



エネルギーを新しい時代へ

# FY2023 Investors Meeting

(Note1) The company's fiscal year (FY) is from April 1 to March 31 of the following year in this material.

(Note2) The Company has voluntarily adopted International Financial Reporting Standards (IFRS) from the consolidated financial statements for the fiscal year ended March 31, 2023 (FY2022).

Therefore, the following pages and thereafter have been prepared in accordance with IFRS.

## JERA Co., Inc.

April 30, 2024

# Outline of Financial Results

## Consolidated Statement of Profit or Loss

(Unit: Billion Yen)

	FY2023(A)	FY2022(B)	Change(A-B)	Rate of Change(%)
Revenue (Net sales)	3,710.7	4,737.8	-1,027.1	-21.7
Operating profit	563.4	138.3	425.1	307.4
Profit	399.6	17.8	381.7	2,114.9
<Reference> Profit excluding time lag	148.7	200.3	-51.6	-25.8

## Consolidated Statement of Financial Position

(Unit: Billion Yen)

	As of Mar 31,2024(A)	As of Mar 31,2023(B)	Change(A-B)	Rate of Change(%)
Assets	8,508.1	9,172.3	-664.2	-7.2
Liabilities	5,849.5	7,132.6	-1,283.1	-18.0
Equity	2,658.6	2,039.7	618.9	30.3

# Key Points of Financial Results

## 【Revenue】

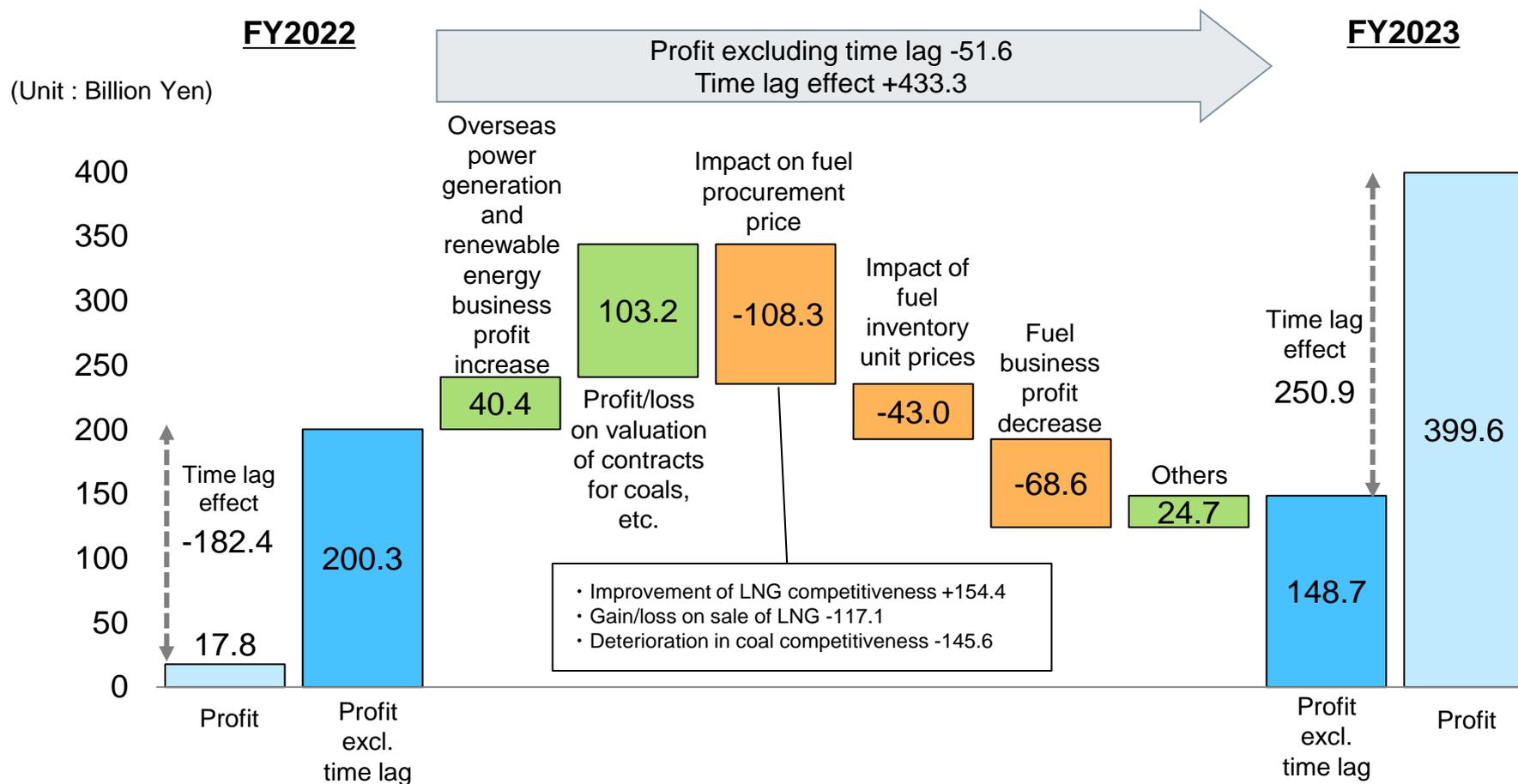
- **Revenue decreased by 1,027.1 billion yen (down 21.7%) from the same period last year to 3,710.7 billion yen** mainly due to a decrease in electrical energy sold.

## 【Profit】

- **Profit increased by 381.7 billion yen from the same period last year 17.8 billion yen and rose to profit of 399.6 billion yen.**
  - The effect of time lag shifted from losses to gains.  
(+433.3 billion yen [-182.4 billion yen to 250.9 billion yen])
  - Profit excluding time lag decreased.  
(-51.6 billion yen [200.3 billion yen to 148.7 billion yen])
- Profit excluding time lag decreased due to the impact on fuel procurement price, the impact of fuel inventory unit prices, and the decrease in profit from fuel business, though the profit from overseas power generation and renewable energy business increased and profit/loss on valuation of contracts for coals, etc. improved.

# Change Factors of Consolidated Profit

- Profit excluding time lag decreased due to the impact on fuel procurement price, the impact of fuel inventory unit prices, and the decrease in profit from fuel business, though the profit from overseas power generation and renewable energy business increased and profit/loss on valuation of contracts for coals, etc. improved.



Note: Figures are after-tax.

# Consolidated Statement of Profit or Loss

(Unit: Billion Yen)

	FY2023(A)	FY2022(B)	Change(A-B)	Main Factors of Changes
Revenue (Net sales)	3,710.7	4,737.8	-1,027.1	• Decrease of electrical energy sold
Operating expenses	3,222.2	4,600.9	-1,378.6	• Decrease of fuel costs
Other operating income/ loss	74.9	1.3	73.6	• Increase of share of profit / loss of investments accounted for using equity method +67.6 • Exchange income and loss +19.8
Operating profit	563.4	138.3	425.1	
Financial income	78.6	27.1	51.5	• Increase of interest received +44.9
Financial costs	64.6	63.1	1.4	• Increase of interest paid +18.2 • Exchange income and loss -16.3
Profit before tax	577.4	102.2	475.1	• Improvement of time lag effect +601.9 (-253.4 → 348.4) • Decrease of profit excluding time lag -126.7 (355.7 → 228.9)
Income tax expense	116.1	-63.3	179.4	
Profit attributable to non-controlling Interests	61.6	147.7	-86.0	
Profit	399.6	17.8	381.7	

# Consolidated Statement of Financial Position

(Unit: Billion Yen)

	As of Mar 31,2024(A)	As of Mar 31,2023(B)	Change (A-B)	Main Factors of Changes
Cash and cash equivalents	1,405.3	1,360.9	44.4	
Property, plant and equipment	2,805.4	2,387.8	417.5	• Increase on acquisition of Parkwind, etc.
Investments accounted for using equity method	1,235.2	1,112.7	122.4	
Others	3,062.0	4,310.8	-1,248.7	• Decrease of derivative assets (JERAGM, etc.) -1,074.3
<b>Assets</b>	<b>8,508.1</b>	<b>9,172.3</b>	<b>-664.2</b>	
Interest-bearing liabilities	3,103.6	3,510.8	-407.1	• Borrowings -463.4 • Commercial Paper -99.0 • Corporate Bonds +155.0
Others	2,745.8	3,621.8	-875.9	• Decrease of derivative liabilities (JERAGM, etc.) -1,100.0
<b>Liabilities</b>	<b>5,849.5</b>	<b>7,132.6</b>	<b>-1,283.1</b>	
Equity attributable to owners of parent	2,632.6	2,022.8	609.7	• Profit +399.6 • Foreign currency translation adjustments +147.4
Non-controlling interests	25.9	16.8	9.1	
<b>Equity</b>	<b>2,658.6</b>	<b>2,039.7</b>	<b>618.9</b>	

# Consolidated Statement of Cash Flows

(Unit: Billion Yen)

		FY2023(A)	FY2022(B)	Change(A-B)
<b>Operating cash flow</b>		1,324.8	450.7	874.1
<b>Investment cash flow</b>	<b>Purchase of property, plant, and equipment</b>	-242.3	-303.4	61.1
	<b>Purchase of investment securities</b>	-59.6	-27.0	-32.5
	<b>Others</b>	-226.5	-38.9	-187.5
		-528.4	-369.4	-159.0
<b>Free cash flows</b>		796.4	81.2	715.1
<b>Financial cash flow</b>	<b>Increase (decrease) in interest-bearing debt</b>	-731.5	780.7	-1,512.3
	<b>Dividends paid *</b>	-	-84.2	84.2
	<b>Others</b>	-141.6	99.7	-241.4
		-873.2	796.2	-1,669.4
<b>Increase (decrease) in cash and cash equivalents (minus indicates decrease)</b>		44.4	904.4	-859.9

\* Excluding Dividends paid to non-controlling interests

# Segment Information

(Unit: Billion Yen)

