# Environmental data 2020

Kansai Electric Power

power with heart

# Reporting Coverage

## ■Reporting coverage of Kansai Electric Power and its 80 consolidated subsidiaries (as of the end of March 2020)

（1）Specific data of environmental impact including electricity consumption in an office is grasped and reported in this report

⇒ **97.1%**

<Explanation>

It represents the ration of companies that are performing Eco-Action among 80 consolidated subsidiaries (ratio of sales).

・<Calculation Method>

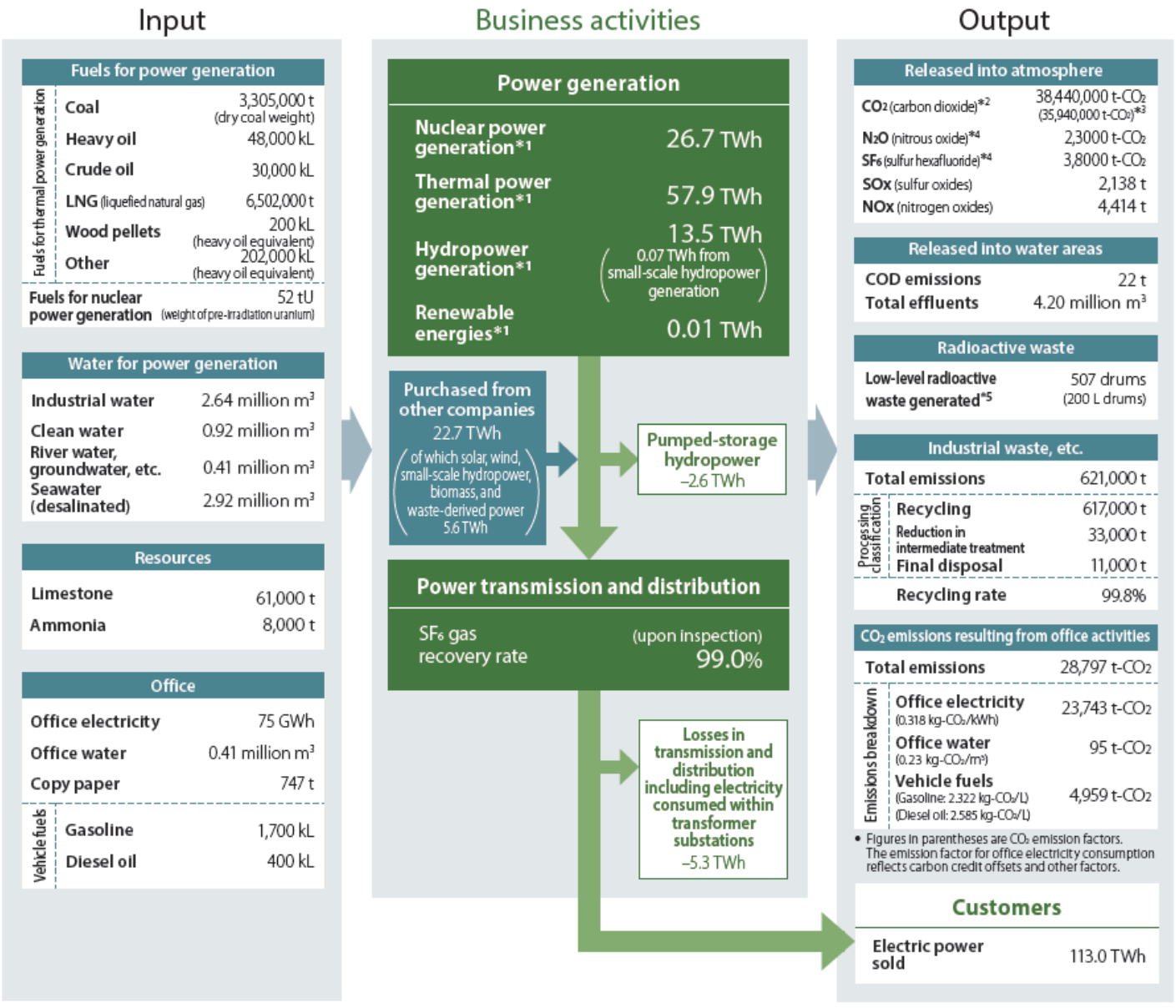
$$\frac{\text{(Sales of Kansai Electric Power in FY 2019) + (Sales of 38 consolidated subsidiaries in FY 2019 that are performing Eco-Action as of the end of March 2020)}}{\text{(Sales of Kansai Electric Power in FY 2019 ) + (sales of 80 consolidated subsidiaries in FY 2019)}}$$

＊Eco-Action

It is the environmental action plan including the reducing office electricity consumption and office water consumption

# ＜Data＞

# Status overview of our business activities and environmental load




Note 1: This table contains non-consolidated figures for Kansai Electric Power Co., Inc. only.
Note 2: Totals may not sum due to rounding.
Note 3: Thermal power generation figures do not include biomass power generation.

*1 Excludes amounts of power for inside power plants
*2 Includes $CO_2$ originating from electricity purchased from other companies
*3 Emissions reflecting environmental values, etc. adjusted according to the renewable energy feed-in tariff system
*4 $CO_2$ conversion
*5 Net generation (generated amount – reduced amount)

# Environmental accounting （KEPCO ①）

KEPCO has introduced environmental accounting both on a non-consolidated basis and for group companies to clarify the costs of environmental conservation in our business activities and the benefits achieved.

## FY2019 assessment（Environmental conservation costs）

For environmental conservation costs, investments were about 4 billion yen, about 600 million more than the previous fiscal year. Due to SF6 gas recovering costs and other cost reduction efforts, expenses were about 16.7 billion yen, which is about 130 million yen less than the previous fiscal year.

## Environmental conservation costs (100 million yen)

| Category | Investment | | Expenses | | Major items |
|---|---|---|---|---|---|
| | FY2018 | FY2019 | FY2018 | FY2019 | |
| 1. Global environmental conservation costs ($CO_2$ reductions,etc.) | 0.1 | 0.1 | 4.9 | 2.0 | $SF_6$ gas collection |
| 2. Local environmental conservation costs | 39 | 38 | 40.5 | 37.7 | |
| (1)Measuring/monitoring environmental impact | 1.3 | 2.4 | 16.1 | 14.3 | Radiation control and measurement, air quality concentration measurement, marine area surveys |
| (2)Pollution control(air pollution, water contamination, oil leakage, etc.) | 37.3 | 35.2 | 16.4 | 15.6 | Air pollution control measures, water contamination prevention measures |
| (3)Nature conservation | 0 | 0 | 8.0 | 7.8 | Revegetation |
| 3. Costs to build a circular economy | 1.3 | 2.9 | 117.4 | 123.1 | |
| (1)Industrial waste processing, recycling | 1.2 | 2.8 | 53.9 | 57.8 | Industrial waste processing, PCB processing |
| (2)General waste processing, recycling | 0 | 0 | 0.1 | 0.0 | Paper recycling |
| (3)Radioactive waste processing | 0 | 0 | 63.4 | 65.3 | Low-level radioactive waste processing |
| (4)Green purchasing | 0.1 | 0.1 | 0 | 0 | Research-related work |
| 4. Environmental management costs | 0 | 0 | 0.7 | 0.7 | Environmental reports |
| 5. R&D costs | 0.1 | 0.1 | 4.4 | 3.0 | Load leveling, environmental conservation, energy savings and recycling, natural energy |
| 6. Other costs | 0 | 0 | 0.2 | 0.2 | Research Laboratory repairs |
| **Total** | 40.0 | 40.6 | 168.0 | 166.7 | |
| **Total capital investment during the period** | 3,693 | 4,472 | – | – | |
| **Operating expenses during period** | – | – | 26,632 | 25,332 | |

Note: Based on the Environmental Reporting Guidelines (FY2005 version) issued by the Ministry of the Environment. Depreciation is not calculated into expenses. Composite costs are tallied proportionally by one of three methods: (1)calculation of differences; (2) proportional division based on rational criteria; (3) proportional division based on criteria of expediency. Costs involved in generating nuclear power are calculated with the sum of individual measures to protect the environment taken as environmental conservation costs (radiation control and measurement, low-level radioactive waste processing, etc.). Figures may not add up due to rounding off.

# Environmental accounting （KEPCO ②）

## FY2019 assessment（Effects of environmental conservation）

CO2 emissions intensity is expected to improve greatly compared to the previous fiscal year. 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.

Furthermore, we reduced SOx and NOx emissions intensities compared to the previous fiscal year through the appropriate use of sulfur scrubbers and nitrogen scrubbers and other efforts.

