

J-POWER Group Integrated Report 2021 Supplementary Material: Environment

Electric Power Development Co.,Ltd.



The Materials of Environmental Initiatives 2021 attached to J-POWER Group Integrated Report 2021.

The scope of applicability includes J-POWER and its 26 consolidated domestic subsidiaries, which are engaged in the electric power business, electric power related business, and other business. The amounts attributed to consolidated subsidiaries are based on percentages corresponding to J-POWER's equity share. Please refer to section 9-3「Major Group Companies」.

1. Business Activities, INPUT・OUTPUT
2. Reduction of Emissions of Environmentally Harmful Substances
3. Creation of a Recycling-Oriented Society
4. Management of Chemical Substances
5. Protect the Natural Environment
6. Implementation of Accurate Environmental Impact Assessments
7. Improvement of Environmental Management Level
8. Full Compliance with Laws, Regulations, Agreements, and Other Rules
9. Environment-Related Data
 - 9-1. Environment-Related Data
 - 9-2. Third-Party Assurance Regarding Environment-Related Information
 - 9-3. Major Group Companies

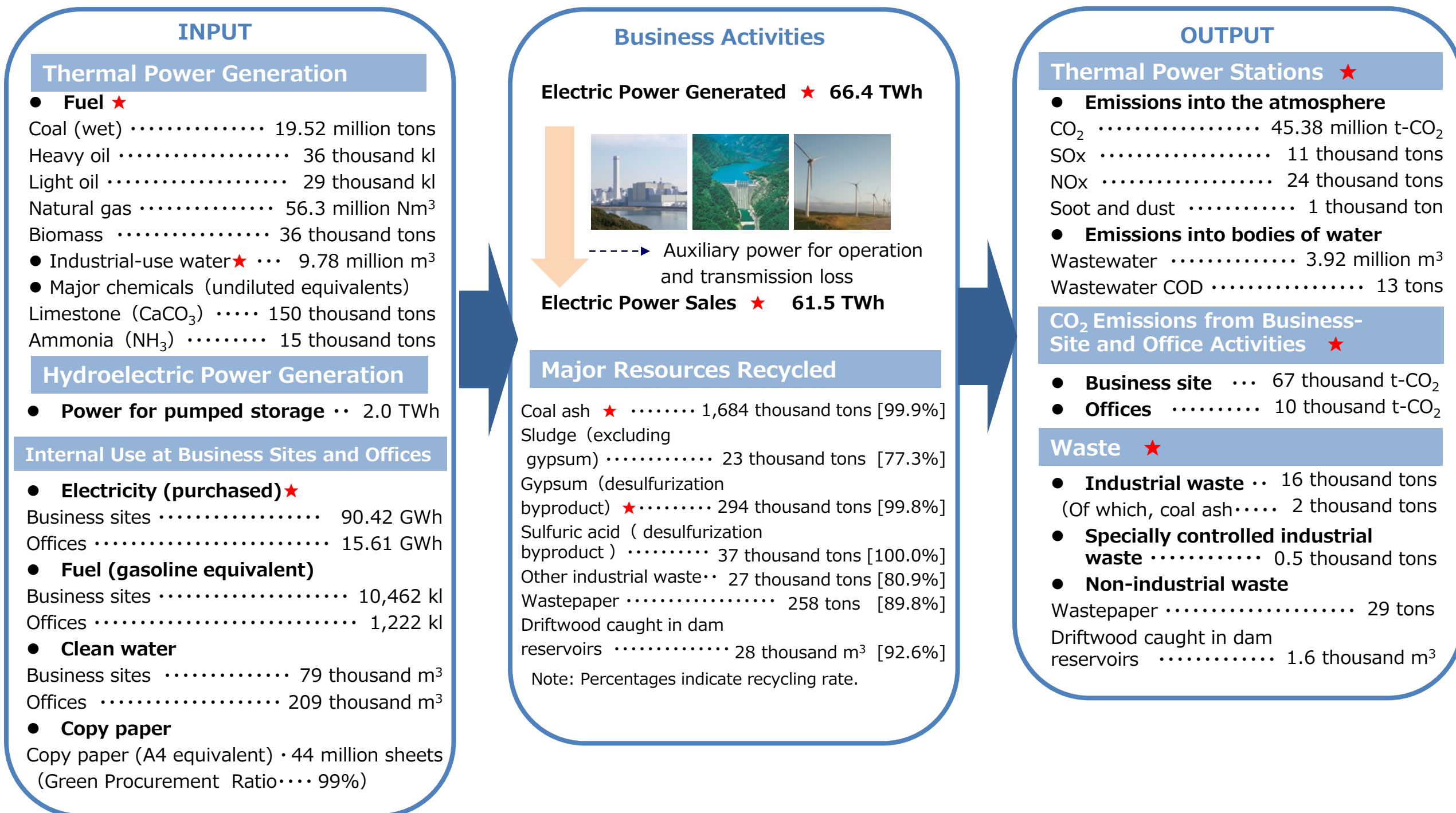
1. Business Activities and the Environment



The charts below detail the resource consumption and environmental load of the fiscal 2020 J-POWER Group operations within Japan.

The ★ marks denote data that are the subject of third-party assurance. (Please refer to section 9-2「Third-Party Assurance Regarding Environment-Related Information」)

Note: The scope of applicability includes J-POWER and its 26 consolidated domestic subsidiaries, which are engaged in the electric power business, electric power related business, and other business. The amounts attributed to consolidated subsidiaries are based on percentages corresponding to J-POWER's equity share. Note that equity method affiliates (one company in Japan) are included in the calculation of CO₂ emissions from thermal power stations.