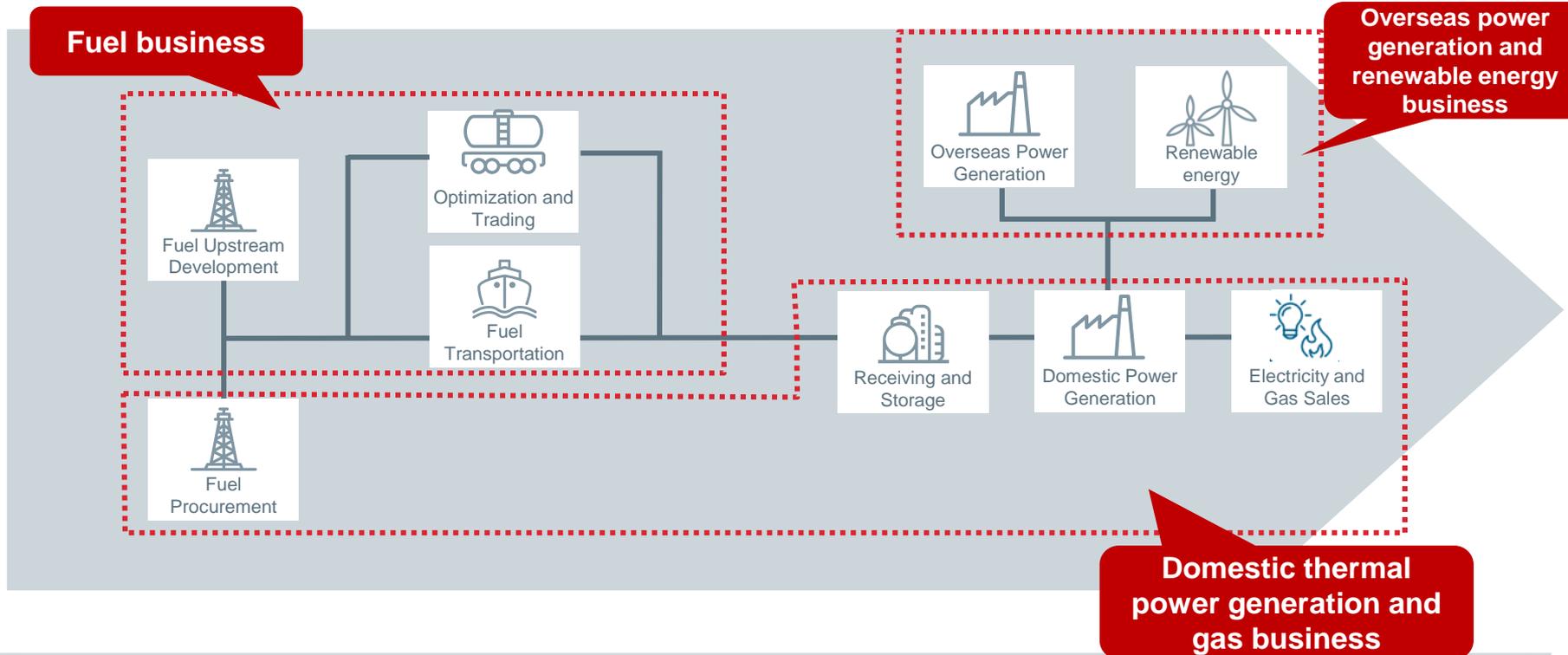
	FY2023(A)		FY2022(B)		Change(A-B)		Main Factors of Changes in Profit / Loss
	Revenue	Profit / Loss	Revenue	Profit / Loss	Revenue	Profit / Loss	
Fuel	407.4	132.6	585.7	201.3	-178.2	-68.6	•Profit decrease in JERAGM, etc.
Overseas power generation and renewable energy	52.5	33.7	8.6	-6.6	43.8	40.4	•Gain on reversal of impairment loss in Formosa 2 +19.6 •Profit increase in overseas IPPs, etc +20.7
Domestic thermal power generation and gas	4,424.2	255.3 4.4*2	6,153.4	-96.8 85.6*2	-1,729.2	352.2 -81.1*2	•Profit/loss on valuation of contracts for coals, etc. +103.2 •Improvement of LNG competitiveness +154.4 •Gain/loss on sale of LNG -117.1 •Deterioration in coal competitiveness -145.6 •Impact of fuel inventory unit prices -43.0
Adjustments*1	-1,173.5	-22.1	-2,010.0	-79.8	836.4	57.6	•Elimination of unfulfilled fuel contracts +19.0
Consolidated	3,710.7	399.6 148.7*2	4,737.8	17.8 200.3*2	-1,027.1	381.7 -51.6*2	

\*1 : "Adjustments" includes headquarter expenses and consolidation adjustments such as intersegment eliminations

\*2 : Excluding the effect of time lag

# (Reference) : JERA's Value Chain and Segment

- JERA owns the entire supply chains for fuel and thermal power generation, from fuel upstream business (development of gas fields) to transportation and storage (fuel terminal operation) to power generation and wholesaling.
- We have three business segments; "Fuel business" for investment in fuel upstream, transportation and trading business, "Overseas power generation and renewable energy business" for investment in overseas power generation and domestic and overseas renewable energy business, and "Domestic thermal power generation and gas business" for sales of electricity and gas in Japan.



# FY2024 Forecast

- Profit excluding time lag is expected to be around 150 billion yen, while time lag profit is projected to be 50 billion yen, with a total profit of around 200 billion yen.
- Results may fluctuate due to changing trends in fuel markets and other factors.

(Unit: Billion Yen)

	FY2024 Forecast (A)	FY2023 Result (B)	Change (A-B)
<b>Profit</b>	200.0	399.6	Approx. -200.0
Time lag effect	50.0	250.9	Approx. -200.0
Profit excl. time lag	150.0	148.7	Same level

## [ Breakdown for each segment ]

(Unit: Billion Yen)

	FY2024 Forecast (A)	FY2023 Result (B)	Change (A-B)
<b>Profit excl. time lag</b>	150.0	148.7	Same level
Fuel	100.0	132.6	Approx. -30.0
Overseas power generation and renewable energy	20.0	33.7	Approx. -10.0
Domestic thermal power generation and gas	60.0	4.4	Approx. 60.0
Adjustments	-30.0	-22.1	Approx. -10.0

\*Breakdown is based on rough estimates at the disclosure date.

# Appendix

## [FY2023 Results]

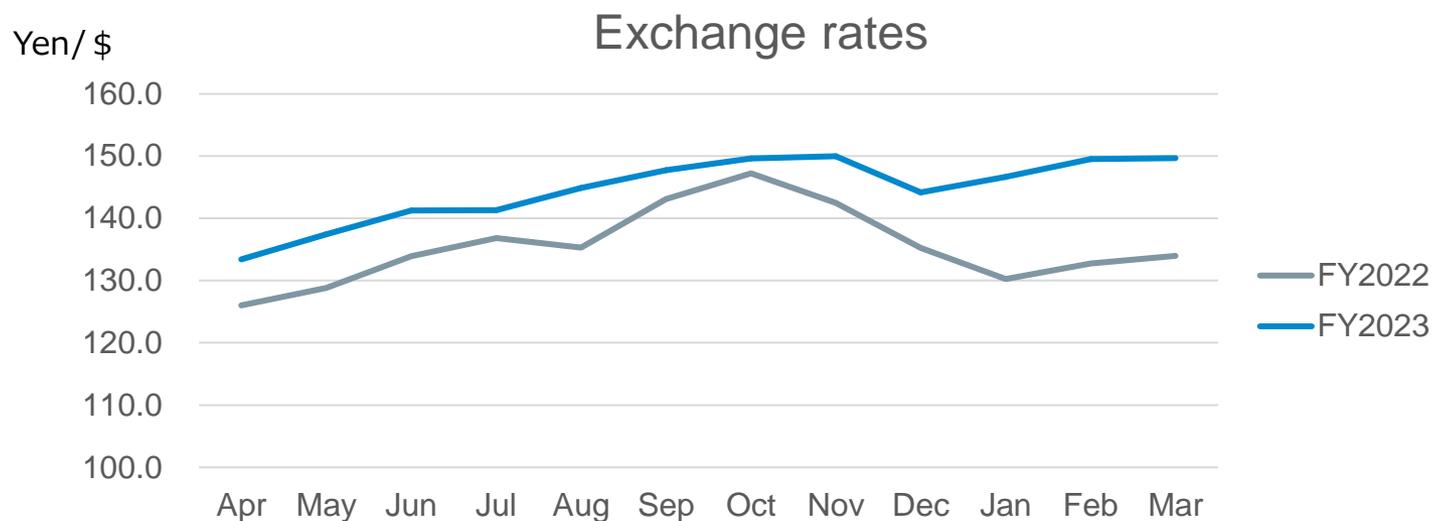
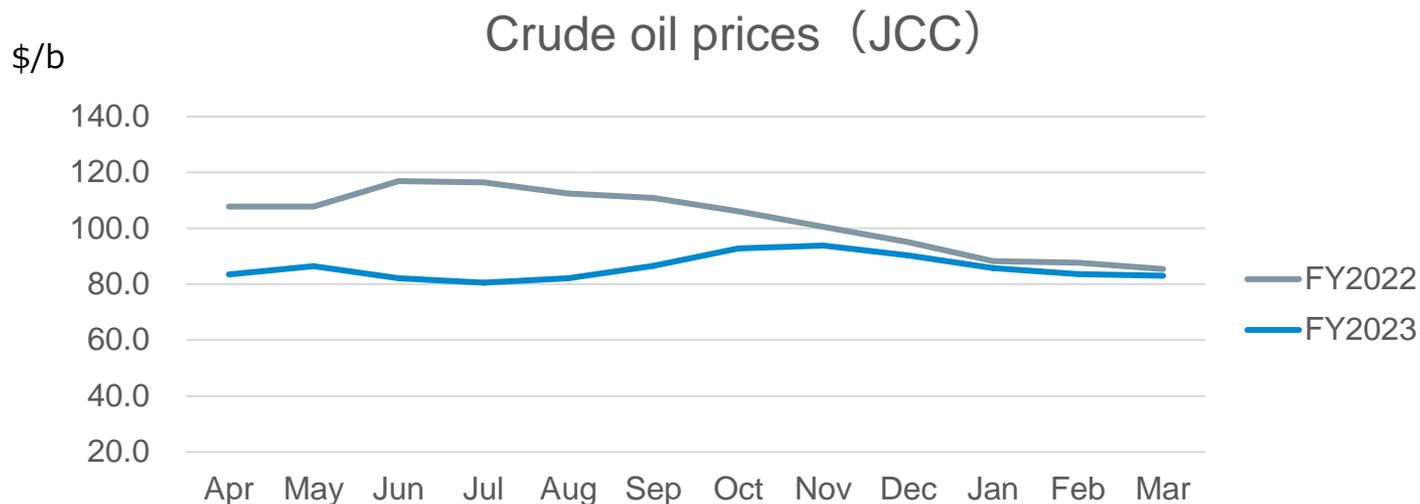
	FY2023 (A)	FY2022 (B)	Change(A-B)
Electrical Energy Sold (TWh)	236.2	255.1	-18.8
Crude Oil Prices(JCC) (dollar/barrel)	86.0	102.7	-16.7
Foreign Exchange Rate (yen/dollar)	144.6	135.5	9.1

Note: Crude Oil Prices(JCC) for 2023 is tentative.