## Effects of environmental conservation

| Category | Item (unit) | | FY2018 | FY2019 | Year-on-year change |
|---|---|---|---|---|---|
| 1. Global environmental conservation | $CO_2$ emissions (basic) | (10,000t-$CO_2$) | 4,153 | 3,844 | ▲ 309 |
| | $CO_2$ emissions intensity (basic) | (kg-$CO_2$/kWh) | 0.352 | 0.340 | ▲ 0.01 |
| | $CO_2$ emissions (after adjustment) | (10,000t-$CO_2$) | 3,936 | 3,594 | ▲ 342 |
| | $CO_2$ emissions intensity (after adjustment) | (kg-$CO_2$/kWh) | 0.334 | 0.318 | ▲ 0.02 |
| 2. Local environmental conservation | Air pollution control | | | | |
| | SOx emissions | (t) | 2,351 | 2,138 | ▲ 213 |
| | SOx emissions intensity | (g/kWh) | 0.037 | 0.036 | ▲ 0.001 |
| | NOx emissions | (t) | 4,686 | 4,414 | ▲ 272 |
| | NOx emissions intensity | (g/kWh) | 0.074 | 0.074 | 0.000 |
| | Landscape integration | | | | |
| | Revegetation area | (1,000 $m^2$) | 3,313 | 3,109 | ▲ 204 |
| 3. Building a circular economy | Industrial waste and other emissions | (1,000 t) | 580 | 621 | 41 |
| | Recycling rate for industrial waste, etc | (%) | 99.8 | 99.8 | 0.0 |
| | Low-level radioactive waste processing | (Rods) | 2,701 | 507 | ▲ 2,194 |

Note: $CO_2$ emissions: including from power supplied by other companies; $CO_2$ emissions and $CO_2$ emissions coefficient: 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.; $CO_2$ emissions coefficient: by amount of power sold(adjusted CO2 emissions include the environmental value adjustments under the surplus solar power purchasing system and the renewable energy feed-in tariff system.); SOx and NOx emissions: only KEPCO-generated power; SOx and NOx emissions coeffcient: by amount of power generated by KEPCO thermal power plants

# Environmental accounting （KEPCO ③）

## FY2019 assessment（Economic benefits from environmental conservation measures）

Economic benefits increased approximately 0.1 billion yen from the previous year due to an increase of gain on sale of disused article etc.

## Economic benefits from environmental conservation measures (100 million yen)

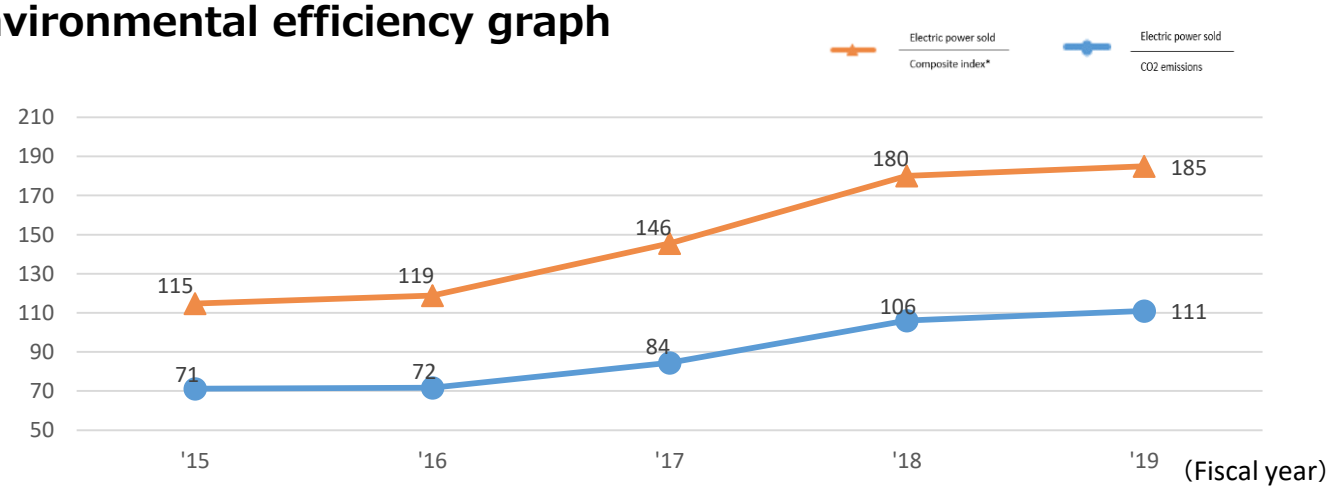
| Category | | FY2017 | FY2018 | Major Items |
|---|---|---|---|---|
| Revenue | Operating revenues from recycling, etc. | 39.9 | 34.8 | Gain on sale of disused articles(recycling) |
| Cost savings | Cost savings from reuse and recycling, etc. | 0.1 | 0.1 | Cost savings from the purchase of recycled items |
| Total | | 40.0 | 34.9 | |

## Environmental efficiency

Environmental efficiency (with FY1990 as the base year) is calculated to indicate the relationship between environmental load and economic value.

Environmental efficiency for fiscal 2019 include scores of 185 for electric power sold/composite index, which is an increase of 5 points from the previous fiscal year, and 111 for electric power sold/CO2 emissions, which is an increase of 5 points from the previous fiscal year. We consider that the main factor for it is increase in rate of CO2-free power generation in the total of power generation.

## Environmental efficiency graph




* Composite index = Environmental load of emissions: CO2, SOx and NOx emissions, landfill disposal of industrial waste + Resource consumed: Oil, coal, LNG

Note: LIME2 integration coefficients developed by the National Institute of Advanced Industrial Science and Technology have been used for calculations since fiscal 2007.

# Environmental accounting (group companies)

## Environmental conservation costs (million yen)

| Category | Major Items | Investment | | Expenses | |
|---|---|---|---|---|---|
| | | FY2018 | FY2019 | FY2018 | FY2019 |
| Costs for pollution control | Air, water and soil pollution prevention | 0 | 0 | 32.2 | 31.5 |
| Costs for resource recycling | General and industrial waste processing and recycling | 0.2 | 0.3 | 83.2 | 82.3 |
| Costs for management activities | Environmental protection efforts, environmental education and related activities at business places and in their neighborhoods | 0 | 0.4 | 25.1 | 24.1 |
| Costs for community activities | Contributions to and support of environmental protection activities and environmental protection organizations outside the company | 0 | 0 | 0 | 0 |
| Costs for research and development | Research and development of products, for example, that contribute to environmental protection | 0 | 0 | 11.0 | 7.7 |
| Costs related to environmental damages | Natural restoration, damage compensation, etc. | 0 | 0 | 0.3 | 0.3 |
| Other costs | | - | - | 0 | 0 |
| Total | | 0.2 | 0.7 | 151.8 | 145.9 |

## Environmental conservation effects (physical effects)

| Category | Items (unit) | FY2018 | FY2019 |
|---|---|---|---|
| Global and local environmental conservation | $CO_2$ emissions (10,000 t-$CO_2$) | 12.5 | 11.1 |
| | SOx emissions (t) | 0.3 | 0.3 |
| | NOx emissions (t) | 52.3 | 59.7 |
| Environmental management | ISO or other external certifications(locations)* | 5 | 5 |
| Building a circular economy | Industrial waste emissions (1,000 t) | 86.4 | 62.4 |

*Cumulative to end of fiscal year

## Economic benefits from environmental conservation effects (million yen)

| Category | Major Items | FY2018 | FY2019 |
|---|---|---|---|
| Revenue | Business income from recycling | 5.3 | 18.1 |
| Cost savings | Cost savings from re-use and recycling, etc. | 0.0 | 0.1 |
| Total | | 5.4 | 18.1 |

# Environment-related data

## ○Initiatives contributing to the realization of a low-carbon society

| 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 $CO_2$, $SF_6$ and $N_2O$ emissions) reported by electric companies in line with the Law Concerning the Promotion of the Measures to Cope with Global Warming along with $CO_2$ emissions from transportation fuel use, which are excluded from the reporting obligations. $SF_6$ emissions are based on the calendar year.
*4 Electricity indirect GHG emissions (Scope 2) include $CO_2$ 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) Σ (number of employees × operating days × emission intensity)
*13 Not applicable because of specific to our business

