31

# **J-POWER Group Businesses**



# **Power Generation Business**

## **Recognition of Business Environment**

• Widespread use and expansion of CO<sub>2</sub>-free power sources and CO<sub>2</sub>-free opportunities hydrogen aimed at achieving carbon neutrality

- Expansion of new markets and forms of selling
- Greater earnings fluctuations resulting from increased volatility in resource and electricity market prices
- Earnings deterioration due to CO<sub>2</sub> emissions regulations
   Higher operating costs due to inflation
- Well-balanced power source portfolio consisting of renewable energy and thermal power
- Comprehensive technological capabilities that can be executed within the

#### Strengths Group from development to operation

- The highest level of engineering and execution capabilities gained from involvement in global development
- Relationships of trust with local communities

## **Overview of Power Generation Business**

J-POWER Group generates electricity from our power sources, including renewable energy and thermal power, and sells it to the former general electric utility companies (EPCOs) and the Japan Electric Power Exchange (JEPX) to ensure a stable supply of electricity in Japan. J-POWER also sells electricity procured from JEPX and other sources to retail electricity suppliers.

## • Flow of electricity sales

Risks



In principle, the structure of sales charges to EPCOs consists of a baseline charge based on the value of power generation capacity (kW) and a metered charge based on the quantity of electricity sold (kWh). For the portion equivalent to fuel costs, which account for the majority of the metered charge for thermal power generation, we have introduced a system that reflects fluctuations in market conditions related to fuel procurement as appropriate.

The sales price of the electricity procured from JEPX is determined through discussions with retailers and is revised in a timely manner.

Net sales/Segment profit/Assets						
				(Billions of yen)		
FY	2020	2021	2022	2023		
Net sales	706.0	854.4	1,393.7	875.5		
Segment profit	16.0	27.4	54.1	20.3		
Assets	2,029.3	2,136.4	2,226.6	2,284.5		

Note: Segment profit is ordinary profit. The total amounts of each segment's net sales, profit, and assets are not equal to consolidated operating revenue, consolidated ordinary profit, and total assets in each fiscal year due to adjustments such as the elimination of inter-segment transactions.

## Share of power generation capacity in Japan



17%

# **J-POWER Group Businesses**

## Power Generation Business

# **Renewable Energy**

#### Hydroelectric Power

Over the past 70 years or so, the Group has engaged in the development and operation of hydroelectric power plants. Hydroelectric power plants can be started quickly and their output is adjustable, and pumped storage hydropower plants play an important role as a regulating power source to absorb surplus power and compensate for power shortages. With no available land left for large-scale developments in Japan, the Group is engaged in increasing the generation output and power generation volume through the development of small hydroelectric power plants and the comprehensive renewal of main facilities.

Share of hydroelectric power generation capacity No. 2 in Japan 8,577 mw (As of March 31, 2024)



Tagokura Dam

#### Wind Power

The Group began engaging in the wind power generation business early in Japan. Even now, we are engaged in many development projects while also advancing facility upgrades at its initial operation sites.

In terms of offshore wind power, we will proceed with the construction of the Kitakyushu Hibikinada Offshore Wind Farm Project to start commercial operation in FY2025, utilizing the expertise gained through our participation in the Triton Knoll Offshore Wind Farm Project in the United Kingdom. In addition, we will work on the development of an offshore wind power project off the coast of Oga City, Katagami City, and Akita City, Akita Prefecture, for which J-POWER was selected as a business operator in December 2023.

Share of wind power generation capacity No. 2 in Japan 560 мw

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(As of March 31, 2024)





A rendering of Kitakyushu Hibikinada Offshore Wind Farm

## **Geothermal Power**

Geothermal energy is a domestically produced CO<sub>2</sub>-free energy source, and utilized as a baseload power source that is capable of stable power generation without being affected by weather conditions. The Group operates the Wasabizawa Geothermal Power Plant and Onikobe Geothermal Power Plant, and also started the operation of the Appi Geothermal

Power Plant in March 2024. Currently, we are conducting research for geothermal energy development in the Takahinatayama region in Miyagi Prefecture.



