a turbine generator unit

VOICE

Employee Attitudes

I work on operating the Tachibanawan Thermal Power Station (third shift). The power station operators conduct day-to-day operation and monitoring of the generating facilities and strive to maintain stable operation by quickly identifying any abnormalities in the equipment, taking responsive measures, and preventing shutdown of the power station by conducting on-site patrols. Despite these efforts, equipment problems can occur at any time of day or night. There are various causes of problems including aging equipment and natural disasters. Under these types of circumstances, operators must objectively assess the situation and make rapid and accurate responses. To do this, we engage in regular reporting, communication and consultations and maintain close communications among operators to improve teamwork. In addition to learning operations-related information, we use operations simulators to enhance operating skills. Going forward, we will continue to use occupational safety methods such as pointing and calling to ensure reliable operations, maintain strict compliance with environmental laws and regulations, and contribute to stable electric power supplies.

J-POWER Tachibanawan Thermal Power Station
Generating Group
Kiyoto Sugami

The Coal Value Chain

The J-POWER Group is involved in the entire value chain for coal, including procurement, transport, and receiving of the coal. We are building a global system that enables stable procurement of the coal we use in our coal-fired power stations.

Procurement

Coal Mine Project in Australia

The J-POWER Group began its participation in the Blair Athol Coal Mine, in the state of Queensland, in 1982. We have been investing in coal mining interests since that time, and as of the end of fiscal 2013, we own coal mining interests in the states of Queensland and New South Wales, Australia.

For the future, we will be scrutinizing trends in coal supply-and-demand balance and among competing companies for stable procurement of the coal as we examine new, cost-competitive projects, and as we pursue participation in new coal mine projects.

Clermont Coal Mine (Australia)

Transport

Stable Transport of Coal

The J-POWER Group uses approximately 21 million tons of coal per year. Transporting this coal to the various power stations requires 200 or more ship voyages per year. We will introduce dedicated vessels* and so on for this purpose as part of our measures to provide stability in the transport of coal.

JP CORAL

Receiving

Management of Coal at Power Stations

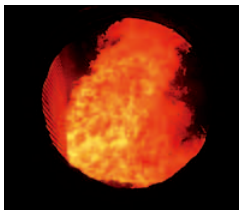
On-site at the power stations, the coal that has been received needs to be managed according to its particular characteristics. In order to control coal temperatures in the coal yard, we use infrared cameras and install water sprinkler systems in addition to enacting 24-hour systems of control.

Matsushima Thermal Power Station coal yard

Combustion

Creating Steam

Coal stored in the coal yard is finely ground into a powder by a coal pulverizer. The powdered coal is combusted by burners and water is heated in a boiler to generate high-temperature, high-pressure steam.



View inside a boiler

Power generation

Generating Electricity

The high-temperature, high-pressure steam spins a turbine. The high-speed turbine generates electricity by spinning a generator.

The turbine generator in the Isogo Thermal Power Station

Environmental preservation

Effective Use of Ash

The coal ash produced from burning coal is effectively used as a raw material in cement and other applications (see p. 31).

Fly ash mortar

* **Dedicated Vessel:** A ship that is built and owned by a shipping company for the special purpose of carrying cargo exclusively under a long-term contract.

VOICE

Ash Processing Facility Inspection and Maintenance

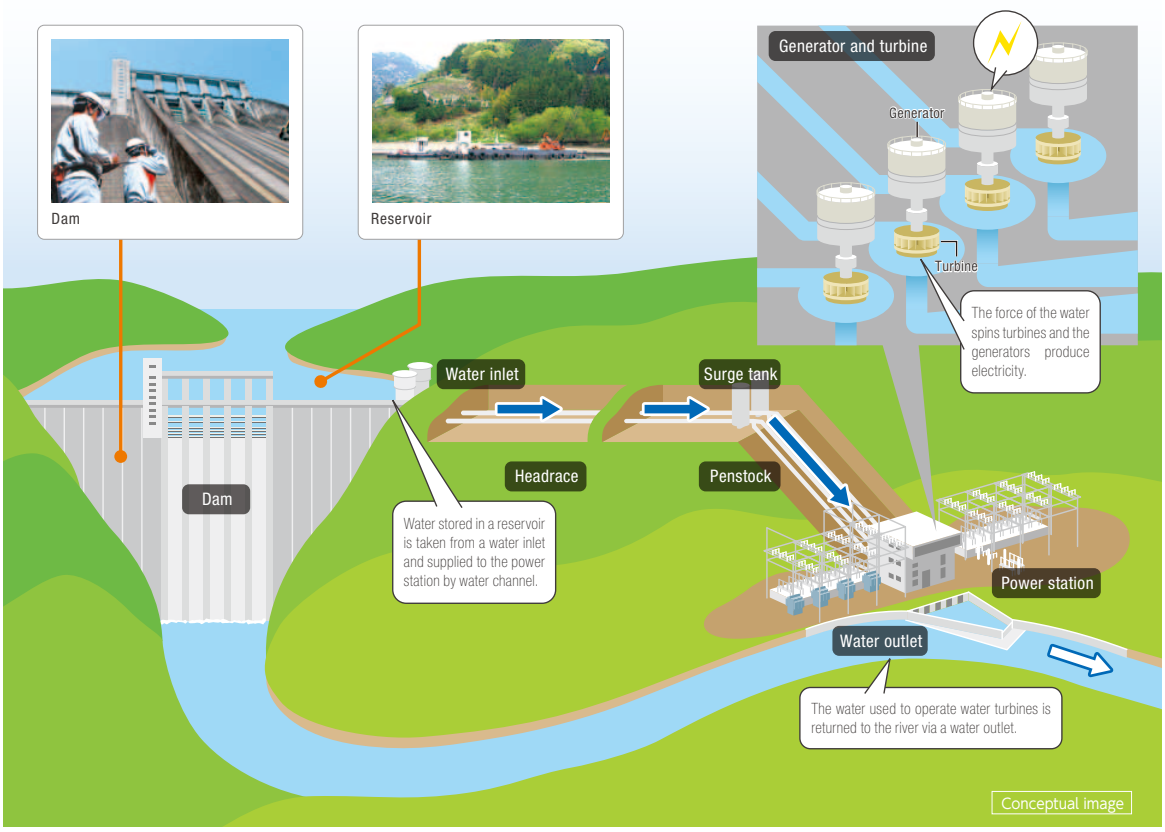
Coal-fired power stations have ash-processing equipment to process the coal ash that was burned in the boiler furnaces. This is simply processing the combusted ash, but abrasion from the powder, which is at a temperature of about 200°C, occurs continuously and facility maintenance requires an extreme amount of labor. Each time major inspections are conducted to repair a single problem, other problems in the pipes before and after the problem area and in the boiler may be discovered, so ordinary maintenance* is a never-ending job. I worked in the Operating Group for 18 years until this past September, and I have now been in the Maintenance Group for just six months, and every day I learn something new. In order to complete more than 20 work processes during shutdowns (10 days effective) for interim inspections and so on, I am extremely busy coordinating with operating personnel and employees of cooperating companies, procuring materials, negotiating with customers, and so on, but I feel that my work is meaningful when I can complete the on-site work processes efficiently and without problem. I hope to continue experiencing personal growth and to contribute to the stable operation of the power station.

* **Ordinary maintenance:** unplanned repairs performed when a problem occurs.