# Environment-related data

## ○Initiatives contributing to the realization of a low-carbon society

| 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 $CO_2$ emissions refer to those produced by fuel combustion at the Group's thermal power plants in Japan.
*2 $CO_2$ emission factor (at the generation end) corresponds $CO_2$ emissions per kWh of the Group's domestic power generation business
・$CO_2$ emission factor (at the generation end) = $CO_2$ 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 $CO_2$ emissions refer to those produced by fuel combustion at the thermal power plants and include those for power purchased from other corporations.
*2 Adjusted $CO_2$ emissions include the environmental value adjustments under the surplus solar power purchasing system and the renewable energy feed-in tariff system.
・$CO_2$ emissions = $CO_2$ emissions (before adjustment) + $CO_2$ emissions (after feed-in tariff adjustment, etc.)
*3 $CO_2$ emission factor (energy used) corresponds $CO_2$ emissions per kWh of Kansai Electric Power Company electricity used.
・$CO_2$ emission factor (energy used) (before adjustment) = $CO_2$ emissions (before adjustment) ÷ amount of electric power sold
・$CO_2$ emission factor (energy used) (after adjustment) = $CO_2$ emissions (after adjustment) ÷ amount of electric power sold
*1,2,3 The results for FY2019 are provisional; the actual $CO_2$ 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 |
|---|---|---|---|---|
| $N_2O$ (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 $CO_2$ equivalent
*2 $SF_6$ 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

# Environment-related data

## ○Initiatives contributing to the realization of a low-carbon society

| 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 (heavy oil equivalent) | 16 | 2 | 0.2 |
| | Other | | 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

| Eco Action-related (non-consolidated) | | Unit | FY2017 | FY2018 | FY2019 |
|---|---|---|---|---|---|
| $SF_6$ gas emissions | | t | 0.1 | 0.2 | 0.1 |
| | ・Upon inspection | t | 0 | 0.2 | 0.1 |
| | ・Upon removal | t | 0.1 | 0.1 | 0.0 |
| $SF_6$ gas recovery rate | | | | | |
| | ・Upon inspection | % | 99.6 | 98.5 | 99.0 |
| | ・Upon removal | % | 99.3 | 99.3 | 99.4 |
| Transmission and distribution loss rate*1*2 | | % | 4.4 | 5.1 | 4.8 |

*1 Transmission and distribution loss rates = (area transmission-end power – area consumption power (end use) – substation power) / area transmission-end power × 100 [%]
"Area" in this case refers to the entire supply area of Kansai Transmission and Distribution, Inc.
*2 Data of Kansai Transmission and Distribution, Inc. only

| Development and promotion of renewable energy (consolidated) | | Unit | FY2017 | FY2018 | FY2019 |
|---|---|---|---|---|---|
| Development and promotion of renewable energy | Capacity of facilities that have begun operation (completed construction) | 10,000 kW | * | 372.46 | 388.58 |
| | Projects underway | | * | 66.14 | 54.02 |
| | Accumulated installed capacity | | * | 438.60 | 442.60 |
| | ・Solar power generation | 10,000 kW | * | 8.17 | 8.17 |
| | ・Wind power generation | 10,000 kW | * | 30.40 | 30.95 |
| | ・Hydroelectric power generation | 10,000 kW | * | 374.36 | 377.80 |
| | ・Biomass power generation | 10,000 kW | * | 25.67 | 25.67 |
| | ・Geothermal power generation | 10,000 kW | * | — | 0.01 |

* Shown are the results in FY2018-2019, with targets revised to "achieve 6 million kW of installed capacity by 2030s (2 million kW or more new development in Japan and abroad)" in line with the Kansai Electric Power Group Medium-term Management Plan (2019-2021), which was set out in 2019.

# Environment-related data

## ○Initiatives contributing to the realization of a low-carbon society

| Office-related (non-consolidated) | | Unit | FY2017 | FY2018 | FY2019 |
|---|---|---|---|---|---|
| Energy and resource conservation (Office division) | Office electricity consumption*1 | GWh | 77 | 74 | 75 |
| | Office water consumption*1 | 1,000 $m^3$ | 452 | 426 | 413 |
| | Fuel efficiency of company vehicles | km/L | 11.31 | 11.4 | 10.95 |
| | Vehicle fuel consumption (gasoline) | 1,000 kL | 2.1 | 2.0 | 1.7 |
| | Vehicle fuel consumption (diesel oil) | 1,000 kL | 0.3 | 0.3 | 0.4 |
| | Copy paper consumption | t | 809 | 773 | 747 |
| $CO_2$ emissions resulting from office activities*2 | Office electricity | 10,000 t-$CO_2$ | 3.3 | 2.4 | 2.4 |
| | Office water | 10,000 t-$CO_2$ | 0.01 | 0.01 | 0.01 |
| | Vehicle fuels | 10,000 t-$CO_2$ | 0.6 | 0.5 | 0.5 |

*1 The scope of this calculation was reviewed for the actual consumption amounts of office electricity and water.

*2 $CO_2$ emissions from office activities = amount of electricity consumption × adjusted factors
$CO_2$ emissions from office water consumption = amount of office water consumption × emission factor
$CO_2$ emissions from vehicle use = amount of vehicle fuel consumption × coefficient by type of fuel

# Environment-related data

## ○Initiatives contributing to the realization of a recycling-oriented society

| Waste-related (non-consolidated)*1 | Unit | FY2017 | FY2018 | FY2019 |
|---|---|---|---|---|
| Amount of industrial waste and other emissions | 1,000 t | 653.6 | 580.0 | 621.3 |
| ・Soot particles (heavy/crude oil ash, coal ash, etc.) | | 438.3 | 387.0 | 384.7 |
| ・Sludge (desulfogypsum, waste water processing sludge, etc.) | | 130.3 | 107.9 | 129.7 |
| ・Cinders | | 28.6 | 25.3 | 45.8 |
| ・Demolition debris (waste concrete utility poles, etc.) | | 16.5 | 18.2 | 18.1 |
| ・Metal scraps | | 29.1 | 23.9 | 25.5 |
| ・Glass/ceramic scraps (thermal insulation scraps, insulator scraps, etc.) | | 1.8 | 1.3 | 2.4 |
| ・Waste oil | | 2.2 | 3.0 | 4.1 |
| ・Waste plastic | | 0.9 | 0.9 | 1.4 |
| ・(Repeated) Ash and gypsum | | 592.7 | 515.7 | 553.2 |
| ・Other | | 6 | 12.6 | 9.6 |
| (Repeated) Special controlled industrial waste | | 5.5 | 8.3 | 7.1 |
| Amount of industrial waste for landfill disposal | 1,000 t | 0.9 | 0.9 | 1.1 |
| ・Glass/ceramic scraps (thermal insulation scraps, insulator scraps, etc.) | | 0.06 | 0.09 | 0.19 |
| ・Sludge (wastewater processing sludge, etc.) | | 0.19 | 0.48 | 0.41 |
| ・Demolition debris | | 0.03 | 0.03 | 0.00 |
| ・Cinders | | 0.00 | 0.00 | 0.00 |
| ・Waste plastic | | 0.05 | 0.10 | 0.27 |
| ・Metal scraps | | 0.19 | 0.05 | 0.03 |
| ・Other | | 0.42 | 0.14 | 0.20 |
| ・(Repeated) Amount except for special controlled industrial waste | | 0.52 | 0.77 | 0.95 |
| Industrial waste recycling rate*2 | % | 99.9 | 99.8 | 99.8 |
| Ash and gypsum waste recycling rate*2 | % | 100 | 100 | 100 |
| Amount of PCB waste*3 | 1,000 t | 4.7 | 7.4 | 6.6 |
| Amount of high-level PCB processed (cumulative total)*4 | units | 5,073 | 5,241 | 5,365 |

*1 The totals may not match up due to rounding.
*2 Industrial waste recycling rate = [(industrial waste and other emissions - amount of landfill disposal) ÷ (industrial waste and other emissions)] × 100
*3 Amount of detoxified PCB waste in landfill (high/low-level PCB) + recycled amount
*4 Number of transformers and capacitors containing high-level PCB, detoxified by JESCO

| Water consumption by our Company | Unit | FY2017 | FY2018 | FY2019 |
|---|---|---|---|---|
| Total net fresh water consumption*1 | million m³ | 5.35 | 5.19 | 3.97 |
| River water | | 0.36 | 0.40 | 0.41 |
| Groundwater | | 0.00 | 0.00 | 0.00 |
| Total municipal water supplies | | 4.99 | 4.79 | 3.56 |
| Amount of industrial water used (for power generation) | | 3.85 | 3.70 | 2.64 |
| Amount of service water used (for power generation) | | 1.14 | 1.09 | 0.92 |
| Seawater (desalinated)*2 | | 2.63 | 2.74 | 2.92 |
| (Repeated) Office water consumption | 1,000 m³ | 452 | 426 | 413 |