Notes: 1. Other than that discharged as wastewater, almost all industrial-use water used in thermal power stations is released into the atmosphere as steam.
2. River water used in hydroelectric power stations is not included in the input figures, as all such water is returned to the river after power generation.

2. Reducing Emissions of Environmentally Harmful Substances



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

Measures to Prevent Noise and Vibration

The boilers, turbines, air blowing fans are installed in a building to prevent noise and vibration. We installed soundproof covers and soundproof walls for outside facilities as required. The magnitude of noise and vibration is measured regularly at the boundary of the site to ensure that it remains at or below the reference values.

Measures to Prevent Malodor

Since ammonia is added to flue gas denitrification system, we pay attention to prevent leakage from ammonia-using equipment and receiving storage facilities equipment through daily inspections. The magnitude of malodor measured regularly at the boundary of the site to ensure that it remains at or below the reference values.

Measures to Prevent Air Pollution

The combustion of coal and other fuels can generate sulfur oxides (SO_x), nitrogen oxides (NO_x), and soot and dust. To eliminate these emissions, we take such measures as improving combustion methods and always making appropriate use of such flue gas treatment equipment as desulfurization and denitrification systems and electrostatic precipitators. In this way, we achieve highly efficient pollutant reduction. This equipment operates automatically with the aid of measurement devices that continuously monitor the content of flue gas.

Our fiscal 2020 performance regarding SO_x, NO_x, and soot and dust emissions is shown in the below table. The figures obtained are quite low by international standards.

Measures to Control Coal Dust, etc.

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

Measures to Control Thermal Water Discharge

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

Measures to Prevent Water Pollution

Wastewater from such facilities as desulfurization units and offices is appropriately treated in integrated wastewater treatment systems using such processes as coagulation, precipitation, and filtration. Treated water is always monitored by automatic measuring equipment and analyzed periodically to ensure that it meets the standards set under the Water Pollution Prevention Act and environmental protection agreements.

Cutting Back on Industrial Water Use

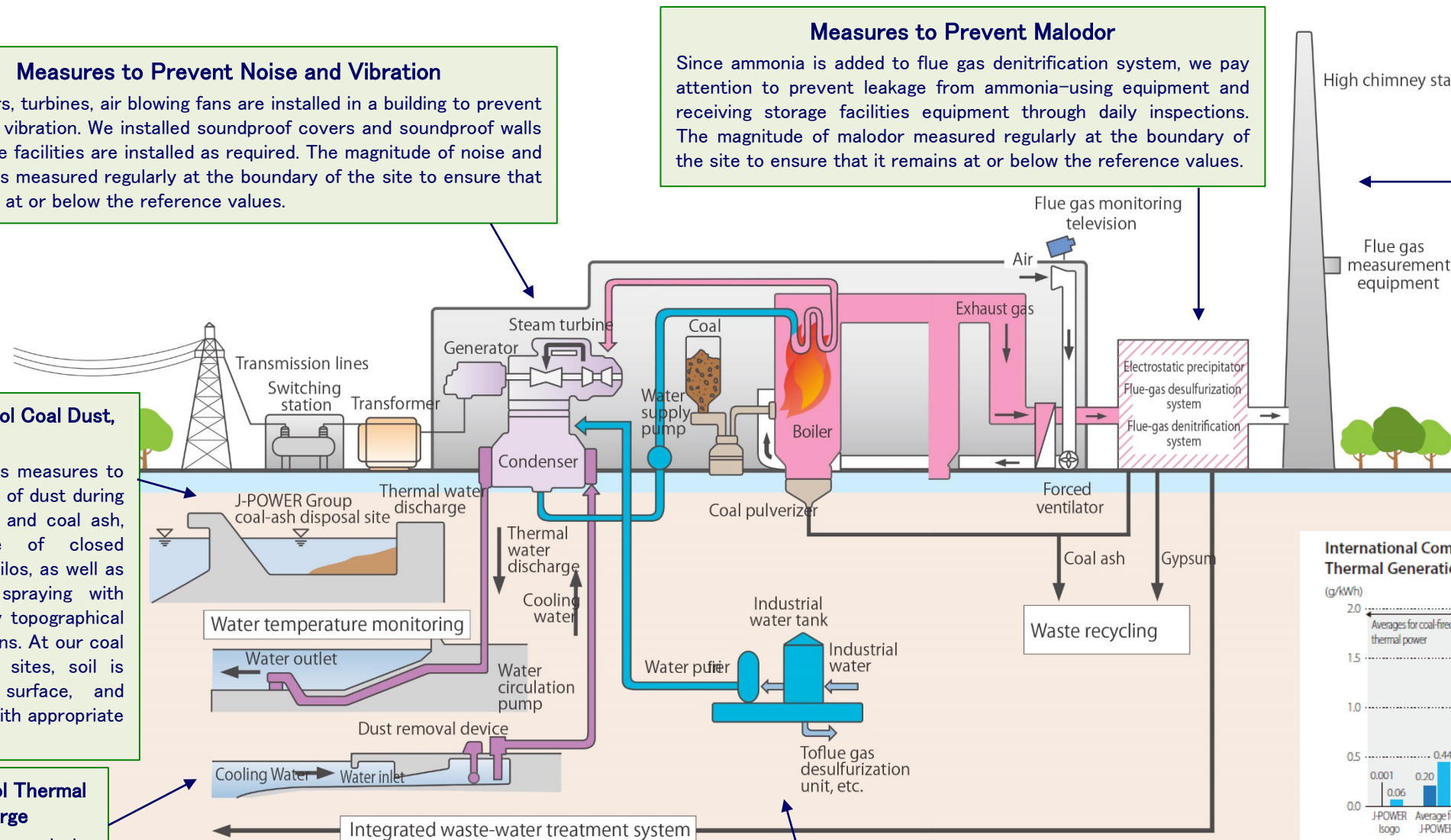
Industrial water is used in such equipment as boilers, cooling systems, and wet-type desulfurization systems. Part of this water is released into the atmosphere as steam. We work to recover and reuse as much of the wastewater not released into the atmosphere as possible in order to reduce our consumption of industrial water.