JPec Co., Ltd.
Maintenance Group, Matsuura Company
Yohei Yamashita

Hydroelectric power

J-POWER's hydroelectric power facilities are able to respond rapidly to changes in electricity demand and have high output per power station. For these reasons, they make significant contributions to electricity supplies in various regions around Japan as peak power supplies that can respond to daily and seasonal peak demand periods. In addition, hydroelectric power is a valuable, entirely domestic energy source and accounts for the J-POWER Group's largest renewable energy generation facilities, comprising 14% of Japan's total renewable energy capacity. As a result, hydroelectric power is a core presence for ensuring stable electricity supplies and reducing CO_2 emissions.



VOICE

Contributions in Both the 50 Hz and 60 Hz Regions

We conduct maintenance, inspections, and construction of the frequency converter station that connects the five power stations on the Tenryu River, which is also known as the "turbulent Tenryu," and its tributaries with 50 Hz and 60 Hz electric power. Because of recent circumstances regarding electric power, much of the work performed with the generators shut down is conducted on holidays or at night, and we seek to contribute to stable electric power supplies by responding quickly to problems with the facilities whether they occur during the day or night. There are generators that can produce both 50 Hz and 60 Hz power here, and I am confident that we are making contributions to both regions.

JPHYTEC Co., Ltd. Chubu Company
Deputy manager, Sakuma Office
Sohachi Sasaki

VOICE

Civil Engineering Facility Maintenance, Management, and Emergency Recovery

Civil engineering personnel at the Koide Power Station manage the civil engineering facilities for five dams and eight power stations including the Okutadami Dam. We conduct inspections, measurement, and repairs of dams and water channels, updating of aging facilities, and water discharges from dams to prevent any impairment of generating operations.

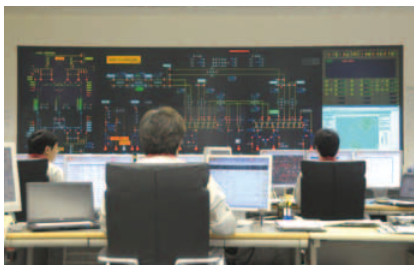
In July 2011, we repaired a road for power station management that had been damaged by torrential rains in Niigata and Fukushima Prefectures. The road was necessary for operation and management of the power station and is located in an area that is at risk of landslides from nearby mountains even during normal rainfall, so we conducted the construction with careful consideration for safety.

J-POWER East Regional Headquarters
Koide Power Station
Miki Hamada

The J-POWER Group implements measures on a daily basis to increase the reliability and efficiency of its existing hydroelectric power facilities. To use hydroelectric resources, a CO_2-free, renewable energy source, we are actively developing small and medium-sized hydroelectric power stations, one of the policies set forth in the Energy Basic Plan, and taking measures to increase generating capacity including installing new facilities and replacing facilities at existing dams to enhance use of facilities and resources.

Stable Operation of Hydroelectric power Facilities

The J-POWER Group operates 58 hydroelectric power stations located throughout Japan and monitors and controls each power station under a 24-hour system with three regional control centers located in Hokkaido, Saitama Prefecture, and Aichi Prefecture. At each power station, we conduct daily inspections for early detection of any abnormalities in facilities and prevention of accidents before they can occur so that J-POWER can provide stable power to the entire country.



North Regional Control Center (Hokkaido)

Measures for New Hydroelectric power Facilities

One measure we are pursuing to enhance the value of existing hydroelectric power facilities is concurrent updating of principal electrical equipment at the hydroelectric power stations that is becoming obsolescent. We plan to implement updates at the Akiba No. 2 Power Station starting in of 2015. At the old Isawa No. 1 Power Station, which began operating in 1954, we constructed a new power station that makes use of the Isawa Dam, a dam being constructed by the Ministry of Land, Infrastructure, Transport and Tourism directly above the power station, and began operations in July 2014 (see VOICE below).

To utilize currently unused hydroelectric power resources, we are actively developing small and medium-sized hydroelectric power stations. Construction of the Kuttari Power Station began in October 2013, and the station will use river maintenance discharges from the existing Kuttari Dam to generate a maximum of 470 kW. We aim to begin operations in April 2015, and work is currently underway on rebuilding some of the discharge facilities and constructing the turbine generator facilities.

A view of the generator (rotator) suspended (Isawa Hydroelectric Power Station, Iwate Prefecture)

VOICE

Using New Hydroelectric Power Facilities for Handing down Technologies

We have been working in construction at the Isawa No. 1 Power Station (located in Oshu City, Iwate Prefecture; maximum output of 14.2 MW) since February 2011.

Isawa No. 1 Power Station has one large and one small water turbine, and the small turbine is designed to make maximum use of river water when non-irrigating water flows are low. I coordinated dam construction and corporate office construction in a narrow worksite, and the work was conducted with a high level of teamwork by every member and with the highest priority on safety. We also implement various measures to protect the environment, including (1) preventing pollution of river and bodies of water and soil contamination, (2) preventing excess noise and vibration, (3) performing proper management of construction bi-products, (4) preserving scenery and cultural assets, and (5) protecting plant and animal life in surrounding areas.

There is a shortage of sites for new hydroelectric development, and this new construction, the first by J-POWER in about 10 years, has been valuable experience for handing down technologies. I hope to enable young employees to build high-quality power stations and to experience the joys of making things.

J-POWER Isawa hydroelectric Construction Manager
Yoshihiro Goda

Renewable Energy

We are actively undertaking measures concerning renewable energy under the new Energy Basic Plan as a promising and diverse domestic energy source that can be produced in Japan and contribute to ensuring energy safety. The J-POWER Group's renewable energy initiatives are diverse and include contributing to stable electricity supplies through existing hydroelectric power, wind power, and geothermal power stations, for which we have the second-highest shares among each type of domestic generation facilities; developing new power sources such as wind and geothermal power; and conducting research and development on offshore wind power. Renewable energy is a CO_2-free energy source that does not produce greenhouse gases such as CO_2 at the time of generation. The J-POWER Group is moving forward with the Ohma Nuclear Power Station plan and expanding the use of renewable energy with the aim of increasing CO_2-free energy sources.

Kaminokuni Wind Farm (Hokkaido)

Hibikinada Solar Power Station (Kitakyushu City)

Wind Power

The J-POWER Group made an early entry into the wind power business with the start of operation of the Tomamae Winvilla Wind Farm in December 2000. We currently have 19 wind power facilities with a total generating capacity of approximately 380 MW located nationwide. We have the second-highest share of wind power facilities in Japan.

We conduct business by utilizing the technologies and know-how developed over many years as a wholesale power provider and using integrated implementation systems that cover everything from wind surveys to plans, construction, operation, and maintenance as strengths. Construction is currently underway at the Minami Ehime Wind Power Plant (located in Uwajima City, Ehime Prefecture) and other facilities and we are moving forward with new development projects.

There are high expectations for offshore wind power in Japan, which is surrounded by seas on all four sides. J-POWER is conducting a demonstration project relating to offshore wind power in waters off Kitakyushu City in Fukuoka Prefecture (outsourced and joint research for NEDO*) and consistently conducting research, deepening our technical knowledge regarding offshore wind power generation.

* The New Energy and Industrial Technology Development Organization.