## [FY2024 Forecast]

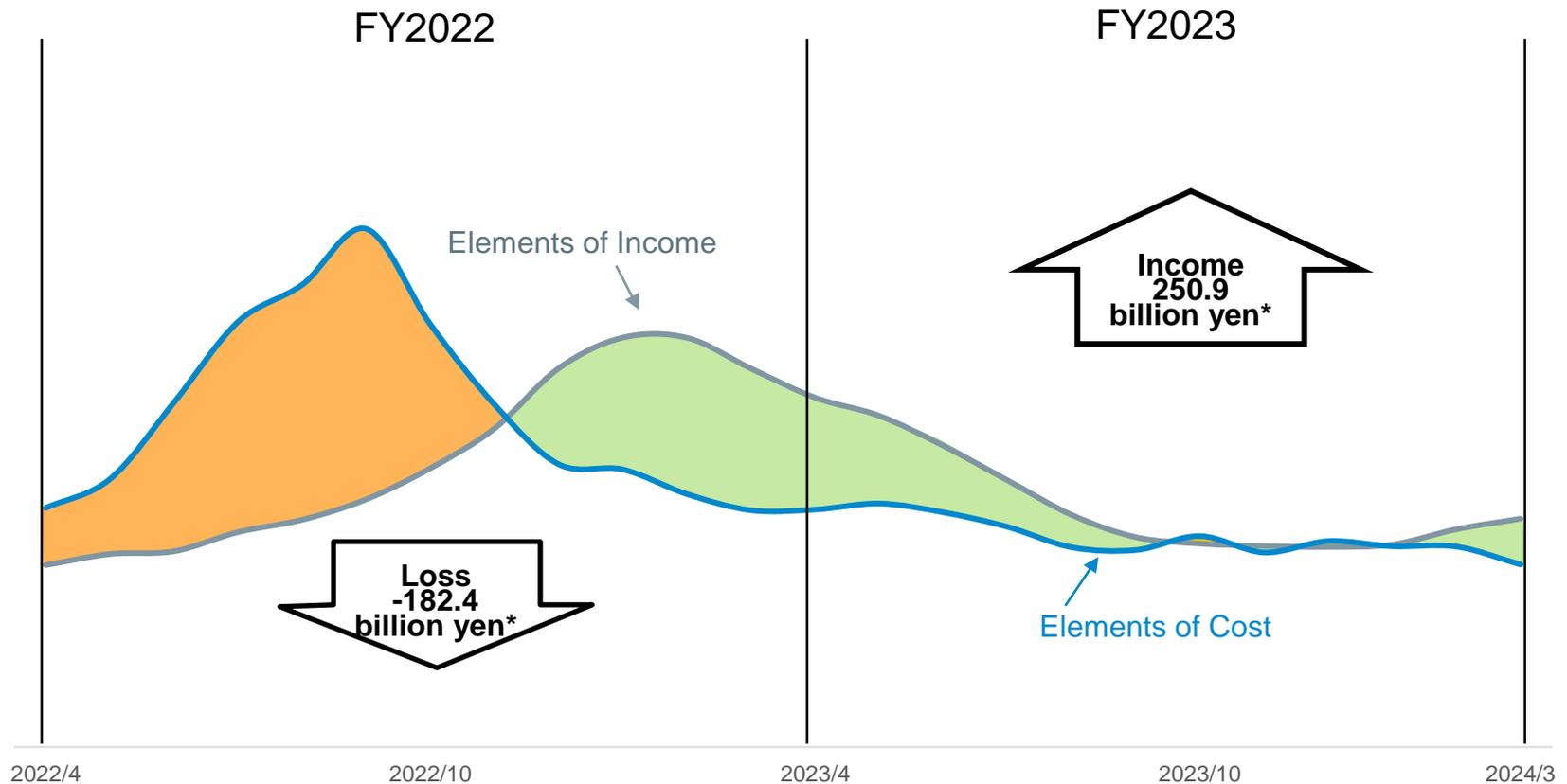
	FY2024 Forecast	FY2023 Result
Crude oil prices(JCC) (dollar/barrel)	Approx. 80	86.0
Foreign exchange rate (yen/dollar)	Approx. 141	144.6

# Trends in Crude Oil Price and Exchange Rates



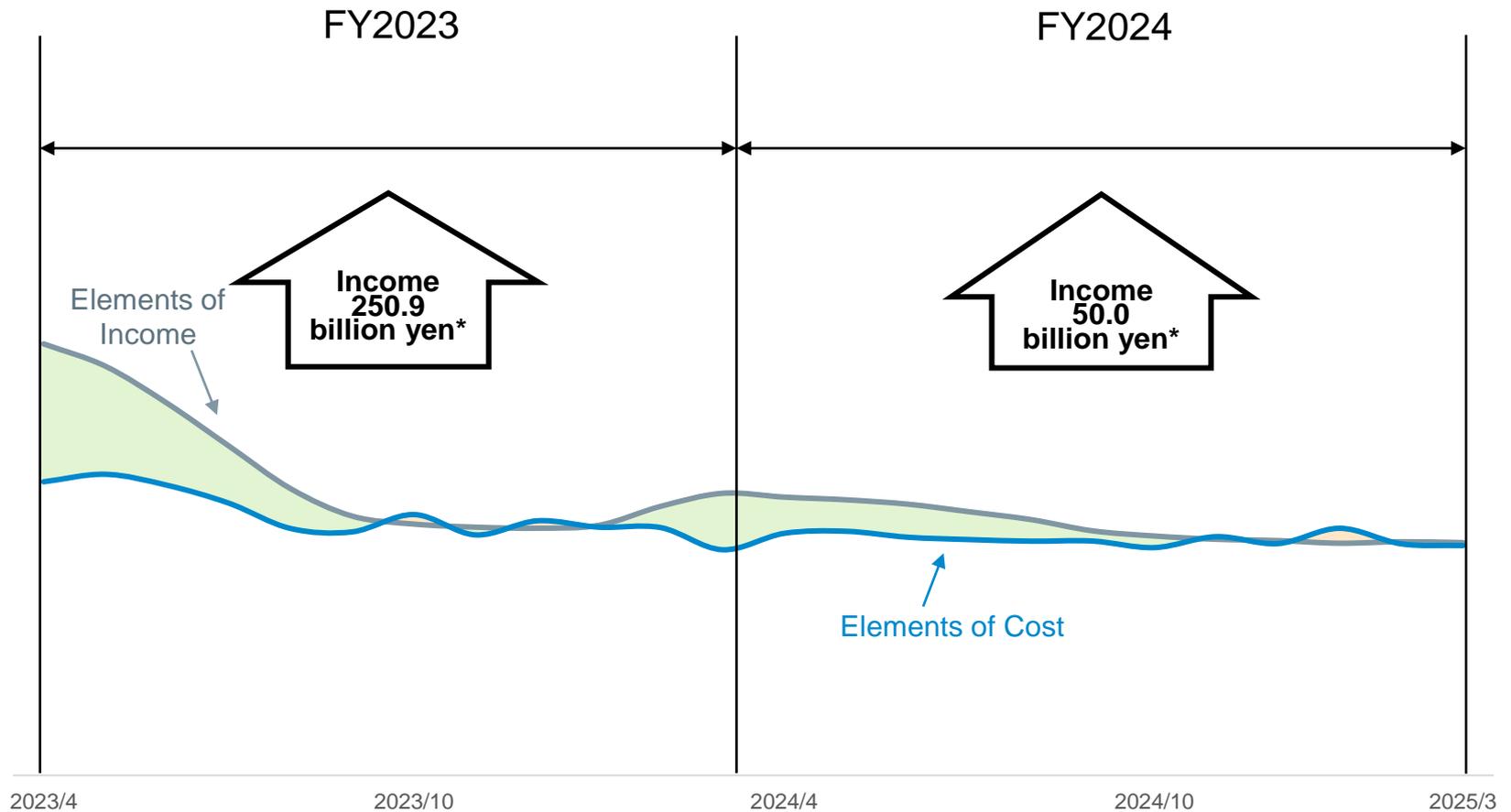
# Image of Time Lag (FY2022 – FY2023)

- Time lag is profits and losses due to the time difference between changes in fuel prices and their reflection in sales prices.
- The impact on profits and losses will be neutral in the medium to long term.



\* Figures are after-tax amounts.

# Image of Time Lag (FY2023 – FY2024)



\* Figures are after-tax amounts.

# Electrical Energy Sold and Electrical Power Generated

## [ Electrical Energy Sold(TWh) ]

	Apr to Jun	Jul to Sep	Oct to Dec	Jan to Mar	Total
<b>FY2023</b>	48.1	67.3	58.2	62.6	236.2
<b>FY2022</b>	57.9	69.9	63.6	63.7	255.1

## [ Electrical Power Generated(TWh) ]

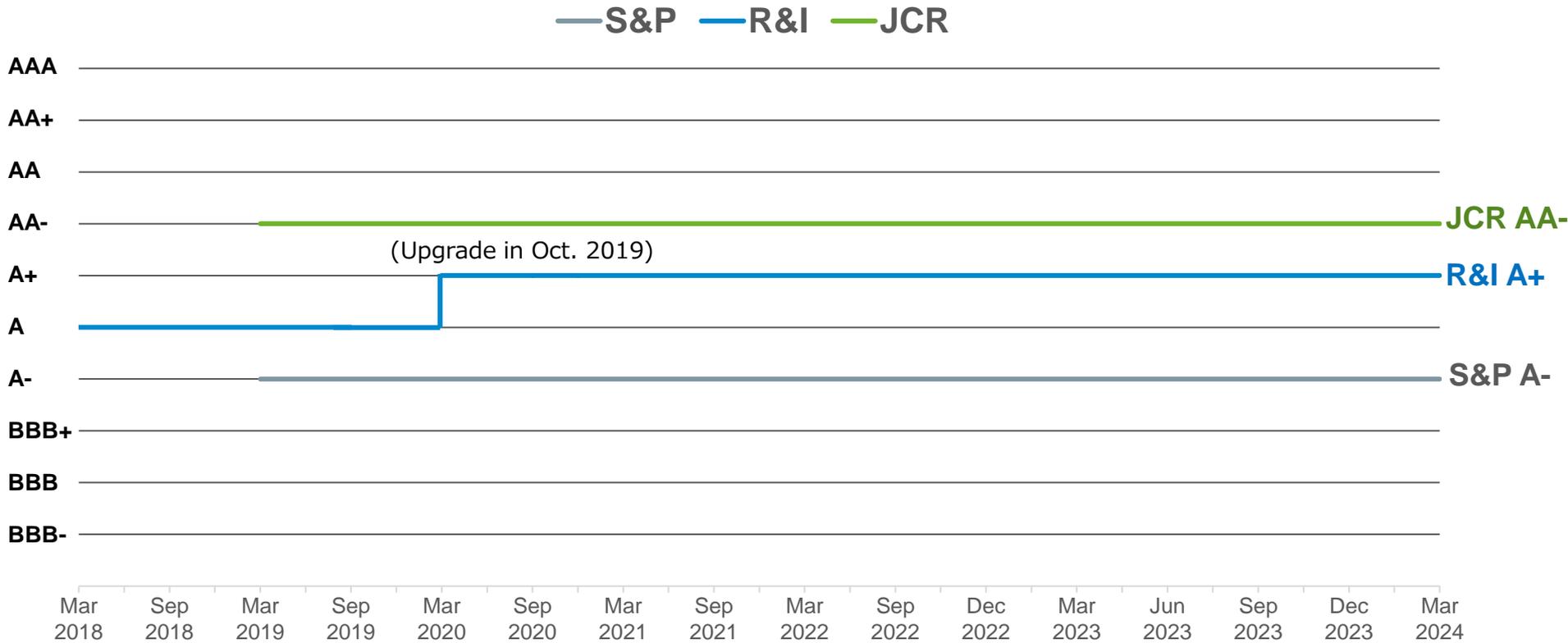
	Apr to Jun	Jul to Sep	Oct to Dec	Jan to Mar	Total
<b>FY2023</b>	47.5	66.2	55.0	62.2	230.9
<b>LNG</b>	36.2 (76%)	48.8 (74%)	41.7 (76%)	47.5 (76%)	174.2 (75%)
<b>Coal</b>	11.2 (24%)	17.2 (26%)	13.3 (24%)	14.3 (23%)	56.1 (25%)
<b>Others</b>	0 (0%)	0.1 (0%)	0 (0%)	0.4 (1%)	0.6 (0%)
<b>FY2022</b>	52.8	63.5	58.0	60.8	235.1
<b>LNG</b>	41.7 (79%)	47.0 (74%)	43.9 (76%)	45.8 (75%)	178.4 (76%)
<b>Coal</b>	11.2 (21%)	16.5 (26%)	14.0 (24%)	15.0 (25%)	56.7 (24%)
<b>Others</b>	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

\*The total may not match due to rounding.

Note: Electrical Power Generated for Jan to Mar of FY2023 is tentative.

