

Climate Change

◆◆◆ Policy and Concept ◆◆◆

● Social background

In the Paris Agreement that established a framework for climate change countermeasures, every country is expected to submit and revise greenhouse gas reduction targets every five years. In response, the Japanese government set a target to “reduce greenhouse gas emissions 26% by fiscal 2030 compared to fiscal 2013.” This target is consistent with the 2030 energy mix established by the government.

● Targets and efforts to achieve them

As a leading “decarbonization” company, we declared our intention to make efforts to reduce environmental load, including tackling climate change – a commitment we made in the Kansai Electric Power Group Medium-term Management Plan as part of our contribution to Japan’s global warming countermeasures. Among these efforts, with a base of strength in nuclear power generation, we will seek to achieve 6 million kW of renewable installed capacity by the 2030s. We are making these our “two wheels” of non-fossil fuel energy supplies. Through these efforts, we will keep the top spot for the amount of CO₂-free power generation in Japan, and halve CO₂ emissions associated with power generation in Japan in fiscal 2030 compared to fiscal 2013.

Specifically, we will pursue “lowering electric power’s carbon intensity,” including the utilization of nuclear power generation with the most emphasis on safety and through the further development, incorporation and utilization of renewable energies as well as by improvement of the efficiency of thermal power plants and other efforts. Moreover, we will increase the electrification ratio in society and advance the efficient use of electricity. In addition to the advancement of these efforts in both supply and demand, we will build a next generation network that is prepared to incorporate large amounts of renewable energy as a means of connecting them. Accordingly, the Electric Power Council for a Low Carbon Society (ELCS), which was established by a consortium of electric companies including our Company, set a CO₂ emission factor target of about 0.37 kg-CO₂/kWh (energy used) by fiscal 2030, based on the projected energy mix. We will continue contributing to efforts to achieve its goals.

◆◆◆ Goals ◆◆◆

● Advancing efforts to control CO₂ emissions

- Keep the top spot for the amount of CO₂-free power generation in Japan.
- Halve CO₂ emissions associated with power generation in Japan in FY2030 (compared to FY2013)

● Continuing safe and stable operation of nuclear power plants

- Operation of nuclear power plants with top priority placed on safety

● Further development and utilization of renewable energy

- Achieve 6 million kW of installed capacity by 2030s (2 million kW or more new development in Japan and abroad)

● Maintaining and improving the thermal efficiency of thermal power plants (lower heating value base)

- Benchmark indicators (A: 1.00, B: 44.3%)

● Reducing transmission and distribution loss*

- To be maintained and reduced

* Targets apply only to Kansai Transmission and Distribution, Inc.

● Promoting use of innovative forms of energy among customers and communities

- Contribute to making energy use by customers and society more sophisticated

● Limiting SF₆ emissions (calendar year basis) (gas recovery rate upon inspection/removal of equipment)

- 97% (upon inspection)
- 99% (upon removal)

◆◆◆ Efforts ◆◆◆

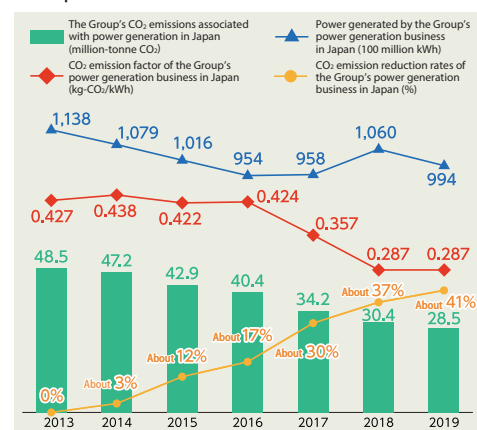
● Our Group’s CO₂ emissions associated with power generation in Japan

Our Group’s CO₂ emissions associated with power generation in Japan amounted to about 28.5 million tonnes in FY2019; emissions have been declining since FY2013 when the target was set. As a leading “decarbonization” company, we are committed to safely and stably operating Takahama Nuclear Power Station Units 3 and 4 and Ohi Nuclear Power Station Units 3 and 4 while developing and promoting renewable energy. Our efforts have resulted in a reduction in CO₂ emissions of about 40% from 2013 levels.

● Continuing safe and stable operation of nuclear power plants

Since nuclear power generation emits no CO₂, it is an important source of energy that prevents global warming. With understanding of residents of local communities, we continue the safe and stable operation of plants that have resumed operation and restart plants as soon as the safety is confirmed by appropriately responding to examinations of the Nuclear Regulation Authority. We will also keep independently and continuously promoting safety measures that exceed regulatory requirements.

◆ The Group’s CO₂ emissions and CO₂ emission factors associated with power generation in Japan



● Maintaining and improving the thermal efficiency of thermal power plants

We continuously undertake measures related to facilities and operation, working to reduce the amount of fuel used and suppress CO₂ emissions by maintaining and improving thermal efficiency.