*1 Excluding desalinated seawater
*2 Desalinated seawater

# Environment-related data

## ○Promotion of environmental protection in local communities

| Fiscal year | | 2017 | 2018 | 2019 | Unit |
|---|---|---|---|---|---|
| SOx emissions※1 | | 2,734 | 2,351 | 2,138 | t |
| SOx emissions intensity (for KEPCO-generated power)※2 | | 0.028 | 0.022 | 0.021 | g/kWh |
| SOx emissions intensity (by volume of power from thermal power generation)(for KEPCO-generated power)※3 | | 0.039 | 0.037 | 0.036 | |
| NOx emissions※4 | | 5,402 | 4,686 | 4,414 | t |
| NOx emissions intensity (for KEPCO-generated power) ※5 | | 0.055 | 0.043 | 0.043 | g/kWh |
| NOx emissions intensity (by volume of power from thermal power generation)(for KEPCO-generated power)※6 | | 0.077 | 0.074 | 0.074 | |
| Amount of limestone used | | 71 | 57 | 61 | 1,000 t |
| Amount of ammonia used | | 10 | 8 | 8 | 1,000 t |
| COD emissions※7 | | 18 | 21 | 22 | t |
| Revegetation rate※8 (end of fiscal year) | Thermal power plants | 38 | 38 | 39 | % |
| | Nuclear power plants | 68 | 68 | 67 | |
| | Electric power offices (substations) | 28 | 28 | 28 | |
| Rate of conversion to underground transmission lines (end of fiscal year) | | 17.3 | 17.4 | 17.5 | % |
| Rate of conversion to underground distribution lines (end of fiscal year) | | 10.3 | 10.3 | 10.3 | % |

※1 This is calculated from amounts of sulfur in fuel as well as SOx concentrations in gas emissions (measured values) and gas emission volumes. (Some previous fiscal year amounts were calculated from the amount removed by desulfurization equipment.)
※2 SOx emissions intensity (for KEPCO-generated power) = SOx emissions amount÷power generated amount (for KEPCO-generated power)
※3 SOx emissions intensity (by volume of power from thermal power generation (for KEPCO-generated power)) = SOx emissions amount÷volume of power from thermal power generation (for KEPCO-generated power)
※4 This is calculated from Sox concentrations in gas emissions (measured values) and gas emission volumes.
※5 NOx emissions intensity (for KEPCO-generated power) = NOx emissions amount÷power generated amount (for KEPCO-generated power)
※6 NOx emissions intensity (by volume of power from thermal power generation (for KEPCO-generated power)) = NOx emissions amount÷volume of power from thermal power generation (for KEPCO-generated power)
※7 This is calculated from analyzed wastewater concentration values.
※8 Revegetation rate = (Business site revegetation area÷Business site total area)×100

# Environment-related data

## ○Management of chemical substances (PRTR)

| Name of targeted chemical substance | Emissions (t/year) | | |
|---|---|---|---|
| | 2017 | 2018 | 2019 |
| 2-aminoethanol | 0.0 | – | – |
| Asbestos (specified) | 0.0 | 0.0 | 0.0 |
| Ethylbenzene | 3.8 | 4.7 | 8.6 |
| Ferric chloride | 0.0 | 0.0 | 0.0 |
| Xylene | 5.4 | 6.5 | 12 |
| Dioxins (specified) | 0.35 (mg-TEQ/year) | 0.065 (mg-TEQ/year) | 0.24 (mg-TEQ/year) |
| 1,2,4-trimethylbenzene | 1.9 | <0.1 | – |
| Toluene | 5.9 | 4.9 | 8.7 |
| Hydrazine | <0.1 | <0.1 | <0.1 |
| Benzenes (specified) | 0.2 | 0.1 | <0.1 |
| Boron compound | 0.0 | – | 0.0 |
| PCB | – | 0.0 | 0.0 |
| Methylnaphthalene | 2.4 | 1.4 | 1.2 |
| Bromotrifluoromethane | – | 0.0 | – |
| Nonylphenoxypolyoxyethanol | – | 0.0 | – |
| Ethylenediaminetetraacetic acid | – | – | 0.0 |

| Name of targeted chemical substance | Amount moved (t/year) | | |
|---|---|---|---|
| | 2017 | 2018 | 2019 |
| 2-aminoethanol | 4.1 | – | – |
| Asbestos (specified) | 4.7 | 6.8 | 1.6 |
| Ethylbenzene | 0.0 | 0.0 | <0.1 |
| Ferric chloride | 0.0 | 1.0 | 0.9 |
| Xylene | 0.0 | 0.0 | 0.4 |
| Dioxins (specified) | 0.39 (mg-TEQ/year) | 0.030 (mg-TEQ/year) | 0.0043 (mg-TEQ/year) |
| 1,2,4-trimethylbenzene | 0.0 | 0.0 | – |
| Toluene | 0.0 | 0.0 | 0.8 |
| Hydrazine | 2.5 | 0.0 | 0.0 |
| Benzenes (specified) | 0.0 | 0.0 | 0.0 |
| Boron compound | 8.4 | – | 0.0 |
| PCB | – | 4.7 | 2.3 |
| Methylnaphthalene | 0.0 | <0.1 | 0.0 |
| Bromotrifluoromethane | – | 0.0 | – |
| Nonylphenoxypolyoxyethanol | – | 0.0 | – |
| Ethylenediaminetetraacetic acid | – | – | 0.0 |

Notes :
- The chart show total values reported in compliance with the PRTR Law
- "0"indicates no emissions or transfers at targeted business site
- "<0.1"indicates less than 0.1 t/year emissions, etc.
- "－" indicates no business sites targeted for totaling
- Significant figures are displayed in two digits

# Environment-related data

## ○Radioactive substances, radioactive waste

| Fiscal year | | | 2017 | 2018 | 2019 | Unit |
|---|---|---|---|---|---|---|
| Gaseous waste | Evaluated dose values for the public in the vicinity of power plants (inert gases) | Mihama Nuclear Power Station | N.D. | N.D. | N.D. | Millisieverts※1 |
| | | Takahama Nuclear Power Station | N.D. | N.D. | N.D. | |
| | | Ohi Nuclear Power Station | N.D. | N.D. | N.D. | |
| | Evaluated dose values for the public in the vicinity of power plants (iodine) | Mihama Nuclear Power Station | N.D. | N.D. | N.D. | Millisieverts※1 |
| | | Takahama Nuclear Power Station | N.D. | N.D. | N.D. | |
| | | Ohi Nuclear Power Station | N.D. | N.D. | N.D. | |
| Liquid waste | Evaluated dose values for the public in the vicinity of power plants | Mihama Nuclear Power Station | <0.001 | <0.001 | <0.001 | Millisieverts※1 |
| | | Takahama Nuclear Power Station | <0.001 | <0.001 | <0.001 | |
| | | Ohi Nuclear Power Station | <0.001 | <0.001 | <0.001 | |
| Radioactive gaseous waste discharged (inert gas) | | Mihama Nuclear Power Station | N.D. | N.D. | N.D. | Becquerel※2 |
| | | Takahama Nuclear Power Station | N.D. | N.D. | N.D. | |
| | | Ohi Nuclear Power Station | N.D. | N.D. | N.D. | |
| Radioactive gaseous waste discharged (iodine) | | Mihama Nuclear Power Station | N.D. | N.D. | N.D. | Becquerel※2 |
| | | Takahama Nuclear Power Station | N.D. | N.D. | N.D. | |
| | | Ohi Nuclear Power Station | N.D. | N.D. | N.D. | |
| Radioactive gaseous waste discharged (excluding tritium) | | Mihama Nuclear Power Station | N.D. | N.D. | N.D. | Becquerel※2 |
| | | Takahama Nuclear Power Station | N.D. | N.D. | N.D. | |
| | | Ohi Nuclear Power Station | N.D. | N.D. | N.D. | |
| Radioactive solid nuclear waste generated (200-L drums)※4 | | | 15,863 | 11,800 | 12,312 | Equivalent in drums |
| | Mihama Nuclear Power Station | | 5,000 | 4,828 | 3,918 | |
| | Takahama Nuclear Power Station | | 5,722 | 4,396 | 4,624 | |
| | Ohi Nuclear Power Station | | 5,141 | 2,576 | 3,770 | |
| Radioactive solid nuclear waste shrinkage (200-L drums)※5 | | | 14,412 | 9,099 | 11,805 | Equivalent in drums |
| | Mihama Nuclear Power Station | | 5,424 | 3,907 | 2,946 | |
| | Takahama Nuclear Power Station | | 4,354 | 3,460 | 3,959 | |
| | Ohi Nuclear Power Station | | 4,634 | 1,732 | 4,900 | |
| Amount of solid radioactive waste generated-amount of solid radioactive waste reduced (200-L drum can equivalent)※6 | | | 1,451 | 2,701 | 507 | Equivalent in drums |
| | Mihama Nuclear Power Station | | -424 | 921 | 972 | |
| | Takahama Nuclear Power Station | | 1,368 | 936 | 665 | |
| | Ohi Nuclear Power Station | | 507 | 844 | -1,130 | |
| Radioactive solid nuclear waste cumulative amount stored (200-L drums)※7、8 | | | 97,610 | 100,311 | 100,818 | Equivalent in drums |
| | Mihama Nuclear Power Station | | 25,251 | 26,172 | 27,144 | |
| | Takahama Nuclear Power Station | | 43,287 | 44,223 | 44,888 | |
| | Ohi Nuclear Power Station | | 29,072 | 29,916 | 28,786 | |

*1 Millisieverts (effective dose): unit indicating the degree of radiation's effect on the human body
*2 Becquerel: Unit of radioactivity (one becquerel is defined as one nucleus decaying per second, representing the rate at which radioactive material emits radiation)
*3 Notes 4-7 are for the storage status at power plants
*4 This is the amount of solid low-level radioactive waste produced in the fiscal year.
*5 This is the total of amount of solid waste with low-level radioactivity reduced through incineration, for example, and transported out of facilities in the fiscal year.
*6 This is the net increase of solid waste with low-level radioactivity calculated by deducting the amount reduced from the amount generated in the fiscal year.
*7 Cumulative amount of low-level solid radioactive waste
*8 Totals might not match due to rounding after conversion to drum equivalent.