# Credit Ratings

## [ Issuer Credit ratings history ]

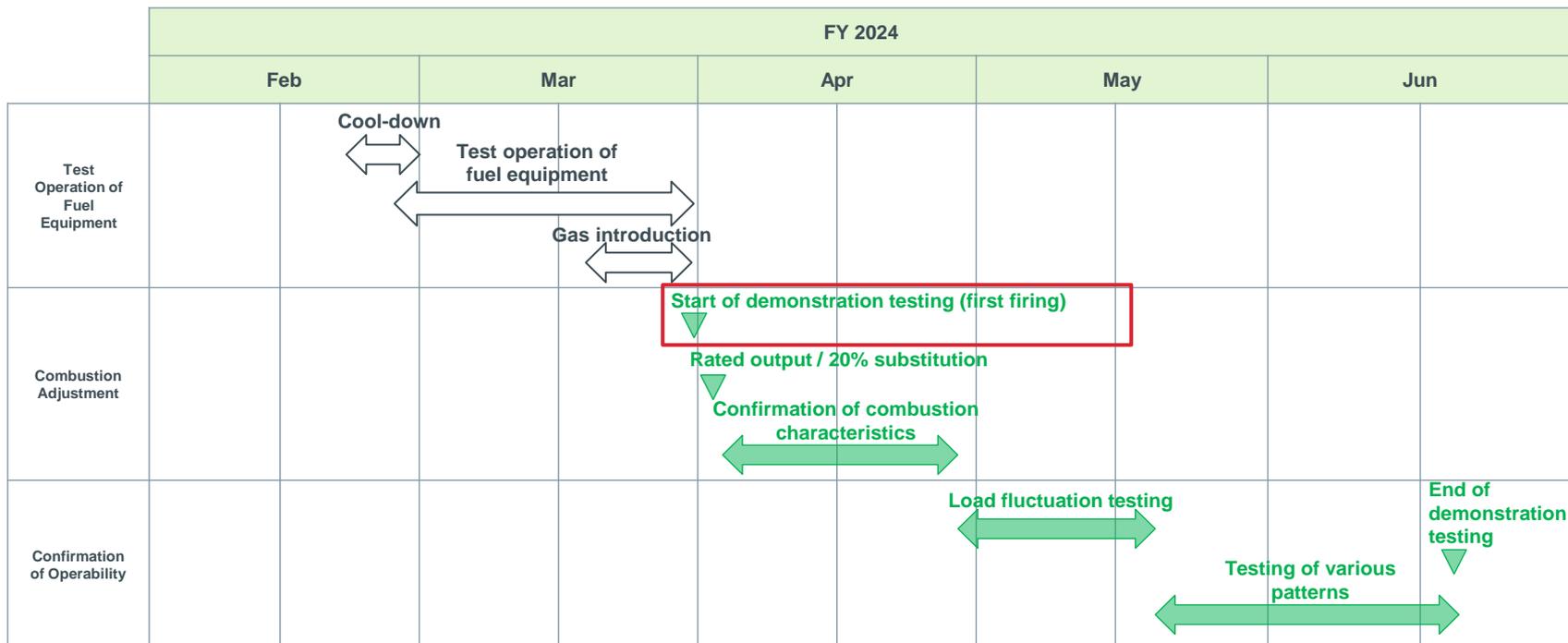


# Reference: Topics

# Start of Demonstration Testing of 20% Fuel Ammonia Substitution

- The world's first demonstration testing of 20% ammonia substitution at a large-scale commercial coal-fired thermal power plant in Hekinan thermal power station began on 1st April 2024.
- The plant's overall functions, such as nitrogen oxide (NOx) emissions, impact on the boiler and peripheral equipment, and operability, were investigated through the demonstration testing.
- Based on the demonstration testing, commercial operation of substituting 20% of fuel with ammonia will begin at unit 4 of Hekinan station.

## Overview of the Demonstration Testing



# Topic: Establishment of JERA Nex

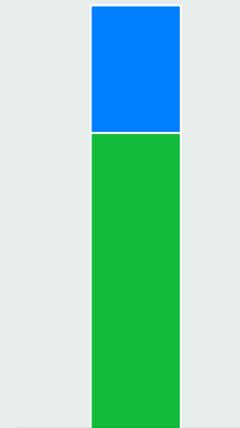
- The UK-based subsidiary specialized in renewable energy, “JERA Green” changed its name to “JERA Nex” to introduce and develop renewable energy business and start its operation in April 2024.
- A range of our renewable energy assets will be collected to JERA Nex, which will construct a platform to develop our renewable energy business swiftly.
- The new target to develop renewable capacity: 20GW in FY2035

## Summary

Name	JERA Nex Limited
CEO	Nathalie Oosterlinck Head of Global Renewables at JERA
Investor	JERA: 100%
Registration date	March 26, 2024
Location	UK, London
Business	Investment and development for a range of renewable energy assets, including offshore and onshore wind, solar and battery storage in the world. Operation of renewable energy assets by taking advantage of O&M.

## Proposed JERA Nex 2035 global net installed capacity ambition

⚡ 20GW



Target 2035

■ Offshore wind ■ Onshore RES



Offshore wind:  
~ 1/3



Onshore RES:  
~ 2/3



Coupled with **BESS**  
and **LCF**

We aim to achieve our goals based on disciplined investment decisions in high quality projects while keeping an eye on the market environment.

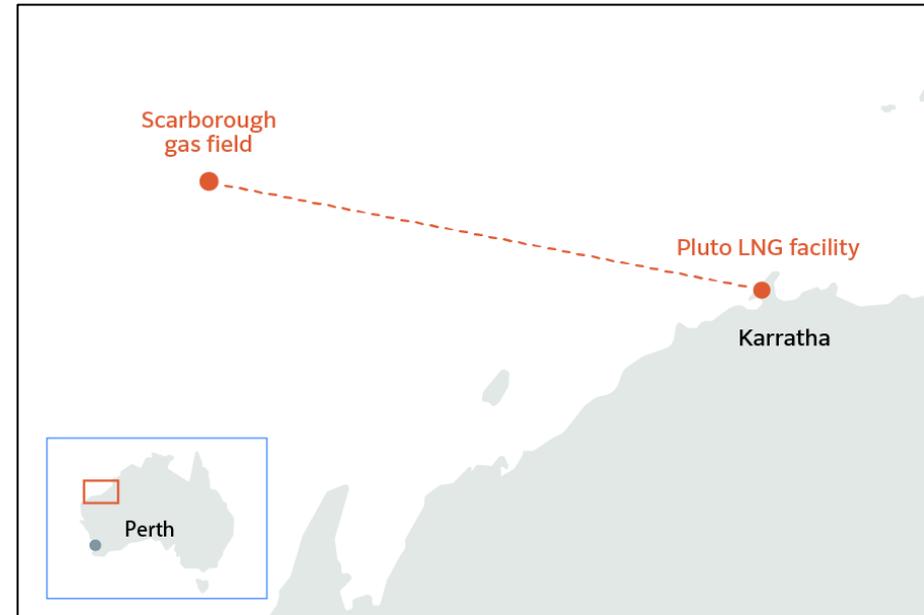
JERA Nex takes a lead in achieving the 20GW capacity development goal.

# Signed the Agreement for Scarborough Gas Field Development Project

- The Scarborough gas field is an LNG project being developed by Woodside as an operator.
- JERA signed an agreement with Woodside to acquire 15.1% participating interest in Scarborough gas field from Woodside.
- JERA will acquire the interest in the gas field through a newly established SPC (JERA Scarborough). The SPC is wholly owned subsidiary of JERA Australia Pty Ltd, which in turn is wholly owned by JERA Co., Inc.
- The composition of the gas field is very low in CO<sub>2</sub>, at less than 0.1%.

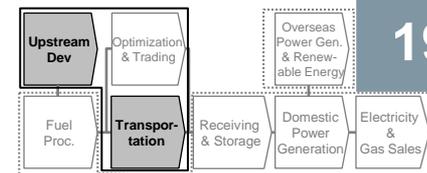
## Project Overview (Scarborough Gas Field Development)

Location	Approximately 375 km off the Pilbara coast of Western Australia
Partners	Woodside: 100%* <sup>1</sup> (Operator) * <sup>1</sup> LNG Japan Co., Ltd. Announced on 8 August 2023 to acquire 10% interest
LNG plant	Pluto LNG Facility (Pluto Train 2 <sup>2</sup> under construction) <sup>2</sup> Woodside 51%; GIP 49%
LNG production	Up to 8 Mtpa JERA to off-take its equity share (15.1%) of LNG to be produced, approximately <b>1.2 Mtpa</b> of LNG cargoes.
Final investment decision	November 2021
First LNG cargo	Target in 2026



# **Reference: Overview of each segment**

# Fuel Business: Fuel Upstream / Transportation Business



- Demand for LNG has increased in Europe and Asia as low-carbon energy. However, we participate in LNG upstream projects by leveraging one of the world’s largest LNG transaction volume (FY2022: Approximately 35 million tons\*) to achieve stable energy supply. We secure stable LNG sources by building portfolio which can diversify procurement risk as well as acquire the information related to procurement and the market trend.
- Additionally, we own fuel carriers that contribute to highly consistent, flexible, and competitive fuel supply.
- In June 2022, a fire incident occurs at the Freeport LNG terminal, shutting down operations at the terminal. In March 2023, regulatory approvals for resumption of production were obtained one by one. And production has resumed at all lines.

\*1 JERA Group as a whole

## Fuel Upstream Project

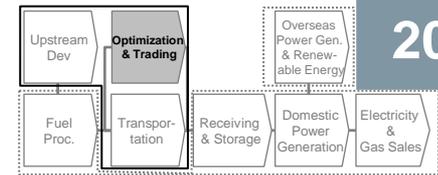
Project Name	Country	LNG Production / Liquefaction Capability	Investment Ratio*2
Darwin LNG Project	Australia	Approx. 3.7 million tons/year	6.132%
Gorgon LNG Project		Approx. 15.6 million tons/year	0.417%
Ichthys LNG Project		Approx. 8.9 million tons/year	0.735%
Wheatstone LNG Project		Approx. 8.9 million tons/year	Gas field: 10%, LNG plant: 8%
Barossa gas field Project		LNG production and liquefaction capacity is the same scale as Darwin LNG Project.	12.5%
Scarborough Gas Field Project		Approx. 8.0 million tons/year at maximum (Supply will be planned to start in 2026)	15.1%
Freeport LNG Project (Train1)	United States	Approx. 5.15 million tons/year	25%
Freeport LNG Development, L.P.*3		Approx. 15.45 million tons/year*4 for all three lines	25.7%

\*2 The stake of Wheatstone LNG Project represents the ratio of shares held through PE Wheatstone in which JERA invests