Embedded-type offshore wind power generation equipment (Kitakyusyu city)

VOICE

Measures to Increase Wind Power Operating Efficiency

Maintaining and improving the operating efficiency of wind power stations requires systematic inspections and repairs and responses to sudden problems. The Nikaho Highlands experience strong winds from autumn to spring, but the winds tend to be calm during the summer so inspections and repairs are systematically conducted during the summer. If a problem occurs during the high-wind period, we make every effort to respond quickly and minimize shutdown times. The working environment on the Nikaho Highlands is extreme during the winter, but I am able to perform my work with the cooperation of our local partners. The turbines are designed to rotate, and for maintenance personnel such as myself, there is nothing better than to see every turbine in operation. I hope to enhance my maintenance skills even further in the future.

J-Wind Service Co., Ltd.
Manager, Nikaho Office
Kimiaki Sugamata

Geothermal Power

Geothermal power is a CO_2-free power source that emits almost no CO_2 at the time of generation and is also a renewable energy source capable of providing a stable supply of electricity throughout the year without being affected by weather. For these reasons, there are high expectations for the future development of geothermal power.

The J-POWER Group owns and operates the Onikobe Geothermal Power Station in Osaki City, Miyagi Prefecture (output: 15 MW), and joined in April 2010 with Mitsubishi Materials Corporation and Mitsubishi Gas Chemical Company, Inc. to establish the Yuzawa Geothermal Co. Ltd. with the aim of building new geothermal power stations in the Wasabizawa and Akinomiya areas of Yuzawa City in Akita Prefecture. The environmental impact assessment procedures are currently underway.

Onikobe Geothermal Power Station (Miyagi Prefecture)

CLOSE UP

Environmental impact assessment in the Wasabizawa Geothermal Power Station (provisional name) siting plan

The environmental impact assessment report procedures for creation of a new geothermal power station in Yuzawa City, Akita Prefecture began in November 2011 with the start of the operation procedures followed by approximately one year of on-site assessment from June 2012 to September 2013. The assessment is currently in the environmental impact assessment report review phase.

This is the first time that environmental impact assessment procedures have applied to a geothermal power station since the Environmental Impact Assessment Act came into effect in 1999. Despite the lack of past precedents, the process is ongoing including briefings on the procedures for residents and individual briefings.

The on-site assessment consisted primarily of an atmospheric environment assessment, water environment assessment, and wildlife assessment to forecast the impact of the power station construction and operation on the atmosphere, water quality, wildlife, and so on, investigate issues that should be kept in mind to preserve the environment, and determine the current status of important standards.

When conducting on-site assessments in all four seasons of this mountainous region with heavy snowfall, various measures had to be taken other than the assessment itself including securing transportation access and power supplies and taking measures to ensure safety and protection against the cold. With the understanding and cooperation of local people involved with the project as well as experts, the assessment was successfully completed without any accidents or incidents.

Atmospheric Environment Assessment

Wildlife Assessment

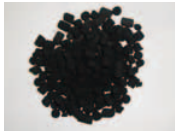
Water Environment Assessment

Promoting the Biomass Mixed Combustion

Forestry offcut and sewage sludge are carbon neutral biomass that absorb and release equal amounts of CO_2 over their life cycles, but in Japan, much of these resources remains unused.

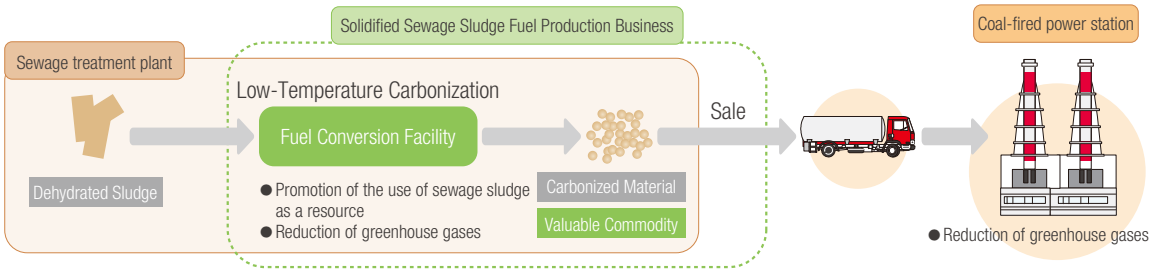
The J-POWER Group is reducing the carbon emissions of coal-fired power stations by utilizing unused biomass for mixed combustion at power stations.

Status of biomass mixed combustion initiatives

Biomass resources	Wood		Sewage sludge		Carbonization of ordinary waste for use as fuel
	Chips	Pellets	Low-temperature carbon fuel	Oil-desiccated fuel	
Examples of biomass fuels					
Characteristics of biomass fuels	Scrap construction timber is chipped and used. Comprise 50 to 70% of the calorific value of coal.	Forest offcut is dried, ground, and formed into pellets. They have about 70% of the calorific value of coal.	Sewage sludge is carbonized at a lower temperature than the incineration temperature used in conventional processing in order to manufacture fuel that produces less N_2O, a greenhouse gas, than conventional processing. The fuel produces little odor and has 50-70% of the calorific value of coal.	Sewage sludge and waste cooking oil are mixed and heated to remove the water content and produce fuel. This fuel has a calorific value about the same as that of coal.	General waste is carbonized to create a fuel able to be stored for long periods. It has about half the calorific value of coal.
Sites for the production of biomass fuel	Nagasaki City, Nagasaki Prefecture	Kobayashi City, Miyazaki Prefecture*	(1)Hiroshima City, Hiroshima Prefecture* (2)Kumamoto City, Kumamoto Prefecture* (3)Osaka City, Osaka Prefecture*	Fukuoka City, Fukuoka Prefecture	Saikai City, Nagasaki Prefecture*
Mixed combustion in coal-fired power stations	Matsuura Thermal Power Station	Matsuura Thermal Power Station	(1)Takehara Thermal Power Station (2)Matsuura Thermal Power Station (3)Takasago Thermal Power Station (Mixed combustion is being tested)	Matsuura Thermal Power Station	Under consideration

* Sites at which J-POWER is also involved in the manufacture of biomass fuel.

Conceptual diagram of the biomass fuel business (using the solidified sewage sludge fuel production business as an example)



Power Transmission, Substation, and Communications Facilities

J-POWER's transmission facilities are used not only to send electricity that the J-POWER Group generates to users, but also utilize extra-high-voltage AC and DC transmission lines to link Honshu with Hokkaido, Shikoku, and Kyushu, connecting the electrical grids of different regions. The Sakuma Frequency Converter Station, which enables the transmission of electricity between the different frequencies of eastern and western Japan, and the Hokkaido-Honshu Electric Power Interconnection Facility, which links Honshu with Hokkaido via DC transmission lines, support power interchange over wide areas of Japan and contribute to reducing needed spare electric power and maintaining frequencies.

J-POWER has also constructed a nationwide high-reliability information and telecommunications network that uses microwave radio circuits, optical lines, and other communications lines operated by the Group to operate the electric power grid and conduct centralized, remote control of unmanned hydroelectric power stations and dams. These facilities are installed in various environments including mountainous regions and urban areas and are exposed to extreme weather conditions including wind, snow, lightning, and seawater. Consequently, we conduct daily patrols and regular inspections to discover irregularities at an early stage and prevent facility accidents before they can occur.