Our Himeji No. 2 Power Station, one of our largest natural gas-fired thermal power plants, employs a combined-cycle power generation with advanced 1,600°C class gas turbines. We are working to suppress CO₂ emissions by increasing thermal efficiency to about 60%, which is the highest global standard, and reducing the amount of fuel used.

Moreover, at Units 1 and 3 of the Aoi Power Station, in addition to the heavy oil and crude oil we had been using, we began using natural gas, which is less expensive and better for the environment, in 2016.

● Encouraging efficient energy use

With the goals of realizing energy conservation, cost cutting and CO₂ reduction for our customers and society, we are offering high-efficiency systems that utilize renewable energy sources and heat pump technologies, as well as proposing effective operation procedures, for example. In addition, we are providing total support for energy management to customers and other members of society and undertaking activities that serve these purposes, including the services that allow customers to see energy use.

The solution offered to residential customers is “total electric conversion,” which, through efficient use of energy, can make our lives more comfortable and convenient. Specific products and services include an energy-efficient hot water supply system (EcoCute), safe, comfortable and convenient electric appliances (IH cooking heaters, etc.), and power consumption visualization (Hapi e-Miruden). The internet-based service Hapi e-Miruden monitors the amount and rate of electricity and gas consumed. In addition, by entering data on utility costs the system can automatically indicate the total amount of household CO₂ emissions while providing useful information, such as tips on energy conservation according to registered equipment or power consumption patterns.

We are also providing total support for the energy management of our business customers. For example, we offer proposals for energy systems that are optimized to their various needs, including making energy use more efficient, and explain how to operate these systems. We also work with other group companies to provide a range of services such as energy conservation diagnoses and energy management support appropriate to the customer's facility usage patterns. We remain committed to helping our customers minimize their energy consumption, achieve cost savings, and reduce their CO₂ emissions.

● Adoption of smart meters

Kansai Transmission and Distribution, Inc. is systematically introducing smart meters. In addition to making amounts of electricity use visible to customers, installing smart meters contributes to the energy conservation of society as a whole, allows flexible handling of various rate options, and enables formation of facilities efficiently according to the conditions of electricity use, among other benefits. We have completed installation of smart meters for customers that receive high-voltage and extra-high-voltage electricity, and we plan to install them for every customer that receives low-voltage power by fiscal 2022.

● Controlling SF₆ gas emissions

Greenhouse gases other than CO₂, Sulfur hexafluoride (SF₆) is electrically extremely stable and safe to humans, so it is used in gas circuit breakers and other devices.

Most SF₆ emissions into the atmosphere attributable to internal inspections and the removal of SF₆ equipment are recovered.

● Group companies' power generation business

Kanden Energy Solution Co., Inc. (hereinafter “Kenes”) provides one-stop optimal solutions to customers, leveraging technical capabilities and expertise accumulated through its electricity business, coupled with our Group's comprehensive resources. Specific services such as utility services (including ESP* services) help customers save on energy, costs and CO₂ emissions.

Meanwhile, Kenes' power generation business capitalizes on their technical capabilities, engineering expertise and extensive experience/know-how as an energy professional, thereby introducing and promoting untapped and natural energy sources as a means to promote and encourage renewable energy.

* Energy service provider

◆ Major achievements

Solar power generation

Arida Solar Power Station (Arida City, Wakayama Prefecture)

The Arida Solar Power Station is the Group's largest solar power station with about 150,000 solar panels installed across a large area.

| | |
|------------------------------------|--|
| Power output | 29,700 kW |
| Generated energy | Approx. 31 million kWh/annum (Equivalent to the annual consumption by 10,000 standard households) |
| CO ₂ emission reduction | Approx. 16,000 tonnes/annum* |
| Total site area | Approx. 45 ha |
| Commencement | October 2015 |



Wind power generation

Awaji Wind Power Station (Awaji City, Hyogo Prefecture)

While harmonizing with the community, this station operates by utilizing the wind blowing through the hills in northern Awaji City.

| | |
|------------------------------------|---|
| Power output | 12,000 kW (6 turbines @2,000 kW) |
| Generated energy | Approx. 20 million kWh/annum (Equivalent to the annual consumption by 6,500 standard households) |
| CO ₂ emission reduction | Approx. 7,000 tonnes/annum* |
| Commencement | December 2012 |



* The reduction in CO₂ emissions was a figure calculated upon commencement of operations.

● Addressing TCFD Recommendations

Our Group has set targets related to ESG and are making efforts toward achieving them not only for sustainable growth in our company through the safe and steady supply of energy that considers the global environment, but also for the contribution for sustainable development of society by solving global social issues.