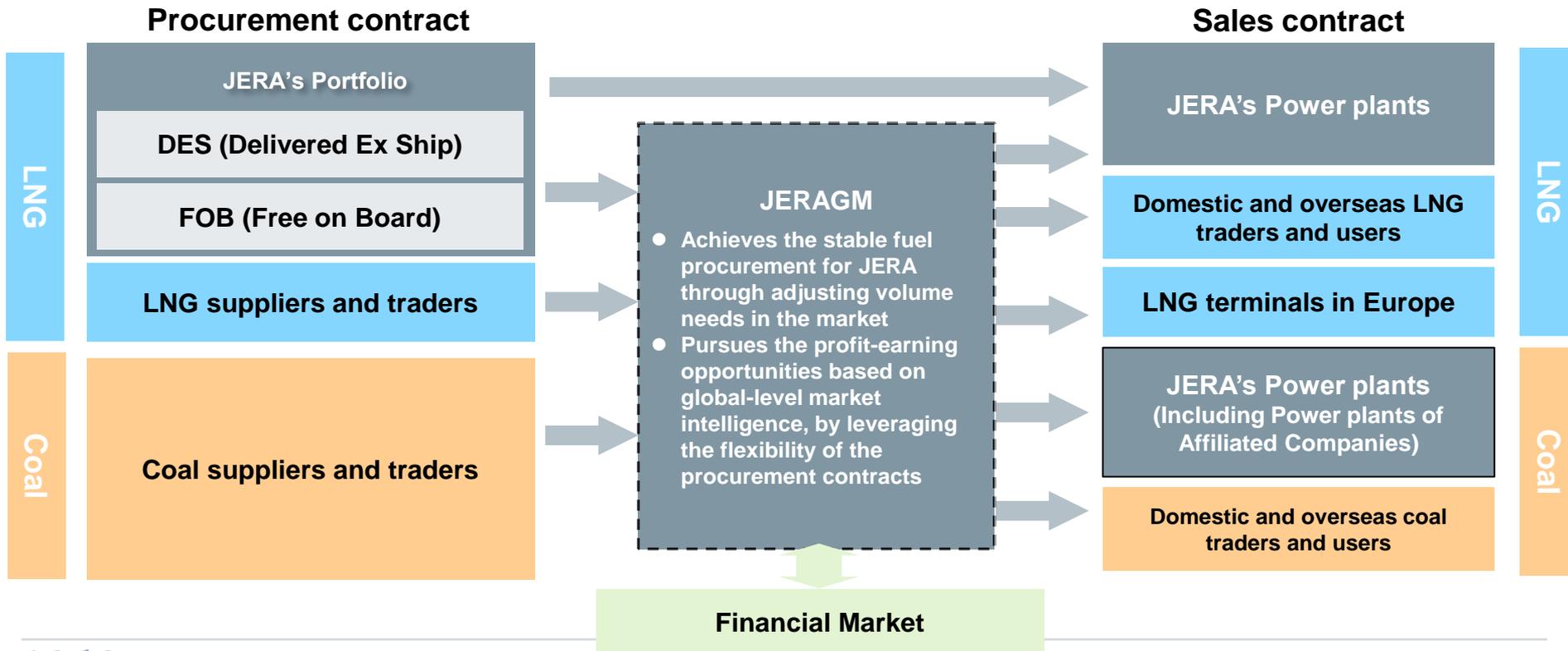
\*3 Freeport LNG Project Management Company

\*4 Including 5.15 million tons/year from Train 1

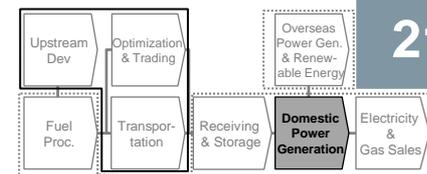
# Fuel Business: Trading Business



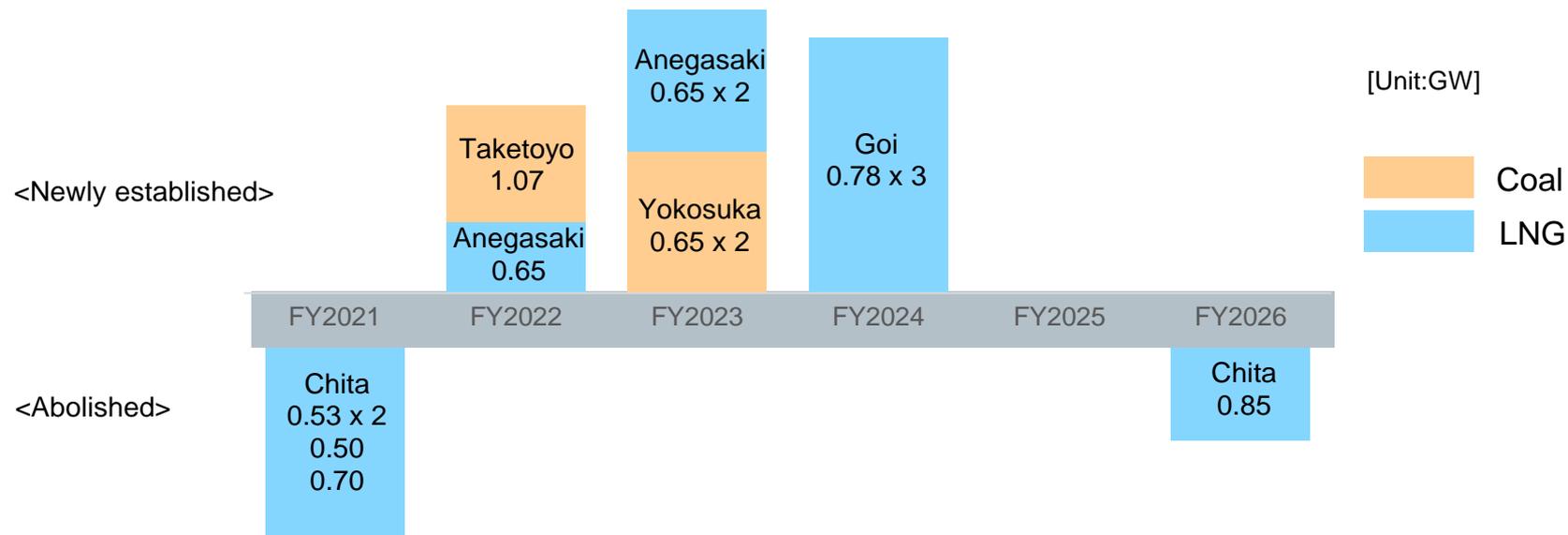
- In addition to the Singapore headquarters, JERAGM has offices in the United Kingdom, the United States, and Japan, and holds approximately 300 employees who engage in asset-backed trading.
- Utilizing the global trading network, JERAGM supplies LNG and coal to JERA's domestic power generation business. Leveraging this commercial flow, JERAGM has been able to achieve both supply stability and the expansion of profits by efficiently capturing profit opportunities through transactions with markets and third parties.
- JERAGM trades within the limited volume under the governance of the Board of Directors elected by shareholders.



# Domestic Thermal Power and Gas Business: Progress of Replacement of Thermal Power Plants in Japan



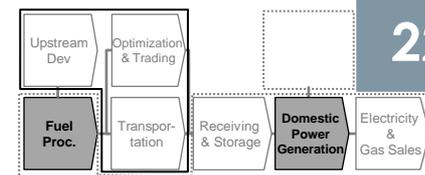
- We have been replacing with the latest high-efficiency thermal power generation facilities. Following Taketoyo and Anegasaki New Unit 1, Anegasaki New Unit 2 began commercial operation in April, Yokosuka Unit 1 in June, Anegasaki New Unit 3 in August 2023, and Yokosuka Unit 2 in December 2023.
- Construction and commissioning of Goi Unit 1 to 3 are well underway.
- Unit 1 to 4 of Chita were abolished in FY2021. Unit 5 is planned to be abolished in FY2026 and is being considered for replacement with the latest high-efficiency thermal power generation (environmental impact assessment has been conducted).



\*As of March 31, 2024

Development Point	Status of Development
Goi	Full-scale construction started in April 2021. Construction progress: 99%

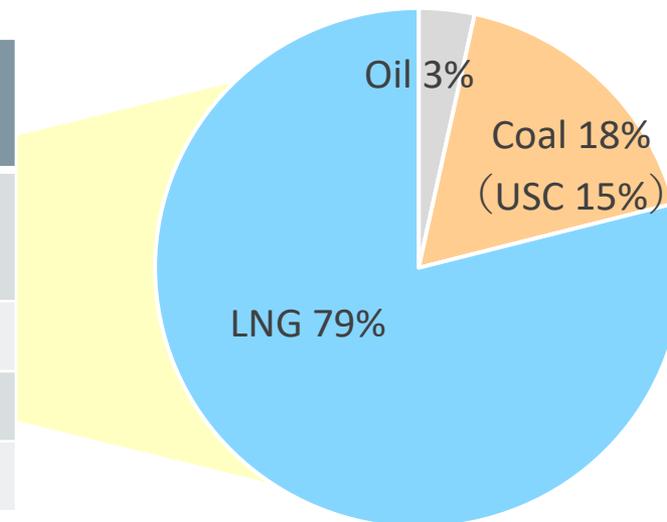
# Domestic Thermal Power and Gas Business: Composition of Power Sources



- 79% of our power source is LNG, which has low CO<sub>2</sub> emissions.
- In coal, ultra super critical power generation system (USC), which emits comparatively small amount of CO<sub>2</sub>, accounts for a large proportion. We will shut down all inefficient coal power plants by 2030\*<sup>1</sup>.

## Composition of Power Sources\*<sup>2</sup>

Fuel	Capacity (Generator output)
Coal (USC)	10.32 GW (8.92 GW)
LNG* <sup>3</sup>	46.29 GW
Oil	2.00 GW
Total	58.61 GW



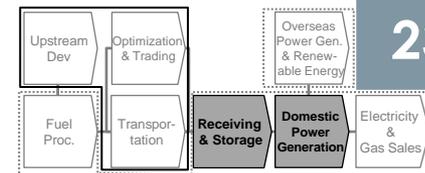
\*1 Press release on October 13, 2020 “Towards Zero CO<sub>2</sub> Emissions in 2050”

[https://www.jera.co.jp/english/information/20201013\\_539](https://www.jera.co.jp/english/information/20201013_539)

\*2 As of March 31, 2024. Includes capacity under construction.  
Excludes capacity of affiliates.

\*3 Includes LPG and City Gas.

# Domestic Thermal Power and Gas Business: Domestic Thermal Power Plants

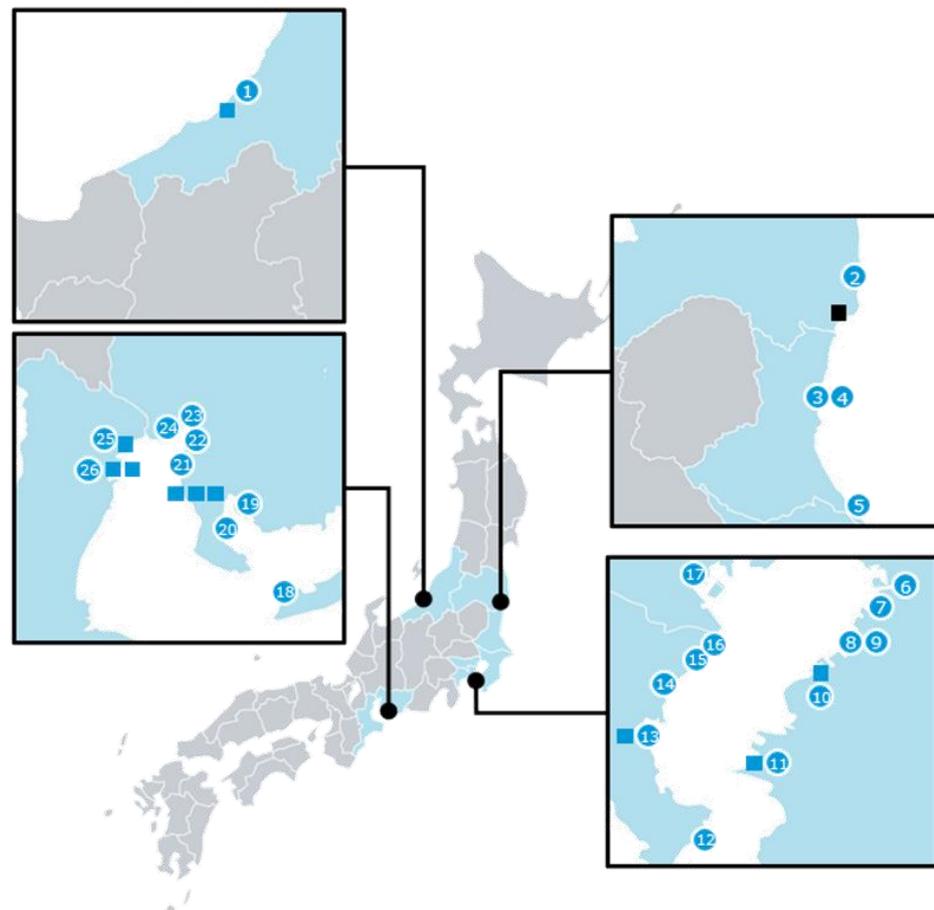


➤ We own nearly half of total thermal power generation capacity in Japan.

