



エネルギーを新しい時代へ

# FY2023 Second Quarter Investors Meeting

(Note1) The company's fiscal year (FY) is from April 1 to March 31 of the following year in this material.  
“2Q” refers to the period from April 1 to September 30.

(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.

October 27, 2023

# Outline of Financial Results

## Consolidated Statement of Profit or Loss

(Unit: Billion Yen)

	2023/2Q(A)	2022/2Q(B)	Change(A-B)	Rate of Change(%)
Revenue (Net sales)	2,097.3	1,943.4	153.8	7.9
Operating profit / loss	427.7	-182.5	610.3	-
Quarterly profit / loss attributable to owners of parent	291.2	-214.1	505.3	-
<Reference> Quarterly profit excluding time lag	75.3	150.1	-74.8	-49.8

## Consolidated Statement of Financial Position

(Unit: Billion Yen)

	As of Sep 30, 2023(A)	As of Mar 31, 2022(B)	Change(A-B)	Rate of Change(%)
Assets	9,393.6	9,172.3	221.2	2.4
Liabilities	6,768.0	7,132.6	-364.5	-5.1
Equity	2,625.5	2,039.7	585.8	28.7

# Key Points of Financial Results

## 【Revenue】

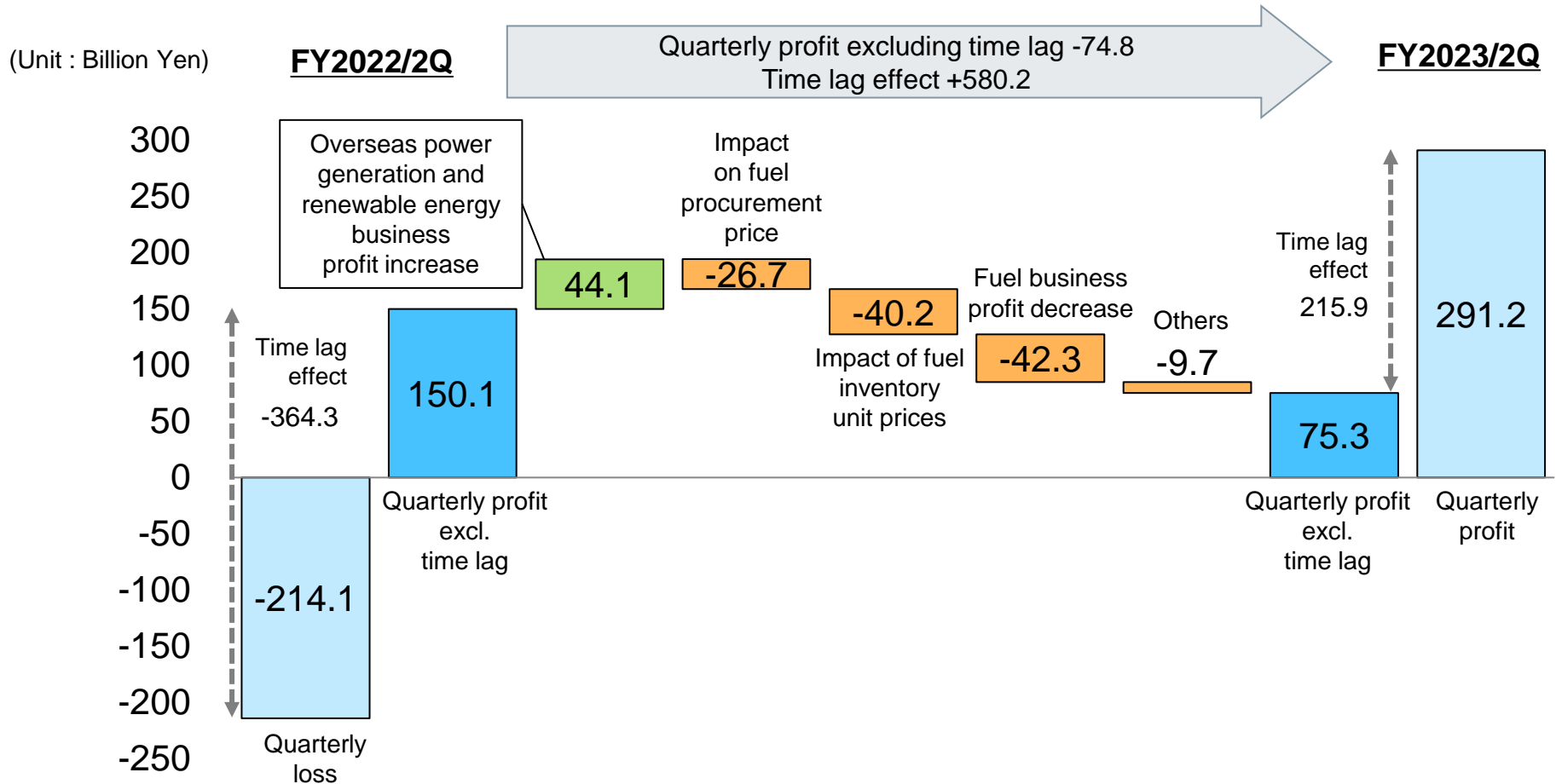
- Revenue increased by 153.8 billion yen (up 7.9%) from the same period last year to 2,097.3 billion yen.

## 【Quarterly profit/loss】

- Quarterly profit/loss increased by 505.3 billion yen from the same period last year -214.1 billion yen and rose to profit of 291.2 billion yen.
  - The effect of time lag shifted from losses to gains.  
(+580.2 billion yen [-364.3 billion yen to 215.9 billion yen])
  - Quarterly profit excluding time lag decreased.  
(-74.8 billion yen [150.1 billion yen to 75.3 billion yen])
- Quarterly 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, while the profit from overseas power generation and renewable energy business increased.

# Change Factors of Quarterly Consolidated Profit/Loss

- Quarterly 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 the fuel business, while profit from the overseas power generation and renewable energy business increased.



Note: Figures are after-tax.

# Consolidated Statement of profit or loss

(Unit: Billion Yen)

	2023/2Q(A)	2022/2Q(B)	Change(A-B)	Main Factors of Changes
Revenue (Net sales)	2,097.3	1,943.4	153.8	• Due to the decrease of elimination amount (factor for the revenue decrease) between JERA and JERAGM
Operating expenses	1,708.4	2,107.6	-399.1	• Decrease of fuel costs
Other operating income/ loss	38.8	-18.4	57.2	• Decrease of exchange loss +32.8 • Increase of share of profit / loss of investments accounted for using equity method +23.0
Operating profit / loss	427.7	-182.5	610.3	
Financial income	37.6	5.4	32.2	• Increase of interest received +22.3
Financial costs	41.9	105.6	-63.6	• Decrease of exchange loss -64.9
Profit / loss before tax	423.4	-282.7	706.2	• Decrease of time lag effect +805.8 (-506.0 → 299.8) • Decrease of profit excluding time lag -99.6 (223.2 → 123.6)
Income tax expense	87.5	-94.8	182.3	
Quarterly profit attributable to non-controlling Interests	44.7	26.1	18.5	
Quarterly profit / loss attributable to owners of parent	291.2	-214.1	505.3	

# Key Elements

	2023/2Q(A)	2022/2Q(B)	Change(A-B)
Electrical Energy Sold (TWh)	115.4	127.8	-12.4
Crude Oil Prices(JCC) (dollar/barrel)	83.5	111.9	-28.4
Foreign Exchange Rate (yen/dollar)	141.0	134.0	7.0

Note: Crude Oil Prices(JCC) for 2023/2Q is tentative.