# Environmental protection records at thermal power plants ①

| Item | | | | Sakaiko Power Station | | Tanagawa No. 2 Power Station | Nanko Power Station | Miyazu Energy Research Center | Kansai International Airport Energy Center | Maizuru Power Station |
|---|---|---|---|---|---|---|---|---|---|---|
| Main fuel | | | | L | | Heavy/crude oil | L | Heavy/crude oil | Kerosene | Coal |
| Air quality related | Sulfur oxide | Amount emitted hourly (m3N/h) | Air Pollution Control Law (total amount regulation) | 84 | | – | 98 | 306※1 | 13 | 515※1 |
| | | | Agreed value | – | | – | – | 112 | – | 255 |
| | | | Actual value | – | | Stopped | – | Stopped | – | 181 |
| | | Amount emitted daily (t/d) | Agreed value | 10.1 | | 9.3 | – | – | – | – |
| | | | Actual value | – | | Stopped | – | – | – | – |
| | | Amount emitted annually (t/y) | Agreed value | 940 | | 3,020 | – | $492\times10^3m^3N$ | – | $1523\times10^3m^3N$ |
| | | | Actual value | – | | Stopped | – | Stopped | – | $789\times10^3m^3N$ |
| | Nitrogen oxide | Amount emitted hourly (m3N/h) | Air Pollution Control Law (total amount regulation) | 625 | | – | 255 | – | – | – |
| | | | Agreed value | – | | – | – | 58 | – | 244 |
| | | | Actual value | 45.3 | | Stopped | 35 | Stopped | – | 210 |
| | | Amount emitted daily (t/d) | Agreed value | 7.7 | | 7.2 | 1.8 | – | – | – |
| | | | Actual value | 2.0 | | Stopped | 1.1 | – | – | – |
| | | Amount emitted annually (t/y) | Agreed value | 1,420 | | 2,100 | 400 | $244\times10^3m^3N$ | – | $1,457\times10^3m^3N$ |
| | | | Actual value | 566 | | Stopped | 137 | Stopped | – | $1,188\times10^3m^3N$ |
| | Soot particles | Emission concentration (g/m3N) | Air Pollution Control Law | 0.04 | | 0.07 | 0.03 | 0.05 | 0.05 | 0.1 |
| | | | Agreed value | 0.02 | | 0.02 | Not emitted | 0.014 | – | 0.009 |
| | | | Actual value | <0.002 | | Stopped | – | Stopped | – | 0.005 |
| Water quality related | Hydrogen ion concentration index | | Water pollution laws and regulations | No.1 drain outlet | No.2 drain outlet | 5.8~8.6 | 5.0~9.0※2 | 5.0~9.0 | – | 5.0~9.0 |
| | | | | 5.8~8.6 | | | | | | |
| | | | Agreed value | – | | 5.8~8.6 | – | 5.8~8.6 | – | 5.8~8.6 |
| | | | Actual value | 7.9 | 7.6 | Stopped | 7.8 | 6.0~7.8 | – | 6.3~7.2 |
| | Chemical oxygen demand | Highest concentration (mg/L) | Water pollution laws and regulations | 12 | 160 | 160 | – | 160 | – | 160 |
| | | | Agreed value | – | | 15 | – | 15 | – | 15 |
| | | | Actual value | 2.6 | 2.0 | Stopped | – | 7.4 | – | 6.0 |
| | | Pollution load amount (kg/d) | Water pollution laws and regulations | 388.4 | | 55 | – | – | – | – |
| | | | Agreed value | – | | 14 | – | 20.8 | – | 22 |
| | | | Actual value | 18.5 | | Stopped | – | 0.3 | – | 6.28 |
| | Amount of suspended solids | Highest concentration (mg/L) | Water pollution laws and regulations | 50 | | 90 | 600※2 | 200 | – | 200 |
| | | | Agreed value | – | | 20 | – | 20 | – | 15 |
| | | | Actual value | <5 | | Stopped | <5 | 2 | – | 3 |
| | Amount of inclusion of normal hexane extractable substances | Highest concentration (mg/L) | Water pollution laws and regulations | 2 | | 3 | 4※2 | 5 | – | 5 |
| | | | Agreed value | – | | 1 | – | 1 | – | 1 |
| | | | Actual value | <1 | | Stopped | <1.0 | <0.5 | – | <1.0 |

※1 Regulation in rules for the execution of ordinances to protect and nurture the environment of Kyoto Prefecture
※2 Regulated value of Osaka City sewer ordinance execution rules

# Environmental protection records at thermal power plants ②

| Item | | | | Gobo Power Station | Himeji No.1 Power Station 5,6U & GT1,2U | Himeji No.2 Power Station | Aioi Power Station | Ako Power Station |
|---|---|---|---|---|---|---|---|---|
| Main fuel | | | | Heavy/crude oil | LNG | LNG | LNG | Heavy/crude oil |
| Air quality related | Sulfur oxide | Amount emitted hourly (m3N/h) | Air Pollution Control Law (total amount regulation) | 6,510※3 | 129 | 582 | 2,757※3 | 2,158※3 |
| | | | Agreed value | 184 | – | – | 165 | 180 |
| | | | Actual value | 68 | – | – | 4 | 57 |
| | | Amount emitted daily (t/d) | Agreed value | – | – | – | – | – |
| | | | Actual value | – | – | – | – | – |
| | | Amount emitted annually (t/y) | Agreed value | 970×10³m³N | – | – | 885×10³m³N | 650×10³m³N |
| | | | Actual value | 3.12×10³m³N | – | – | 0.306×10³m³N | 7.3×10³m³N |
| | Nitrogen oxide | Amount emitted hourly (m3N/h) | Air Pollution Control Law (total amount regulation) | – | – | – | – | – |
| | | | Agreed value | 110 | 123.5 | 463 | 85 | 94 |
| | | | Actual value | 47 | 52.0 | 95 | 43 | 69 |
| | | Amount emitted daily (t/d) | Agreed value | – | – | – | – | – |
| | | | Actual value | – | – | – | – | – |
| | | Amount emitted annually (t/y) | Agreed value | 560×10³m³N | 701×10³m³N | 2,263×10³m³N | 390×10³m³N | 340×10³m³N |
| | | | Actual value | 3.184×10³m³N | 168.797×10³m³N | 396×103m3N | 39.6×103m3N | 14.4×103m3N |
| | Soot particles | Emission concentration (g/m3N) | Air Pollution Control Law | 0.07 | 0.05 | 0.05 | 0.07 | 0.05 |
| | | | Agreed value | 0.01 | – | – | 0.015 | 0.015 |
| | | | Actual value | 0.002 | – | 0 | 0 | 0.002 |
| Water quality related | Hydrogen ion concentration index | | Water pollution laws and regulations | – | 5.0～9.0 | 5.0～9.0 | 5.0～9.0 | 5.0～9.0 |
| | | | Agreed value | 5.8～8.6 | 5.8～8.6 | 5.8～8.6 | 5.8～8.6 | 5.8～8.6 |
| | | | Actual value | 6.5～8.0 | 7.1～7.9 | 7.0～7.6 | 6.8～7.3 | 6.4～7.3 |
| | Chemical oxygen demand | Highest concentration (mg/L) | Water pollution laws and regulations | – | 70 | 70 | 70 | 70 |
| | | | Agreed value | 10 | 15 | 15 | 15 | 15 |
| | | | Actual value | 5.7 | 2.8 | 3.8 | 3 | 2.8 |
| | | Pollution load amount (kg/d) | Water pollution laws and regulations | – | 38.8 | 173.9 | 67.8 | 85.5 |
| | | | Agreed value | 36.8 | 15.2 | 35 | 18 | 22.4 |
| | | | Actual value | 4.7 | 3.2 | 10.2 | 2.98 | 2.4 |
| | Amount of suspended solids | Highest concentration (mg/L) | Water pollution laws and regulations | – | 90 | 90 | 90 | 90 |
| | | | Agreed value | 20 | 20 | 20 | 20 | 20 |
| | | | Actual value | 3.5 | 2 | 3 | 2 | <1 |
| | Amount of inclusion of normal hexane extractable substances | Highest concentration (mg/L) | Water pollution laws and regulations | – | 5 | 5 | 5 | 5 |
| | | | Agreed value | 1 | 1 | 1 | 1 | 1 |
| | | | Actual value | 0.1 | 0.1 | 0.2 | 0.1 | <0.5 |

※3 Regulated K value

# Kansai Electric Power Group Environmental Action Policy

Based on our Kansai Electric Power Group CSR Action Charter, as an energy business that has a deep connection to the environment, we are formulating the Kansai Electric Power Group Environmental Action Policy as the environmental management policy to be pursued by our group over the medium and long terms. We are realizing this policy through deliberations by our Environmental Board chaired by our Executive Officer in charge of environmental affairs.