## List of Thermal Power Plants in Japan<sup>1</sup> (Total output and fuel type listed for each thermal power plant)

As of March 31, 2024

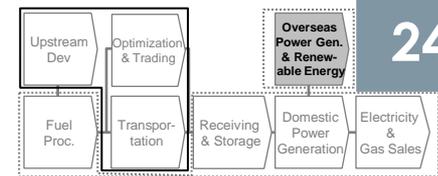
① Joetsu	2.38 GW	◆
② Hirono	1.80 GW	◆◆◆
③ Hitachinaka	2.00 GW	◆
④ Hitachinaka Kyodo <HITACHINAKA GENERATION>	0.65 GW	◆
⑤ Kashima	1.26 GW	◆
⑥ Chiba	4.38 GW	◆
⑦ Goi <GOI UNITED GENERATION> *Scheduled to start operation in FY2024	2.34 GW	◆
⑧ Anegasaki	1.20 GW	◆
⑨ Anegasaki <JERA Power ANEGASAKI> *Started operation in August 2023	1.941 GW	◆
⑩ Sodegaura	3.60 GW	◆
⑪ Futtsu	5.16 GW	◆
⑫ Yokosuka <JERA Power YOKOSUKA> *Started operation in December 2023	1.30 GW	◆
⑬ Minami-Yokohama	1.15 GW	◆
⑭ Yokohama	3.016 GW	◆
⑮ Higashi-Ohgishima	2.00 GW	◆
⑯ Kawasaki	3.42 GW	◆
⑰ Shinagawa	1.14 GW	◆
⑱ Atsumi	1.40 GW	◆◆
⑲ Hekinan	4.10 GW	◆
⑳ Taketoyo <JERA Power TAKETOYO> *Started operation in August 2022	1.07 GW	◆
㉑ Chita	1.708 GW	◆
㉒ Chita Daini	1.708 GW	◆
㉓ Shin-Nagoya	3.058 GW	◆
㉔ Nishi-Nagoya	2.376 GW	◆
㉕ Kawagoe	4.802 GW	◆
㉖ Yokkaichi	0.585 GW	◆



◆ LNG ◆ Coal ◆ Heavy Oil  
◆ Crude Oil ◆ Utility Gas  
■ LNG Terminal<sup>2</sup> ■ Coal Terminal

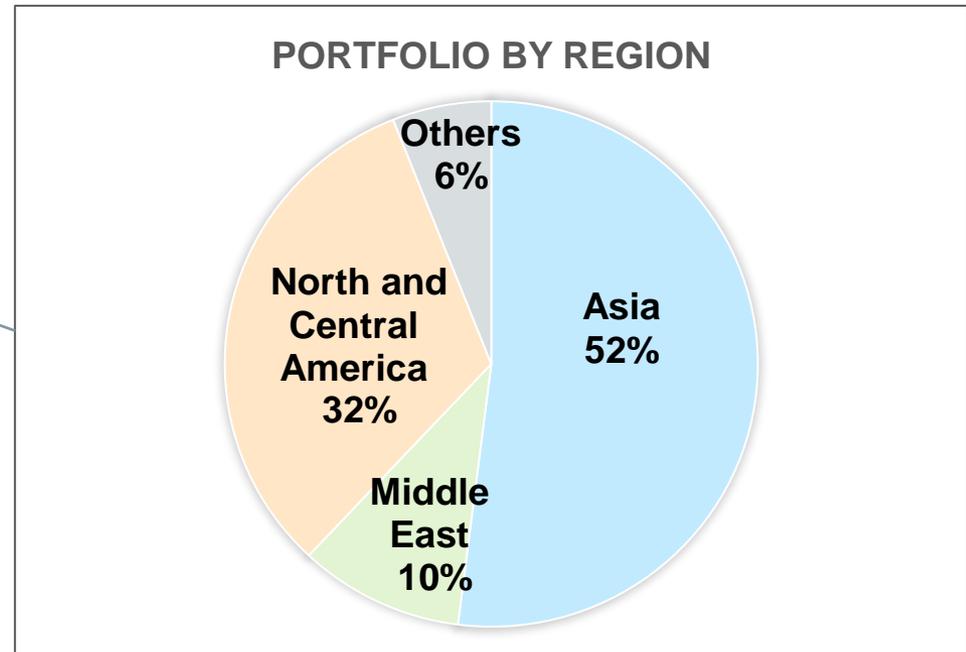
1 Power plant's name <Operator's name>  
2 Includes jointly operated terminals in the Chita and Yokkaichi areas

# Overseas Power Generation and Renewable Energy Business: Portfolio of Overseas Power Generation and Renewable Energy Business

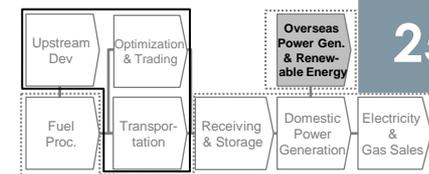


- JERA is expanding its businesses through the experience gained from projects around the world. Total capacity of power generation in overseas projects is 13.27 GW (including under construction).
- JERA aims to secure funds and expand earnings by replacing its portfolio through the sale and reinvestment of assets to achieve an optimal asset structure in line with changes in the business.

< Power Generation Capacity (As of March 31, 2024) >



# Overseas Power Generation and Renewable Energy Business: List of Overseas Power Generation / Renewable Energy projects (1)



(As of March 31, 2024)

## Investment on Platform Companies\* \*Companies participating in multiple power generation projects

Country	Project Name	Investment ratio	Capacity	Fuel type	Notes
Philippines	TeaM Energy IPP	25.0%~50.0%	2,341 MW	Coal	
	Aboitiz Power Corporation	27%	4,996 MW	Coal/Oil/ Renewable	Including under construction
Thailand	EGCO Corporation	12.3%	6,996 MW	Coal/Gas/ Renewable	Including under construction
Vietnam	Gia Lai Electricity Joint Stock Company	35.1%	612 MW	Solar/Wind/Hydro	Including under construction
India	ReNew Company	7.9%	13,756 MW	Solar/Wind/Hydro	Including under construction
Bangladesh	Summit Power IPP	22.0%	1,883 MW	Gas	Including under construction
Japan	Green Power Investment	5.46%	N/A	Offshore Wind	*1
United Kingdom	Zenobe Battery Storage	7.06%	431 MW	-	Including under construction
Belgium	Parkwind	100.0%	535 MW	Offshore Wind	Including under construction

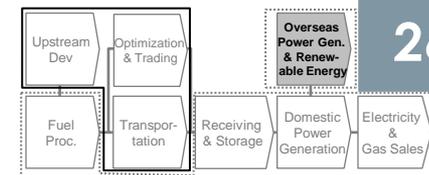
\*1 The capacity only includes the offshore wind projects that JERA has agreed with other shareholders to utilize its management assets

## Power Generation / Renewable Energy Projects(1/2)

Japan	Solar	100.0%	30 MW	Solar	Including under construction
	Ishikari Bay New Port Offshore Wind Farm	100.0%*2	112 MW	Offshore Wind	
Taiwan	Chang Bin/Fong Der/Star Buck Gas Thermal IPP	19.5%~22.7%	3,060 MW	Gas	Including under construction
	Formosa 1 Offshore Wind IPP	32.5%	128 MW	Offshore Wind	
	Formosa 2 Offshore Wind IPP	49.0%	376 MW	Offshore Wind	
Vietnam	Phu My Gas Thermal IPP	15.6%	715 MW	Gas	
Indonesia	Cirebon2 Coal Thermal IPP	10.0%	1,000 MW	Coal	

\*2 This is actual investment ratio added direct investment by JERA and indirect investment through GPI.

# Overseas Power Generation and Renewable Energy Business: List of Overseas Power Generation / Renewable Energy projects (2)



(As of March 31, 2024)

## Power Generation / Renewable Energy Projects(2/2)

Country	Project Name	Investment ratio	Capacity	Fuel type	Notes
Thailand	Ratchaburi Gas Power Thermal IPP	15.0%	1,400 MW	Gas	
	Solar Power IPP	49.0%	31 MW	Solar	
	Wind Power IPP	5.0%	180 MW	Onshore Wind	
Bangladesh	Meghnaghat Gas Thermal IPP	49.0%	718 MW	Gas	Under construction
UAE	Umm Al Nar Gas Thermal IWPP	20.0%	1,550 MW	Gas	
Qatar	Ras Laffan B Gas Thermal IWPP	5.0%	1,025 MW	Gas	
	Ras Laffan C Gas Thermal IWPP	5.0%	2,730 MW	Gas	
	Mesaieed Gas Thermal IPP	10.0%	2,007 MW	Gas	
	Umm Al Houl Gas Thermal IWPP	10.0%	2,520 MW	Gas	
Oman	Sur Gas Thermal IPP	19.5%	2,000 MW	Gas	
Mexico	Valladolid Gas Thermal IPP	50.0%	525 MW	Gas	
United States	Tenaska Gas Thermal IPP	11.1%~17.5%	2,950 MW	Gas	
	Carroll County Gas Thermal IPP	20.0%	702 MW	Gas	
	Cricket Valley Gas Thermal IPP	38.0%	1,100 MW	Gas	
	Linden Gas Thermal IPP	50.0%	972 MW	Gas	
	Compass Gas Thermal IPP	50.0%	1,123 MW	Gas	
	Brady Thermal IPP	100.0%	1,633 MW	Oil/Gas	
	El Sauz Onshore Wind IPP	100.0%	302 MW	Onshore Wind	Under construction
United Kingdom	Gunfleet Sands Offshore Wind IPP	25.0%	173 MW	Offshore Wind	

**Reference:  
Progress of  
JERA Zero CO<sub>2</sub> Emissions 2050**

# JERA Zero CO2 Emissions 2050: Efforts towards Zero CO2 Emission (Power Generation)

## Initiatives for Ammonia Conversion

➤ The following projects have been adopted by NEDO and are currently being implemented.