We follow the recommendations of the Task Force on Climate-related Financial Disclosures or TCFD* (hereinafter “TCFD Recommendations”) to analyze long-term risks and opportunities, with results used to properly address climate change.

* TCFD was established by the Financial Stability Board, which is an international agency that has central banks, financial regulatory authorities and other organizations from major countries as members. In total, 1419 organizations around the world, including financial institutions, businesses and governments, declared their support for the TCFD Recommendations as of September 16, 2020.

◆ Support for the TCFD Recommendations

On May 27, 2019, our Company declared our support for the TCFD Recommendations. Recognizing the size of the impacts that our Group business activities have on the global environment, we declared our support for the TCFD Recommendations to “analyze and disclose business risks and opportunities originating in climate change over the medium and long terms in order to reduce risks of financial market destabilization.”

◆ Indicators and objectives

Recognizing the size of the impacts that our business activities have on the global environment, we are committed to promoting renewable energy, effective use of nuclear power generation and improving the efficiency of thermal power generation, all of which are designed to promote decarbonization.

Our Group's targets

Halve CO₂ emissions associated with power generation in Japan in FY2030 (compared to FY2013)

Achieve 6 million kW of installed capacity by 2030s
(2 million kW or more new development in Japan and abroad)

Keep the top spot for the amount of CO₂-free power generation in Japan.

◆ Scenario Analysis

Referring to three scenarios based on two axes (technological advancement and decarbonization policies), we are implementing Scenario Analysis according to data provided by the IEA* and other institutions, the details of which will be included in an integrated report.

* International Energy Agency

● Performance data

| GHG emissions (non-consolidated) | | Unit | FY2017 | FY2018 | FY2019 |
|---|----------------|--------------------------|---------|---------|---------|
| Direct greenhouse gas emissions (Scope 1)*1*2*3 | | 10,000 t-CO ₂ | 3,281.4 | 2,865.7 | 2,663.2 |
| Electricity indirect greenhouse gas emissions (Scope 2)*1*2*4 | | 10,000 t-CO ₂ | 1.0 | 0.6 | 0.5 |
| Other indirect greenhouse gas emissions (Scope 3)*1*5 | | 10,000 t-CO ₂ | 3,115.1 | 3,784.5 | 3,173.9 |
| | Category 1*6 | 10,000 t-CO ₂ | 129.6 | 123.2 | 142.7 |
| | Category 2*7 | | 80.0 | 102.6 | 129.3 |
| | Category 3*8 | | 2,903.2 | 3,556.6 | 2,900.0 |
| | Category 4*9 | | 0.1 | 0.1 | 0.0 |
| | Category 5*10 | | 1.2 | 1.1 | 1.0 |
| | Category 6*11 | | 0.3 | 0.3 | 0.3 |
| | Category 7*12 | | 0.8 | 0.6 | 0.6 |
| | Category 8*13 | | — | — | — |
| | Category 9*13 | | — | — | — |
| | Category 10*13 | | — | — | — |
| | Category 11*13 | | — | — | — |
| | Category 12*13 | | — | — | — |
| | Category 13*13 | | — | — | — |
| | Category 14*13 | | — | — | — |
| | Category 15*13 | | — | — | — |

*1 The amount of greenhouse gases emitted in our entire supply chain is calculated in accordance with the Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (ver. 2.3) issued by the Ministry of the Environment and the Ministry of Economy, Trade and Industry.

*2 GHG emissions (non-consolidated) in fiscal 2019 include those of Kansai Transmission and Distribution, Inc., which was later spun off.

*3 Direct GHG emissions (Scope 1) refer to emissions (energy-derived CO₂, SF₆ and N₂O emissions) reported by electric companies in line with the Law Concerning the Promotion of the Measures to Cope with Global Warming along with CO₂ emissions from transportation fuel use, which are excluded from the reporting obligations. SF₆ emissions are based on the calendar year.

*4 Electricity indirect GHG emissions (Scope 2) include CO₂ emissions originating from electricity and heat purchased from external corporations, which should be reported by electric operators in line with the Law Concerning the Promotion of the Measures to Cope with Global Warming. For electricity, adjusted factor was used.

*5 Indirect emissions not covered by Scope 1 or Scope 2 (emissions from other corporations related to the business activities of the company concerned)

*6 Product/service price (purchased or obtained) × emission intensity

*7 Capital goods price × emission intensity

*8 Fuel consumption × emission intensity + electricity purchased externally × emission factor

*9 Fuel consumption × emission intensity

*10 Waste disposal volume × emission intensity + fuel consumption × emission intensity

*11 Number of employees × emission factor

*12 (City classification-based) ∑ (number of employees × operating days × emission intensity)

*13 Not applicable because of specific to our business

| The Group's CO ₂ emissions and their factors associated with power generation in Japan | Unit | FY2017 | FY2018 | FY2019 |
|---|--------------------------|--------|--------|--------|
| CO ₂ emissions ^{*1} | 10,000 t-CO ₂ | 3,420 | 3,040 | 2,850 |
| CO ₂ emission factor (at the generation end) (per power generation output) ^{*2} | kg-CO ₂ /kWh | 0.357 | 0.287 | 0.287 |

*1 CO₂ emissions refer to those produced by fuel combustion at the Group's thermal power plants in Japan.