Onikobe Geothermal Power Plant

## Solar Power

The Group is currently constructing the Kitakyushu Hibikinada Solar Power Plant and Himeji Oshio Solar Power Plant. We are also promoting the on-site PPA model, where we install solar power generation equipment on the roofs or in open spaces of customers' facilities to supply power, thereby contributing to their needs for self-consumption of renewable energy.





## **Power Generation Business**

## **Thermal Power**

Coal is a crucial resource for energy security in Japan, a country with limited energy resources, as it can be easily stored and there is no disproportionate concentration of mining sites in specific regions. Geopolitical risks are thought to be lower for coal than for other fuels because it is mostly obtained from politically stable countries like Australia and Indonesia, which are the major exporters of the coal used at the Group's thermal power plants.

In the design and operation of our power plants, we contribute to the stable supply of electric power while curbing emissions of air pollutants such as SOx and NOx using our advanced technologies, and reducing CO<sub>2</sub> emissions by employing the highest-efficiency technologies available at the time of construction.

In addition, the Group is promoting mixed combustion of biomass fuel made from sewage sludge and wood materials to reduce CO<sub>2</sub> emissions. Since 2022, we have been working on 10% mixed combustion of biomass fuel at the Takehara Thermal Power Plant New Unit No. 1. From the perspective of sustainability and stably procuring biomass fuel, the Group is also engaged in the business of producing sustainable biomass fuels such as woody fuels employing forest offcuts, which are underutilized resources in Japan.

Furthermore, by upcycling our existing coal-fired thermal power plants toward decarbonization, we aim to convert to hydrogen power generation. The first step toward this goal is our work in Nagasaki Prefecture on the GENESIS Matsushima Plan

#### P.50 GENESIS Matsushima Plan



Takehara Thermal Power Plant New Unit No. 1

## Nuclear Power

Plant Project with safety as our top priority, aiming to expand CO<sub>2</sub>-free power sources.



34

35

# J-POWER Group Businesses

# **Transmission and Transformation Business**

Recognition of Business Environment	Main Facilities				
Opportunities  • Expansion of renewable energies  • Growing need to achieve carbon neutrality  Risks  • Impact of intensifying natural disasters on facilities  • Aging of facilities	<ul> <li>Transmission line</li> <li>Transmission line</li> <li>(under construction)</li> <li>Substation, frequency converter station, AC/DC converter station</li> <li>Frequency converter station</li> <li>(under construction)</li> </ul>				
<ul> <li>Comprehensive technological capabilities accumulated through over 70 years of experience in the construction, maintenance, and management of power transmission and transformation facilities</li> <li>Relationships of trust with local communities</li> </ul>	Hakodate (AC/DC Hokkaido-Honshu HVDC Interconnection Line	in Line			
Overview of Transmission and Transformation Business	Kamikita (AC/DC converter station)	Net sales/Segmen	t profit/As	sets	
		-	·	(Billi	ions of yen)
.I-POWER Transmission Network Co. Ltd. (.I-POWER Transmission) is a company which is	Isawa	FY 2020	2021	2022	2023
independent of the J-POWER Group's power generation and retailing divisions, handling its transmission business from a neutral position. With pipe substations and converter sta-		Net sales 50.7	49.8	50.6	49.5
tions, and approximately 2,400 km of transmission lines across Japan, J-POWER Transmission contributes to the cross-regional operation of Japan's overall power grid.		Segment 8.9	6.3	5.6	7.3
In particular, cross-regional interconnection facilities connecting Honshu with Hokkaido,	* Ford (	Assets 267.6	246.6	249.9	259.0
Shikoku, and Kyushu, and the Sakuma Frequency Converter Station, which was the first in Japan to enable the flexible ex- change of power with different frequencies between eastern Japan (50 Hz) and western Japan (60 Hz), are important in enabling the cross-regional operation of power grid in Japan.	su East Tadami Trunk Line Nagoya Line Nishi Tokyo Sakuma West Line 50 Hz tunk Line 60 Hz	Note: Segment profit is orr each segment's net to consolidated oper profit, and assets in such as the eliminat <b>Transmission and</b> (As of March 31, 2024)	dinary profit. TI sales, profit, ar ating revenue, each fiscal yea ion of inter-seg transform	ne total amo id assets ar consolidate ir due to adj iment trans <b>ation fac</b>	ounts of e not equal ed ordinary justments actions. cilities
High Voltage Direct Current (HVDC)	New Sakuma Frequency	Power transmission			
To deliver renewable energy to major consumption areas	) Sakuma Frequency Converter Station	facilities (distance)		2,4	410.2 km
from Hokkaido, Tohoku, Kyushu, and other regions where it	Line (AC/DC converter station)	AC transmission lines	_	2,1	143.0 km
is being introduced and expanded, the master plan for the	7*	DC transmission lines		2	267.2 km
electric power network calls for the development of subma-	20	Substations (output)	4 location	s 4,487	,000 kVA
high level of expertise in submarine DC cables gained from		Frequency converter stations (output)	1 location	300	),000 kW
do-Honshu HVDC Interconnection Line and Kii Channel		AC/DC interconnection stations (output)	<sup>1</sup> 4 location	s 2,000	),000 kW

