Corporate Philosophy

Our Mission
We will meet people’s needs for energy without fail, and play our part for the sustainable development of Japan and the rest of the world.

Our Credo
We value integrity and pride, and these elements drive every-thing we do.
We pursue harmony with the environment, and thrive in the trust of communities where we live and work.
We regard profits as the source of our growth, and share the fruits with society.
We refine our knowledge constantly to be the pioneering leader in technologies and wisdom.
We unite diverse personalities and passions as one, and dare to create a better tomorrow.

Shokawa Cherry Trees
The two giant cherry trees growing on the Nakano observation platform along Lake Miboro (Gifu Prefecture) are Azuma-higan cherry trees said to be more than 450 years old. Visiting this area during construction of the Mibo Dam in 1959, Tatsunosuke Takasugi, the company’s first president, conceived the idea of saving the ancient trees from the dam as a salve to the villagers whose community was soon to be submerged. It was an unprecedented undertaking, but thanks to a massive cooperative effort, the two trees were successfully transplanted. Later named the Shokawa Cherry Trees, we have continued to take care of them for more than half a century.

Greetings
At the Electric Power Development Co., Ltd. (J-POWER) we have been supplying low-cost, stable electricity for about 70 years while constructing and operating power transmission lines nationwide that contribute to Japan’s economic growth and improve people’s living standards.
We have been providing engineering consultancy services worldwide for over half a century. These consist of consulting operations on the development of electric power as well as on power transmission and transforming. Utilizing this knowledge, we are also proactively engaged in the field of power generation overseas.
Currently changes are occurring in the field of energy such as an increase in our activities relating to the achievement of the decarbonization of a society based on The Paris Agreement on greenhouse gas reduction and the deregulation of the power supply business sector and advances in digital technology. In view of these changes based on the experience and technological capabilities we have accumulated, at J-POWER we are aiming to achieve carbon decarbonization. We utilize our inventiveness by employing the latest technology and taking up the challenge of new fields as we grow globally.
We will continue to exert our utmost efforts to fulfill our mission which is “We will meet people’s needs for energy without fail, and play our part for the sustainable development of Japan and the rest of the world.”

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Company History

For about 70 years J-POWER has expanded and diversified its business operations while continuously focusing on energy and the environment. Building on our achievements and marshaling technologies developed in Japan and around the world, we are contributing to the achievement of a sustainable society.

Development of large-scale hydropower generation & domestic coal-fired power generation and overseas technological cooperation

With the Electric Power Development Promotion Law, enforced in July 1952 to ease nationwide power shortages, J-POWER, which was established in September of the same year, started to develop large-scale hydropower generation.

1952 J-POWER was established
1956 Sakuma Power Station started operation
1959 Tajokura Power Station started operation
1960 Okutadani Power Station started operation
1961 Miboro Power Station started operation
1962 Tacin Hydropower Project (Peru)
1963 Wakamatsu Thermal Power Station started operation
1965 Sakuma Frequency Converter Station started operation
1967 Khai Tai No.1 (Siriragrand) Hydropower Project (Thailand)
1967 Isogo Thermal Power Station and Takehara Thermal Power Station started operation
1968 Takasago Thermal Power Station started operation

Construction of large-scale pumped storage power stations and high-capacity transmission lines

With oil-fired power generation becoming a major power source and nuclear power development progressing, power demand in summer began to rise sharply. In view of this, J-POWER started to develop large-scale pumped storage power generation and high-capacity transmission lines.

1969 Hanna Line (500kV) started operation
1972 Shintoyone Pumped Storage Power Station started operation
1973 Numapara Pumped Storage Power Station started operation
1975 Onikobe Geothermal Power Station started operation
1978 Okukiyotsu Pumped Storage Power Station started operation
1979 Hokkaido-Honshu Interconnection Line (Hakodate-Kamikita Power Converter Station) started operation
1980 West Area Interconnection Line started full-scale operation

Coal-fired power generation projects in Japan and overseas

Because of a growing need for diversifying energy sources after two oil crises in the 1970s, J-POWER started to construct Japan’s first large-scale, coal-fired power station using imported coal. It also acquired the rights for several overseas coal mines and achieved the stable procurement of fuel.

1979 Signed a memorandum of understanding for rights to develop Blair Athol Coal Mine in Australia
1981 Matsushima Thermal Power Station started operation
1982 Sakuma No. 2 Power Station started operation
1983 Takehara Thermal Power Station (Unit 3) started operation
1986 Ishikawa Coal Thermal Power Station started operation
1988 Shimogo Pumped Storage Power Station started operation
1990 Masinloc, Coal-fired Thermal Power Project (The Philippines) started operation
1990 Matsusaka Thermal Power Station started operation

New technologies and overseas operations

With demand for power growing, J-POWER has been focusing on improving overall power generation efficiency and overall stable energy supply. It is also engaging in a variety of activities at home and abroad in an era of globalization and increased interest in global environmental issues.

1992 Signed a framework agreement on demonstration of desulfurization technology (China)
1994 Honshu-Shikoku Interconnection Line started operation
1996 Okukiyotsu No. 2 Pumped Storage Power Station started operation
1999 Established Omuta Waste-Fueled Power Plant (Refuse-Derived Fuel)
2000 Extended Horshu-Shikoku Interconnection Line
2000 Participated in Roi- Et Biomass Power Station (Thailand)
2000 Tachibanaw Thermal Power Station started operation
2002 Tomamae Winrilla Wind Farm started operation
2002 Test operations of coal Energy Application for Gas Liquid and Electricity (EAGLE) project were launched
2003 The Electric Power Development Promotion Law abolished
2004 J-POWER fully privatized, with its shares listed on the First Section of the Tokyo Stock Exchange
2005 Participated in CBK Hydropower Generation Project (The Philippines)
2006 Participated in Tenaska Frontier Power Station (U.S.A.)
2007 Koriyama-Nunobiki Kogen Wind Farm started operation
2007 Kaeng Khoi 2 Gas-fired Power Station started operation (Thailand)
2008 Started construction of Ohma Nuclear Power Station
2009 Isogo Thermal Power Station replacement work completed
2010 Orange Grove Power Station started operation (U.S.A.)

