

Fiscal Year Ending December 2023

# Consolidated Financial Report for the Second Quarter

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August 7, 2023



Securities Code  
5563

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# 1. Four Core Businesses

Securing stable earnings from the ferroalloy business, the company's funding business.  
Promoting corporate growth and addressing social issues through the businesses of functional materials, environment, and electric power.

## Ferroalloys

- Top domestic manganese ferroalloy supplier. Consistent supply of high-quality ferroalloys with outstanding global competitiveness
- Green ferroalloy production using hydroelectric power (overseas affiliates)

**Main Products**  
High-carbon ferromanganese  
SLP ferromanganese  
Silicomanganese, Ferrosilicon

**Main Applications**  
Additives for steel to improve its hardness, tensile strength, and other properties  
Desulfurization and deoxidation agent in steel



High-carbon ferromanganese

Facility: Tokushima Plant, Pertama Ferroalloys Sdn. Bhd. (overseas affiliates)

## Functional Materials

- Providing materials for several advanced components supporting a decarbonization and digitalization society
- Distinctive material lineup, such as "No.1" and "Only One" products

**Main Products**  
Zirconium oxide / Boron oxide / Manganese inorganic chemical products / Ferroboron / Metal hydride alloys / Cathode materials for lithium-ion batteries

**Main Applications**  
Ceramic capacitors / Glass substrates for displays / Additives for electronic components / Neodymium magnets / Anode materials for HVs' nickel-hydride batteries / Cathode materials for EVs' lithium-ion batteries



Zirconium oxide

Facility: Toyama Plant (Imizu and Takaoka area), Myoka Plant, Tokushima Plant

## Environment

### Environmental recycling systems

- Contribute to the realization of circular economy and carbon-neutral society through our wastewater purification and pure water production technology and services

**Main Products**  
Wastewater treatment equipment  
Pure water production system

**Main Applications**  
Treatment of industrial wastewater  
Production of pure water for hydrogen stations, etc.

Facility: Koriyama Plant

### Melting and solidification of incineration ash

- Contribute to a recycling society through our perfect incineration ash recycling

**Main Products**  
ECOLAROCK (Slag by melting and solidification of incineration ash)  
Recycling of valuable metals

**Main Applications**  
Construction materials such as roadbed materials  
Return valuable metals to nonferrous smelter and refiner

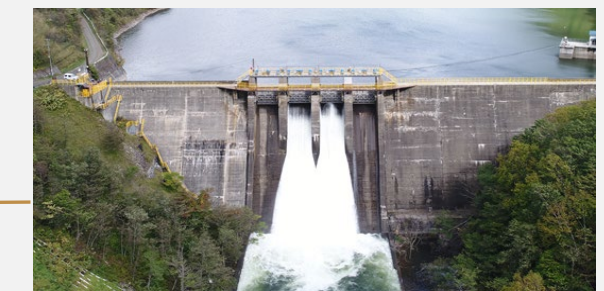
Facility: Chuo Denki Kogyo (Kashima City)

## Electric Power

- Stable sale of electricity by utilizing renewable energy Feed-In Tariff system (FIT)
- Stable supply of green electricity through the largest private-sector owned dams
- Introducing the environmental advantages of green electricity