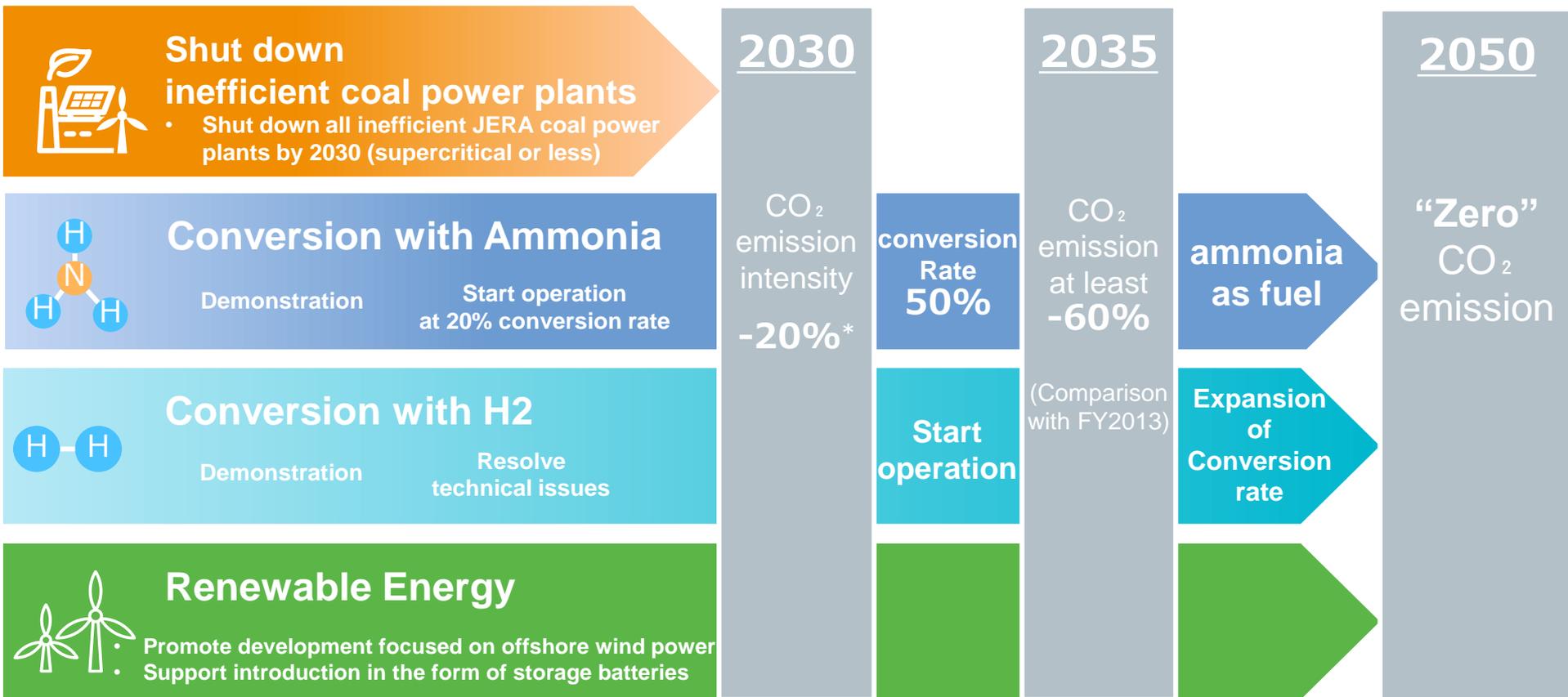
Project	Development of Technologies for Carbon Recycling and Next-Generation Thermal Power Generation / Research, Development, and Demonstration of Technologies for Ammonia Co-Firing Thermal Power Generation	Green Innovation Fund Program / Establishment of Fuel Ammonia Supply Chains project / Demonstration project to develop technology to increase the ammonia co-firing rate at coal-fired boilers
Overview	<ul style="list-style-type: none"> <li>At Hekinan Thermal Power Station Unit 4 (power output: 1 million kW), JERA started electricity generation of <b>20% ammonia conversion</b>.</li> <li>In addition, small-scale tests using burners of different materials was conducted at Unit 5 of Hekinan Thermal Power Station (power output: 1 million kW).</li> </ul>  <p>Hekinan Thermal Power Station</p>	<ul style="list-style-type: none"> <li>Ammonia high conversion burners will be implemented in Hekinan Thermal Power Station Units 4 or 5, with the aim of <b>increasing the ammonia conversion rate to 50% or more</b>.</li> <li>JERA will plan to develop a burner capable of 50% or more ammonia conversion, and to start 50% or more ammonia conversion in actual equipment by FY2028.</li> <li>JERA will plan to develop an ammonia-fired burner suitable for coal boilers and to demonstrate its operation with actual equipment.</li> <li>We have the plan to develop the burner that can exclusively burn ammonia by FY2024, and verify that two units of different boiler types can <b>convert to ammonia more than 50%</b> by FY2028.</li> </ul>

## Initiatives for Hydrogen Conversion

- Received notice of acceptance of “Demonstration project related to hydrogen utilization at an LNG thermal power plant in Japan” under Green Innovation Fund program lead by NEDO, and conducted evaluation of operational and environmental characteristics for hydrogen utilization at existing LNG thermal power plants in Japan from FY2021 to FY2028.
- At Linden Gas Thermal Power Station Unit 6 in the United States, electricity generation started by the partly replacement of natural gas with hydrogen-containing off-gas generated at the adjacent oil refinery.

# JERA Zero CO2 Emissions 2050: Roadmap for its Business in Japan

➤ JERA established “JERA Zero CO<sub>2</sub> Emissions 2050 Roadmap for its Business in Japan”, including four initiatives.

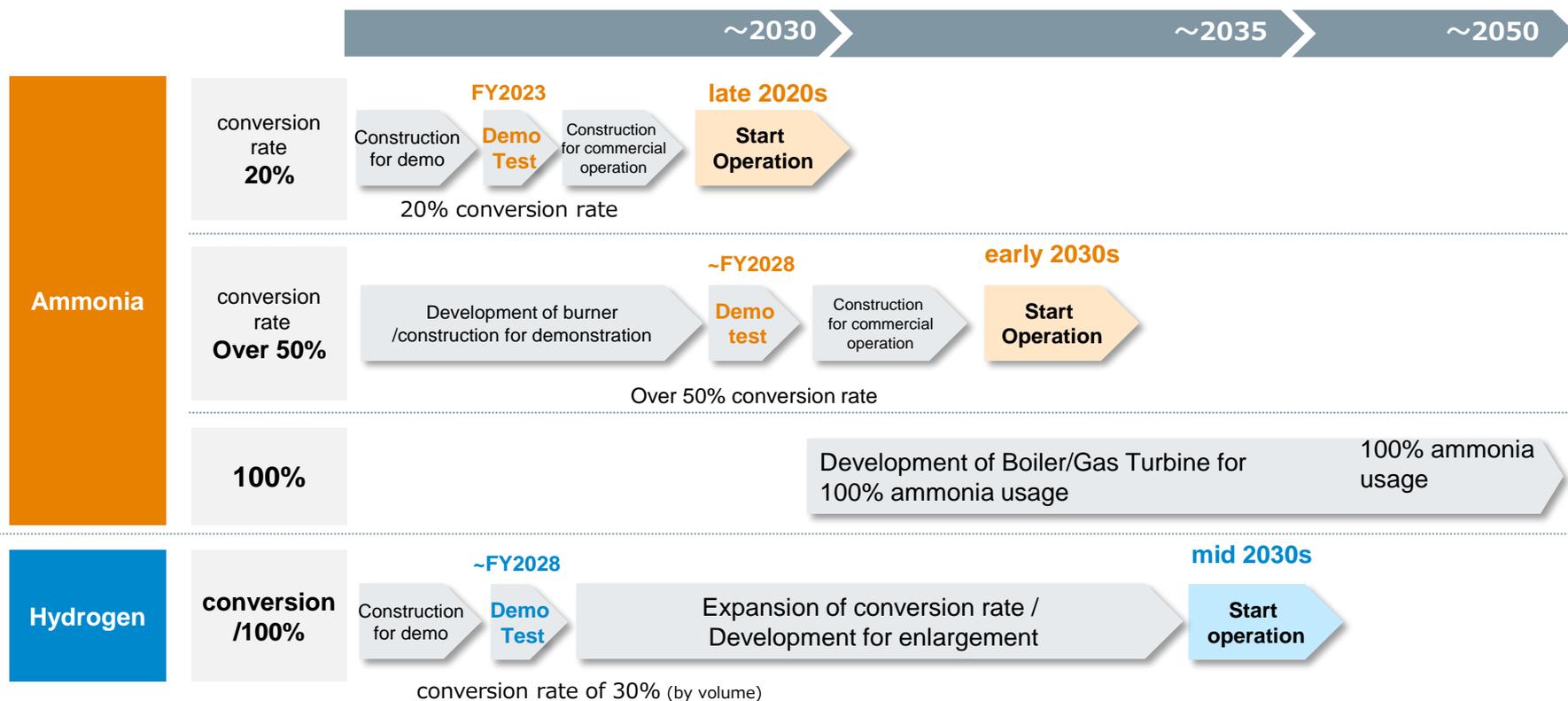


\*Reduce carbon emission intensity of thermal power plants by 20% based on the long-term energy supply-demand outlook for FY2030 as set by the government

## JERA Zero CO2 Emissions 2050:

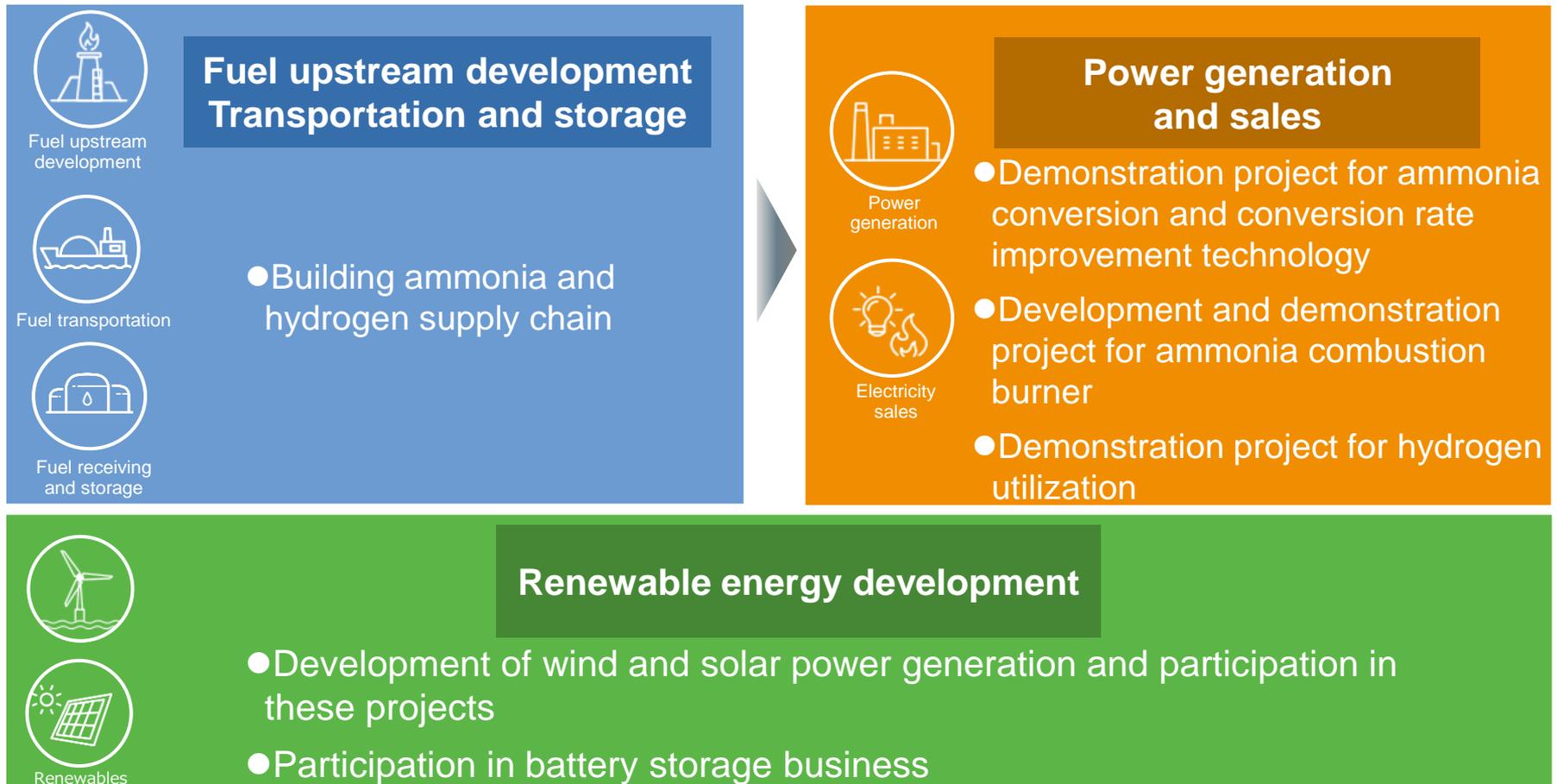
# JERA's decarbonization technologies development timeline

- The demonstration test of ammonia 20% conversion rate (by calorie) started on 1st April 2024 in Hekinan power plant Unit 4 in FY2023. Demonstration test of over 50% conversion rate will be conducted by FY2028 at Hekinan Unit 5. After the demo tests, commercial operation will start at the power plants.
- Demonstration test of hydrogen 30% conversion rate (by volume) using JERA's Gas turbine CC unit will be conducted by FY2028 targeting commercial operation in the mid 2030s.