# Consolidated Statement of Financial Position

(Unit: Billion Yen)

	As of Sep 30,2023(A)	As of Mar 31,2022(B)	Change(A- B)	Main Factors of Changes
Cash and cash equivalents	1,654.0	1,360.9	293.1	• Increase in JERA, etc.
Property, plant and equipment	2,720.0	2,387.8	332.2	• Increase of acquisition of Parkwind, etc.
Investments accounted for using equity method	1,320.9	1,112.7	208.1	• Increase of acquisition of GPI, etc.
Others	3,698.5	4,310.8	-612.2	• Decrease of accounts receivable trade -254.8 • Decrease of derivative assets (JERAGM, etc.) -305.2
<b>Assets</b>	<b>9,393.6</b>	<b>9,172.3</b>	<b>221.2</b>	
Interest-bearing liabilities	3,465.4	3,510.8	-45.3	• Borrowings -410.0 • Commercial Paper -79.0 • Corporate Bonds +74.7
Others	3,302.6	3,621.8	-319.2	• Decrease of derivative liabilities (JERAGM, etc.) -443.4
<b>Liabilities</b>	<b>6,768.0</b>	<b>7,132.6</b>	<b>-364.5</b>	
Equity attributable to owners of parent	2,604.3	2,022.8	581.4	• Profit +291.2 • Foreign currency translation adjustments +172.7
Non-controlling interests	21.2	16.8	4.3	
<b>Equity</b>	<b>2,625.5</b>	<b>2,039.7</b>	<b>585.8</b>	

# Consolidated Statement of Cash Flows

(Unit: Billion Yen)

		2023/2Q(A)	2022/2Q(B)	Change(A-B)
<b>Operating cash flow</b>		994.7	-717.7	1,712.4
<b>Investment cash flow</b>	<b>Purchase of property, plant, and equipment</b>	-123.8	-188.0	64.2
	<b>Purchase of investment securities</b>	-57.8	-9.4	-48.3
	<b>Others</b>	-228.6	-28.0	-200.5
<b>Free cash flows</b>		-410.3	-225.5	-184.7
<b>Free cash flows</b>		584.4	-943.3	1,527.7
<b>Financial cash flow</b>	<b>Increase (decrease) in interest-bearing debt</b>	-294.4	908.2	-1,202.7
	<b>Dividends paid *1</b>	0	-83.1	83.1
	<b>Others</b>	-96.3	-48.7	-47.5
		-390.8	776.4	-1,167.2
<b>Increase (decrease) in cash and cash equivalents (minus indicates decrease)</b>		293.1	-135.9	429.0

\*1 Excluding Dividends paid to non-controlling interests



# Segment Information

(Unit: Billion Yen)

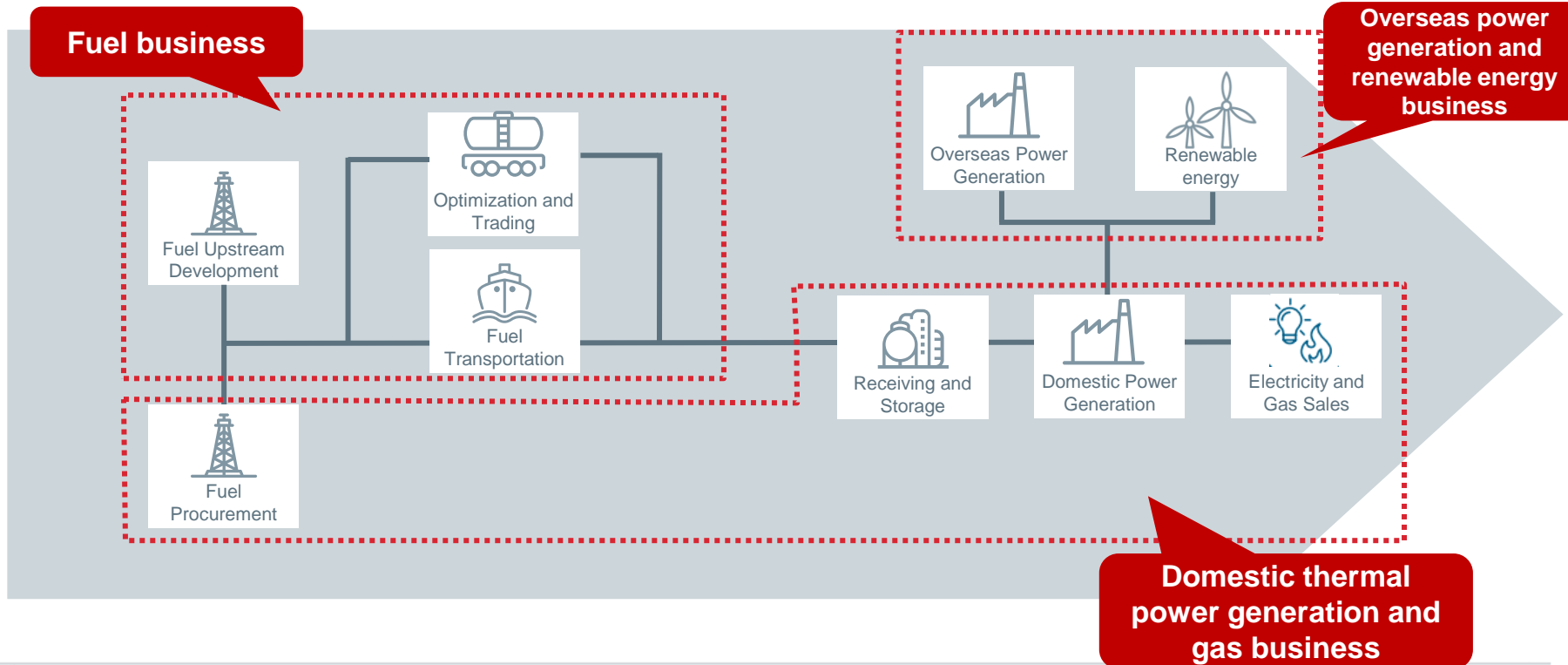
	2023/2Q(A)		2022/2Q(B)		Change(A-B)		Main Factors of Changes in Profit / Loss
	Revenue	Profit / Loss	Revenue	Profit / Loss	Revenue	Profit / Loss	
Fuel	242.4	75.3	386.5	117.6	-144.0	-42.3	•Profit decrease in JERAGM, etc.
Overseas power generation and renewable energy	18.6	33.4	2.2	-10.6	16.4	44.1	•Gain on reversal of impairment loss in Formosa 2 +19.6 •Profit increase in overseas IPPs +24.5
Domestic thermal power generation and gas	2,275.5	186.1 -29.7※2	2,616.0	-163.9 200.3※2	-340.5	350.0 -230.1※2	• Impact on fuel procurement price -26.7 •Impact of fuel inventory unit prices -40.2 • Gain/loss on sale of LNG -62.0
Adjustments※1	-439.3	-3.6	-1,061.3	-157.2	622.0	153.6	•Elimination of unfulfilled fuel contracts +92.5
Consolidated	2,097.3	291.2 75.3※2	1,943.4	-214.1 150.1※2	153.8	505.3 -74.8※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.



# FY2023 Forecast

- Profit excluding time lag is expected to be around 150 billion yen, while time lag profit is projected to be 200 billion yen based on the current fuel price trends, with a total profit of around 350 billion yen.
- Results may fluctuate due to changing trends in fuel markets and other factors.
- No change from the previous forecast announced in FY2023/1Q.

(Unit: Billion Yen)

	Current Forecast(A)	Previous Forecast(B)	Change (A-B)	Rate of Change (%)
Profit	350.0	350.0	-	-
Time lag effect	200.0	200.0	-	-
Profit excl. time lag	150.0	150.0	-	-

## 【Reference : Comparison with the previous year's result】

(Unit: Billion Yen)