Measures to Prevent Soil Pollution

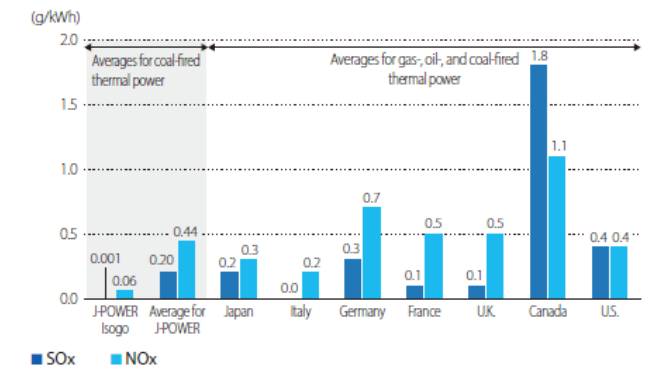
From fiscal 2004 through 2006, we conducted studies at all J-POWER Group domestic sites and determined that they were free of soil and groundwater contamination. We will continue working diligently to ensure that no soil pollution occurs.

Measures to Prevent Oil Leaks

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



International Comparison of SO_x and NO_x Emissions Intensity for Thermal Generation (g/kWh)



※ Thermal water discharge:

In thermal power generation, the steam that drives the turbine is sent through a condenser for cooling, returning to its liquid state for reuse in the boiler. In almost all power stations in Japan, seawater is used for cooling in the condensers. As the seawater cools the steam passing through the condenser, its temperature rises. It is then returned to the ocean through the discharge outlet, at which point it is referred to as thermal water discharge.

3. Creation of a Recycling-Oriented Society



Maintaining and Improving the Industrial Waste Recycling Rate

The J-POWER Group's target industrial waste recycling rate is 97%. The total amount of industrial waste we generated in fiscal 2020 was 2.05 million tons, with a recycling rate of 99.2%.

Making Effective Use of Coal Ash and Gypsum

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

We recycle 99.9% of coal ash produced in coal-fired thermal power generation, mainly as material for making cement and for land reclamation. We recycle 99.8% of the gypsum and 100% of sulfuric acid produced as byproducts of emissions desulfurization.

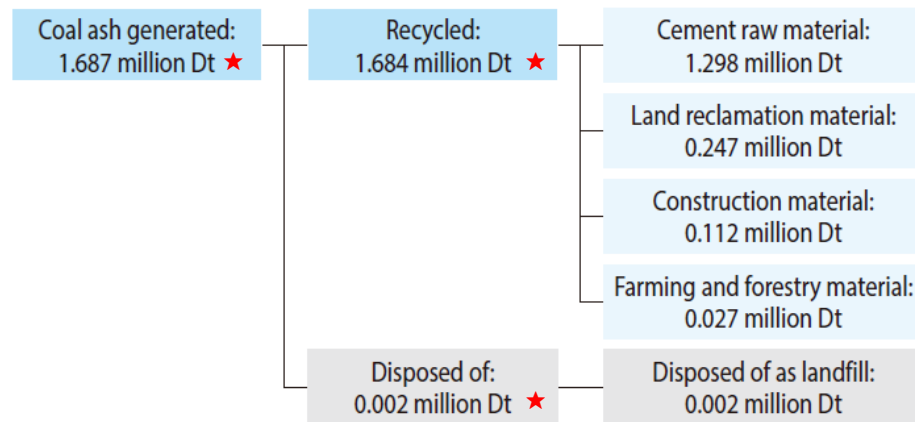
Information on Maintenance and Management of industrial Waste Final Disposal Sites

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

<http://www.jpowers.co.jp/bs/karyoku/maintenance.html>

(Japanese Only)

Breakdown of Coal Ash Recycling (displacement tons)



Note: Sums of figures may not equal totals due to rounding.

The ★ marks denote data that are the subject of third-party assurance. (Please refer to section 9-2「Third-Party Assurance Regarding Environment-Related Information」)

4. Management of Chemical Substances (1)



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

PRTR Substance Release and Transfer Volumes (Fiscal 2020)

Substance	Use	Volume handled	Volume released	Volume transferred as waste
33: Asbestos	Insulation for equipment	9.3 t/y	–	9,320 kg/y
71: Ferric chloride	Wastewater treatment agents	5.2 t/y	–	–
80: Xylene	Coating for machinery	10.7 t/y	3,153 kg/y	–
240: Styrene	Coating for machinery	3.0 t/y	3,040 kg/y	–
296:1, 2, 4-trimethylbenzene	Fuel (kerosene)	8.8 t/y	75 kg/y	–
300: Toluene	Fuel for power generation (coal)	16.2 t/y	16,194 kg/y	–
405: Boron compounds	Manure additives	18.2 t/y	0.8 kg/y	–