Honshu-Shikoku Interconnection (Okayama and Kagawa Prefecture)
500,000-volt transmission lines across the Seto Inland Sea to connect Honshu and Shikoku. These transmission lines are connected to backbone transmission lines in Honshu and Shikoku, contributing to stable electric supplies in western Japan.

Sakuma Frequency Converter Station (Shizuoka Prefecture)
This converter station enables the transmission of electricity between the different frequencies of eastern Japan (50 Hz) and western Japan (60 Hz). It is the world's first electricity business frequency converter station built to support efficient electric power operations.

Tsuge Radio Relay Station (Nara Prefecture)
A microwave radio relay station that links power stations, transformer stations, and other facilities. The station is highly reliable in order to ensure uninterrupted communications even in the event of a disaster such as an earthquake or typhoon.

VOICE

Transmission Cooperation of Related Persons is Essential for Maintaining Transmission Facilities

The majority of the facilities in this transmission station have been in operation for more than half a century, and when it was built, the area was wilderness, but now most has been converted to agricultural use including fields and pasturage. As a result, the steel towers are in the middle of farmland, making the cooperation of landowners and others with rights to the land that we have to pass through essential to conduct patrols, inspections, and repairs in order to maintain the transmission facilities. Our fundamental role is ensuring a stable supply of electricity, and we perform maintenance of the transmission facilities while placing a priority on communications with landowners and other related persons.

J-POWER Hokkaido Regional Headquarters
Deputy manager, Kamishihoro Transmission Station
Shiro Sato

Substation Substations are Necessary for Stable Electric Power Supply

The Nagoya Substation is a key facility that links the main Chubu Electric Power Company's 500,000-volt substations and response to a portion of demand in the Chubu region. The substation transforms the voltage and adjusts it to appropriate levels, and adjusts the flow of electricity to ensure stable electric supplies. It is connected directly to users, so if any problems with the facility occur, there will be a direct interruption of power supplies. Because of this, maintenance personnel exercise special care when performing regular patrols, inspections, and work and make every effort to ensure a stable supply of electricity.

J-POWER Chubu Regional Headquarters
Manager, Nagoya Substation
Shinichi Okubo

Communications Securing Radio Communication Circuits While Considering Preservation of the Environment

J-POWER's radio communication circuits and optical communications lines are used for power station remote monitoring and control systems. Radio communication circuits go through relay stations, but when relay stations are located in mountainous areas and trees grow along the propagation paths, the radio signals are interrupted and the signals become week. As a result, it is necessary to remove the trees, and at that time, we confirm the owner of the trees and the trees to be removed and take environmental preservation into consideration, removing only the necessary trees.

J-POWER Hokkaido Regional Headquarters
Deputy Manager, Hokkaido Telecommunication Engineering Center
Akio Otsuka

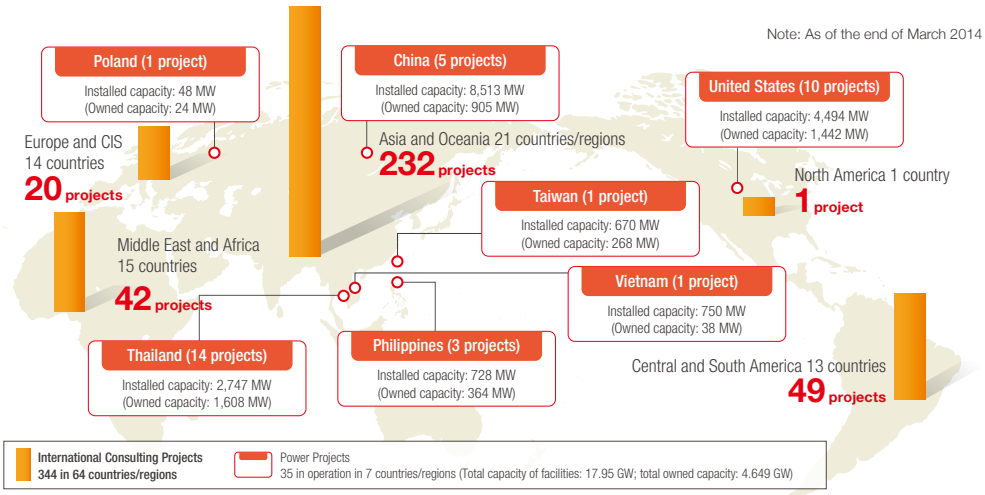
Overseas Business

The J-POWER Group's corporate philosophy calls on us to "play our part for the sustainable development of Japan and the rest of the world." Taking this as our basic approach, and leveraging the accomplishments and know-how we have acquired through a half-century of overseas operations, we are engaging in international consulting projects, which involve technical cooperation to develop power sources and protect the environment, and in overseas power generation projects, which involve our participation in businesses through the investment of capital and technology.

From the Second Pillar of Management to Two Pillars

The purpose of J-POWER's overseas consulting business is "to provide cooperation on electric power generation technology to developing countries and so contribute to the international community." Since implementing our first project in 1962, we have been involved in 344 projects in 64 countries (as of the end of March 2014). In the overseas power generation business, we have 35 electric power generation facilities in seven countries and regions with a total output of 17.95 GW. Our owned share of this output amounts to 4.649 GW (as of the end of March 2014).

We are reinforcing our efforts to change this overseas business from a "second pillar" into one of "two pillars" side by side with our electric power generation business in Japan. In terms of the environment, we will aim to use the clean coal technology we have in Japan to simultaneously achieve a contribution to growth in Asia and to reduction of environmental burden.



TOPICS

Providing Clean Coal Technology to the World through Our Consulting Business

In 2013, J-POWER received*1 a contract from NEDO*2 to conduct a proposal formation study concerning a high-efficiency, environmentally friendly ultra-supercritical coal-fired power station suitable for urban areas and restricted sites in Indonesia. The project involves converting the existing 300 MW oil-fired thermal power station (Tambak Lorok Power Station) located approximately 2 km from the center of Semarang in Central Java into a 600 MW coal-fired power station. The study is a feasibility study.

The project power station is located in an urban area, and the coal-fired power station must produce less environmental impact than the current plant. To meet these needs, it is believed that installation of an urban high-efficiency, low environmental impact-type coal-fired power station previously not possible in Indonesia would be ideal. Such a plant would not only contribute to reducing greenhouse gas emissions in accordance with policies being implemented by the Indonesian government, but would also impose the major challenge of constructing a coal-fired power station that can coexist with local residents.

We have been developing and introducing clean coal technology for more than half a century and are focusing our efforts on the transfer and spread of such technology overseas through our consulting business. The Isogo Thermal Power Station, which is located near a major city and has been in operation for many years, can serve as a model for this project, and by incorporating clean coal technology as well as our operational know-how, we can propose a high-efficiency low environmental impact-type coal-fired power station suitable for conditions in Indonesia.

By providing the technologies and expertise that we have developed to date, we can contribute to stable and environmentally friendly electric power supplies in Indonesia. This project is expected to support the spread of Japan's state-of-the-art clean coal technology.