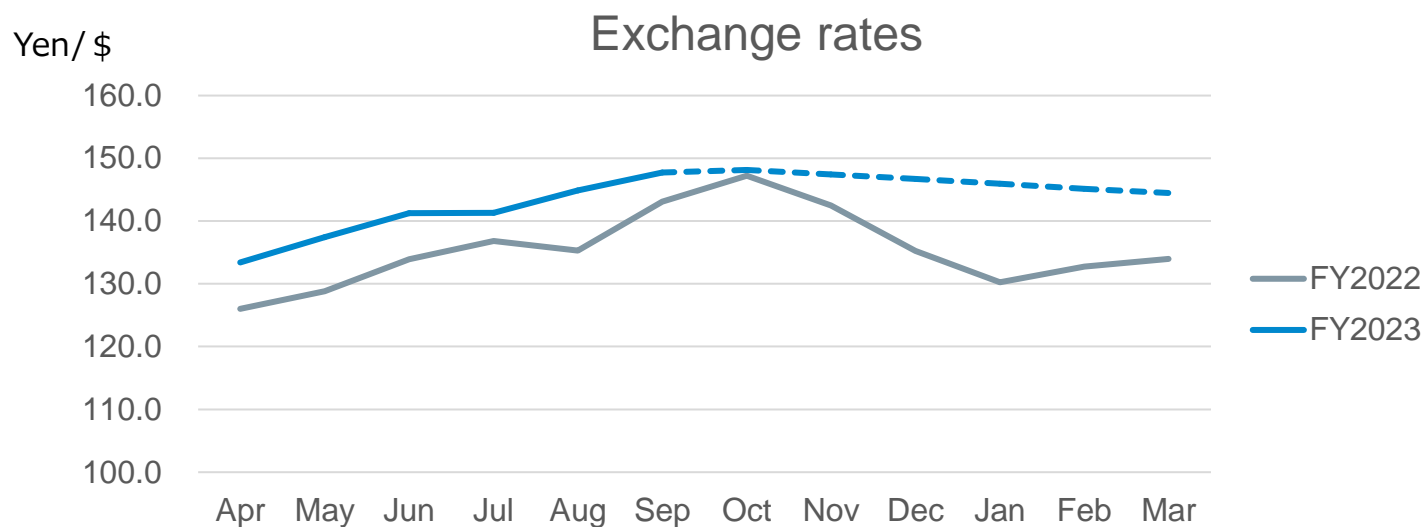
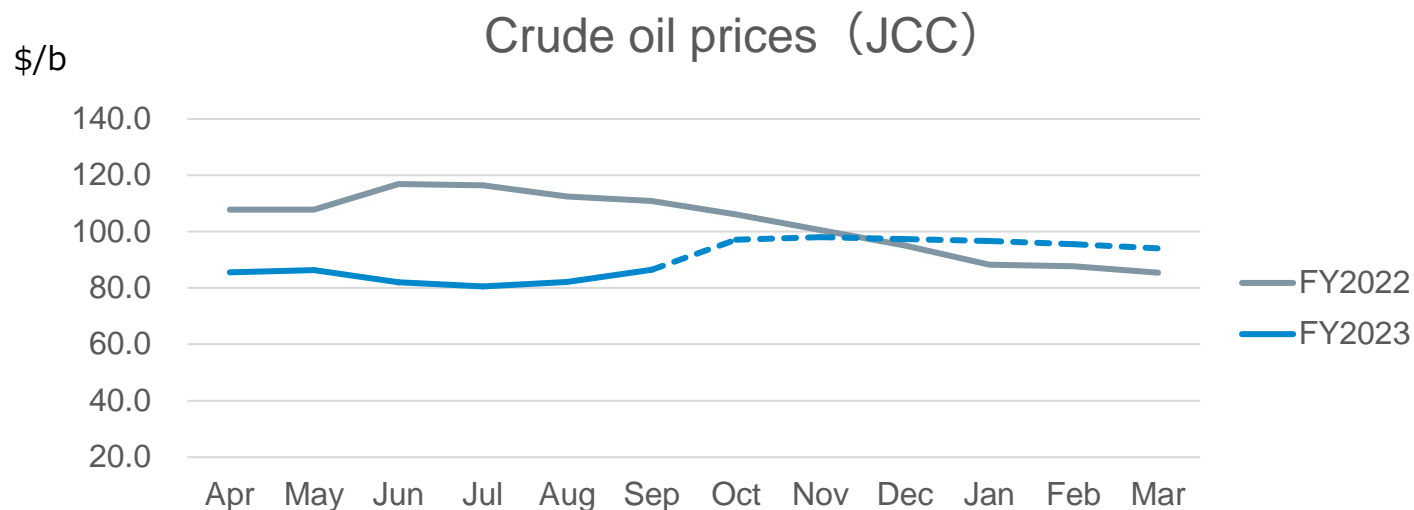
	Current Forecast(A)	FY2022 Result(B)	Change (A-B)	Rate of Change (%)
Profit	350.0	17.8	Approx. 330.0	1,866.3
Time lag effect	200.0	-182.4	Approx. 380.0	-
Profit excl. time lag	150.0	200.3	Approx. -50.0	-25.1

## 【Key Data】

	Current Forecast	(Of these, from Oct onwards)	Previous Forecast	【Reference】 FY2022 Result
Crude oil prices(JCC) (dollar/barrel)	Approx. 90	Approx.96	Approx.79	102.7
Foreign exchange rate (yen/dollar)	Approx.144	Approx.146	Approx.140	135.5