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

4. Management of Chemical Substances (2)



Scope of use (buildings and facilities) of asbestos (as of the end of March 2021)

Items		Type of Use	Present Conditions
Blown-in materials Containing asbestos		Acoustic insulation, thermal insulation and fireproofing materials in facility buildings	Appropriate measures have been taken for products containing asbestos
Asbestos-containing products	Building materials	Fireproofing panel, flooring for buildings, etc.	It is considered that asbestos is contained in the building materials used before August 2006. No asbestos-containing products have been used since then.
	Acoustic insulation	Acoustic insulation for transformers (Transformer facility)	Appropriate measures have been taken for products containing asbestos
	Asbestos-cement pipes	Duct wiring for underground wires (Transmission facility)	Approx. 0.6 km
	Thermal Insulation	Power generation facilities (Thermal power facility)	Remaining products containing asbestos : Approx. 21,000m ³ (about 20 % of total)
	Sealing materials, gaskets	Power generation facilities (Thermal power facility)	Remaining products containing asbestos : Approx. 31,000 (about half of total)
	Thickeners	Electric wire for overhead transmission lines (Transmission facility)	Electric wire corrosion prevention material Approx. 28 km
		Power generation facilities (Hydro power facility)	Asphalt surface shielding membrane 3 facilities (Ootsumata-dam: Fukushima Prefecture, Numappara- dam : Tochigi Prefecture, Hombetsu Power Station Headrace Opening Ditch: Hokkaido)
Buffers	Suspension insulations for transmission facilities	Approx. 490,000 (Asbestos-containing products are used as buffers inside the insulations. Not used for the surface part.)	

Note : Reflects the partial amendment of the Industrial Safety and Health Act Enforcement Ordinance in September 2006.(Asbestos content regulation changed from 1% to 0.1%)

5. Protect the Natural Environment (1)



Preservation of Aquatic Environments

From fiscal 2013 onward, the preservation of aquatic environments has been designated as one of the Corporate Targets under the J-POWER Group Environmental Management Vision with the aim of reinforcing our environmental preservation initiatives regarding rivers and the seas.

We undertake environmental preservation measures based on the specific regional environment and characteristics of each business site. For example, near hydroelectric power stations, we take measures regarding water quality and the accumulation of silt in dam lakes and downstream area, while near thermal power stations we manage effluent emitted into nearby oceans in accordance with applicable laws and regulations.

Preservation of Biodiversity

To reinforce our measures in light of the Basic Act on Biodiversity, from fiscal 2011 onward, the preservation of biodiversity has been one of the Corporate Targets under the J-POWER Group Environmental Vision.

During the planning and design stages of power generation facilities, we incorporate environmental preservation measures to mitigate the impact on surrounding ecosystems and environments where plants and animals live and grow, based on the results of environmental impact assessments. We strive to preserve plants and animals that live and grow in the vicinity of operating power plants, particularly rare species and their habitats.

5. Protect the Natural Environment (2)

These measures are tailored to local environments and characteristics. For example, every effort is made to avoid outdoor work during the nesting season of the Japanese golden eagle and other endangered birds that live in the vicinity of the Okutadami Dam and Otori Dam. Another example is the restoration, maintenance, and management of marshes that became landfill areas when the Okutadami Dam was expanded.

In addition to proper conservation of the forests we own near our hydroelectric power facilities throughout Japan, the J-POWER Group contributes to forest preservation and the reduction of CO₂ emissions through efforts to combust coal together with biomass fuel pellets, made from forestry offcuts, at coal-fired thermal power stations.



Okutadami dam downstream Yazaki Wetland (Niigata)

6. Implementation of Accurate Environmental Impact Assessments



Environmental Impact Assessment

Before building or expanding power plants, we conduct environmental impact assessments in accordance with applicable laws and regulations and implement adequate environmental preservation measures, taking the opinions of local residents into consideration. After a power plant becomes operational, we carry out ongoing monitoring in accordance with environmental protection agreements entered into with related local governments to ensure that our environmental preservation measures are effective. Currently, 21 projects are in the process of environmental impact assessment (as of July, 2021).

Project (tentative name)	Area	Project (tentative name)	Area
Aso Oguni Wind Farm (Replacement)	Kumamoto Prefecture	Naka-Noto Wind Farm	Ishikawa Prefecture
Watarai Minami-Ise Wind Farm	Mie Prefecture	Fukui Ono Ikeda Wind Farm	Fukui Prefecture
Koriyama Nunobiki Kogen Wind Farm (Replacement)	Fukushima Prefecture	Kichu Wind Farm	Wakayama Prefecture
Aso Nishihara Wind Farm (Replacement)	Kumamoto Prefecture	Hisatsu Wind Farm	Kumamoto Prefecture
Minamiosumi Wind Farm (Replacement)	Kagoshima Prefecture	Hiroshim-Nishi Wind Farm	Hiroshima Prefecture
Tahara Seaside Wind Farm (Replacement)	Aichi Prefecture	Fukui Prefecture Awara offshore wind power generation	Fukui Prefecture
Kita-Kagoshima Wind Farm	Kagoshima Prefecture	Hiyama area offshore wind power generation	Hokkaido Prefecture
Seiyo Yusuhara Wind Farm	Ehime Prefecture	Hibikinada Offshore Wind Farm	Fukuoka Prefecture
Wajima Wind Farm	Ishikawa Prefecture	Saikai offshore wind power generation	Nagasaki Prefecture
Youra Wind Farm	Oita Prefecture	Uprating project of Sakuma East-West Interconnection Facilities	Yamanashi Prefecture
Reihoku Kunimiyama Wind Farm	Kochi Prefecture		

Note : Assessments listed include those carried under not only J-POWER but also J-POWER Group Companies

7. Improvement of Environmental Management Level



The J-POWER Group has introduced an environmental management system (EMS) based on the ISO 14001:2004 standard of the International Organization for Standardization and the JISQ 14001:2004 standard of the Japanese Industrial Standards, at all of our business sites for conducting environmental conservation activities based on the J-POWER Group's Environmental Vision. We are advancing efforts to improve the level of our environmental management and to strictly comply with laws and agreements.