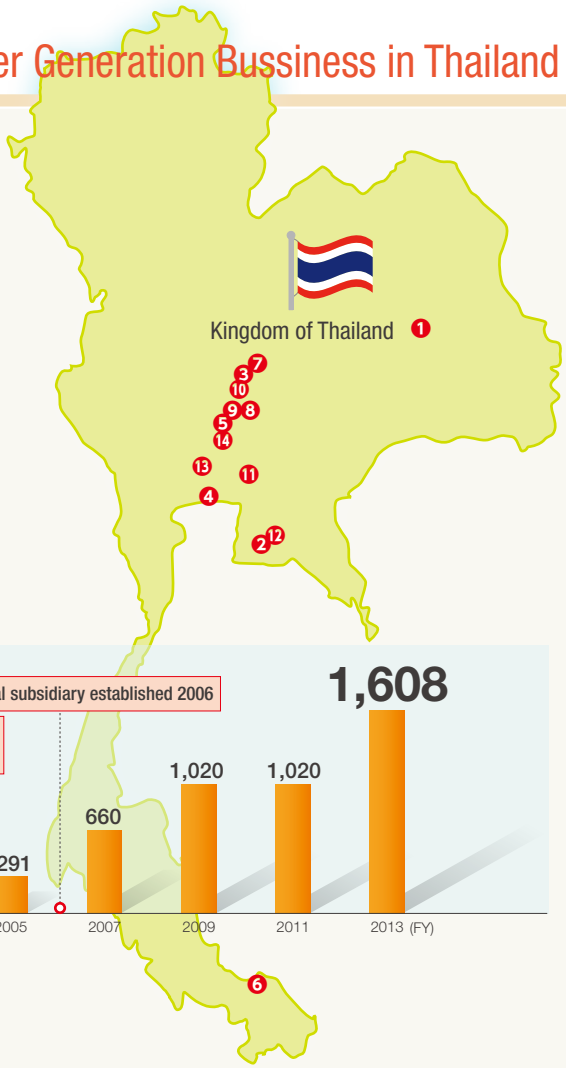

Tambak Lorok Power Station

*1 J-POWER received the order through a consortium with Hitachi, Ltd., Mizuho Bank, Ltd., and the Japan Coal Energy Center.
*2 New Energy and Industrial Technology Development Organization

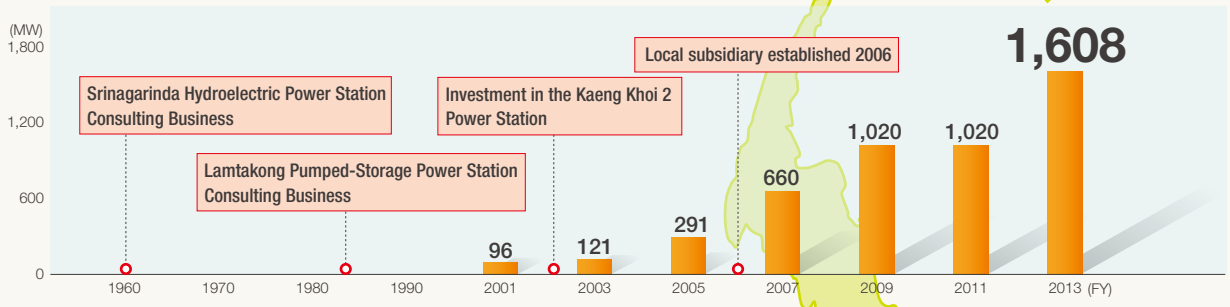
CLOSE UP J-POWER Electric Power Generation Bussiness in Thailand

List of Power Stations in Operation and under Construction	Type	Facility Output
❶Roi Et	Biomass (chaff)	10 MW
❷Rayong	Gas-fired thermal (Combined cycle)	112 MW
❸Gulf Cogeneration	Gas-fired thermal (Combined cycle)	110 MW
❹Samut Prakan	Gas-fired thermal (Combined cycle)	117 MW
❺Nong Khae	Gas-fired thermal (Combined cycle)	120 MW
❻Yala	Biomass (rubber wood waste)	20 MW
❼Kaeng Khoi 2	Gas-fired thermal (Combined cycle)	1468 MW
❽Gulf JP KP1	Gas-fired thermal (Combined cycle)	110 MW
❾Gulf JP KP2	Gas-fired thermal (Combined cycle)	110 MW
❿Gulf JP TLC	Gas-fired thermal (Combined cycle)	110 MW
⓫Gulf JP NNK	Gas-fired thermal (Combined cycle)	110 MW
⓬Gulf JP NLL	Gas-fired thermal (Combined cycle)	120 MW
⓭Gulf JP CRN	Gas-fired thermal (Combined cycle)	110 MW
⓮Gulf JP NK2	Gas-fired thermal (Combined cycle)	120 MW

As of the end of March 2014



J-POWER Group's Owned Capacity in Thailand



The J-POWER Group is actively expanding its electric power business in Thailand.

Seven newly constructed 100 MW-class gas combined thermal power stations went online in October 2013. When these are supplemented by large-scale IPP projects (Nong Saeng and U-Thai, each with a capacity of 1.6 GW) scheduled to go online in 2014 and 2015, the J-POWER Group will supply approximately 10% of electric power demand in Thailand.

In this way, business in Thailand is a key part of the overseas electric power business, which is positioned as a second profit base after our domestic wholesale electricity business, along with our business in The United States and China.

Nong Saeng IPP (1.6 GW, Gas-Fired Thermal)

Construction of the Nong Saeng IPP proceeded smoothly following its start in December 2011 and commercial operation of the No. 1 system began on June 1, 2014. Construction of the No. 2 system is proceeding with a scheduled start of operations at the end of 2014.

Nong Saeng IPP

U-Thai IPP (1.6 GW, Gas-Fired Thermal)

The U-Thai IPP construction site was submerged during the flooding in 2011, but construction started as planned in December 2012. Construction is now proceeding steadily for the scheduled start of operation of the No. 1 unit in June 2015. As of the end of March 2014, 67% of the construction had been completed.

U-Thai IPP

Relief Materials Provided during 2011 Flooding in Thailand

In the autumn of 2011, once-in-a-half-century, record-breaking torrential rains caused the Chao Phraya River, which runs from north to south through central Thailand, to overflow its banks, resulting in unprecedented flooding. The flooding reached the Rojana Industrial Park, where the U-Thai IPP is located, and the planned site of the power station was submerged.

Fortunately, the flooding occurred before the start of construction, and there was no major impact. J-POWER wanted to assist Thailand and immediately provided relief supplies (small boats, foods, etc.) to victims through a local business in which J-POWER has an equity interest. J-POWER also received a request for the provision of flood relief materials from the Thai Ministry of Energy and shipped 130 submersible drainage pumps to Thailand by airfreight and supported drainage work in flooded areas in cooperation with EGAT (Electricity Generating Authority of Thailand).

VOICE

Seeking Mutual Benefit and Collaboration in Thailand

I live in Thailand, and I feel that the people I have come to know here have taught me how to enjoy life. I believe that the greatest appeal of Thailand is the ability to evoke this feeling in foreigners who come here. In my work involving construction supervision of the IPP projects and new development projects, I encounter differences in the ways of thinking of Japanese and Thai people, and sometimes they come into conflict, but the work proceeds steadily through compromise. What is important for us Japanese, who have come a long way to a different country in order to carry out a project, is developing mutual respect and building relationships based on mutual trust. Just as is the case when living in a different country, once you are separated from the framework of a company, there is a limit to what a single person can do, and I was struck by just how important trusting relationships among people are. I believe that pursuing mutual benefit and collaborating will contribute to the development not only of the parties directly involved, but the two companies and both countries as well. I hope that there are additional opportunities to engage in this type of work in the future.