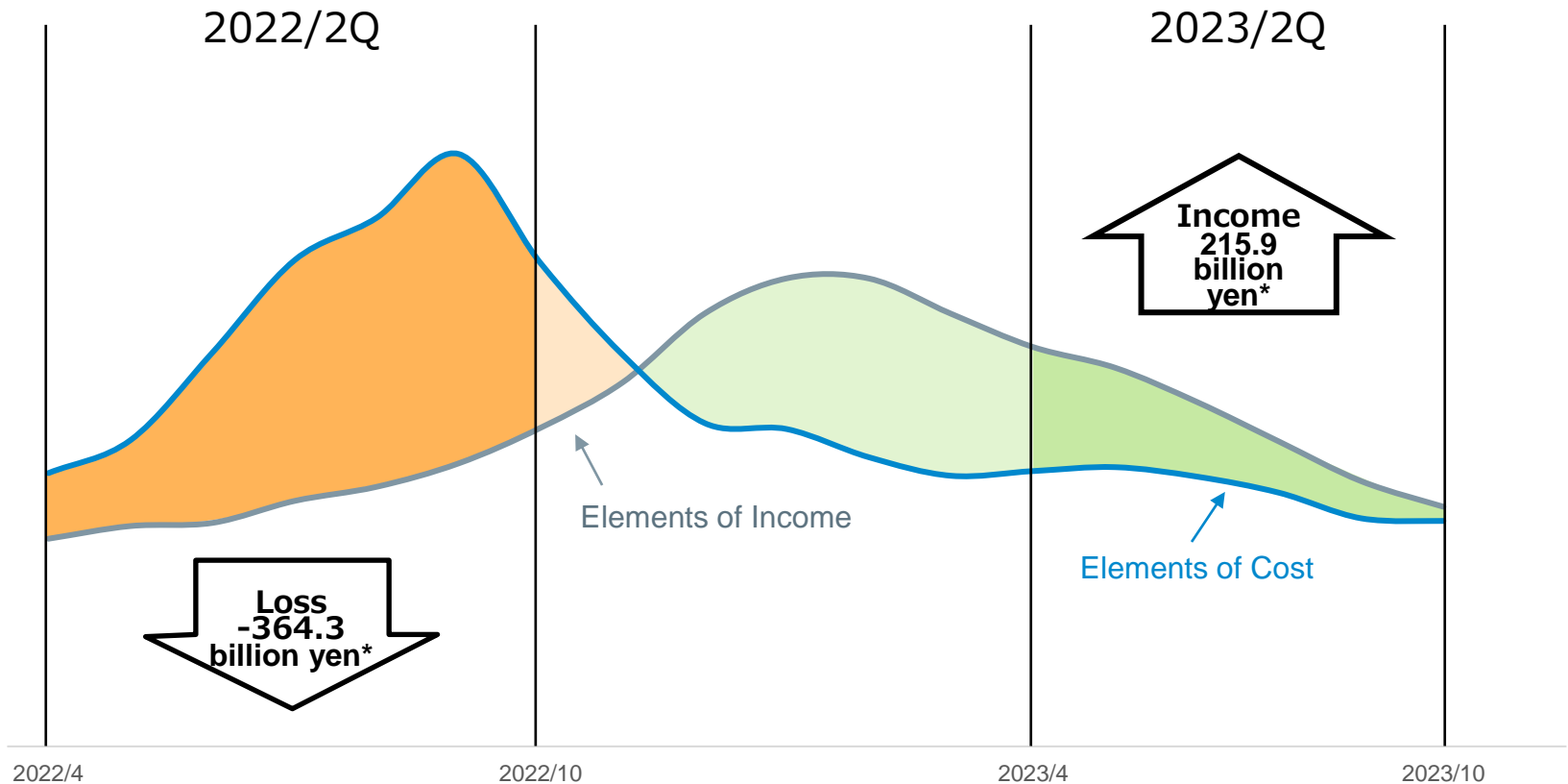
# Appendix

# Trends in crude oil price and exchange rates



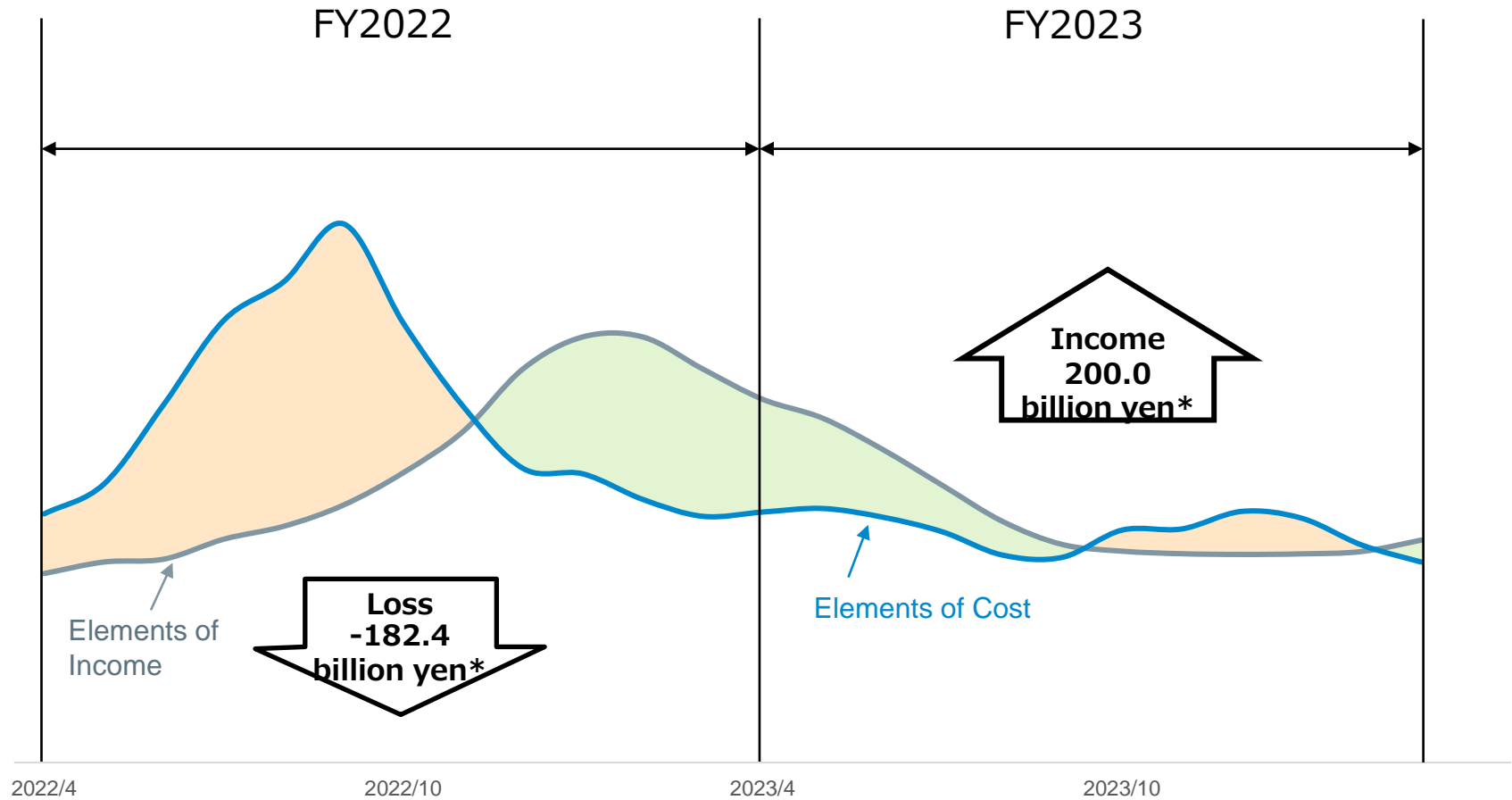
# Image of Time Lag (2022/2Q – 2023/2Q)

- 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 (FY2022 – FY2023)



\* 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
FY2023	48.1	67.3			115.4
FY2022	57.9	69.9	63.6	63.7	255.1

## 【Electrical Power Generated(TWh)】

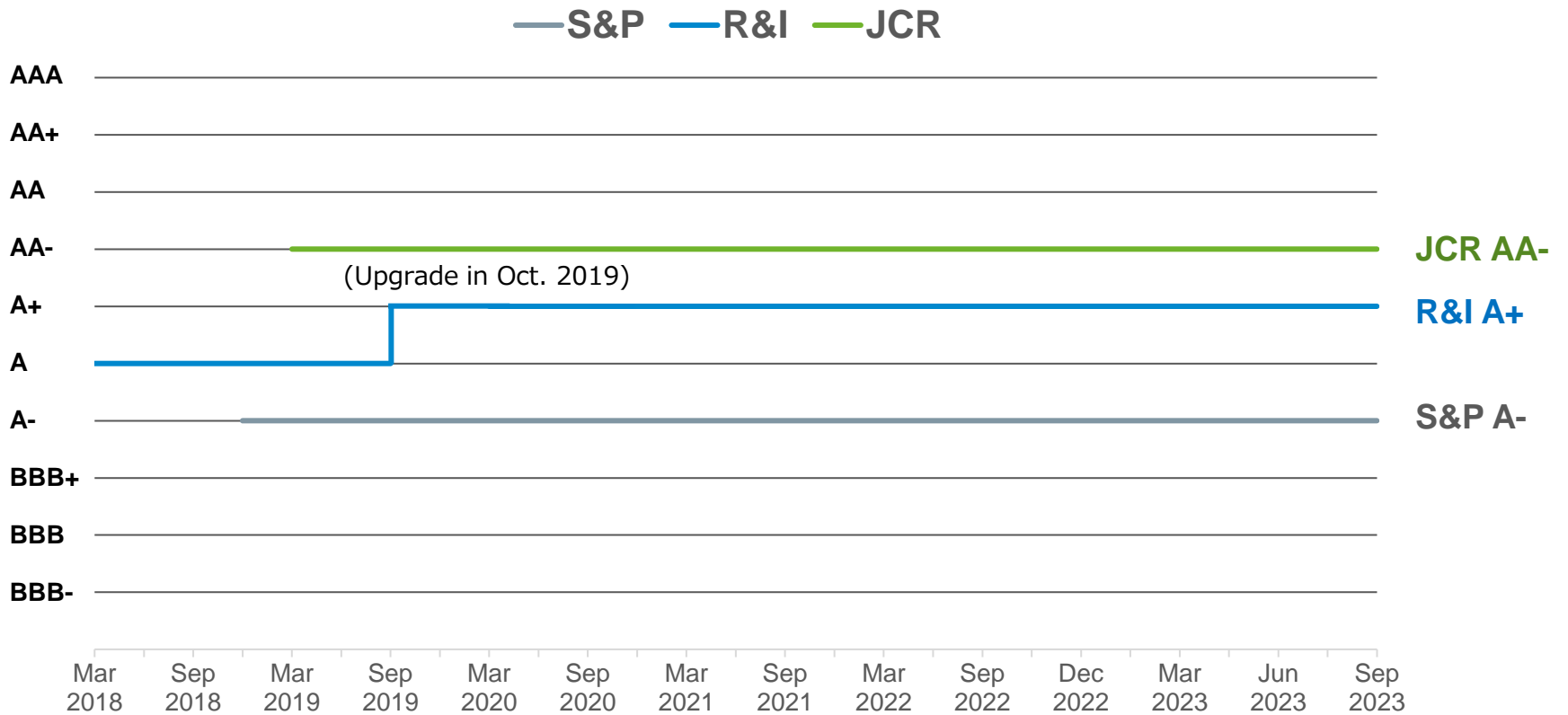
	Apr to Jun	Jul to Sep	Oct to Dec	Jan to Mar	Total
FY2023	47.5	66.2			113.6
LNG	36.2 (76%)	48.8 (74%)			85.0 (74%)
Coal	11.2 (24%)	17.2 (26%)			28.4 (25%)
Others	0 (0%)	0.1 (0%)			0.2 (0%)
FY2022	52.8	63.5	58.0	60.8	235.1
LNG	41.7 (79%)	47.0 (74%)	43.9 (76%)	45.8 (75%)	178.4 (76%)
Coal	11.2 (21%)	16.5 (26%)	14.0 (24%)	15.0 (25%)	56.7 (24%)
Others	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

\*The total may not match due to rounding.



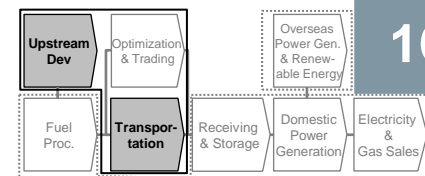
# Credit Ratings

## 【 Issuer Credit ratings history 】



**Reference:  
Overview and topics of  
each segment**

# Fuel Business: Fuel Upstream / Transportation Business



- Participating in LNG upstream projects by leveraging one of the world’s largest LNG transaction volume (FY2022: Approximately 35 million tons\*), we secure stable LNG sources and 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.