As issues that should be considered in the conduct of our business activities, the Kansai Electric Power Group Environmental Action Policy expresses four main focuses that should be followed in our efforts, including "initiatives contributing to the realization of a low-carbon society."

**Initiatives contributing to the realization of a low-carbon society**

- Lowering electric power's carbon intensity
- Technological developments for constructing the Smart Grid
- Contributing to energy conservation, cost reductions and $CO_2$ emissions reductions for customers and society
- Overseas activities
- Technical development efforts
- Value chain efforts
- Efforts to reduce other greenhouse gases in addition to $CO_2$

**Initiatives contributing to the realization of a recycling-oriented society**

- Promotion of proactive 3R efforts aimed at zero emissions
- Promoting safe, reliable, and complete disposal of PCB wastes
- Promoting green procurement

**Promotion of environmental protection in local communities**

- Measures to prevent air and water pollution, etc.
- Efforts to strictly manage and reduce toxic chemicals
- Considering the preservation of biodiversity

**Promoting environmental management and environmental communication**

- Continuous improvement using environmental management systems based on ISO 14001 systems and strict adherence to laws and regulations
- Active advancement of environmental awareness raising activities with local communities and customers and disclosure of environmental information

# Eco Action (FY 2019 published version)

## Kansai Electric Power Group Eco Actions (results in fiscal 2019 and targets for fiscal 2020)

### Initiatives contributing to the realization of a low-carbon society

| Item | FY2019 | | FY2020 |
|---|---|---|---|
| | Targets | Results | Targets |
| Advancing efforts to control $CO_2$ emissions | ・Keep the top spot for the amount of $CO_2$-free power generation in Japan<br>・Halve $CO_2$ emissions associated with power generation in Japan in FY2030 (compared to FY2013)<br>・About 0.37 kg-$CO_2$/kWh*1 for the entire electric power business by FY2030 | ・We kept the top spot for the amount of $CO_2$-free power generation in Japan (based on surveys and comparisons made in the electric power statistics)<br>・Reduction of about 40% from fiscal 2013 levels of $CO_2$ emissions associated with power generation in Japan (FY2019 results: About 28.5 million t-$CO_2$)<br>・[The Electric Power Council for a Low Carbon Society (ELCS): FY2018] 0.463-kg-$CO_2$/kWh*1 ([Our Company: FY2019] 0.318-kg-$CO_2$/kWh*1,2) | ・Keep the top spot for the amount of $CO_2$-free power generation in Japan<br>・Halve $CO_2$ emissions associated with power generation in Japan in FY2030 (compared to FY2013) |
| Continuing safe and stable operation of nuclear power plants*3 | ・Advance efforts to operate nuclear power plants that make safety the top priority | ・We continued the safe and stable operations at running plants<br>・We implemented safety improvement measures that conform to new regulatory requirements and voluntary efforts for various other safety measures. | Operation of nuclear power plants that make safety the top priority |
| 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) | ・Accumulated installed capacity with a total of 4.43 million kW (Capacity of facilities that have begun operation (completed construction): about 3.89 million kW; Project underway: about 0.54 million kW) | Continued |
| Maintaining and improving the thermal efficiency of thermal power plants*3 | ・Benchmark indicators*4 (A: 1.00, B: 44.3%) | ・A-benchmark indicator: 1.03, B-benchmark indicator: 47.9% | Continued |
| Reducing transmission and distribution loss*5 | ・Reduce from current level | ・4.8% | To be maintained and reduced |
| Promoting use of innovative forms of energy among customers and communities | ・Contribute to making energy use by customers and society more sophisticated | ・We worked to expand use of devices and services that contribute to more sophisticated utilization of energy by customers and society.<br>・Smart meters deployed: 0.94 million/year (Cumulative total: 11.53 million), progress rate: about 88% | Continued |
| Limiting $SF_6$ emissions*6 (gas recovery rate upon inspection/removal of equipment) | ・97% (upon inspection)<br>・99% (upon removal) | ・99.0% (upon inspection)<br>・99.4% (upon removal) | Continued |

*1 Amount of $CO_2$ emissions per unit of electricity use (sales)
*2 This value is provisional. Based on the Law Concerning the Promotion of the Measures to Cope with Global Warming and other factors, the actual value of the $CO_2$ emission factor will be officially announced by the country.
*3 Targets and results apply only to our Company.
*4 Indicators based on the benchmark system of the Law Concerning the Rational Use of Energy
*5 Targets apply only to Kansai Transmission and Distribution, Inc.
*6 On the calendar year basis

### Initiatives contributing to the realization of a recycling-oriented society (non-consolidated)

| Item | FY2019 | | FY2020 |
|---|---|---|---|
| | Targets | Results | Targets |
| Maintaining industrial waste recycling rate | ・99.5% | ・99.8% | Continued |
| Proper processing of PCB wastes | ・Proceed with certainty to achieve processing before the legal deadline | ・Amount of high-level PCB processed (Cumulative total): 5,365* | Continued |

*Number of high-voltage transformers, condensers and other electrical equipment that were subcontracted to the Japan Environmental Storage & Safety Corporation (JESCO).

# Eco Action (FY2019 published version)

## Promotion of environmental protection in local communities (non-consolidated)

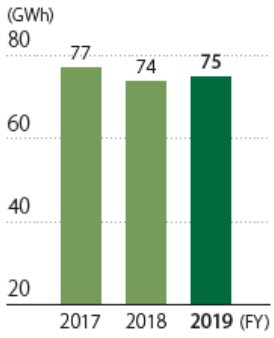
| Item | FY2019 | | | FY2020 |
|---|---|---|---|---|
| | Targets | | Results | Targets |
| Maintaining sulfur oxide (SOx) and nitrogen oxide (NOx) emission factors | SOx | Emission factors: maintain the lowest levels in the world<br>Emissions: strictly adhere to agreed values at each power plant | Overall: 0.021 g/kWh<br>Thermal: 0.036 g/kWh<br>All agreed values were met. | Continued |
| | NOx | | Overall: 0.043 g/kWh<br>Thermal: 0.074 g/kWh<br>All agreed values were met. | |
| Conservation of biodiversity | • Consideration of biodiversity through business activities | | • We studied the status of vegetation around the Kurobe Dam through literature and field surveys.<br>• We examined biodiversity conservation further based on survey results. | Continued |

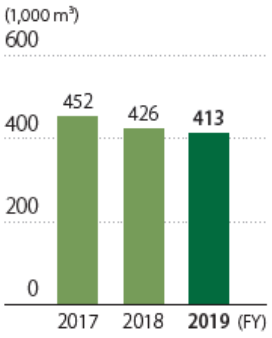
## Office energy and resource conservation activities (group-wide items)

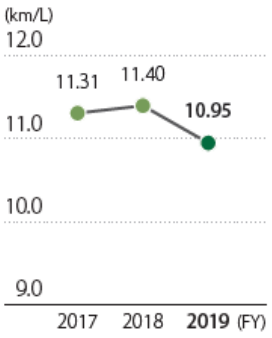
| Item | Reducing office electricity consumption | Reducing office water consumption | Improving fuel efficiency of company vehicles | Reducing copy paper consumption |
|---|---|---|---|---|
| Targets | Reduce by 1% or more from previous year | Reduce as much as possible | Improve as much as possible | Reduce as much as possible |

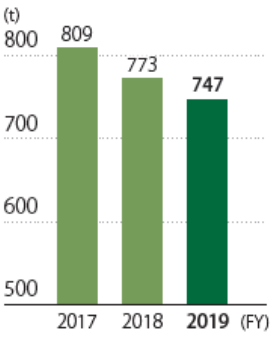
Record of results

Non-consolidated

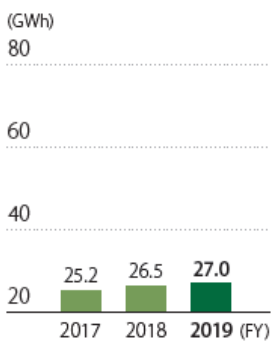


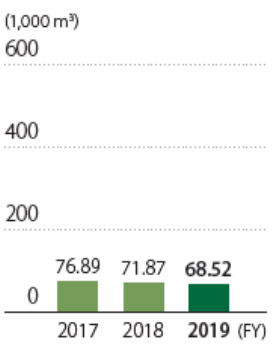



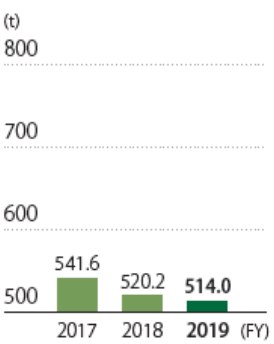




Group companies*








* Calculated for 38 consolidated subsidiaries (excluding Kansai Transmission and Distribution, Inc.) for which three-year data (FY2017–2019) is available.