J-POWER Generation (Thailand) Co., Ltd.
Kayoko Kurisaki

VOICE

Doing Everything in Our Power for the Mission of Providing a Stable Supply of Power While Obtaining the Understanding of Local Residents

Kaeng Khoi 2 Power Station has the motto, "a power station that takes the same viewpoint as local and regional communities in treating both the environment and people with consideration." Therefore, we cooperate with local activities and welcome field trips to our power station. It is not just local people who come on field trips to the power station. We have about 1,000 visitors from within Thailand every year, and we are very grateful for it.

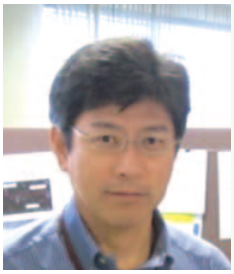
There are some difficulties associated with receiving such large numbers of people, but we hope to continue with this steady effort to have people understand our business. We also want to learn about J-POWER's measures in Japan for harmonious coexistence with local communities, and make good use of them in our activities here. We are committed to the continuing effort to do everything we can toward the mission of providing a stable supply of electric power while we work to gain the understanding of local residents.

Kaeng Khoi 2 Power Station
General Manager
Peerapan Srisukho

VOICE

Trusting Relationships with Local Partners Are Essential

Of the two IPP and seven SPP projects that were implemented, all of the SPP projects went online as planned in 2013. Starting operations as planned is something that is expected in Japan, but this is not necessarily easy in a different country with different work environments and practices. A major factor in performing the construction according to plan was the labor management. Creating suitable worksite organizations and systems based on an understanding of their temperament and work efficiency was the first step to building the power station. In this sense, it was essential for the on-site JPGT personnel to perform our work with a solid understanding of our local partners. It is necessary to interact with local workers through give-and-take and with a sense of balance based on the local conditions and environment. Relationships among people are the basis of everything, and trusting relationships are crucial. One of the IPP projects is scheduled to begin operations in 2014, and I hope to continue collaborative oversight of the project based on trusting relationships with local partners, just as we did with the SPP projects, so we can begin operations as planned with safety remaining our number one priority.



J-POWER Generation (Thailand) Co., Ltd.
Director
Takashi Jahana

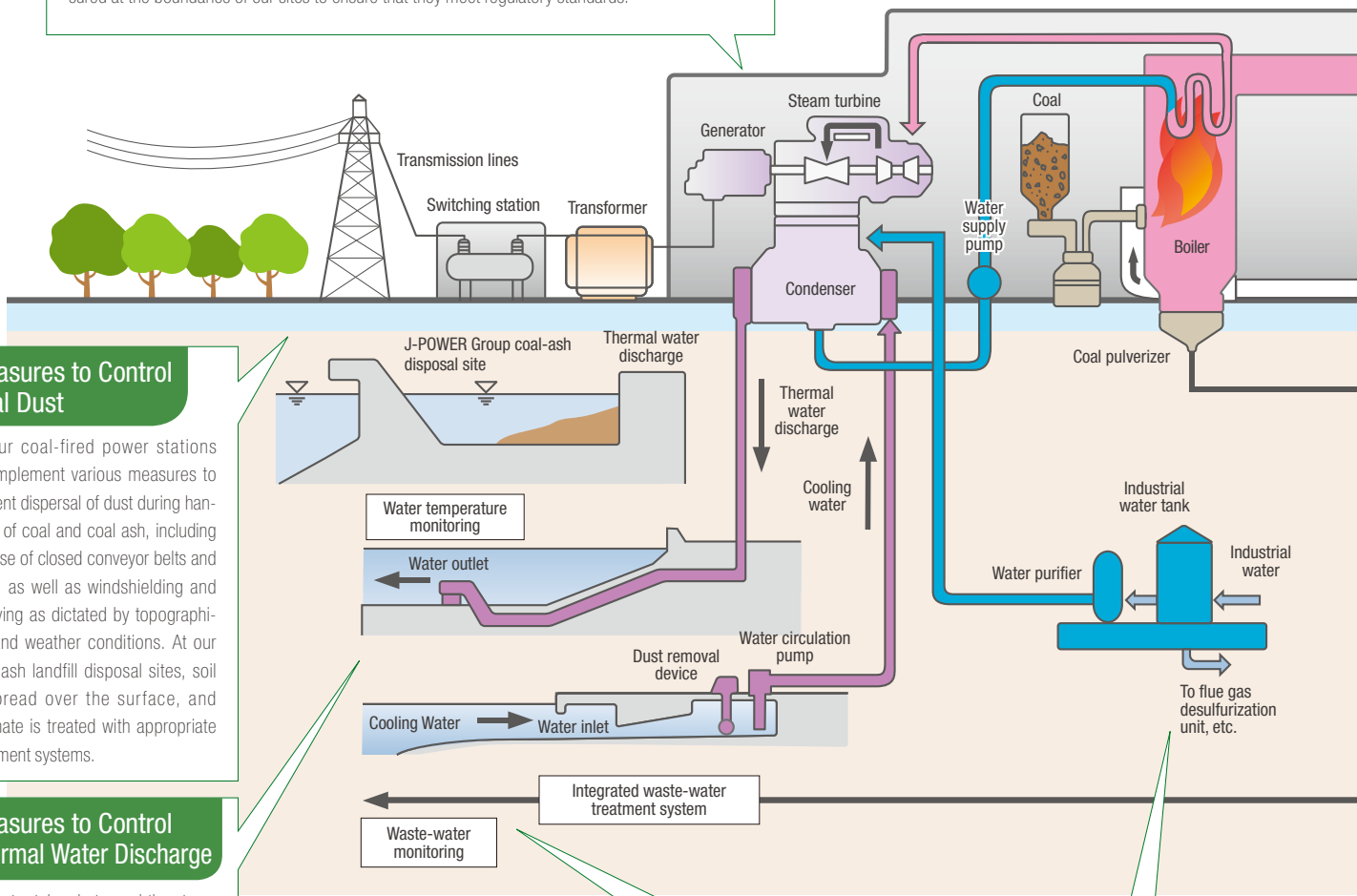
Environmental Preservation

The J-POWER Group undertakes environmental preservation initiatives using the latest technologies and knowledge to reduce the environmental impacts caused by its domestic and overseas electric power businesses.

Environmental Measures at Coal-Fired Power

Measures to Control Noise and Vibration

We work to prevent noise and vibration pollution by keeping such noise- and vibration-emitting equipment as boilers, turbines, and exhaust fans inside buildings. For outdoor equipment, we install soundproof covers and sound barriers as needed. Noise and vibration levels are periodically measured at the boundaries of our sites to ensure that they meet regulatory standards.



Measures to Control Coal Dust

At our coal-fired power stations we implement various measures to prevent dispersal of dust during handling of coal and coal ash, including the use of closed conveyor belts and silos, as well as windshielding and spraying as dictated by topographical and weather conditions. At our coal-ash landfill disposal sites, soil is spread over the surface, and leachate is treated with appropriate treatment systems.

Measures to Control Thermal Water Discharge

Seawater taken in to cool the steam used in power generation is released as thermal water discharge*. We control intake and discharge properly to reduce their impact on marine life in the vicinity, and monitor the temperature of thermal water discharge on a 24-hour basis to ensure that it remains at or below the reference values established by environmental agreements.