*2 CO₂ emission factor (at the generation end) corresponds CO₂ emissions per kWh of the Group's domestic power generation business

• CO₂ emission factor (at the generation end) = CO₂ emissions of the Group's domestic power generation business ÷ amount of power generated

| CO ₂ emissions and retail emission factors of our Company | Unit | FY2017 | FY2018 | FY2019 |
|---|--------------------------|--------|--------|--------|
| CO ₂ emissions (before adjustment) ^{*1} | 10,000 t-CO ₂ | 5,018 | 4,153 | 3,844 |
| CO ₂ emissions (after adjustment) ^{*2} | 10,000 t-CO ₂ | 4,822 | 3,936 | 3,594 |
| CO ₂ emission factor (energy used) (before adjustment) (per amount of electric power sold) ^{*3} | kg-CO ₂ /kWh | 0.435 | 0.352 | 0.340 |
| CO ₂ emission factor (energy used) (after adjustment) (per amount of electric power sold) ^{*3} | | 0.418 | 0.334 | 0.318 |

*1 CO₂ emissions refer to those produced by fuel combustion at the thermal power plants and include those for power purchased from other corporations.

*2 Adjusted CO₂ emissions include the environmental value adjustments under the surplus solar power purchasing system and the renewable energy feed-in tariff system.

• CO₂ emissions = CO₂ emissions (before adjustment) + CO₂ emissions (after feed-in tariff adjustment, etc.)

*3 CO₂ emission factor (energy used) corresponds CO₂ emissions per kWh of Kansai Electric Power Company electricity used.

• CO₂ emission factor (energy used) (before adjustment) = CO₂ emissions (before adjustment) ÷ amount of electric power sold

• CO₂ emission factor (energy used) (after adjustment) = CO₂ emissions (after adjustment) ÷ amount of electric power sold

*1,2,3 The results for FY2019 are provisional; the actual CO₂ emission factor will be officially announced by the government in accordance with the Law Concerning the Promotion of the Measures to Cope with Global Warming, etc.

| Greenhouse gases other than CO ₂ (non-consolidated) | Unit | FY2017 | FY2018 | FY2019 |
|--|--------------------------|--------|--------|--------|
| N ₂ O (dinitrogen oxide) ^{*1} | 10,000 t-CO ₂ | 2.8 | 2.4 | 2.3 |
| SF ₆ (sulfur hexafluoride) ^{*1*2} | 10,000 t-CO ₂ | 4.6 | 5.1 | 3.8 |

*1 CO₂ equivalent

*2 SF₆ emissions are based on the calendar year

| Utilization rate of nuclear power facilities and net thermal efficiency of thermal power facilities, both operated by our Company | Unit | FY2017 | FY2018 | FY2019 |
|---|------|--------|--------|--------|
| Utilization rate of nuclear power facilities ^{*1} | % | 18.0 | 54.6 | 48.4 |
| Net thermal efficiency of thermal power facilities ^{*2} | % | 48.3 | 49.0 | 48.6 |

*1 Utilization rate of nuclear power facilities = amount of power generated ÷ (permitted output × calendar hours) × 100

*2 Net thermal efficiency of thermal power facilities = (amount of power transmitted × quantity of heat per kWh) ÷ total amount of input heat (lowest heat value standard) × 100

| Energy consumption (non-consolidated) | | Unit | FY2017 | FY2018 | FY2019 |
|--|--------------|------------------------|---------|---------|---------|
| Total energy consumption ^{*1} | | 1,000 GJ | 554,656 | 492,321 | 460,060 |
| Thermal fuel consumption ^{*2} | Coal | 1,000 t | 4,288 | 3,455 | 3,305 |
| | Heavy oil | 1,000 kL | 157 | 136 | 48 |
| | Crude oil | 1,000 kL | 345 | 194 | 30 |
| | LNG | 1,000 t | 7,287 | 6,734 | 6,502 |
| | Wood pellets | 1,000 kL | 16 | 2 | 0.2 |
| | Other | (heavy oil equivalent) | 361 | 288 | 202 |
| Fuels for nuclear power generation (weight of pre-irradiation uranium) ^{*2} | | tU | 37 | 87 | 52 |

*1 These figures are reported to the government in accordance with the Act on the Rational Use of Energy. (Fossil fuel consumption, purchased electricity, and purchased heat)

*2 Data exclusive to our Company