Privatization and a new “J-POWER”

J-POWER will continue growing through its contribution to the sustainable development of Japan and the world, and it is implementing overseas power generation operations and the development of large-scale wind farms.

2011 Miyazaki Wood Pellet manufacturing plant started operation
2012 Commenced Calidole (Australia) Oxygen Project to demonstrate oxyfuel combustion and CO2 capture technology
2013 Commenced Kunamoto Sewage Sludge Solid Fuel Project
2014 Nong Saeng Gas Fired Power Station started operation (Thailand)
2015 Uta Gas Fired Power Station started operation (Thailand)
2016 Konokidani (Medium Scale Hydropower) Power Station started operation
2016 Commenced Oxygen-Blown IGCC verification tests at OSAKI CoolGen
2017 Yurihonjo Bayside Wind Farm started operation
2018 Participation in offshore wind power farm construction project in the UK
2019 Wasabizawa Geothermal Power Plant started operation

Seeking the coexistence of energy and the environment

The environment surrounding energy is undergoing massive changes and under these circumstances J-POWER continues seeking to achieve decarbonization by further increasing the use of renewable energy and achieving zero emissions in coal utilization.

2011 Wasabizawa Geothermal Power Plant started operation

Sakuma Dam

Numapara Dam (left)

Matsushima Thermal Power Station

Roi- Et Biomass Power Station

Koriyama-Nunobiki Kogen Wind Farm

Wasabizawa Geothermal Power Plant
J-POWER Operations in Japan

J-POWER Group produces electric power at about 100 power stations around Japan and delivers electricity via approximately 2,400 kilometers of transmission lines.

J-POWER Group Facilities (As of June 30, 2019)

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Quantity</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power generation facilities</td>
<td>97 locations</td>
<td>17,438,528 kW [11,244,326 kW]</td>
</tr>
<tr>
<td>Hydropower stations</td>
<td>61</td>
<td>8,575,369 kW</td>
</tr>
<tr>
<td>Thermal power stations</td>
<td>11</td>
<td>8,340,420 kW</td>
</tr>
<tr>
<td>Wind power stations</td>
<td>22</td>
<td>443,660 kW</td>
</tr>
<tr>
<td>Geothermal stations</td>
<td>1</td>
<td>46,199 kW</td>
</tr>
<tr>
<td>Other power generation facilities</td>
<td>2</td>
<td>32,880 kW</td>
</tr>
<tr>
<td>Transmission lines</td>
<td></td>
<td>Total length 2,404.6 km</td>
</tr>
<tr>
<td>AC power transmission lines</td>
<td></td>
<td>2,137.4 km</td>
</tr>
<tr>
<td>DC power transmission lines</td>
<td></td>
<td>267.2 km</td>
</tr>
<tr>
<td>Substations</td>
<td>4 locations</td>
<td>4,301,000 kVA</td>
</tr>
<tr>
<td>Frequency converter station</td>
<td>1 location</td>
<td>300,000 kW</td>
</tr>
<tr>
<td>AC/DC converter stations</td>
<td>4 locations</td>
<td>2,000,000 kW</td>
</tr>
<tr>
<td>Telecommunication network</td>
<td></td>
<td>Total circuit length 5,833 km</td>
</tr>
</tbody>
</table>

Share of Hydropower Installed Capacity in Japan (As of March 31, 2019)

J-POWER 17%

Share of Coal-fired Power Installed Capacity in Japan (As of March 31, 2019)

J-POWER 18%

Share of Wind Power Installed Capacity in Japan (As of March 31, 2019)

J-POWER 14%

Main Facilities (As of June 30, 2019)

- Hydropower stations
- Hydropower stations (Under construction or planned)
- Thermal power stations
- Thermal power stations (Under construction or planned)
- Nuclear power stations (Under construction)
- Geothermal power stations
- Geothermal power stations (Under construction or planned)
- Wind power stations
- Wind power stations (Under construction)
- Other power generation facilities
  - Transmission lines
  - Transmission lines (Under construction or expansion planned)
  - Substations and converter stations
  - Converter stations (planned)
  - R&D facilities, etc.
Renewable Energy

From its inception J-POWER has been involved in the development of renewable energy in the form of hydroelectric power, and it has since expanded into areas such as geothermal power, wind power, and biomass fuel. Japan’s Basic Energy Plan characterizes renewable energy as a promising domestic source of energy that can contribute to the country’s energy security. It is intended to make this the “second power source” by 2050.
Determined to be a leader in the field of renewable energy, J-POWER will engage in approximately one GW (compared to FY2017) in new renewable energy development by 2025.

Hydroelectric Power

Overview
J-POWER has been engaged in the construction and operation of hydroelectric power facilities for more than 60 years, from such large-scale conventional plants as the Sakuma Power Station (Shizuoka Prefecture), which began operating in 1956, to the development of pumped storage plants, which facilitate adjustment of output to meet peak demand. Nationwide, J-POWER currently has about 60 domestic hydroelectric power facilities with a combined capacity of approximately 9.6 GW, accounting for almost 20% of hydroelectric power generation in Japan. In recent years, J-POWER has undertaken a variety of initiatives aimed at improving the reliability and efficiency of our existing hydroelectric facilities and expanding our utilization of this hydroelectric resource.

Development of Large-Scale Hydropower Generation
One of the salient features of J-POWER’s hydroelectric power stations is their large capacity per station. Large-scale conventional hydroelectric power stations and pumped storage power stations built on rivers with abundantly flowing water form the backbone of our hydroelectric power capability. With their ability to respond to fluctuations in electricity demand over the course of a day and from season to season, they make an important contribution to the power supply around the nation.