We also actively engage in environmental communication activities with our local communities.

Improvement of Environmental Management Level

On the basis of the J-POWER Group Environmental Action Guidelines that are reviewed annually by J-POWER's management, we draw up Environmental Action Plans, periodically review and evaluate initiatives, and revise measures to be taken, following the PDCA cycle. In this way, we work to constantly enhance environmental management.

In addition, the J-POWER Group plans and implements environmental education, using such means as online classes and e-learning, to foster a deeper awareness of environmental issues and sense of personal responsibility among employees.

Fiscal 2020 In-House Environmental Training

Media	Type	Training category	Results	Main content
General training	General environmental management	Environmental management briefing	93 locations Assessed	Information regarding group environmental management initiatives and information of energy policy etc.
		Environmental Seminar	75 Participants	Held a seminar on the theme of biodiversity by an outside lecturer
	E-learning	Basic knowledge regarding Environmental issues	90.2%	Latest environment-related laws
Advanced and specialized training	EMS implementation	Internal environmental auditor training	91 Participants	Knowledge necessary to conduct internal audits under EMSs
		Follow-up training for internal environmental auditors	12 Participants	Knowledge necessary to oversee audit teams conducting internal audits under EMSs
	Environmental laws and Regulations	Skill enhancement training for wasteprocessing operations	175 Participants	Explanation of the key points of the Waste Disposal Act
		Wasteprocessing risk assessment	2 locations Assessed	Checking provisions of agreements and manifests specified by law
		Training on environmental laws and Regulations	126 Participants	Explanation of environmental laws and regulations
E-learning	EMS course	103 Participants	Basic knowledge of EMSs	

8. Full Compliance with Laws, Regulations, Agreements, and Other Rules



Full Compliance with Laws, Regulations, Agreements, and Other Rules

In order to constrain the impact of our business activities on the surrounding environment, we take appropriate steps to comply with laws, regulations, agreements, and other rules applicable to our business activities, and work to make these widely known. We also engage in ongoing efforts to improve our facilities and operations. In order to dispose of waste properly, we take measures to maintain and improve the disposal capabilities of waste disposal operators, employing waste disposal consulting firms to directly confirm the status of waste disposal by local organizations.

Responding to Environmental Incidents

Regarding the management of environmental incidents, based on our environmental management systems, we make every effort to prevent environmental incidents before they occur and to minimize harm if they do occur. We have in place a notification framework for the occurrence of environmental incidents, under which we notify local agencies concerned as well as the J-POWER Headquarters Emergency Response Team and related departments.

The J-POWER Headquarters Emergency Response Team promptly notifies top management and, in the interest of information disclosure, releases information on emergencies to the media and other relevant parties. We also devise measures to prevent recurrences. In fiscal 2020, there were two environmental incidents that were reported through the mass media.

Status of Environmental Incidents

Fiscal year 2018 : 1 incident Fiscal year 2019 : 0 incidents Fiscal year 2020 : 2 incidents

Location	Situation and Countermeasures
Matsushima Thermal Power Plant (Nagasaki Prefecture)	<p>On July 28, 2020, at the Matsushima Thermal Power Plant, about 40 liters of lubricating oil leaked and part of it leaked to the sea due to a break in the drain pipe of the No. 2 unloader oil tank of the coal lifting facility. Immediately, an oil fence was extended over the sea to prevent the spread of oil and the spilled oil was recovered.</p> <p>In addition to repairing broken drain pipe, we are working to prevent recurrence by installing a new oil pan to prevent oil from leaking into the sea.</p>
Otsumata Power Station Ohyoopi Intake Dam (Fukushima Prefecture)	<p>On November 3, 2020, at the Otsumata Power Station Ohyoopi Intake Dam, about 9 liters of light oil for small generator fuel spilled into the Ohyoopi River, a tributary of the Otsumata River.</p> <p>We immediately stopped using the small generator and installed an oil fence downstream of the oil spill to minimize the impact. In addition, we have conducted lake surface patrols and water inspections at multiple locations in the spilled river and downstream dam lake and confirmed that there is no impact on the river environment due to oil leakage.</p> <p>In response to the occurrence of this event, we immediately conducted a priority inspection of small generators, including at other locations.</p>

9-1. Environment-Related Data (1)



The following data represent year-end values for each fiscal year. Unless specifically noted, includes data for Group companies. ¹

1. The scope of applicability includes J-POWER and its 26 consolidated domestic subsidiaries, which are engaged in the electric power business, electric power related business, and other business. The amounts attributed to consolidated subsidiaries are based on percentages corresponding to J-POWER's equity share. Please refer to section 9-3「Major Group Companies」for the covered data in the Environment-Related data .(However, the figures under Usage of Specified CFCs and for SF₆ emissions and handled amount under Greenhouse Gas Emissions are calculated based on the total amounts from consolidated subsidiaries.)

Note: The sums of individual figures may not equal the corresponding totals due to rounding.