\*JERA Group as a whole

## Fuel Upstream Project

Project Name	Country	LNG Production / Liquefaction Capability	Investment Ratio *1
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%
Freeport LNG Project (Train1)	United States	Approx. 5.15 million tons/year	25%
Freeport LNG Development, L.P.*2		Approx. 15.45 million tons/year*3 for all three lines	25.7%

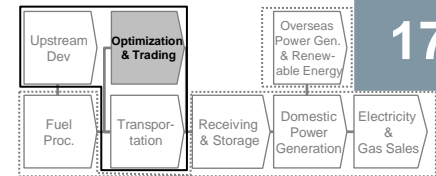
\*1 The stake of Wheatstone LNG Project represents the ratio of shares held through PE Wheatstone in which JERA invests

\*2 Freeport LNG Project Management Company

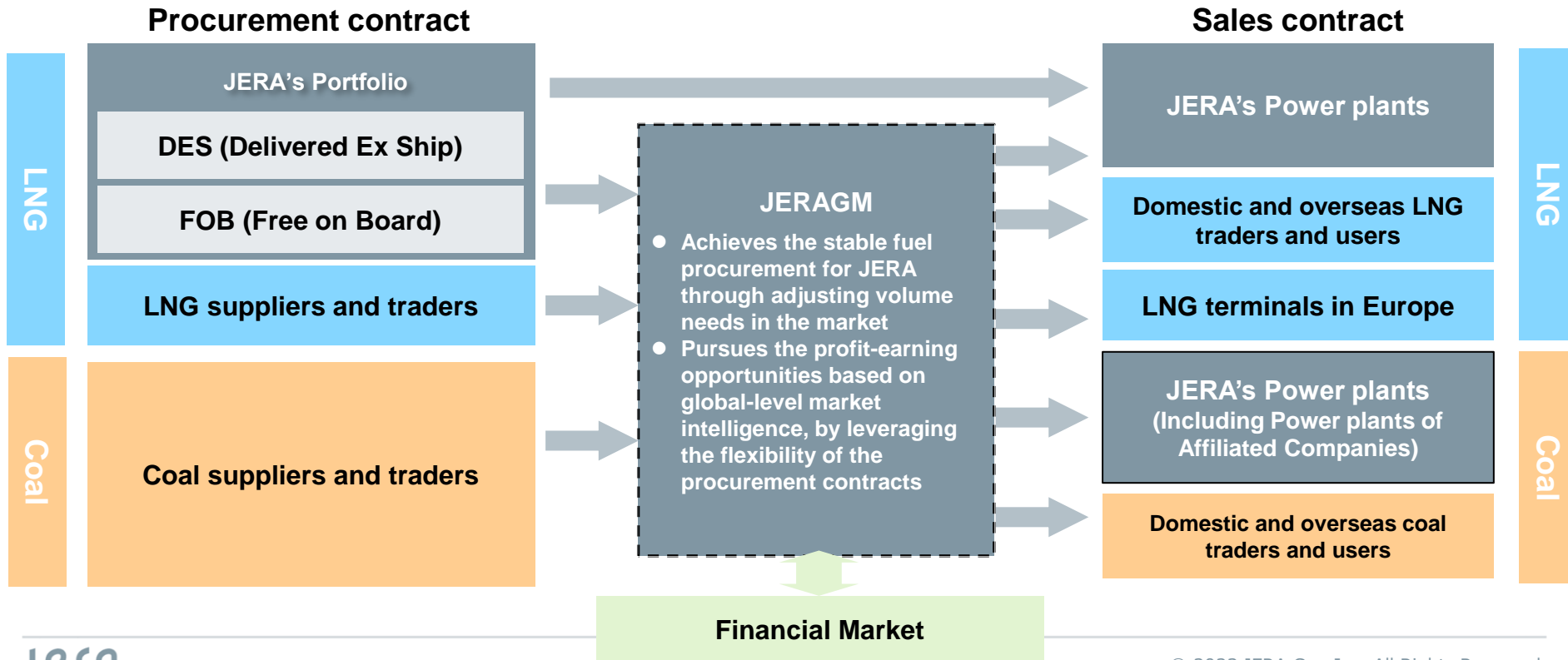
\*3 Including 5.15 million tons/year from Train 1

- In June 2022, a fire incident occurs at the Freeport LNG terminal, shutting down operations at the terminal. In 2023, regulatory approvals for resumption of production were obtained one by one. And production has resumed at all lines.

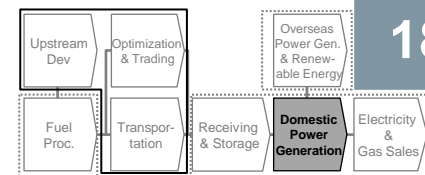
# Fuel Business: Trading Business



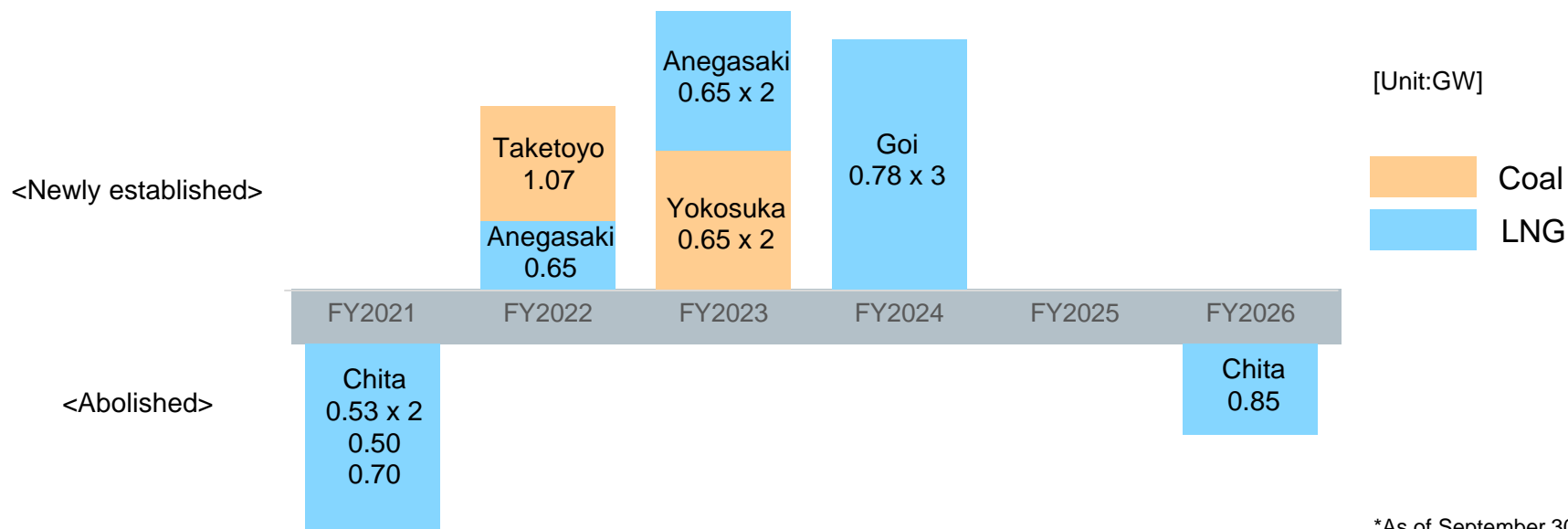
- In addition to the Singapore headquarters, JERAGM has offices in the United Kingdom, the Netherlands, the United States, and Japan, and holds approximately 300 employees who engage in asset-backed trading.
- Utilizing the global trading network, JERAGM supplies LNG and coal to JERA's domestic power generation business. Leveraging this commercial flow, JERAGM has been able to achieve both the enhancement of 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



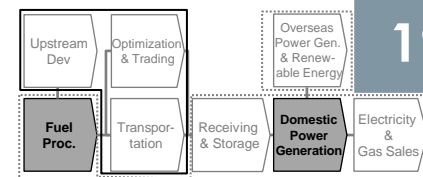
- Replaced with the latest high-efficiency thermal power generation facilities. Following Taketoyo and Anegasaki New Unit 1, Anegasaki New Unit 2 began commercial operation in April, Yokosuka Unit 1 in June, and Anegasaki New Unit 3 in August 2023.
- Construction and commissioning of Yokosuka Unit 2 and 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 (environmental impact assessment has been conducted).



\*As of September 30, 2023

Development Point	Status of Development
Yokosuka	Full-scale construction started in August 2019. Construction progress: 99%
Goi	Full-scale construction started in April 2021. Construction progress: 93%

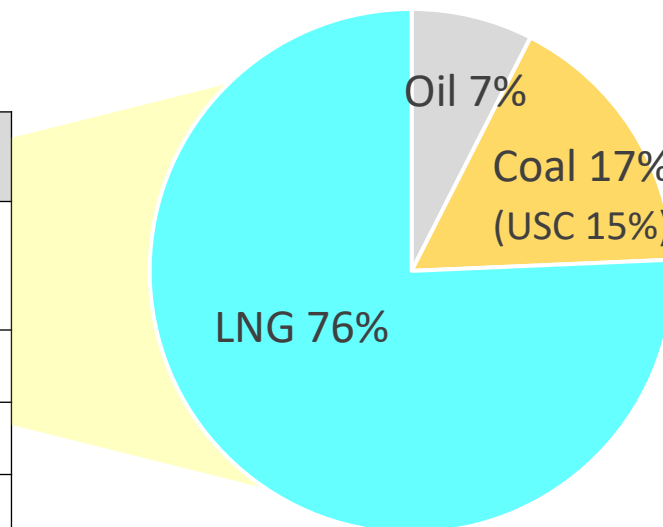
# Domestic Thermal Power and Gas Business: Composition of Power Sources



- 76% 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\*1.