# **Overseas Business**

Recognition of Business Environment				
Opportunities	<ul> <li>Strengthened international initiatives to achieve carbon neutrality</li> <li>Growing power demand primarily in emerging economies</li> </ul>			
Risks	<ul> <li>Increasingly volatile resource prices</li> <li>Tighter international environmental regulations</li> </ul>			
Strengths	<ul> <li>Project development capabilities</li> <li>Project promotion capabilities</li> <li>Ability of management to control risk and replace assets in response to changes in the business environment to increase profitability and sustainability</li> </ul>			

## **Overview of Overseas Business**

## **Overseas consulting business**

Leveraging the experience and technical prowess acquired through its domestic electric power business, the J-POWER Group conducts businesses including basic design study, feasibility studies, design, construction management, and transfer of environmental technologies on development of power sources and transmission and transformation facilities around the world. Since its first project in 1962, the Group has conducted 376 projects in 64 countries and regions. (As of March 31, 2024)

## **Overseas power generation business**

The J-POWER Group has actively identified and developed overseas power generation projects by leveraging its experience, credibility, and networks cultivated through its domestic operations and overseas consulting business.

When the Group first began its overseas power generation business in 1997, it primarily participated in the construction of power plants or plant operations through relatively small-scale investment. The Group has gradually expanded the business, shifting from acquiring interests in existing profitable projects to greenfield development, mainly in Thailand, the U.S., China, and other Asian countries. More recently, the Group has been seeking to expand development opportunities and acquire developer's profits by

participating in projects from the initial stage of development and selling interests in power plants and other projects.

Going forward, the overseas power generation business will engage in project development, primarily in the area of renewable energy, to further optimize our business portfolio.



## Net sales/Segment profit/Assets

(Billions of yen) Net sales 138.0 145.1 277.5 259.2 Segment profit 30.8 22.0 22.6 44.3 679.1 773.0 918.2 947.0 Assets

Note: Segment profit is ordinary profit. The total amounts of each segment's net sales, profit, and assets are not equal to consolidated operating revenue, consolidated ordinary profit, and assets in each fiscal year due to adjustments such as the elimination of inter-segment transactions.