J-POWER’s Okutadami Power Station (Fukushima Prefecture) has the largest capacity of any conventional hydroelectric power facility in Japan.

*1 Conventional hydroelectric power: The water of rivers and lake water created by building a water dam is used to generate electric power.
*2 Pumped storage power: Water is stored in a reservoir at a lower elevation and then pumped up to a upper reservoir when electricity demand is high.

Comprehensive Refurbishment of Hydropower Generation
At J-POWER, we strive to maximize the reliability and efficiency of our hydroelectric power stations by refurbishing all major electro-mechanical installations as they age and by providing proper maintenance and management of existing facilities. Akiba No.1 Power Station (Shizuoka Prefecture) underwent refurbishment. The runner blade profiles of the hydro turbine were optimized and the plant’s capacity was increased from 46,250 kW to 47,200 kW. Currently, we are engaged in construction and conversion work at the Shinkatsurazawa and Kumai Hydroelectric Power Stations and equipment refurbishment at Ashoro Hydroelectric Power Station (Hokkaido Prefecture).

Geothermal Power

The first large scale geothermal power station in Japan for 23 years
Geothermal energy is a renewable and purely domestic energy source that promises steady output throughout the year, regardless of weather conditions.
J-POWER has established Yuzawa Geothermal Power Generation Corporation together with Mitsubishi Materials Corporation and Mitsubishi Gas Chemical Company, Inc. It commenced operation at Wasabizawa Geothermal Power Plant (Akita Prefecture) from May 2019. It generates a power output of 46,199 kW. This is the first large-scale geothermal power station operation in Japan for 23 years with an output over of 10,000 kW.

Development of Small-and Medium-scale Hydroelectric Power Facilities
J-POWER is actively pursuing the development of small-and medium-scale hydroelectric power facilities to make use of untapped hydroelectric resources. The Kuttari Hydroelectric Power Station (Hokkaido Prefecture) utilizes ecological unused discharge flow from the Kuttari Dam in Hokkaido to generate up to 470 kW of electricity.
In December 2016, the Konokidani Hydroelectric Power Station (Fukui Prefecture) commenced operation. It takes advantage of the available head difference between the Kuzuryu Dam reservoir and the Konokidani intake to generate up to 199 kW.

Refurbishment of equipment and additional development work
J-POWER has continuously operated the Onikobe Geothermal Power Station for over 40 years from 1975 in Osaka City, Miyagi Prefecture. Utilizing the knowledge from this long-term operation it is currently engaged in renewal of equipment with the latest units (Scheduled to commence operation from 2023). It is also participating in a geothermal power station development project underway in the Appi area of Hachimantai City, Iwate Prefecture. (Joint project with Mitsubishi Materials Corporation and Mitsubishi Gas Chemical Company, Inc.)

Conceptual drawing of Onikobe Geothermal Power Station renewal project
Wind Power

Overview
J-POWER was quick to engage in the use of wind power generation, a clean, renewable energy source.
Since the start of operation of the Tomamae Wind Farm (Hokkaido Prefecture) in 2000 J-POWER has been a leader in building "Wind Farms", which are large-scale wind power generation units.
J-POWER is the second-largest provider of wind power in Japan, operating 22 wind farms with a combined capacity of 443.660 kW, as of March 31, 2019.
With the technology and know-how accumulated through years of experience in building, operating, and maintaining power stations and transmission lines, J-POWER is able to provide the complete wind power package, from wind resource assessments to planning, construction, operation, and maintenance.

New development of on-shore wind power
J-POWER is proactively engaged in the development of new wind power stations. Minami Ehime Wind Farm (Ehime Prefecture) operations commenced in 2016 and it is the largest wind power station in the Shikoku Region with an output of 28,500kW. In 2017 the Yurihonjo Bayside Wind Farm (Akitak Prefecture) commenced operations with an output of 16,100 kW. Currently we are engaged in new construction work including the Setana Ohsato Wind Farm (Hokkaido Prefecture), Nikaho No.2 Wind Farm (Akitak Prefecture) Kuzumaki No.2 Wind Farm (Iwate Prefecture), and Kaminokuni No.2 Wind Farm (Hokkaido Prefecture). In addition we are also engaged in the refurbishing of existing equipment and planning new development projects.

Challenge of offshore wind power generation
Compared to land power generation, offshore wind power generation has advantages that include strong and stable winds, and expectation is placed on an expansion of these facilities in Japan. J-POWER is engaged in realizing a large-scale offshore wind power project in Kitakyushu City, Fukuoka Prefecture (Joint project with Kyuden Mirai Energy Company, Hokkataku Co., Ltd., SAIBU Gas Co., Ltd., and Kyuden Corporation). In addition, J-POWER is participating in the Triton Knoll Offshore Wind Farm Project to build a large-scale offshore wind farm off the North Sea coast of the UK, and it seeks to acquire technology and knowledge from this.

Coal-Fired Thermal Power

Overview
J-POWER has been in the business of coal-fired thermal power generation for more than a half-century since the 1963 startup of the Wakamatsu Thermal Power Station in Kitakyushu City (now the site of the Wakamatsu Operations & General Management Office and Wakamatsu Research Institute). Since that time we have worked diligently to reduce the environmental impact of coal-fired thermal power through measures to boost thermal efficiency and protect the environment.
Isogo Thermal Power Station (Karagawa Prefecture) commenced operation of New Unit 1 in April 2002 and New Unit 2 in July 2009. Through the introduction of the world’s most advanced coal-fired technology it achieves the world’s highest level of environmental protection measures and thermal efficiency.
J-POWER will continue to promote clean, high-efficiency coal-fired power generation through proper maintenance and replacement of facilities as well as construction of new power stations.