# Eco Action results (FY2015～FY2019)

| Item | | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| Advancing efforts to control $CO_2$ emissions | CO2 emissions※1 | 42.9 million t-CO2 | 40.4 million t-CO2 | 34.2 million t-CO2 | 30.4 million t-CO2 | 28.5 million t-CO2 |
| | CO2 emission factor (end use) (after adjustment) (by amount of electric power sold) ※2,※3 | 0.496kg $CO_2$/kWh | 0.493kg $CO_2$/kWh | 0.418kg $CO_2$/kWh | 0.33kg $CO_2$/kWh | 0.318kg $CO_2$/kWh |
| Developing and utilizing renewable energy sources further | Accumulated installed capacity※4 | | | | | about 4.43 million kW |
| | Renewable energy development※5 | 2 locations 30,220kW | 2 locations 7,580kW | 1 location 500kW | 3 locations 3,890kW | |
| | Renewable energy purchased※5 | 4.00 billion kWh | 4.83billion kWh | 5.85 billion kWh | 5.72 billion kWh | |
| Contributing to the realization of low carbon societies through overseas power generation businesses | Promotion of hydroelectric power construction※5 | - | - | 2 | 2 | |
| | Participation in renewable energy investment projects※5 | - | - | 1 | 2 | |
| | Developing country support efforts under GSEP framework※5 | - | - | 2 | 1 | |
| Maintaining and improving the thermal efficiency of thermal power plants(lower heating value base) | Benchmark indicators※6 | | | | | A:1.03, B:47.9% |
| | Thermal efficiency※6※7 | 46.6% | 47.6% | 48.3% | 49.0% | |
| Reducing transmission and distribution loss | transmission and distribution loss rate※8 | 5.2% | 5.5% | 4.4% | 5.1% | 4.8% |
| Promoting use of innovative forms of energy among customers and communities | Smart meters deployed | 1.6million/year (cumulative 5.55 million) | 1.95million/year (cumulative 7.5 million) | 1.82million/year (cumulative 9.32 million) progress rate : about 72% | 1.26million/year (cumulative 10.58 million) progress rate : about 81% | 0.94million/year (cumulative 11.53 million) progress rate : about 88% |
| Limiting $SF_6$ emissions(calender year basis)(gas recovery rate upon inspection/remival of equipment) | Upon inspection | 99.1% | 99.3% | 99.6% | 98.5% | 99.0% |
| | Upon removal | 99.1% | 99.6% | 99.3% | 99.3% | 99.4% |
| Maintaining industrial waste recycling rate | Industrial waste recycling rate※9 | 99.9% | 99.7% | 99.9% | 99.8% | 99.8% |
| Proper processing of PCB wastes(before the legal dead line) | Amount of high-concentration PCB processed(cumulative total)※10 | 4,763 | 4,834 | 5,073 | 5,241 | 5,365 |
| Maintaining sulfer oxide（SOx）emission factors | SOx emissions factor (for KEPCO-generated power)※11 | 0.046g/kWh | 0.037g/kWh | 0.028g/kWh | 0.022g/kWh | 0.021g/kWh |
| | SOx emissions factor (by volume of power from thermal power generation)(for KEPCO-generated power)※12 | 0.055g/kWh | 0.043g/kWh | 0.039g/kWh | 0.037g/kWh | 0.036g/kWh |
| Maintaining nitrogen oxide（NOx）emission factors | NOx emissions factor (for KEPCO-generated power)※13 | 0.072g/kWh | 0.067g/kWh | 0.055g/kWh | 0.043g/kWh | 0.043g/kWh |
| | NOx emissions factor (by volume of power from thermal power generation)(for KEPCO-generated power)※14 | 0.085g/kWh | 0.077g/kWh | 0.077g/kWh | 0.074g/kWh | 0.074g/kWh |

※1 CO2 emissions refer to those produced by fuel combustion at the Group's thermal power plants in Japan.
※2 CO2 emission factor (energy used) corresponds CO2 emissions per kWh of Kansai Electric Power Company electricity used.
(CO2 emission factor (energy used) (after adjustment) = CO2 emissions (after adjustment) ÷ amount of electric power sold)
※3 The FY2019 figures are provisional. The actual figures of the CO2 emissions coefficient will be officially announced by the government separately based on the Act on Promotion of Global Warming Countermeasures and other factors.
※4 Shown are the results in FY2019, with targets of Eco Action revised to "achieve 6 million kW of installed capacity by 2030s (2 million kW or more new development in Japan and abroad)" in line with theKansai Electric Power Group Medium-term Management Plan (2019-2021), which was set out in 2019.
※5 Shown are the results in FY2015-2018, because these target removed from Eco Action in 2019.
※6 Shown are the results in FY2019, with targets of Eco Action revised to indicators based on the benchmark system of the Law Concerning the Rational Use of Energy from 2019.
※7 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
※8 Transmission and distribution loss rates = (area transmission-end power – area consumption power (end use) – substation power) / area transmission-end power × 100 [%]
"Area" in this case refers to the entire supply area of Kansai Transmission and Distribution, Inc.
※9 Industrial waste recycling rate = [(Industrial waste and other emissions - Amount of landfill disposal)÷(Industrial waste and other emissions)]×100
※10 nunber of high-voltage transformsers, condensers and other electrical equipment that were subcontracted to the Japan Environmental Storage & Safety Corporation (JESCO)
※11 SOx emissions factor (for KEPCO-generated power) = SOx emissions amount÷power generated amount (for KEPCO-generated power)
※12 SOx emissions factor (by volume of power from thermal power generation (for KEPCO-generated power)) =
SOx emissions amount÷volume of power from thermal power generation (for KEPCO-generated power)
※13 NOx emissions factor (for KEPCO-generated power) = NOx emissions amount÷power generated amount (for KEPCO-generated power)
※14 NOx emissions factor (by volume of power from thermal power generation (for KEPCO-generated power)) =
NOx emissions amount÷volume of power from thermal power generation (for KEPCO-generated power)

# Low carbon target

We announced the following environmental targets in the Kansai Electric Power Group Medium-term Management Plan (2019-2021).

## Low carbon target in the Kansai Electric Power Group Medium Management Plan (2019-2021)

・ We will seek to achieve 600 million kW of renewable installed capacity by 2030s, of which more than 200 million kW will be newly developed in Japan and abroad.

・We will keep the top spot for the amount of $CO_2$-free power generation in Japan, and halve $CO_2$ emissions associated with power generation in Japan in FY2030 (compared to in FY2013) .

# Biodiversity policy ①

## ■ Policies related to business activities that consider the conservation of biodiversity

The Kansai Electric Power Group is pursuing sustainable business activities based on the “Biodiversity Action Guidelines by the Japanese Electric Utility Industry.” Holding up “business activities that consider preservation of biodiversity” as an Environmental Action Policy, we will push this initiative forward.
In the electric power business, we are committed to using the blessings of nature in a sustainable manner while minimizing the impact on biodiversity.

## Biodiversity Action Guidelines by the Japanese Electric Utility Industry (Revised June 2020)

In view of the “integration of business activities and environmental measures” encompassing a wide range of environmental activities, or so-called “environmentally integrated management” that has been required recently, we have revised the “Biodiversity Action Guidelines by the Japanese Electric Utility Industry.”
Based on these Action Guidelines, we will continue to strive for sustainable business activities while appreciating the blessings of nature.

Code of Conduct: As a member of the international and local communities, not just as an electric power company, we keep in mind that biodiversity is an important foundation of a sustainable society and realizing such a society is our responsibility. We will actively promote the following business activities that bring benefits to biodiversity, thereby realizing a sustainable society.