The ★ marks denote data that are the subject of third-party assurance. (Please refer to section 9-2「Third-Party Assurance Regarding Environment-Related Information」)

Fuel Consumption

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
Coal (dry coal 28 MJ/kg equivalent)	million t	17.73	18.87	18.09	16.98	17.05
Use intensity (coal-fired thermal power)	t/GWh	340	340	338	334	334
Natural gas	million m ³ N	160	164	130	96	56
Heavy oil	million kl	0.04	0.04	0.03	0.03	0.04
Diesel	million kl	0.02	0.02	0.02	0.03	0.03
Biomass	million t	0.02	0.03	0.02	0.03	0.04

Note: Denominators for use intensity represent electric power sold by coal-fired thermal power stations

9-1. Environment-Related Data (2)



Greenhouse Gas Emissions²

		Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
CO ₂ emissions (domestic and overseas power generation) ³		million t-CO ₂	55.24	57.02	53.53	52.15	52.40
CO ₂ emission intensity		kg-CO ₂ /kWh	0.65	0.66	0.66	0.64	0.65
CO ₂ emissions (domestic power generation)		million t-CO ₂	45.52	48.42	46.73	43.84	45.38
CO ₂ emission intensity		kg-CO ₂ /kWh	0.73	0.73	0.72	0.71	0.71
SF ₆	Emissions	t	0.1	0.0	0.0	0.0	0.0
	Handled	t	10.2	6.7	2.3	3.4	3.3
	Recovery rate	%	99	99	99	99	99
HFC emissions ⁴		t	0.1	0.1	0.2	0.2	0.1
N ₂ O emissions		t	1,107	1,780	1,618	610	574

- CO₂ emissions comprise emissions from fuel combustion for power generation. Emissions of other greenhouse gases (PFC, CH₄, and NF₃) are effectively zero. The calculation of CO₂ emissions from both operations in Japan and those overseas is performed in accordance with the Act on Promotion of Global Warming Countermeasures.
Greenhouse gas emissions data described in the integrated report p.80 are the data of J-POWER and its domestic and overseas consolidated subsidiaries reported to CDP. J-POWER's equity share is not taken into consideration for consolidated subsidiaries.
The data of CO₂ emissions on this page do not match because of the difference in equity share and covered data.
- This covers J-POWER as well as consolidated subsidiaries and equity method affiliates, which are engaged in the electric power business and overseas business (10 domestic and 30 overseas companies). The amounts attributed to consolidated subsidiaries and equity method affiliates are based on the percentages of J-POWER's equity share. Please refer to section 9-3「Major Group Companies」for the covered data in the calculation of CO₂ emissions.
- Calculated using the same tabulation method as that employed for Usage of Specified CFCs.

Note: Denominators for emission intensity represent electric power sold.

9-1. Environment-Related Data (3)



J-POWER Group Total Thermal Efficiency for Thermal Power Generation (Gross Efficiency)

	単位	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
Total thermal efficiency (gross efficiency, HHV)	%	40.3	40.4	40.6	40.8	40.9

Usage of Specified CFCs

		Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Specified CFCs	Inventory	t	1.0	1.0	1.0	0.0	0.0
	Emissions	t	0.0	0.0	0.0	0.0	0.0
Halons	Inventory	t	4.7	4.5	4.8	4.7	4.7
	Emissions	t	0.0	0.0	0.0	0.0	0.0
Other CFCs	Inventory	t	5.8	5.0	4.7	4.4	4.2
	Emissions	t	0.0	0.0	0.0	0.0	0.0
HFCs (CFC alternatives)	Inventory	t	20.0	20.8	21.1	21.3	22.6
	Emissions	t	0.1	0.1	0.2	0.2	0.1★

9-1. Environment-Related Data (4)



SOx, NOx, and Soot and Dust Emissions

		Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
SOx	Emissions	thousand t	10.2	11.4	12.4	11.9	10.8
	Intensity	g/kWh	0.18	0.19	0.21	0.22	0.20
NOx	Emissions	thousand t	27.8	29.6	29.4	27.5	24.2
	Intensity	g/kWh	0.50	0.49	0.51	0.50	0.44
Soot and dust	Emissions	thousand t	1.0	0.9	0.9	0.6	0.6
	Intensity	g/kWh	0.02	0.02	0.02	0.01	0.01

Notes: 1. Soot and dust emissions are calculated from monthly measurements.

2. Denominators for intensity represent the electricity generated in thermal power stations (excluding geothermal power stations).

Industrial Waste Recycling

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
Volume generated	million t	2.10	2.32	2.30	2.00	2.05
Volume recycled	million t	2.07	2.29	2.27	1.98	2.03
Recycle rate	%	99	99	99	99	99

Coal Ash and Gypsum Recycling

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★	
Coal ash	Volume generated	thousand t	1,719	1,939	1,899	1,633	1,687
	Volume recycled	thousand t	1,708	1,929	1,893	1,630	1,684
	Recycle rate	%	99.4	99.5	99.7	99.8	99.9
Gypsum	Volume generated	thousand t	310	329	318	304	294
	Recycle rate	%	100	100	100	100	99.8

9-1. Environment-Related Data (5)



Electricity (Purchased)

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020 ★
Business sites	GWh	69.66	65.25	87.48	105.80	90.42
Office	GWh	17.31	15.96	15.55	14.29	15.61

Fuel(Gasoline equivalent)

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Business sites	k ℓ	8,961	9,173	9,020	9,636	10,462
Office	K ℓ	1,230	1,324	1,341	1,274	1,222