Environmental Measures at Our Coal-Fired Power Stations
J-POWER’s coal-fired thermal power stations have adopted a wide range of measures to minimize any adverse impact of their operations on the local environment. They employ the latest environmental technology and know-how to prevent air pollution, water contamination, disruption from noise and vibration, and more.
Our newest coal-fired generation facilities, Isogo Thermal Power Station New Unit 1 and New Unit 2, are equipped with advanced anti-pollution technology, including the ReACT (Regenerative Activated Coke Technology) dry-type flue gas desulfurization-denitrification system. As a result, atmospheric pollutants from Isogo Thermal Power Station have become a fraction of the average emission for thermal power generation among the major industrial countries, making the Isogo Thermal Power Station a world leader in environmental performance. This ReACT technology is provided by J-POWER EnTech Co., Inc., one of our group companies.

Dry desulfurization unit
(Isogo Thermal Power Station, New Unit 2)

International comparison of SOx and NOx emissions from thermal power stations per unit of electricity generated

<table>
<thead>
<tr>
<th>Country</th>
<th>SOx (kg/MWh)</th>
<th>NOx (kg/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA (2016)</td>
<td>0.63</td>
<td>0.43</td>
</tr>
<tr>
<td>Canada (2016)</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>UK (2016)</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>France (2016)</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Germany (2016)</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Japan (2016)</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>OECD (2016)</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Source: Emissions OECD, Stat Extract
Output: IEA ELECTRICITY INFORMATION 2018 Edition
J-POWER Isogo performance in FY2017
High-Efficiency Coal-Fired Power Generation

In pursuit of high-efficiency power generation, J-POWER’s coal-fired thermal power stations were among the first to adopt high-temperature and high-pressure ultra supercritical (USC) steam technology. By always adopting the newest technology available, our coal-fired power stations are achieving the world’s highest thermal efficiency. Higher efficiency contributes to lower CO₂ emissions per unit of electricity generated. As thermal power facilities deteriorate with age, their thermal efficiency declines, resulting in greater fuel consumption. J-POWER also takes proactive steps to maintain optimum efficiency through proper refurbishment and maintenance. By preventing a drop in thermal efficiency, we avoid increased fuel consumption and thereby curb CO₂ emissions.

Beneficial Use of Coal Ash

Ash produced as a combustion by-product at coal-fired thermal power stations can be recycled in the form of fertilizer as a constituent in the manufacture of cement, concrete, and other construction materials. J-POWER Group company Kaihatsu Hiroyu Co., Ltd. produces and sells fertilizer made from coal ash.

Effective Use of Biomass Fuel

J-POWER is proactively engaged in the effective use of biomass fuel as an alternative or a supplementary fuel at coal-fired thermal power stations. Mixed combustion of CO₂-free biomass fuel along with coal can reduce the amount of coal consumption and curb CO₂ emissions. In Fukuoka Prefecture J-POWER operates a Solidified Sewage Sludge Fuel Production facility, the largest class in the Kyushu Region. Also, in a joint project with Sumitomo Forestry Co., Ltd., J-POWER seeks to establish the largest scale wood pellets supply system utilizing unused wood of afforested areas in Japan. Also, in addition to mixing with coal, in Omuta City, Fukuoka Prefecture J-POWER is part of an initiative involving high-efficiency power generation from combustion of Refuse-Derived Fuel (RDF) made by compressing and pelletizing municipal solid waste. We are also participating in power generation involving the gasification and melting of municipal solid waste at the Narumi Waste Disposal Plant in Nagoya City.

Reducing the carbon footprint by introducing advanced cutting edge equipment

At Takehara Thermal Power Station (Hiroshima Prefecture), construction is underway on New Unit 1 (600 MW). This state-of-the-art coal-fired thermal power facility is being built to replace the two existing units, whose combined capacity is equal to that of the new unit (replacement project). With the help of cutting-edge ultra-supercritical boiler technology, New Unit 1 is expected to have one of the highest thermal efficiency levels among the coal-fired thermal power stations in Japan. Such improvements in thermal efficiency will reduce coal consumption, resulting in lower CO₂ emissions and significantly reduce the carbon footprint of power generation in Japan.

The challenge of achieving zero emission using coal fuel

Seeking to Maximize Efficiency of Coal-Fired Power

J-POWER is pursuing research and development aimed at further enhancing the efficiency of coal-fired power generation with a view to reducing CO₂ emissions. The next-generation technologies in our development item include Advanced Ultra-Supercritical (A-USC) technology for operation at even higher steam temperatures currently being studied. Research and development include next-generation technologies such as Integrated Coal Gasification Combined Cycle (IGCC), which generates electricity using a combination of gas turbines fueled by gasified coal and steam turbines powered by exhaust heat, as well as Integrated Coal Gasification Fuel Cell Combined Cycle (IGFC), which uses fuel cells in combination with IGCC technology.

Among our achievements is the EAGLE Project (Fukuoka Prefecture), which we implemented in collaboration with the New Energy and Industrial Technology Development Organization (NEDO) for over a decade until the project ended in 2014. In the course of the project, we tested-operated an IGCC pilot plant and conducted research into the development of CO₂ separation and capture technology.

OSAKI CoolGen Project

J-POWER and The Chugoku Electric Power Co., Inc. jointly founded OSAKI CoolGen Corporation (OCC) for the purpose of large-scale demonstration for IGCC, IGFC, and CO₂ separation and capture technologies. This demonstration project involves three stages (project assisted by the Ministry of Economy, Trade and Industry and NEDO).

In Phase 1 of the Oxygen-blown IGCC verification test a 170 MW class demonstration plant cleared all the test objectives and achieved the highest level of thermal efficiency in the world at this scale, and a rate of load change far better than the target rate aimed for. This will contribute to a reduction in CO₂ generation needed in future coal thermal power generation as well as an increase in load regulation ability in order to comply with power variations of renewable energy which can be affected by climatic conditions.

Currently we are engaged in the construction of test equipment for Phase 2 IGCC with the CO₂ separation and capture demonstration project. We plan to begin test operations in 2019. In addition from March 2019, we began work on Phase 3 IGFC with the CO₂ separation and capture demonstration project combined with fuel cells, the first such in the world.
Research and Development of Carbon Capture and Storage (CCS) Technology

CO₂ capture and storage, or CCS, is technology for collecting the CO₂ produced in the process of power generation and sequestering it underground.