## Composition of Power Sources\*2

Fuel	Capacity (Generator output)
Coal (USC)	10.32 GW (8.92 GW)
LNG*3	46.44 GW
Oil	4.60 GW
Total	61.36 GW



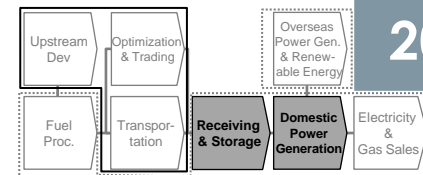
\*1 Press release on October 13, 2020 “Towards Zero CO<sub>2</sub> Emissions in 2050”

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

\*2 As of September 30, 2023. Includes capacity under construction.  
Excludes capacity of affiliates.

\*3 Includes LPG and City Gas.

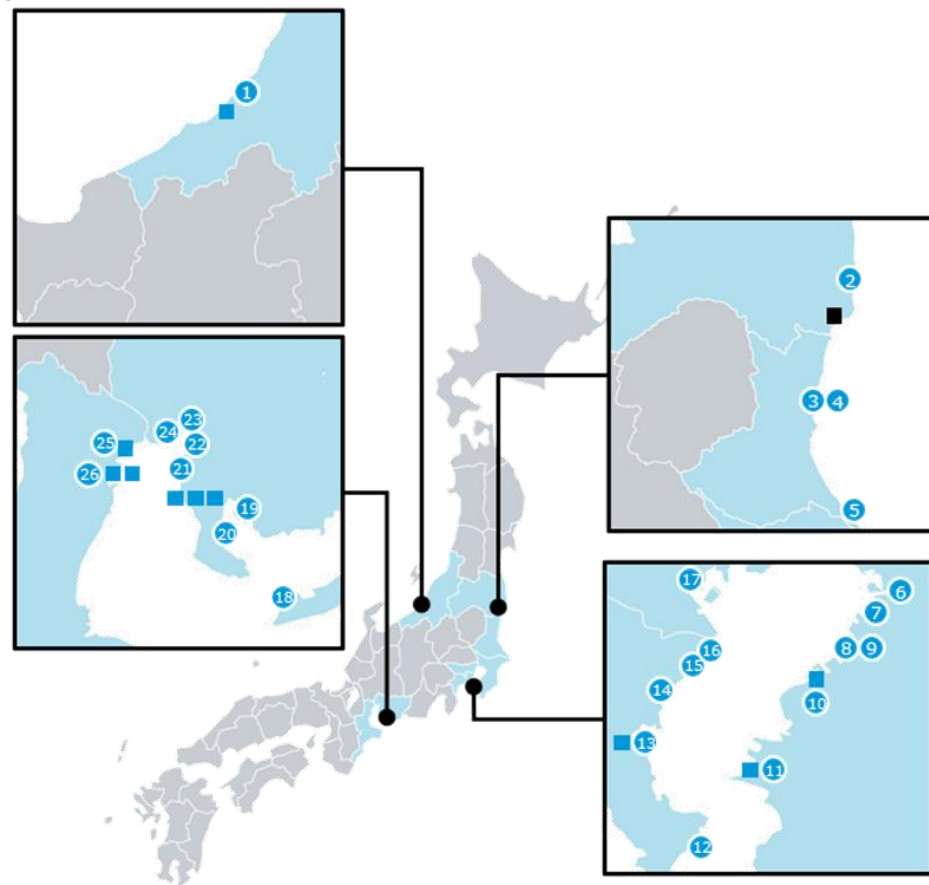
# Domestic Thermal Power and Gas Business: Domestic Thermal Power Plants



➤ 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)

① Joetsu	2.38 GW	◆	As of September 30, 2023
② Hirono	4.40 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> *Scheduled to start operation in phase of 0.65GW each from June 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	◆	

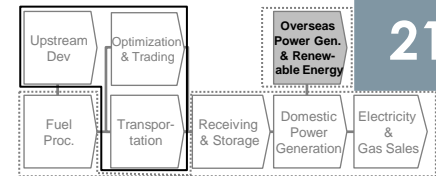


◆ LNG ◆ Coal ◆ Heavy Oil  
◆ Crude Oil ◆ Utility Gas  
■ LNG Terminal<sup>2</sup> ■ Coal Terminal

1 Power plant's name <Operator's name>

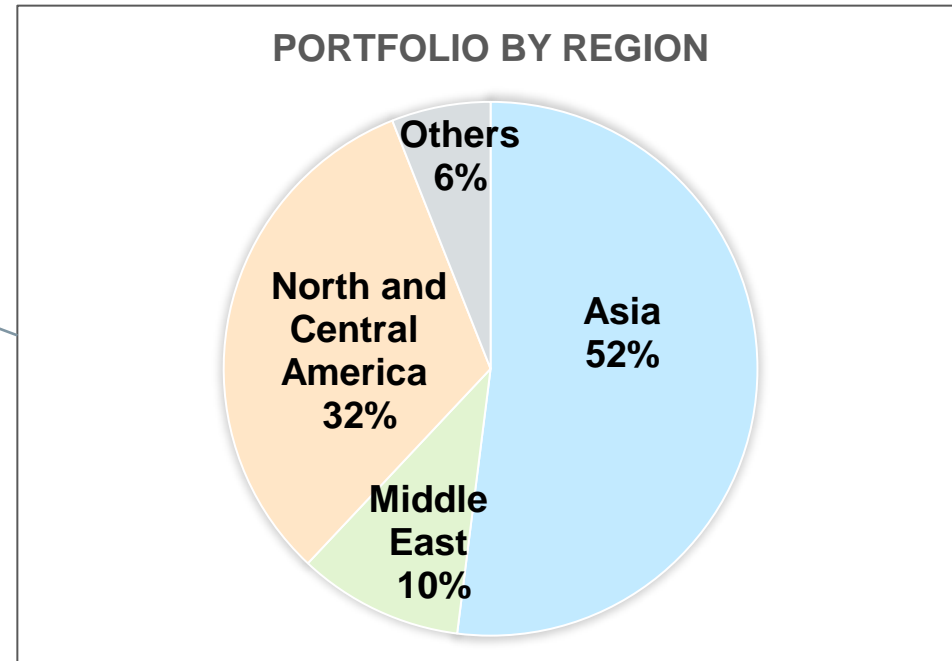
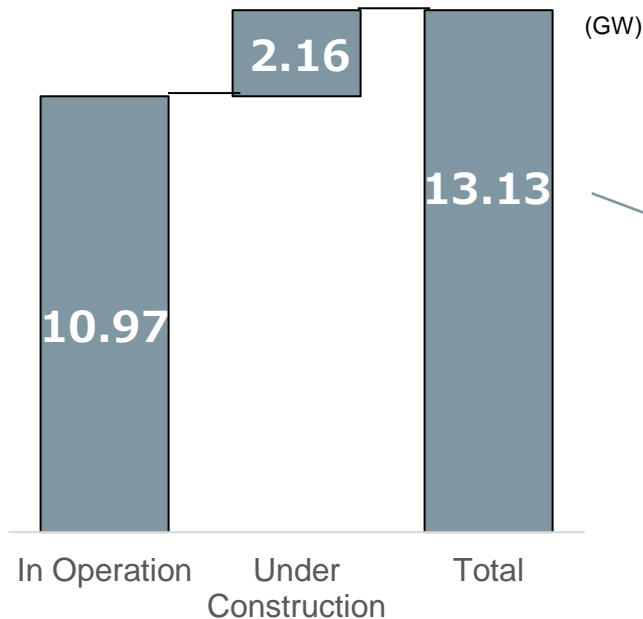
2 Includes jointly operated terminals in the Chita and Yokkaichi areas

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



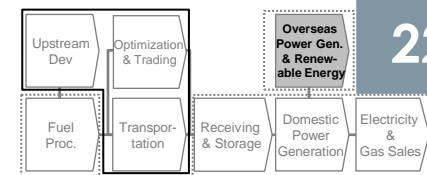
- JERA is expanding its businesses through the experience gained from projects around the world. Total capacity of power generation in overseas projects is 13.13 GW (including under construction).
- JERA aims to secure funds and expand earnings by replacing its portfolio through the sale and reinvestment of assets to achieve an optimal asset structure in line with changes in the business.
- In 2023, JERA transferred its shares in the Formosa 3 offshore wind project. In addition, JERA successfully completed the acquisition of Parkwind NV in Belgium.