I. Promoting environmentally integrated management that contributes to biodiversity
[1] When supplying electricity, carry out corporate management while recognizing the effects of business activities on achieving various goals related to SDGs with due consideration to biodiversity.
[2] In order to reduce greenhouse gas emissions in the electric power industry as a whole, make utmost efforts to use nuclear power generation with the basic premise of ensuring safety, increase the use of renewable energies, further improve efficiency and perform appropriate maintenance of thermal power generation, and provide energy-saving and CO2-saving services that contribute to a low-carbon society.
[3] Continue to engage in 3R (Reduce, Reuse, Recycle) activities, such as effective use of resources and reduction of final waste disposal, to create a recycling-based society and reduce environmental load.
[4] Regarding biodiversity efforts, deliver easy-to-understand information and dialogue appropriately to a broad base of stakeholders.
II. Steadily engaging in actions that contribute to biodiversity
[5] When conducting business activities, properly assess, analyze and evaluate the impact on biodiversity, and strive for conservation and sustainable use.
[6] Promote technologies and R&D that contribute to the conservation and sustainable use of biodiversity, and seek to disseminate them.
[7] Work to conserve biodiversity by voluntarily and proactively engaging in activities that lead to the creation of social value, such as forest conservation and environmental education, while cooperating and collaborating with relevant local organizations and customers. At the same time, contribute to achieving SDGs.
[8] Encourage employees to enhance their awareness of biodiversity by participating in environmental education and environmental conservation activities inside and outside the company.
[9] Provide environmental education activities to customers and the next generation, and participate in and cooperate with educational activities performed in the community to widely spread awareness of biodiversity.

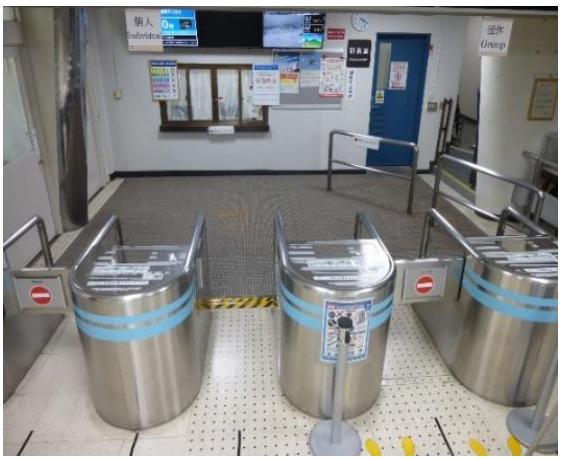
# Biodiversity policy ②

**Efforts for Biodiversity Action Guidelines by the Japanese Electric Utility Industry II-⑤**
In the Kurobe Dam area, we have been working on the protection of native species and so on from the viewpoint of nature preservation. In fiscal 2019, we analyzed the vegetation status around the Kurobe Dam again through literature references and field surveys.
Based on the results, we will go on with further study on biodiversity conservation activities.

## ■Protecting native species around Kurobe Dam

Electric buses run along the Tateyama Kurobe Alpine Route that connects Nagano Prefecture and Toyama Prefecture. Along with not emitting exhaust gases, these vehicles rarely startle animals with their sound because they run extremely quietly.

Kurobe Dam, which is situated in a national park, receives one million visitors annually. At Ogizawa Station, which is the entrance to the Nagano Prefecture side, the seeds of plants that do not naturally grow in Kurobe sometimes get brought over on the soles of the shoes of tourists. Thus, seed removal mats have been placed at the station ticket gates to prevent the influx of non-native species. The removed seeds are collected with a vacuum cleaner and incinerated.



Seed-removing floor mat

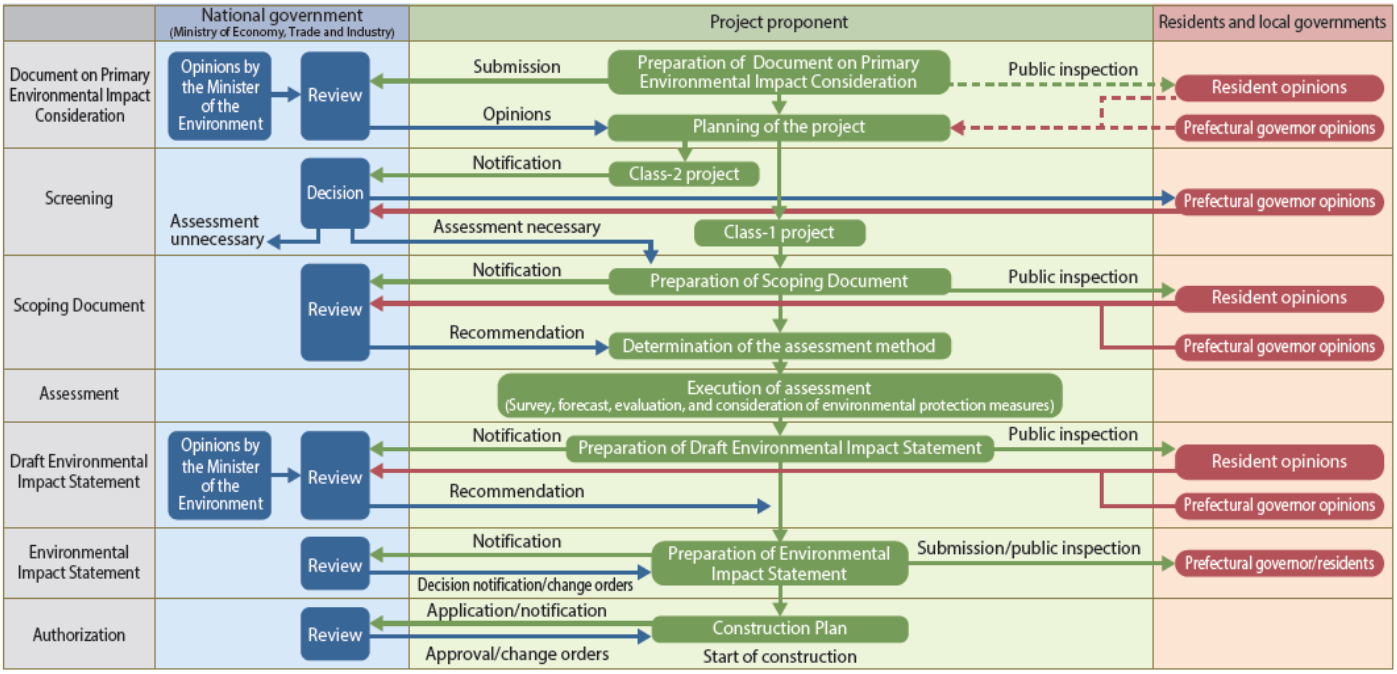
# Biodiversity policy ③

## Examples of specific efforts related to Biodiversity Action Guidelines by the Japanese Electric Utility Industry II-⑤

Execution of environmental impact assessment

An environmental impact assessment system estimates and evaluates impacts on the environment of business activities and investigates necessary countermeasures before the execution of large-scale development projects. In Japan, the system based on the Environmental Impact Assessment Law stipulates subject business survey items, procedure protocols, and other requirements.

In suitably implementing environmental impact assessment for power plant construction (including new and expansion) in the electric power business, along with utilizing the extensive knowledge that we had accumulated before the establishment of this law, we are, for example, listening to the opinions and recommendations of local residents, regional organizations and the national government. Furthermore, through environmental protection measures based on the opinions of experts and others, we are making efforts to minimize impacts on the natural environment and biodiversity as well as restore natural environments.



# Biodiversity policy ④

## Examples of specific efforts related to Biodiversity Action Guidelines by the Japanese Electric Utility Industry Ⅱ－⑦

### Natural forest creation

In order to make forests that are similar to nature at power plants in short amounts of time, we are trying to create environments that protect the original biodiversity of the region by selecting cultivated tree saplings that are suited to the region, and planting different species densely in close proximity.

Moreover, in order to maintain natural forests, as we look to the guidance of experts, we are undertaking continuous efforts to preserve biodiversity, including measures to further diversify species and eliminate invasive species.

### Protecting oriental white storks

In Toyooka City, Hyogo Prefecture, released oriental white storks, which are designated a Special Natural Treasure in Japan, sometimes make their nests on utility poles and steel towers. Not only are there concerns about accidents, but there are also fears that storks could be electrocuted. For these reasons, we patrol carefully, removing nests as quickly as possible and conducting measures to discourage them from coming near utility poles in cooperation with the municipality. In these ways, we are both protecting the storks and maintaining the safety and stability of the power supply.

Power lines with colored markers

Storks nesting on top of a utility pole

Oriental white storks being raised