Industrial-use water・Clean Water

	Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	
Industrial-use water ⁵	million m ³	10.87	11.02	10.05	10.01	9.78★	
Clean Water	Business sites	thousand m ³	68	102	75	87	79
	Office	thousand m ³	185	189	177	215	209

5 Almost all industrial-use water used in thermal power stations

9-1. Environment-Related Data (6)



Office Power Consumption

		Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Power consumed by offices (company total)		GWh	20.83	19.37	18.80	17.66	18.52
Head office	Power consumption	GWh	6.37	6.25	6.15	5.75	5.80
	Lighting/power sockets	GWh	1.22	1.18	1.24	1.20	1.15


(The data is modified according to the aggregable range)

Rate of Green Procurement of Copy paper (Recycled copy paper ratio)

		Unit	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Copy Paper ⁶	Purchased	million sheets	54.81	55.14	53.70	49.98	43.70
	Green Procurement	million sheets	54.58	54.63	52.96	49.49	43.43
	(Green Procurement Rate)	%	100	99	99	99	99

6 A4 paper-size equivalent

The environmental information and performance data (hereinafter “sustainability information”) contained in the “J-POWER Group Integrated Report 2021 Supplementary Material: Environment ” have been reviewed by Ernst & Young ShinNihon LLC, from the point of view of accuracy and comprehensiveness for important sustainability information as determined by the Japanese Association of Assurance Organizations for Sustainability Information (J-SUS). As a result of this review, said sustainability information has received an Independent Assurance Report. The data that were calculated in accordance with the specified calculation standards and are covered by this assurance are indicated by stars (★).



Translation

The following is an English translation of an independent assurance report prepared in Japanese and is for information and reference purposes only. In the event of a discrepancy between the Japanese and English versions, the Japanese version will prevail.

August, 2021

Independent Assurance Report

TO:

Mr. Toshifumi Watanabe
 Representative Director President and Chief Executive Officer
 Electric Power Development Co., Ltd.

Kenji Sawami
 Engagement Partner
 Ernst & Young ShinNihon LLC Tokyo

We, Ernst & Young ShinNihon LLC, have been commissioned by Electric Power Development Co., Ltd. (hereafter the “Company”) and have carried out a limited assurance engagement on the Key Environmental Performance Indicators (hereafter the “Indicators”) of the Company and its major subsidiaries for the year ended March 31, 2021 as included in Supplementary Material: Environment attached to J-POWER Group Integrated Report 2021 (hereafter the “Report”). The scope of our assurance procedures was limited to the Indicators marked with the symbol “★” in the Report.

1. **The Company’s Responsibilities**
 The Company is responsible for preparing the Indicators in accordance with the Company’s own criteria, which it determined with consideration of Japanese environmental regulations as presented in the Investor Relations, IR Library, Integrated Reports, Calculation Standards of Environmental Information of the Company’s website. Greenhouse gas (GHG) emissions are estimated using emissions factors, which are subject to scientific and estimation uncertainties, given instruments for measuring GHG emissions may vary in characteristics, in terms of functions and assumed parameters.
2. **Our Independence and Quality Control**
 We have met the independence requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which is based on the fundamental principles of integrity, objectiveness, professional competence and due care, confidentiality, and professional behavior. In addition, we maintain a comprehensive quality control system, including documented policies and procedures for compliance with ethical rules, professional standards, and applicable laws and regulations in accordance with the International Standard on Quality Control 1 issued by the International Auditing and Assurance Standards Board.
3. **Our responsibilities**
 Our responsibility is to express a limited assurance conclusion on the Indicators included in the Report based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with the International Standard on Assurance Engagements: Assurance Engagements Other than Audits or Reviews of Historical Financial Information - (“ISAE 3000”) (Revised), and with respect to GHG emissions, the International Standard on Assurance Engagements: Assurance Engagements on Greenhouse Gas Statements (“ISAE 3410”), issued by the International Auditing and Assurance Standards Board. The procedures, which we have performed according to our professional judgment, include inquiries, document inspection, analytical procedures, reconciliation between source documents and Indicators in the Report and the following:
 - Making inquiries regarding the Company’s own criteria that it determined with consideration of Japanese environmental regulations, and evaluating the appropriateness thereof;
 - Inspecting relevant documents with regard to the design of the Company’s internal controls related to the Indicators, and inquiring of personnel responsible thereof at the headquarters and one power station;
 - Performing analytical procedures concerning the Indicators at the headquarters and one power station; and
 - Testing, on a sample basis, underlying source information and conducting relevant re-calculations at the headquarters and one power station.
 The procedures performed in a limited assurance engagement are more limited in nature, timing and extent than a reasonable assurance engagement. As a result, the level of assurance obtained in a limited assurance engagement is lower than would have been obtained if we had performed a reasonable assurance engagement.
4. **Conclusion**
 Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the Indicators included in the Report have not been measured and reported in accordance with the Company’s own criteria that it determined with consideration of Japanese environmental regulations.