J-POWER is developing CCS technology based on the achievements of the EAGLE project and the joint Japanese-Australian Callide Oxyfuel Combustion Project.

![CCS Technology Overview](Image)

Studies on effective use of CO₂

As one engagement in the decarbonization of coal fired power generation we are engaged in “Carbon Recycling”. The discharged CO₂ is captured and utilized as a resource. Studies are being made over a wide area on the use of CO₂ for chemical products, fuel and materials such as minerals and promoting the growth of crops.

J-POWER is planning to use CO₂ separation and capture facilities being built at OSAKI CoalGen in a joint project with The Chugoku Electric Power Co., Inc. and it will study methods of making effective use of CO₂ recovered from coal fired power generation.

Seeking to enable the advent of the age of Hydrogen

In order to contribute to the advent of the age of Hydrogen J-POWER is engaged in verification of IGFC, a combination of high efficiency generation technology and fuel cells. In addition J-POWER is also working to create a CO₂ free hydrogen supply chain and use this commercially. Australia has vast reserves of brown coal, an unused resource. J-POWER is participating in a pilot project that seeks to produce hydrogen by gasification of brown coal and to transport this to Japan. J-POWER has been engaged in IGCC development in Japan, and by utilizing the gasification technology built up in this way we will proactively engage in technical verification of refining equipment and processing technology for hydrogen gas production by gasifying brown coal (NEDO Grant Program).

If CCS technology is used at the production stage it is expected that this would make possible the use of hydrogen as CO₂ free energy. Consequently this is very promising technology from the viewpoint of securing adequate energy for Japan, a country with few natural resources, and it would also be a measure to help reducing global warming.

Nuclear Power

From the perspective of steady energy supply, nuclear power is an essential and indispensable source of energy for Japan, an island country with limited natural resources. It is also a source of energy that provides an effective countermeasure to global warming.

We believe it is necessary for nuclear power to continue playing a constant role in Japan’s electric power supply because it can be an effective source of energy, assuming, of course, that adequate safety management measures are taken.

Construction of the Ohma Nuclear Power Plant

Since May 2008, J-POWER has been engaged in construction of the Ohma Nuclear Power Plant in Ohma-machi, Shimokita-gun, Aomori Prefecture, with the necessary permits and approvals in hand. It is a key power plant that will perform a crucial role, both in the stable provision of a very safe and reliable supply of electric power, achieved through the use of cutting-edge technology, and in the nuclear fuel cycle for reuse of plutonium and uranium obtained through reprocessing of spent fuel.

On December 16, 2014, J-POWER submitted an application requesting permission for alteration of the reactor installation license to the Nuclear Regulation Authority (NRA) in order to comply with new safety standards adopted in the wake of the accident at the Fukushima Daiichi Nuclear Power Station. The application is under review by the NRA. Meanwhile, J-POWER has installed a simulator for plant operator training at the operation training and public information center. We have boosted operational skills and knowledge of accident management through simulation training.

At J-POWER, we will not be content simply to comply with regulatory requirements but will undertake voluntary safety measures and strive tirelessly to enhance safety as we exert every effort to build safe nuclear power plants.

**Plan Overview**

<table>
<thead>
<tr>
<th>Location</th>
<th>Ohma-machi, Shimokita-gun, Aomori Prefecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1,383 MW</td>
</tr>
<tr>
<td>Site area</td>
<td>130 ha</td>
</tr>
<tr>
<td>Reactor type</td>
<td>Advanced Boiling Water Reactor (ABWR)</td>
</tr>
<tr>
<td>Start of construction</td>
<td>May 2008</td>
</tr>
<tr>
<td>Start of commercial operations</td>
<td>To be determined</td>
</tr>
<tr>
<td>Fuel</td>
<td>Enriched uranium and high-plutonium mixed oxide (MOX)</td>
</tr>
</tbody>
</table>

**Simulator for plant operators training**

**Advanced Boiling Water Reactor (ABWR)**

The advanced boiling water reactor (ABWR) to be installed at Ohma Nuclear Power Plant incorporates cutting-edge technology, combined with the expertise and experience of the government, BNW manufacturers at home and abroad, and electric power companies in the construction and operation of nearly 100 BNWs around the world. The advantages of the ABWR are listed below.

- Improved safety and reliability
- Reduced radiation exposure for workers
- Reduced radioactive waste
- Enhanced operability and maneuverability

(See our website at www.jpower.co.jp)

**Significance of full MOX-ABWR**

The Ohma Nuclear Power Plant is capable of using both uranium fuel and the MOX fuel produced by reprocessing spent fuel. We call it “full MOX-ABWR” because it can operate with a fuel core consisting entirely of MOX fuel. The percentage of MOX fuel used will gradually be increased to 100%. While the reactor has the same basic specifications as those of the conventional uranium-fuel reactor, the equipment features listed below have been incorporated into design modifications to ensure complete safety.

- Increased capacity of standby liquid control systems
- Enhanced neutron absorbing effect of some control rods
- Increased capacity of main steam safety relief valves
- Adoption of automatic MOX-fuel inspection devices
Transmission Infrastructure

Contributing to the Cross-Regional Management of Japan’s National Grid

Transmission and Conversion Facilities to Unify the Grid

In addition to delivering power within the service areas of Japan’s regional electric power companies, J-POWER’s transmission lines, converter stations, and substations link up Japan’s regions and islands. Altogether, J-POWER operates approximately 2,400 km of transmission lines, four transmission substations, four AC/DC converter stations, and one frequency converter station. This infrastructure plays a vital role in the cross-regional management of Japan’s nationwide grid.

Particularly crucial to the cross-regional management of Japan’s electric power supply are our interconnection lines, linking the island of Honshu with Hokkaido, Shikoku, and Kyushu, and the Sakuma Frequency Converter Station, the first to enable the interchange of power between the 50-Hz-frequency grid of eastern Japan and the 60-Hz-grid of western Japan.