Measures to Prevent Water Pollution

Waste water from such facilities as desulfurization units and offices is appropriately treated in integrated waste-water treatment systems, through coagulation, precipitation, filtration, and so forth. Treated water is routinely monitored by automatic measuring equipment and analyzed periodically to ensure that it meets the standards set under the Water Pollution Control Law and environmental conservation agreements.

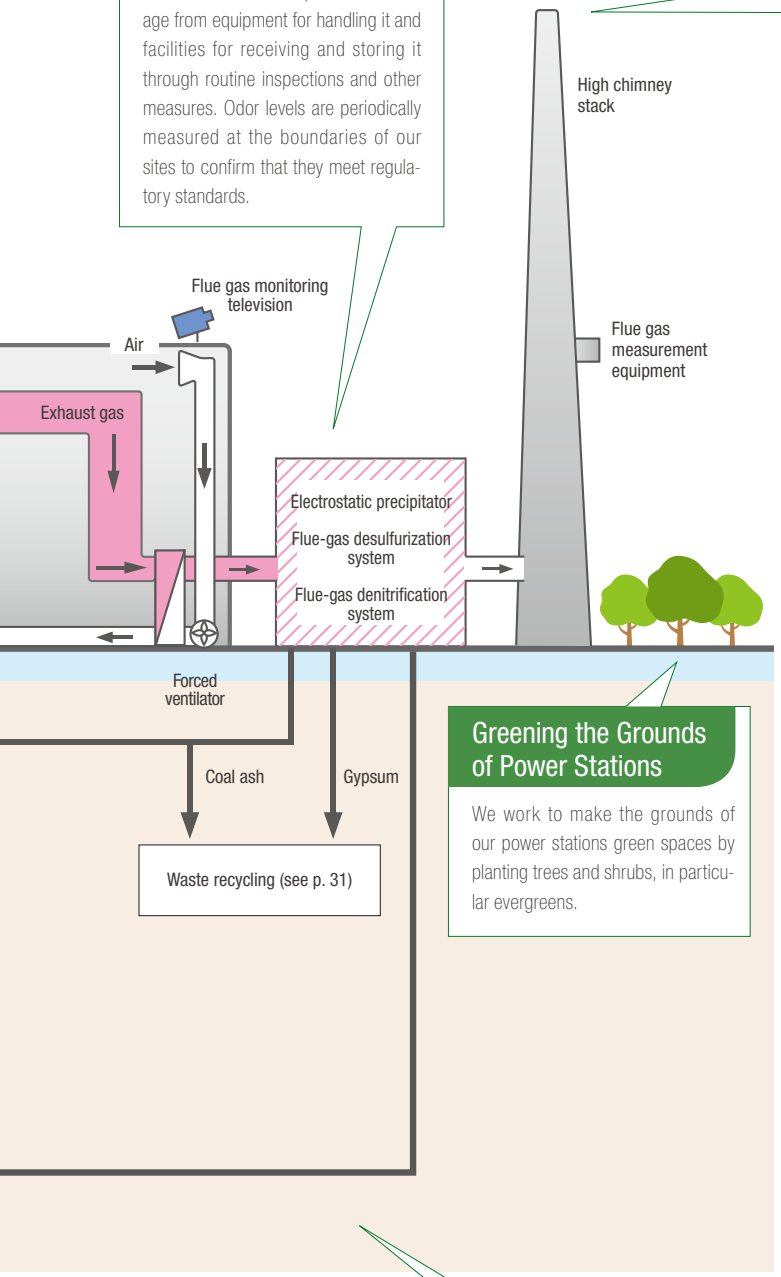
Cutting Back on Industrial Water Use

Industrial water is used in such equipment as boilers, cooling systems, and wet-type desulfurization systems. Part of this water is released into the atmosphere as steam. We are working to reduce our consumption of industrial water through the recovery and reuse, as far as possible, of wastewater that is not released into the atmosphere.

* Thermal water discharge:
In thermal and nuclear power generation, the steam that powers the turbine is cooled and turned to water in a condenser so that it can be used again. In almost all Japanese power stations, seawater is used for cooling in the condensers. As the seawater passes through the condenser, its temperature rises. It is then returned to the ocean through the discharge outlet, at which point it is referred to as thermal water discharge.

Measures to Control Odors

Ammonia is used in such equipment as our flue-gas denitrification systems, and we are careful to prevent its leakage from equipment for handling it and facilities for receiving and storing it through routine inspections and other measures. Odor levels are periodically measured at the boundaries of our sites to confirm that they meet regulatory standards.



Measures to Prevent Air Pollution

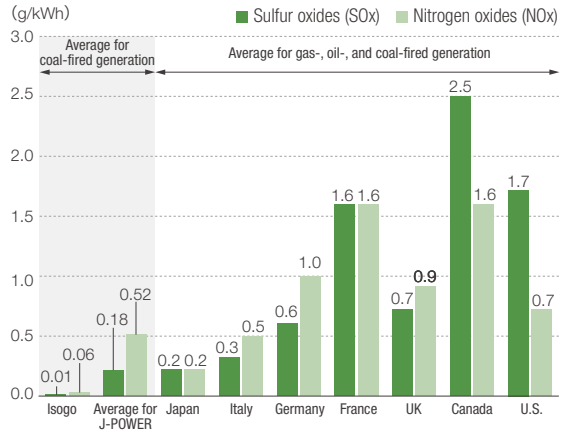
Combustion of coal and other fuels can generate sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust. To reduce these emissions we have improved our combustion methods and installed such flue gas treatment equipment as desulfurization and denitrification systems and electrostatic precipitators. Although the performance of equipment varies with its date of installation, at each facility we have installed the newest technology available at the time to remove pollutants with maximum efficiency. This equipment operates automatically with the aid of measurement devices that continuously monitor the content of flue gas. In addition, human operators monitor the equipment 24 hours a day and are able to mount a swift response in the event of any malfunction, ensuring that our emissions do not exceed the benchmark figures specified by the Air Pollution Control Act and environmental protection agreements.

Flue-gas Emissions, FY 2013

Substance	Equipment efficiency (removal efficiency)	Emissions	Emissions intensity
SOx	69-99%	10,700 tons	0.18g/kWh
NOx	67-93%	31,100 tons	0.52g/kWh
Soot and dust	99% (as designed)	800 tons	0.01g/kWh

Notes:
1. Emissions intensity: Emissions per unit of electricity generated at thermal power stations.
2. Emissions of soot and dust are calculated on the basis of measurements taken monthly.

International Comparison of SOx and NOx Emissions Intensity for Thermal Generation



Overseas: Emissions volume: OECD StatExtracts Complete Databases Available Via OECD's Library
Volume of power generated: IEA Energy Balances of OECD Countries (2012)
Japan: Materials published by The Federation of Electric Power Companies of Japan (10 electric power company and J-POWER)
Figures for Isogo and J-POWER are formulated from results for 2013

Greening the Grounds of Power Stations

We work to make the grounds of our power stations green spaces by planting trees and shrubs, in particular evergreens.

Measures to Prevent Soil Pollution

From FY 2004 through FY 2006, we conducted studies at all J-POWER Group domestic sites and determined that they were free of soil or groundwater contamination. We will continue working diligently to ensure that no soil pollution occurs.