< Power Generation Capacity (As of September 2023) >





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



(As of September 30, 2023)

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

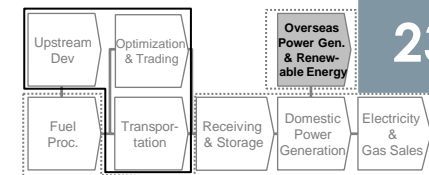
Country	Project Name	Investment ratio	Capacity	Fuel type	Notes
Philippines	TeaM Energy IPP	25.0%~50.0%	2,341 MW	Coal	
	Aboitiz Power Corporation	27%	4,829 MW	Coal/Oil/ Renewable	Including under construction
Thailand	EGCO Corporation	12.3%	6,317 MW	Coal/Gas/ Renewable	Including under construction
Vietnam	Gia Lai Electricity Joint Stock Company	35.1%	503 MW	Solar/Wind/Hydro	Including under construction
India	ReNew Company	7.3%	13,745 MW	Solar/Wind/Hydro	Including under construction
Bangladesh	Summit Power IPP	22.0%	1,883 MW	Gas	Including under construction
Japan	Green Power Investment	17.85%	112 MW*	Offshore Wind	Under construction
United Kingdom	Zenobe Battery Storage	9.9%	235 MW	-	Including under construction
Belgium	Parkwind	100.0%	600 MW	Offshore Wind	Including under construction

\*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%	14.6 MW	Solar	Including under construction
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	

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



(As of September 30, 2023)

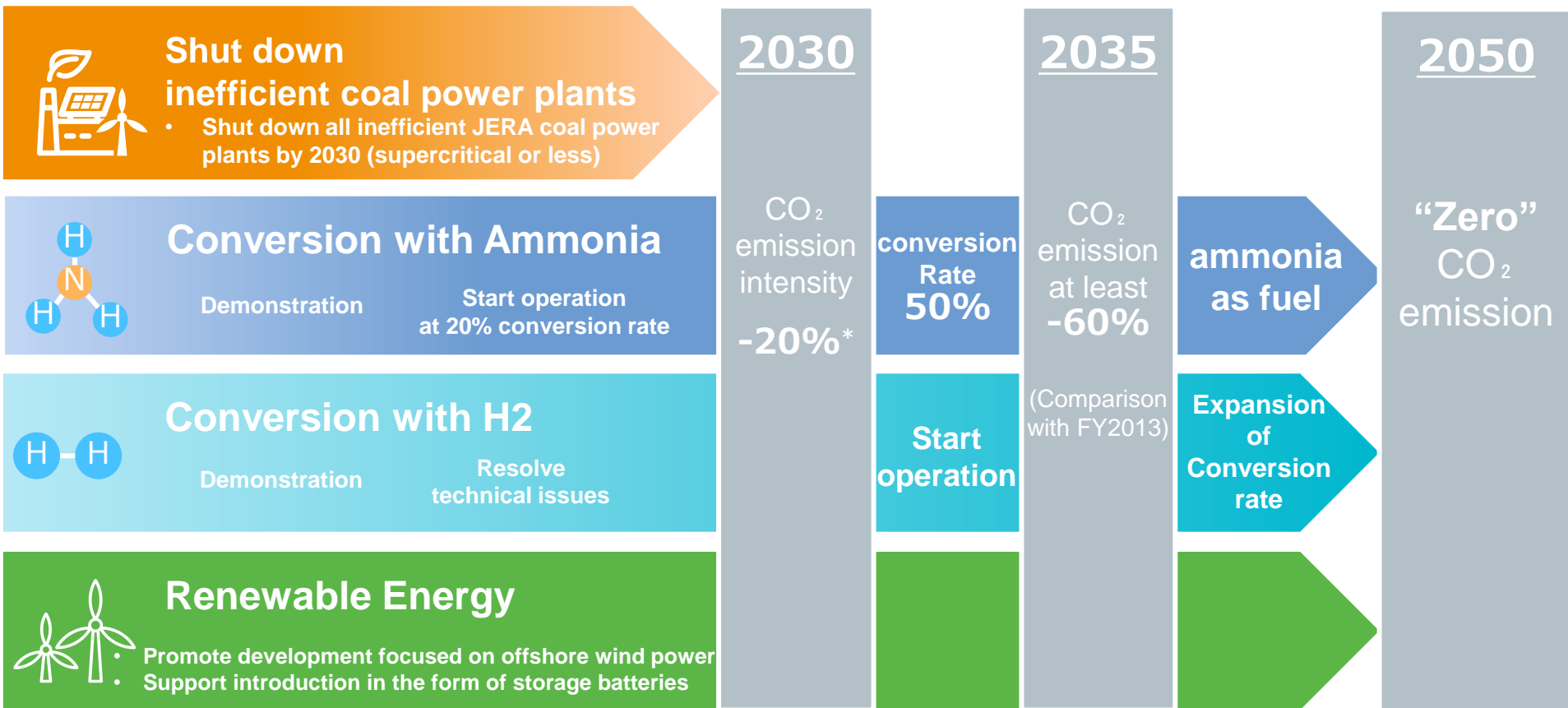
## Power Generation / Renewable Energy Projects(2/2)

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: Roadmap for its Business in Japan

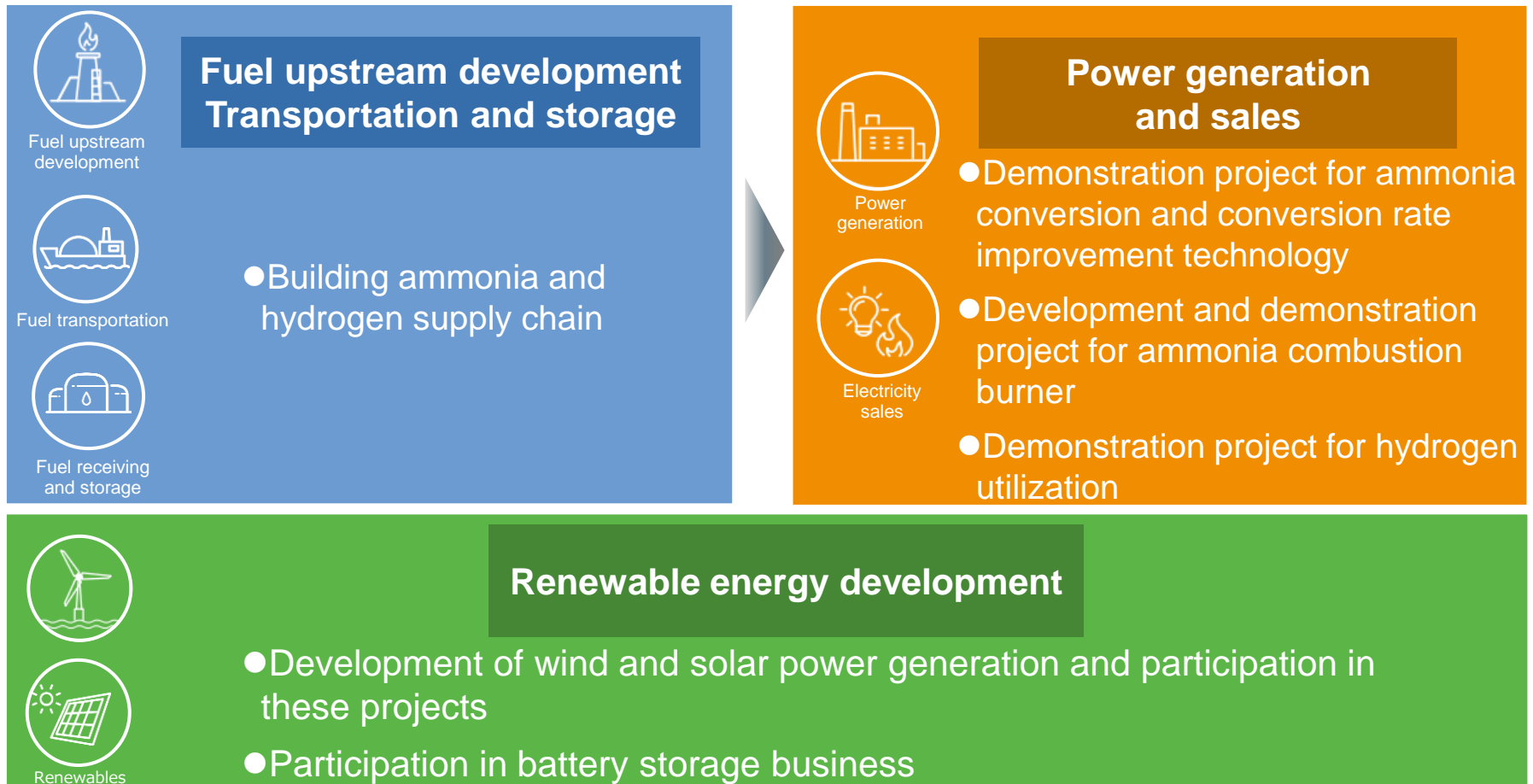
- JERA established “JERA Zero CO<sub>2</sub> Emissions 2050 Roadmap for its Business in Japan”, including four initiatives.