Sakuma Frequency Converter Station: Linking Eastern and Western Japan

The Sakuma Frequency Converter Station (maximum capacity 300 MW) was built to facilitate efficient management of the nation’s power supply by enabling the interchange of electricity between Japan’s eastern and western power networks, which operate at different frequencies. It was the first large-scale frequency converter of its kind in the world. In June 2016, the Organization for Cross-Regional Coordination of Transmission Operators adopted the Cross-Regional Network Development Plan for Interconnection Facilities Between Tokyo and Chubu. In accordance with this blueprint, J-POWER is planning to increase the capacity from 300 MW to 600 MW.

Honshu-Shikoku Interconnection Line: Linking Honshu and Shikoku

The Honshu-Shikoku Interconnection Line is a 500 kV transmission line installed along the Honshu-Shikoku bridge system that spans the Sato Inland Sea. Connecting with the main transmission lines of Honshu and Shikoku, it helps to maintain a stable supply of power in western Japan.

Communications and Other Operations

Communications Network

J-POWER maintains a communications network connecting its electric power facilities around Japan, mainly via microwave radio and fiber optic links. The data communicated across this network is used in our transmission line protection system, remote monitoring and control of power stations, and other systems that support the stable operation and management of our electric power facilities.

J-POWER’s microwave radio relay stations are a vital communications infrastructure linking J-POWER’s power stations, substations, and other facilities. They create a highly reliable network that ensures uninterrupted communication even during earthquakes, typhoons, or other natural disasters.

Diversified Operations

The challenge of achieving further growth

As market competition becomes more mainstream due to the deregulation of electric power supply additional changes will occur in the operational environment and the industrial structure. J-POWER has formed alliances with KDDI Corporation, ENERES Co., Ltd. and Suzuyo Shoji Co., Ltd., companies that have strengths different to those of J-POWER. And it is proactively engaged in responding to the needs of users.

J-POWER is also engaged in a VPP (Virtual Power Plant) Creation Project and seeks to optimize the supply and demand of energy and enhance the added value of the electric power supplied by J-POWER. In addition, J-POWER is also engaged in improving the efficiency of equipment operation and maintenance utilizing digital technology. Also we are expanding our network with startup companies in Japan and overseas which possess advanced technology and innovative ideas.

Water Environment and Energy-Saving Infrastructure

In the water-environment segment, J-POWER has taken part in two PFI projects relating to public waterworks: the Samukawa Water Purification Plant wastewater treatment project (Kanagawa Prefecture) and the Chiba Nogikou-ni-Sato Purification Plant wastewater treatment project (Chiba Prefecture). We also offer optimal water-treatment solutions for such institutions as universities and hospitals, including on-site groundwater purification services.

In addition by investing in WDTA CORP J-POWER is acquiring advanced technology in the area of water treatment and creating new global infrastructure business.

In the area of energy-saving infrastructure, J-POWER has provided consulting services for district heating systems in Japan and overseas. Utilizing this know-how, J-POWER has entered into a joint district cooling project in the United Arab Emirates, becoming the first Japanese power company to participate in such an undertaking in the Middle East.
J-POWER’s Global Business Operations

J-POWER’s extensive experience and track record within Japan have laid the foundations for its overseas business operations for more than 50 years. Moving forward, we are committed to extending our global reach in a manner consistent with our corporate philosophy: Playing our part for the sustainable development of Japan and the rest of the world.

Overseas Power Generation Projects (As of June 30, 2019)
- In operation 36
- Under construction or being planned 3

Overseas Consulting Projects
- Countries/regions receiving services 64
- Projects by Countries/territories 359

Experience in Coal Mine Projects
- Countries/regions in which J-POWER is participating in coal mine interest rights 1
- Coal Mine interests 3

J-POWER Group Facilities
(As of June 30, 2019)

| Power generation facilities (Capacity) | 36 locations | 21,775,970 kW | (6,897,735 kW) |
| Hydropower stations | 5 | 1,178,000 kW | (485,500 kW) |
| Thermal power stations | 28 | 20,519,770 kW | (6,375,867 kW) |
| Other power generation facilities (Wind/Biomass) | 3 | 78,200 kW | (36,368 kW) |

Owned capacity shown in brackets

*Gemeng International Energy Co., Ltd.* is an electric power company that has 14 power generation subsidiaries.
Overseas Consulting Business

Overview
For more than 50 years J-POWER has been providing consulting services around the world in connection with the development of electric power as well as power transformation and transmission facilities, etc. Since our first overseas project in 1962, we have undertaken 359 projects in 64 countries and regions. The mainstay of J-POWER’s overseas consulting business is technical support for specific international cooperation projects. Commissioned by the Japan International Cooperation Agency (JICA), overseas government organizations and private sector corporations, J-POWER completes baseline studies, feasibility studies, preliminary designs, detailed designs and construction supervision, etc.