# JERA Zero CO2 Emissions 2050: Efforts to Achieve Zero CO2 Emissions in JERA's Value Chain

- JERA is participating in business throughout the value chains, from fuel upstream development, transportation, and storage and to the power generation and electricity sales. We are working with many countries and companies around the world to achieve zero emissions at each stage.



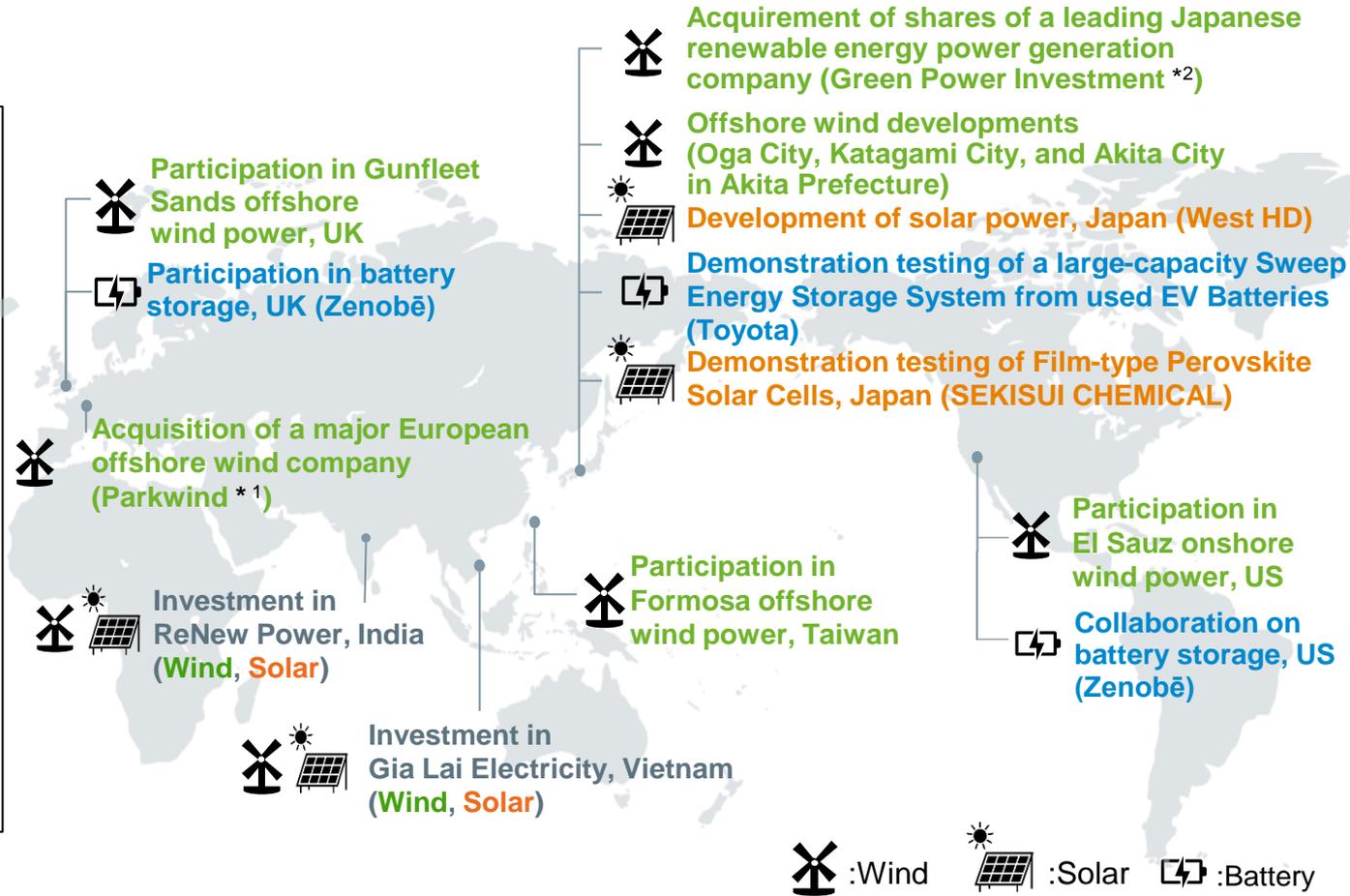
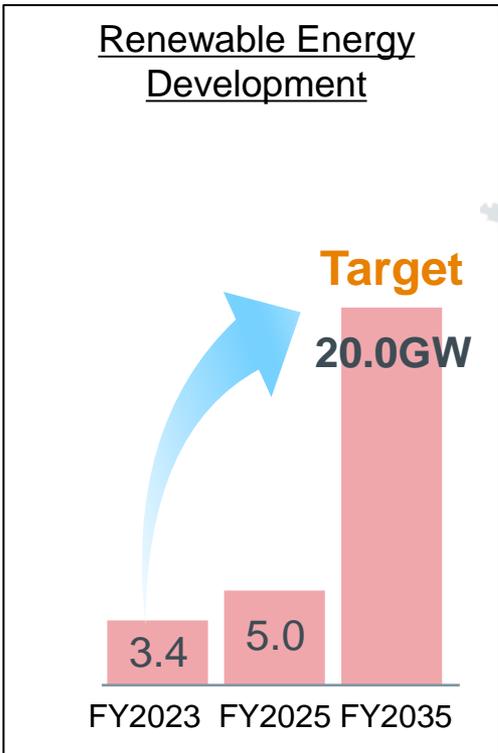
# Efforts towards Zero CO2 Emissions (Ammonia and Hydrogen Supply Chain)

(Announced in the last one year)

Field		Business Partners	Contents	Date
Upstream Development /Production		ADNOC (UAE)	Consideration of cooperation in the fields of clean hydrogen and ammonia	2023/7
		PIF (Saudi Arabia)	Consideration of opportunities for the development including green hydrogen production	2023/7
		TAQA (UAE)	Consideration of project development in the area of decarbonization, including green hydrogen and ammonia production	2023/2
		CF Industries (United States)	Joint Development Agreement for Low Carbon Ammonia Project	2024/4
		Yara (Norway)	Consideration of project development for blue ammonia production and sales & purchase of clean ammonia	2023/1
		Chevron (United States)	Consideration of collaboration on multiple lower carbon opportunities in Asia Pacific region (Australia) and the United States	2022/11
		Exxon Mobil (United States)	The Joint Study to Develop Low Carbon Hydrogen and Ammonia Production Project	2024/3
		ReNew (India)	Agreement to Jointly Develop a Green Ammonia Production Project	2024/4
Transportation		Nippon Yusen / Mitsui O.S.K. Lines	Consideration of transporting fuel ammonia for the Hekinan Thermal Power Plant	2022/11
Power Supply / Utilization	Japan	Kyushu Electric Power	signed a MOU concerning comprehensive discussions on collaboration aimed at achieving decarbonization and a stable supply of energy supply	2023/10
		Kyushu Electric Power Chugoku Electric Power Shikoku Electric Power Tohoku Electric Power Hokuriku Electric Power Hokkaido Electric Power Okinawa Electric Power	Consideration of cooperation in the adoption of hydrogen and ammonia as fuel for power generation	2022/11~ 2023/12
		Mitsui	Signed an Ammonia Sales and Purchase Agreement for its use in the demonstration project at the Hekinan Thermal Power Station	2023/6
		Graduate School in University of Tokyo	Basic Agreement Concerning the Mainstreaming of Carbon-Free Power Combining Digital Technology and Energy	2024/3
		Yamanashi prefecture	Conclusion of a Basic Agreement on Building the Hydrogen Energy Society of the Future: Building a Regional Hydrogen Value Chain	2023/11
		NYK Line, Resonac	The Joint Study and Implement of Aimed at Achieving the World's First-Ever Supply of Fuel Ammonia to Ships	2024/4
		Uniper (Germany)	Signed a Heads of Agreement for the sale of low carbon hydrogen/ammonia produced in the US	2023/9
	Europe	EnBW / VNG (Germany)	Consideration of the development of ammonia cracking technology for hydrogen production	2023/6
		EVN (Vietnam)	Signed a MOU that commits the collaboration to establish a decarbonization roadmap for EVN	2023/10
		Asia	PPT (Thailand)	Consideration of collaboration on initiatives for expanding the supply chain and usage of hydrogen and ammonia towards decarbonization in Thailand
	Aboitiz Power (Philippines)		Consideration of cooperation in studies to decarbonize business and conversion using ammonia at a coal-fired power plant	2023/2
	EGCO (Thailand)		Consideration of cooperation in conversion using ammonia towards decarbonization	2023/1
	IHI Asia Pacific (Malaysia)		Consideration of collaboration on the expansion of ammonia usage in Malaysia	2022/10
	PT Pertamina (Persero)		Joint collaboration in building infrastructure LNG and hydrogen/ammonia and so on	2023/12
		PLN (Indonesia)	Support for Master Plan for Energy Transition Management Project in Indonesia	2024/2
R&D (NEDO's Project)	NIPPON SHOKUBAI Chiyoda Corporation	Development of large-scale ammonia cracking catalyst and technology	2023/6	
	ENEOS	Construction of hydrogen quality standard system for industrial utilization	2023/6	

# JERA Zero CO2 Emissions 2050: Efforts towards Zero CO2 Emission(Renewable Energy Development)

➤ JERA has set a target of 20.0GW renewable energy development by FY2035, and is widely promoting wind power, solar power, battery storage, etc.



\*1 Parkwind's equity generation capacity in operation and under construction is 0.6GW.  
\*2 JERA's equity generation capacity is approximately 0.11GW.

# Actions for Domestic Offshore Wind Power Generation

- JERA selected as the business operator for an offshore wind power project off Oga city, Katagami city, and Akita city in Akita prefecture on 13th December 2023.

## Oga, Katagami, and Akita Offshore Green Energy Consortium

Interconnection Capacity	315MW
Number of Units	21 units
Turbine Model	Vestas V236-15MW
Planned Start of Commercial Operation	June 2028



<Map of Business Areas>

- JERA acquired shares of Green Power Investment Corporation on 3rd August 2023. On 1 January 2024, Ishikari Bay New Port Offshore Wind Farm held by JERA and GPI began in its operation.

## Ishikari Bay New Port Offshore Wind Farm

Interconnection Capacity	112 MW
Number of Units	14 units
Turbine Model	Siemens Gamesa 8MW
Start of Commercial Operation	1st January 2024



<Turbine Generator Installation>