9-2 Third-Party Assurance Regarding Environment-Related Information (2)



List of Sustainability Information Calculation Standards

Primary information	Definition, calculation method, etc.
Fuel Consumption Electricity (purchased)	Calculated in Accordance with the Provisions of the Energy Use Law.
Industrial-use water	Automated measurement data is collected by measuring instruments. Measuring instruments are calibrated in accordance with legal requirements.
CO ₂ emissions, HFC emissions, N ₂ O emissions	The volume is calculated by multiplying the volume of each type of energy used by the relevant energy conversion factor according to the method specified in the Act on Promotion of Global Warming Countermeasures.
SO _x , NO _x , and Soot and Dust Emissions	Automated measurement data is collected by measuring instruments in accordance with the Air Pollution Prevention Act. Measuring instruments are calibrated in accordance with legal requirements.
waste water	Measurements are taken using measuring instruments and the volume is totaled.
Wastewater COD	The volume is calculated by multiplying the concentration of waste water (measured by a measurement certification business) by the volume of waste water in accordance with the method specified in the Water Pollution Prevention Act.
Volume of waste generated	The volume is totaled using the values indicated in manifests* specified in the Waste Disposal Act. Driftwood in dam reservoirs is determined by calculating the volume of driftwood that is removed from the reservoirs. * Manifest: A management form that must be issued under the Waste Disposal Act when transportation and disposal of waste is outsourced to an outside service provider. The manifest indicates the weight of waste, the method of disposal, and other information.
Volume of waste recycled	The volume of waste material that is reused or recycled and the volume of valuable material that is sold to outside service providers is totaled in accordance with the Waste Disposal Act and related notices.
Volume of SF ₆ handled and Emissions	Volume handled: The volume of SF ₆ gas in possession is totaled. Volume released: The volume is calculated by multiplying the volume that leaked (the annual SF ₆ refilling volume to related equipment) by the relevant release coefficient in accordance with the method specified in the Act on Promotion of Global Warming Countermeasures.
Electric power generated, amount of electric power sales	Automated measurement data is collected by measuring instruments. Measuring instruments are calibrated in accordance with legal requirements.
Total thermal power efficiency (gross efficiency, HHV)	Calculated using the following formula: Amount of electric power generated (MWh) × 3,600 ÷ Total heat input (excluding reheating and denitrification) (GJ) ÷ 1,000 × 100

9-3. Major Group Companies



Environment Related Data calculations

Calculation of CO₂ emissions for domestic and overseas power generation

J-POWER and 26 domestic consolidated subsidiaries

J-POWER, 10 electric power business companies and 30 overseas business companies

※Equity Stake [%]

Electric Power-Related Business

- J-POWER HYTEC Co.,Ltd. [100%]
- J-POWER Generation Service Co., Ltd. [100%]
- J-POWER Telecommunication Service Co., Ltd. [100%]
- J-POWER Design Co., Ltd. [100%]
- J-POWER Business Service Corporation [100%]
- JP Enterprise Co., Ltd. ※1 [100%]
- J-POWER EnTech Co., Inc. [100%]
- JM Activated Coke, Inc. [90%]
- PLANT-GIKEN Co.,Ltd. [100%]
- J-POWER RESOURCES Co., Ltd. [100%]
- J-Wind Service Co., Ltd. [100%]
- Miyazaki Wood Pellet Co., Ltd. [98.33%]

Electric Power Business

- J-POWER Transmission Network Co.,Ltd.) [100%]
- J-POWER SUPPLY & TRADING Co., Ltd. [100%]
- Mihama Seaside Power Co., Ltd. [100%]
- ITOIGAWA POWER Inc. [64%]
- J-Wind Co., Ltd. [100%]
- J-Wind SETANA Co., Ltd. [100%]
- J-Wind NIKAHO Co., Ltd. [100%]
- Nagasaki-Shikamachi Wind Power Co., Ltd. [70%]
- TOSA POWER Inc. [45%]
- Kashima Power Co.Ltd. [50%]
- Yuzawa Geothermal Power Generation Corporation [50%]

Other Business

- Kaihatsu Hiryou Co., Ltd. [100%]
- Japan Network Engineering Co., Ltd. [100%]
- Omuta Plant Service Co., Ltd. [100%]
- Biocoal Osaka-Hirano Co., Ltd. [60%]
- Green Coal Saikai Co., Ltd. [60%]
- Biocoal Yokohama-South Co., Ltd. [60%]

Overseas Business

- CBK Power Co.,Ltd.
- Shaanxi Hanjiang Investment & Development Co., Ltd.
- Roi-Et Green Co.,Ltd.
- Gulf Yala Green Co.,Ltd.
- Gulf JP UT Co.,Ltd.
- Gulf JP NS Co.,Ltd.
- Gulf JP NNK Co.,Ltd.
- Gulf JP CRN Co.,Ltd.
- Gulf JP NK2 Co.,Ltd.
- Gulf JP TLC Co.,Ltd.
- Gulf JP KP1 Co.,Ltd.
- Gulf JP KP2 Co.,Ltd.
- Gulf JP NLL Co.,Ltd.
- Gulf Power Generation Co.,Ltd
- Nong Khae Cogeneration Co.,Ltd.
- Samutprakarn Cogeneration Co.,Ltd ※2
- EGCO Cogeneration Co.,Ltd.
- Chiahui Power Corporation ※3
- China Resources Power (Hezhou) Co., Ltd.
- Tenaska Frontier Partners,Ltd
- Elwood Energy, LLC
- Green Country Energy,LLC
- Birchwood Power Partners, L.P.
- Pinelawn Power LLC
- Equus Power I, L.P.
- Tenaska Virginia Partners, L.P.
- Edgewood Energy, LLC
- Shoreham Energy, LLC
- Orange Grove Energy,L.P.
- Tenaska Pennsylvania Partners, LLC

* 1 JP Enterprise Co., Ltd. changed its company name to 'J-POWER Insurance Service Corporation in April 2021.

* 2 Samutprakarn Cogeneration Co.,Ltd data is calculated until August 2020.

* 3 Chiahui Power Corporation data is calculated until November 2020.