Chronology of Major Overseas Consulting Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Project/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>Revision of the Electric Power Development Promotion Law</td>
</tr>
</tbody>
</table>
| 1962 | Tacna Hydropower Project (Peru)  
The first consulting services provided on a commercial basis |
| 1967 | Srinagarind Hydropower Project (Thailand) |
| 1969 | Hasan Ugurlu Hydropower Project (Turkey) |
| 1971 | Lima Chimbote Transmission Line Project (Peru)  
Consulting services for large-scale power transmission |
| 1974 | Thermal Power Project (The Philippines)  
The first consulting services for thermal power generation |
| 1982 | Port Kelang Phase II Thermal Power Project (Malaysia)  
Consulting services for large-scale coal-fired power generation |
| 1984 | Technical assistance on NOx emission reductions (Australia)  
Environmental conservation project in Europe |
| 1985 | Tianshengqiao Hydropower and Transmission Project (China) |
| 1990 | Lam Ta Khong Pumped Storage Power Project (Thailand)  
Consulting services for pumped storage power generation |
| 1994 | Ham Thuan Dami Hydropower Project (Vietnam)  
Bakreswar Thermal Power Project (India) |
| 1996 | Yuncan Hydropower Project (Peru) |
| 1998 | Punatsangchu Hydropower Project (Bhutan)  
Ta Sang Hydropower Project (Union of Myanmar) |
| 2001 | Dai Ninh Hydropower Project (Vietnam) |
| 2003 | Upper Kotmale Hydropower Project (Sri Lanka) |
| 2006 | Thac Mo Hydropower Expansion Project (Vietnam) |
| 2007 | Study on promotion of energy saving measures (Indonesia)  
Consulting services for energy efficiency and conservation |
| 2008 | Ngii Son Thermal Power Project (Vietnam) |
| 2015 | Ulian Bator No.4 Power Station Optimization Project (Mongolia) |
| 2016 | Ultra Super Critical Coal-fired Power Project (Vietnam) |
| 2019 | Chulaiphom pumped storage power station (Thailand) |

<table>
<thead>
<tr>
<th>Image Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Kotmale Hydroelectric Power Station (Sri Lanka)</td>
</tr>
<tr>
<td>Thac Mo Hydropower Expansion Project (Vietnam)</td>
</tr>
<tr>
<td>Ugii Son Thermal Power Project (Vietnam)</td>
</tr>
<tr>
<td>U-Thal Gas Power Station (Thailand)</td>
</tr>
<tr>
<td>Tenaska Westmoreland Generating Station (USA)</td>
</tr>
</tbody>
</table>

Overseas Power Generation Business

Overview
Based on the knowledge and technical capabilities developed through our domestic operations and leveraging the experience, trust, and networks we have built up through our overseas consulting projects, J-POWER has been actively seeking out and developing commercial power generation projects overseas. As of March 31, 2019, we had 36 facilities in six countries and regions, representing a combined generation capacity of about 21,780 MW (6,900 MW owned capacity).

Operations in Thailand
Building on the track record of its overseas consulting projects, J-POWER is participating in multiple power generation projects in Thailand. These include not only large-scale gas thermal power stations, but also plants that run on biomass fuel made from rice husk and gas cogeneration facilities. J-POWER has 16 generation projects in Thailand and, as a major power generation company in Thailand, J-POWER contributes to ensuring a stable supply of electric power.

Operations in the United States
Since its full-scale entry into the US in 2006, through the purchase of a share in power stations and the development of new power stations it has developed and acquired a wide range of knowledge. In December 2018 it commenced commercial operation of Tenaska Westmoreland Generating Station and this became J-POWER’s 11th project in the USA. It has a combined generation capacity of about 5,430 MW (2,020 MW owned capacity). In June 2019 it was decided to construct Jackson natural gas-fired combined-cycle power plant (generation capacity of 1,200 MW) a new project developed by J-POWER.

First high-efficiency coal-fired thermal power station in Indonesia
J-POWER is engaged in the Central Java coal-fired power plant in Batang Regency, Central Java, Indonesia with a capacity of 2 GW. (This is a joint project of J-POWER, PT ADAROPOWER of Indonesia and TOQUBI Corporation). When commercial operation starts this project will be one of the largest scale private sector coal-fired power plant IPP projects in Indonesia. Through the adoption of the Ultra-Super Critical (USC) pressure technology and a wide range of environmental measures, it will be a model environment friendly, high-efficiency power generation. In the area where the power station is located the project company is engaged in various CSR activities matched to the needs of the region. This includes infrastructure building, environmental education programs, the support of community business and skill training.

<table>
<thead>
<tr>
<th>Image Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Java coal-fired IPP project</td>
</tr>
<tr>
<td>Local Primary School environment education programs</td>
</tr>
</tbody>
</table>
Financial Information

Consolidated Balance Sheet (As of March 31, 2019)

<table>
<thead>
<tr>
<th>Assets</th>
<th>Year ended March 31, 2019</th>
<th>Year ended March 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noncurrent assets</td>
<td>2,325,256</td>
<td>2,401,671</td>
</tr>
<tr>
<td>Electric utility plant and equipment</td>
<td>951,149</td>
<td>944,323</td>
</tr>
<tr>
<td>Overseas business facilities</td>
<td>341,418</td>
<td>312,126</td>
</tr>
<tr>
<td>Other noncurrent assets</td>
<td>93,404</td>
<td>94,836</td>
</tr>
<tr>
<td>Construction in progress</td>
<td>525,740</td>
<td>582,083</td>
</tr>
<tr>
<td>Nuclear fuel</td>
<td>73,800</td>
<td>74,514</td>
</tr>
<tr>
<td>Investments and other assets</td>
<td>339,743</td>
<td>393,769</td>
</tr>
<tr>
<td>Current assets</td>
<td>321,798</td>
<td>364,508</td>
</tr>
<tr>
<td>Total assets</td>
<td>2,647,054</td>
<td>2,766,179</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities and Net assets</th>
<th>Year ended March 31, 2019</th>
<th>Year ended March 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noncurrent liabilities</td>
<td>1,566,182</td>
<td>1,622,378</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>249,100</td>
<td>296,279</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>1,815,282</td>
<td>1,918,657</td>
</tr>
<tr>
<td>Shareholders’ equity</td>
<td>745,117</td>
<td>777,699</td>
</tr>
<tr>
<td>Accumulated other comprehensive income</td>
<td>42,114</td>
<td>19,760</td>
</tr>
<tr>
<td>Non-controlling interests</td>
<td>48,833</td>
<td>48,123</td>
</tr>
<tr>
<td>Total net assets</td>
<td>836,124</td>
<td>845,582</td>
</tr>
<tr>
<td>Total liabilities and net assets</td>
<td>2,647,054</td>
<td>2,766,179</td>
</tr>
</tbody>
</table>