## Results of overseas power generation business (As of March 31, 2024)

In operation	7 countries	37 projects	7,712 MW owned capacity
Of which, renewable energy projects*	5 countries	12 projects	826 MW owned capacity
Under construction/ development	4 countries	7 projects	970 MW owned capacity
*Include storages			

**Overseas Business** 

# **Renewable energy**

The Group is focusing on the development of renewable energies overseas. We participated in the Triton Knoll Offshore Wind Farm Project (U.K.) from the construction stage, and are utilizing the expertise gained from this project in offshore wind power generation projects in Japan. In Australia and the U.S., we have been involved in multiple renewable energy development projects. In Australia, we have acquired shares in Genex Power Limited\*, a developer of pumped storage, wind power, and solar power generation projects, contributing to the expansion of renewable energy in the country. In the U.S., we have been participating in the development of a solar power project since 2020.

\*J-Power acquired 100% of the issued shares of Genex Power Limited as of July 31, 2024 and made it a wholly owned subsidiary.

# Overseas renewable energy (owned capacity)



# Portfolio management

Through managing the portfolio of interests we hold by each power source type and based on the characteristics of project areas and other factors, we are working to improve capital efficiency and transition our business model in response to changes in the business environment. In addition to interests in renewable energy power sources, for regions where power plant assets are highly liquid, we sell our interests in such assets as soon as there is a prospect of finishing the development or starting the operations, thereby recovering our investment early.



Making Genex Power a wholly

owned subsidiary

Genex 2

The Value We Provide



## O Business model transition

• Major projects in recent years

(Facility output as of March 31, 2024)



\$

Onshore wind

Pumped storage

Partners

49%

Ownership

Sold partial interests after the development to acquire

developer's profits

J-POWER Group

Jackson

Refugio

In operation 50 MW Under development 400 MW

Under development

375 MW Solar

Under development 258 MW

Under construction 250 MW

51%

37

# **Electric Power-Related Business**

Recognition of Business Environment				
Opportunities	<ul> <li>Low-cost and stable power supply</li> <li>Growing interest in energy security</li> </ul>			
Risks	<ul> <li>Increasingly volatile resource prices</li> <li>Tighter international environmental regulations</li> </ul>			
Strengths	<ul> <li>Stable and long-term fuel procurement based on diversified sources</li> <li>Proven technological capabilities cultivated through the electric power business, which requires high reliability</li> </ul>			

## **Overview of Electric Power-Related Business**

The Electric Power-Related Business engages in businesses that complement the power generation and transmission and transformation businesses, and contribute to their smooth and efficient business execution.

## Investments in coal mines

We have been investing in Australian coal mines since 1980 and currently hold interests in three coal mines in order to provide consistent, long-term supplies of high-grade coal as fuel for thermal power generation.

In the face of increasingly volatile resource prices, we are seeking to optimize the entire supply chain, spanning from fuel procurement to power generation.



## O Coal mining projects (As of December 31, 2023)

Coal mine	Location	Outport	2023 sales volume	Vested interest	Coal production start
Clermont	Queensland	Dalrymple Bay (Hay Point Port)	11.40 million tons	22.2%	2010
Narrabri	New South Wales	Newcastle Port	4.93 million tons	7.5%	2012
Maules Creek	New South Wales	Newcastle Port	8.10 million tons	10.0%	2014

## **Telecommunications network business**

Communication networks are essential infrastructure for operating power plants, as well as transmission and transformation facilities, and thus require high level of reliability. J-POW-ER Telecommunication Service Co., Ltd. undertakes the construction, maintenance, and management of the J-POWER Group's all telecommunications facilities for electric power systems, contributing to the stable supply of power.

#### Net sales/Segment profit/Assets

				(Billions of yen)
FY	2020	2021	2022	2023
Net sales	208.6	74.4	165.6	119.6
Segment profit	4.4	17.2	86.7	47.1
Assets	126.1	133.9	195.3	219.7

Note: Segment profit is ordinary profit. The total amounts of each segment's net sales, profit, and assets are not equal to consolidated operating revenue, consolidated ordinary profit, and assets in each fiscal year due to adjustments such as the elimination of inter-segment transactions.