Measures to Prevent Oil Leaks

We implement various measures to prevent the leakage and dispersion of fuel oil, lubricating oil, and other such substances within power station grounds, to include keeping adsorbent materials constantly ready in our power stations.

Proper Management and Disposal of Waste Material and Chemical Substances

Waste

Reduction and Effective Utilization of Waste

The J-POWER Group has set the industrial waste recycle rate of 97% as a Corporate Target. The total amount of industrial waste we generated in fiscal 2013 was 2.32 million tons, and we achieved a recycle rate of 98%.

Making Effective Use of Coal Ash and Gypsum

The J-POWER Group's industrial waste consists of 97% coal ash and gypsum from thermal power stations.

Of the coal ash produced, 99% is put to effective use, and 100% of gypsum and sulfuric acid are put to effective use.

Information on Maintenance and Management of Industrial Waste Final Disposal Sites

The J-POWER Group discloses on its website its maintenance and management plan for waste final disposal sites, the results of groundwater and discharge water quality analyses, inspection results, the volume of landfill waste, and other maintenance and management information.

Chemical Substances

Management of Chemical Substances

The J-POWER Group complies with applicable laws and regulations and properly and rigorously uses, stores, controls, and treats chemical substances regulated by the PRTR Law that are used in electric power generation or are included in equipment or machinery, dioxins, PCB waste material (including equipment that contains trace amounts of PCB), and materials that contain asbestos and other substances.

PRTR Substance Release and Transfer Volumes (FY 2013)

Substance	Use	Volume handled	Volume released	Volume transferred as waste
33: Asbestos	Insulation for equipment	8.75t/y	—	8,750 kg/y
53 : Ethyl benzene	Coating for machinery	2.71t/y	2,713 kg/y	—
71 : Ferric chloride	Wastewater treatment agents	16.18t/y	—	16,176 kg/y
80 : Xylene	Coating for machinery	6.69t/y	6,689 kg/y	—
300: Toluene	Fuel for power generation (coal)	17.72t/y	17,718 kg/y	
405 : Boron compounds	Manure additives	13.72t/y	1kg/y	—
406: Polychlorinated biphenyl	Transformers Insulating oil	12.15t/y	—	12,150 kg/y

Note:
Figures represent total release and transfer volumes for all business sites handling 1 ton or more per year of a Class 1 designated chemical substance or 0.5 ton or more per year of a Specific Class 1 designated chemical substance.

VOICE

Striving for Optimal Allocation of Coal Ash Transport Vessels

Coal ash produced by coal-fired power stations is effectively used as a material in civil engineering and construction products and as a raw material of cement, and I work in coordinating the vessels that transport coal ash to cement companies in Japan and overseas. The volume of coal ash produced varies according to the electricity demand, and there are often instances where ships are unable to transport the coal ash as planned because of imbalance between supply and demand, bad weather including typhoons and storms, and other factors. To overcome these risks, I maintain close communications and cooperate with all the involved parties to avoid any impediments to stable operation of the power stations and strive every day to allocate vessels optimally.

Coal Ash Utilization Promotion Department, Resource Recycling Business Division, JPec Co., Ltd. Ritsuko Sugimoto

It's My Job to Push Measures for Creating a Recycling-based Society!

J-POWER's thermal power stations generate about 1.8 million tons of coal ash each year, and my job is to build systems for comprehensive recycling of that coal ash and to work with local staff members to implement the recycling.

In addition to recycling the coal ash that is generated each day, there are many difficult aspects such as developing recycling areas and improving operations adapted in a timely manner to the constantly changing ash-processing environment, but I feel that it is a wonderful and meaningful job I am proud to perform. I am in a position within the company to play a leading role in contributing to the development of a recycling-based society, and I hope to provide a powerful push towards the creation of such a society while placing importance on collaboration with processor business partners and on-site personnel involved in this work.

Administration Office, Thermal Power Department Kenji Ueda

Preservation of the Natural Environment

Environmental Impact Assessment

Before expanding power plant facilities, we conduct environmental impact assessments in accordance with applicable laws and regulations and adequately take the environment into consideration while listening to the opinions of local residents during the planning stages. After a power plant becomes operational, we take environmental preservation measures based on the results of monitoring performed pursuant to environmental preservation agreements entered into with relevant local governments.

Environmental Impact Assessments conducted in the 2013 fiscal year (projects in the draft report or later stage are indicated)

Project	Operator	Implementation area	Implementation status
Takehara Thermal Power Station New Unit No. 1 Facility Upgrade Plan	J-POWER	Takehara City, Hiroshima Prefecture	January 2014 Environmental impact assessment procedures completed March 2014 Facility construction started
Wasabizawa Geothermal Power Station (provisional name) Siting Plan	Yuzawa Geothermal Co. Ltd.	Yuzawa City, Akita Prefecture	Environmental impact assessment report under review (as of the end of June 2014)
Ohma Wind Farm Construction Project	J-POWER	Ohma-cho, Shimokita-gun, Aomori Prefecture	Environmental impact assessment report completed
Setana Ozato Wind Power Farm Project (provisional name)	J-POWER	Setana-machi, Kudo District, Hokkaido	Environmental impact assessment report under examination (as of the end of June 2014)
Yurihonjo Seaside Wind Farm Project (provisional name)	J-POWER	Yurihonjo City, Akita Prefecture	Environmental impact assessment report under examination (as of the end of June 2014)

Preservation of the Water Environment

In fiscal 2013, the J-POWER Group made preservation of the water environment a corporate target for its environmental management vision with the aim of reinforcing its environmental preservation initiatives regarding rivers and the seas.

We undertake environmental preservation measures based on the specific regional environment and characteristics of each business site such as taking measures to maintain water quality and prevent the accumulation of silt in dam lakes and downstream areas in the case of hydroelectric power station, and managing the discharge of wastewater into nearby bodies of water in accordance with applicable laws and regulations in the case of thermal power stations.

Forest Conservation

J-POWER owns approximately 4,600 ha of forests in the areas near its hydroelectric power facilities located throughout Japan. We appropriately maintain these valuable forests in accordance with the J-POWER Group Forest Protection Guidelines (formulated in 2007).

Japan's forests are falling into ruin because of inadequate management caused by slumping forestry markets, but the J-POWER Group is contributing to forest conservation and reduction of CO_2 emissions through efforts to burn biomass fuel pellets made from forestry offcuts and other materials in coal-fired power stations along with coal (see p. 24).

Preserving Biodiversity

To reinforce its measures in light of the Basic Law on Biodiversity, in the 2011 fiscal year, the J-POWER Group made preserving biodiversity a corporate target for its environmental management vision.

During the power generation facility planning and design stages, we implement environmental preservation measures taking into consideration the impact on the natural environment and ecological systems based on the results of wildlife and ecological assessments in the land and ocean areas surrounding the facility. We strive to preserve wildlife, particularly rare species, living in the vicinity of operating power plants and other facilities and their habitats.

These measures are tailored to local environments and characteristics such as making every effort to avoid outdoor work during the nesting season of the Japanese golden eagle and other endangered birds in the vicinity of the Okutadami Dam and Otori Dam and restoring, maintaining, and managing wetlands that became landfill areas when the Okutadami Dam in Niigata Prefecture was expanded.

An observation group in the Hassaki wetland, downstream from Okutadami Dam (Niigata Prefecture)