Consolidated Statements of Income (From April 1, 2018 to March 31, 2019)

<table>
<thead>
<tr>
<th>Sales and earnings (consolidated)</th>
<th>Year ended March 31, 2019</th>
<th>Year ended March 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating revenue</td>
<td>856,252</td>
<td>897,366</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>751,916</td>
<td>818,521</td>
</tr>
<tr>
<td>(operating income)</td>
<td>104,336</td>
<td>78,844</td>
</tr>
<tr>
<td>Non-operating income</td>
<td>29,113</td>
<td>18,694</td>
</tr>
<tr>
<td>Non-operating expenses</td>
<td>30,974</td>
<td>25,205</td>
</tr>
<tr>
<td>Total ordinary revenue</td>
<td>885,366</td>
<td>916,261</td>
</tr>
<tr>
<td>Total ordinary expenses</td>
<td>782,690</td>
<td>847,722</td>
</tr>
<tr>
<td>Ordinary income</td>
<td>102,476</td>
<td>68,539</td>
</tr>
<tr>
<td>Extraordinary loss</td>
<td>3,389</td>
<td></td>
</tr>
<tr>
<td>Profit before income taxes and minority interests</td>
<td>99,086</td>
<td>68,539</td>
</tr>
<tr>
<td>Income taxes-deferred</td>
<td>20,124</td>
<td>17,134</td>
</tr>
<tr>
<td>Profit</td>
<td>82,662</td>
<td>55,397</td>
</tr>
<tr>
<td>Profit attributable to non-controlling interests</td>
<td>14,213</td>
<td>9,084</td>
</tr>
<tr>
<td>Profit attributable to owners of parent company</td>
<td>68,448</td>
<td>46,252</td>
</tr>
</tbody>
</table>

Consolidated Sales Breakdown (FY 2018)

<table>
<thead>
<tr>
<th>Sales (Mlns yen)</th>
<th>FY 2016</th>
<th>FY 2017</th>
<th>FY 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary profits</td>
<td>744,402</td>
<td>856,252</td>
<td>897,366</td>
</tr>
<tr>
<td>Profit attributable to owners of parent company</td>
<td>102,476</td>
<td>68,448</td>
<td>46,252</td>
</tr>
</tbody>
</table>

Consolidated Statement of Cash Flow (From April 1, 2018 to March 31, 2019)

| Cash provided by (used in) operating activities | 160,310 | 148,423 |
| Cash provided by (used in) investing activities | -110,635 | -117,042 |
| Cash provided by (used in) financing activities | 885,825 | 74,622 |
| Effect of exchange rate changes on cash and cash equivalents | 3,536 | 3,275 |
| Net increase (decrease) in cash and cash equivalents | 31,614 | 50,237 |
| Cash and cash equivalents at beginning of period | 168,454 | 136,840 |
| Cash and cash equivalents at end of period | 136,840 | 187,077 |

Electricity Sales (FY 2018)

| Amount of electricity sold: 69,356 TWh | 0 |

Corporate Data

Business category: Electricity Utility

Date of incorporation: September 16, 1952

Head Office: 6-15-1 Ginza, Chuo-ku, Tokyo 104-8165, Japan
Tel: 81-3-3546-2211

Capital Million JPY: 180,502

Employees: 2,445

Website: www.jppower.co.jp
E-mail: webmaster@jppower.co.jp

Major Group Companies (As of March 1, 2019)

<table>
<thead>
<tr>
<th>Company name</th>
<th>Location</th>
<th>Telephone/website</th>
<th>Main business activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP Business Service Corporation</td>
<td>Koto-ku, Tokyo</td>
<td><a href="http://www.jpbs.co.jp">www.jpbs.co.jp</a></td>
<td>Welfare facility management, building maintenance services, administrative and labor services, computer software development, etc.</td>
</tr>
<tr>
<td>JPHYTEC Co., Ltd.</td>
<td>Chiyoda-ku, Tokyo</td>
<td><a href="http://www.jphytec.co.jp">www.jphytec.co.jp</a></td>
<td>Construction, engineering, design, consulting and maintenance inspections of hydropower stations, transmission lines and substations; real estate indemnity; land survey; civil engineering work; general architecture; project management, etc.</td>
</tr>
<tr>
<td>JPEC Co., Ltd.</td>
<td>Chuo-ku, Tokyo</td>
<td><a href="http://www.jpec.co.jp">www.jpec.co.jp</a></td>
<td>Construction, engineering, design, consulting and maintenance inspections of thermal and nuclear power stations; unloading and transportation of coal for thermal power stations; sales of fly ash; marine transportation of coal for power generation; research and planning for environmental conservation, etc.</td>
</tr>
<tr>
<td>KEC Corporation</td>
<td>Bunkyo-ku, Tokyo</td>
<td><a href="http://www.kec.co.jp">www.kec.co.jp</a></td>
<td>Construction and maintenance of electronic and telecommunication facilities, etc.</td>
</tr>
<tr>
<td>JP Design Co., Ltd.</td>
<td>Chiyoda-ku, Tokyo</td>
<td><a href="http://www.jpdc.co.jp">www.jpdc.co.jp</a></td>
<td>Construction consulting services; Measurement &amp; geological surveys; Design, supervision, surveys and research of power generation facilities and general facilities</td>
</tr>
<tr>
<td>KAIHATSU HIRYOU CO., Ltd.</td>
<td>Takeharu City, Hiroshima Prefecture</td>
<td><a href="http://www.jpsik.com">www.jpsik.com</a></td>
<td>Production and sales of fertilizers using coal ash, etc.</td>
</tr>
</tbody>
</table>

Major Overseas Subsidiaries (As of April 1, 2019)

- J-Power USA Development Co., Ltd. (U.S.A.)
- J-Power Generation (Thailand) Co., Ltd. (Thailand)
- J-Power Consulting (China) Co., Ltd. (China)
- J-Power AUSTRALIA PTY, LTD. (Australia)