\*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: 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.




(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) 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	
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	Consideration of cooperation in the adoption of hydrogen and ammonia as fuel for power generation	2022/11 ~2023/6
	Europe	Mitsui	Signed an Ammonia Sales and Purchase Agreement for its use in the demonstration project at the Hekinan Thermal Power Station	2023/6
		Uniper (Germany) EnBW / VNG (Germany)	Signed a Heads of Agreement for the sale of low carbon hydrogen/ammonia produced in the US	2023/9 2023/6
	Asia	EVN (Vietnam)	Signed a MOU that commits the collaboration to establish a decarbonization roadmap for EVN	2023/10
		PPT (Thailand)	Consideration of collaboration on initiatives for expanding the supply chain and usage of hydrogen and ammonia towards decarbonization in Thailand	2023/5
		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 (Singapore) Jurong port, MHI-AP (Singapore)	Consideration of collaboration on the expansion of ammonia usage in Malaysia Consideration of establishing a 100% ammonia direct combustion power plant in Singapore	2022/10 2022/8
	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(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 ammonia conversion technologies for thermal power generation	Green Innovation Fund Program / Establishment of Fuel Ammonia Supply Chains project / Demonstration project to develop technology to increase the ammonia conversion 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 will aim to achieve <b>20% ammonia conversion by FY2023</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 by FY2023, 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>

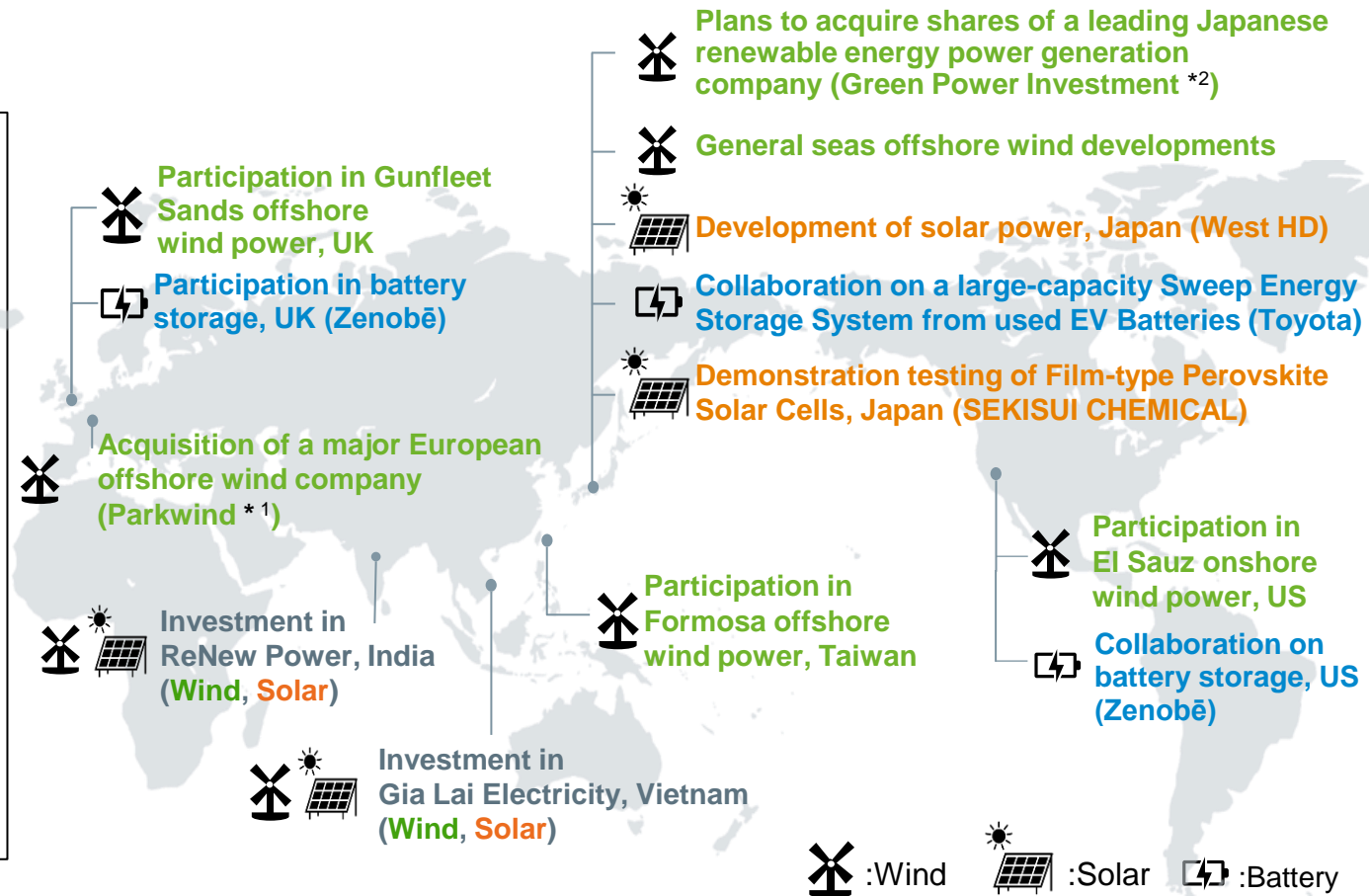
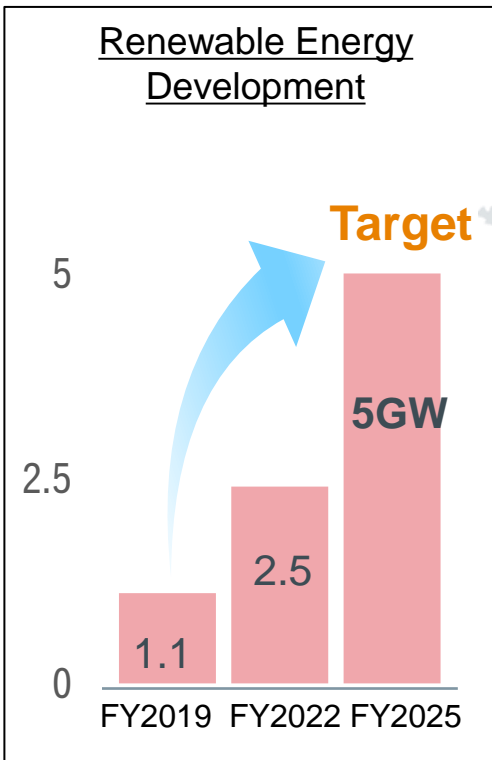
## Initiatives for Hydrogen Conversion

- 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.
- Completed modification of the gas turbine at Linden Gas Thermal Power Station Unit 6 in the United States to enable the use of hydrogen, making possible the conversion of natural gas with hydrogen-containing off-gas generated at the adjacent oil refinery.

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

- JERA has set a target of 5GW renewable energy development by FY2025, and is widely promoting wind power, solar power, battery storage, etc.

Renewable Energy  
Development



\*1 Parkwind's equity generation capacity in operation and under construction is 0.6GW, equity generation capacity under development is 4.5GW.

\*2 JERA's equity generation capacity is approximately 0.1GW.



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

## Renewable Energy Development Status

JERA and Other Major Renewable Energy Operators in Asia	Equity Generation Capacity
 (Japan)	3.4 GW*
 (India)	8.0 GW
 (India)	7.7 GW
 (Korea)	5.6 GW
 (Malaysia)	3.8 GW
 (India)	3.6 GW

\* JERA's generation capacity is aggregated development basis including capacity of Parkwind and GPI. (as of September 2023)  
Source: Compiled by JERA based on each company's website (as of May 2023)

## Future Initiatives

Consolidate renewable energy businesses under a specialized organization to create a global structure