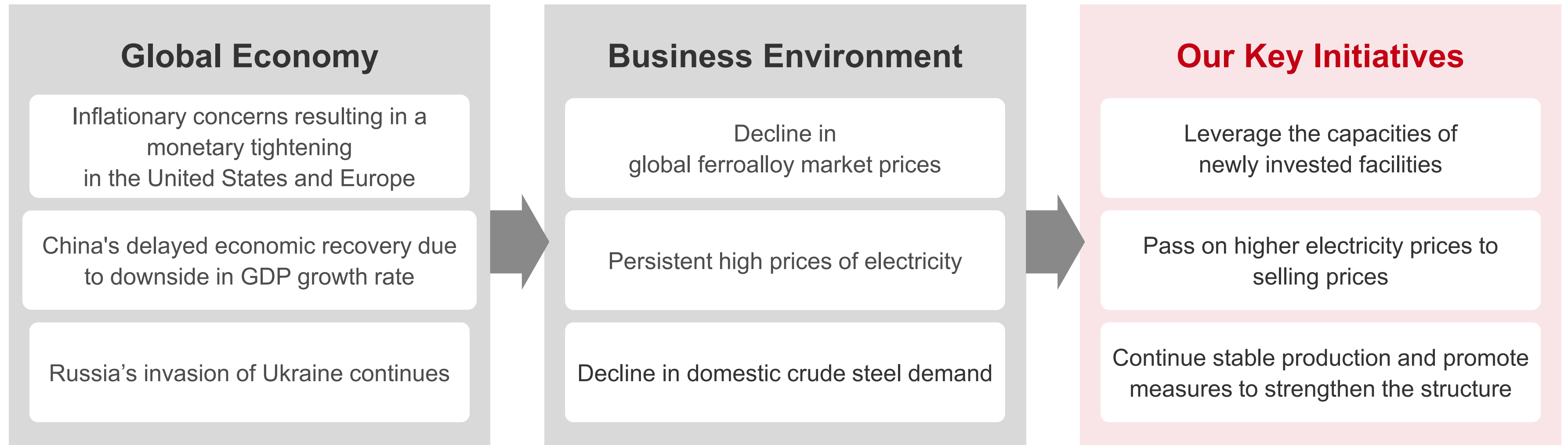
Facility: Hidaka Office



Horomangawa Hydroelectric Power Plants

## 2-1. FY2023 Business Environment & Projection ①

Projection

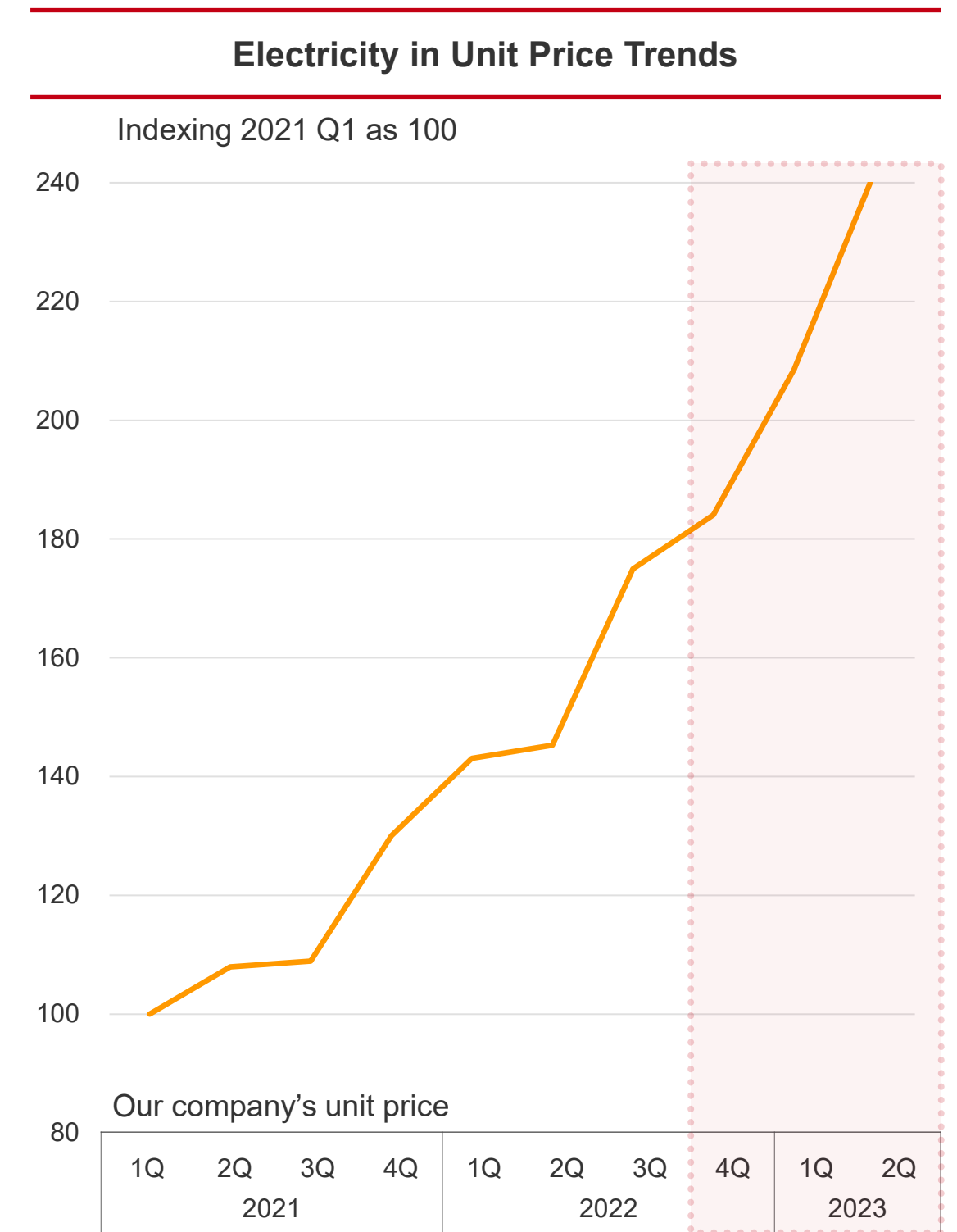
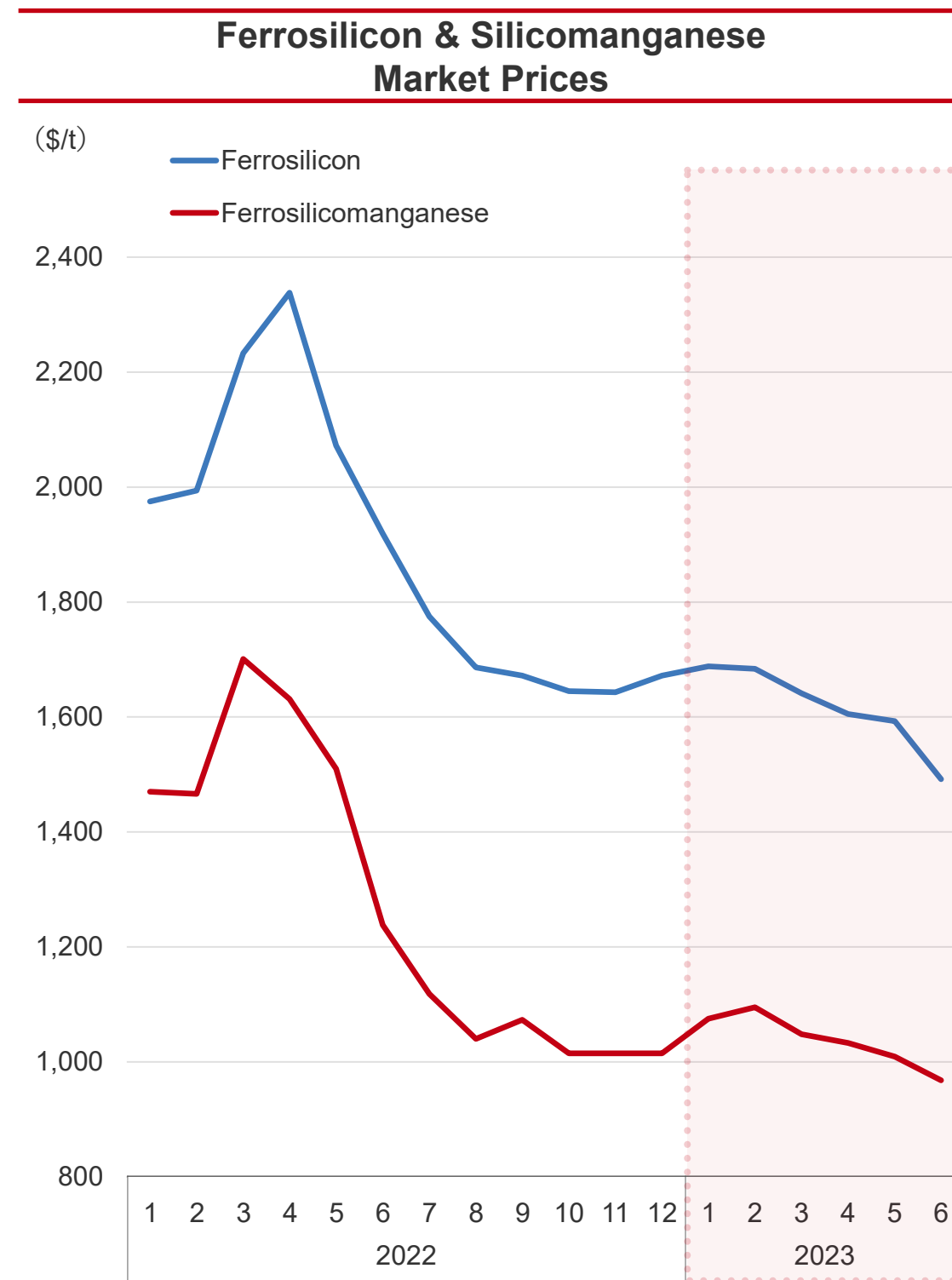
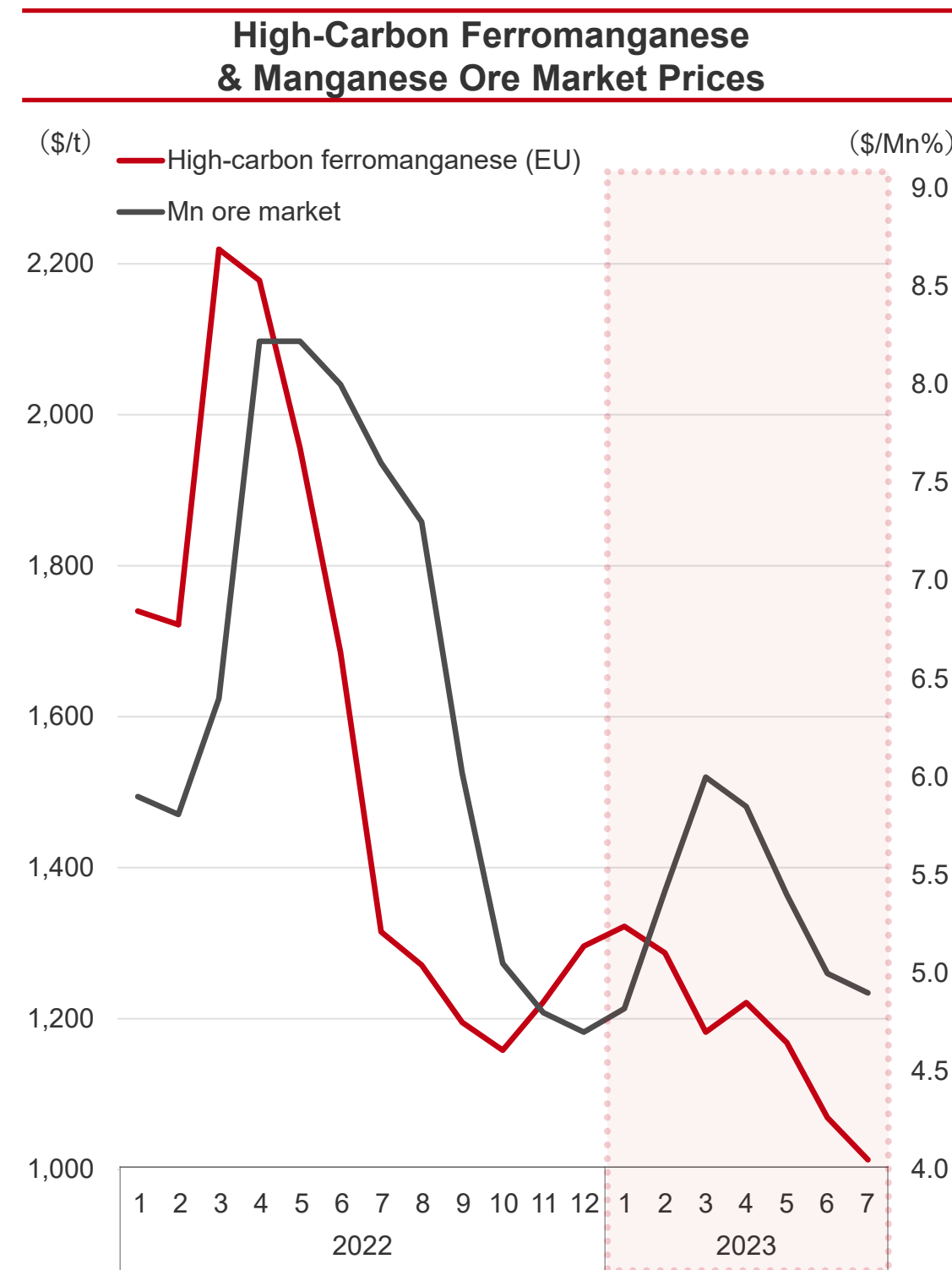


**Despite our efforts to secure profit and take advantage of the price scheme, we anticipate a substantial decrease in profitability due to falling manganese ore market prices and inventory impact.**

# 2-2. FY2023 Business Environment & Projection ②

Projection

The current business environment remains challenging with the continued decline in the ferroalloy market and consistent high electricity prices.



## 2-3. FY2023 Consolidated Earnings Projection

Projection

- The ferroalloy market has deteriorated even further since the earnings forecast announcement in May.  
⇒ Earnings forecast revised downward (ordinary profit 4.0 billion yen ⇒ 2.5 billion yen)
- On a positive note, when excluding the inventory impact and other factors, the projection for our underlying ordinary profit (5.7 billion yen) remains in line with the previous year.
- Profit attributable to owners of parent and annual dividends remains unchanged.

(bil. yen)

	FY2022	FY2023 Projection		YoY
	Results	Announced on May 11, 2023	Announced on Aug. 7, 2023	
Net sales	79.3	78.0	<b>78.0</b>	-1.3
Ordinary profit	10.4	4.0	<b>2.5</b>	-7.9
Ordinary profit (underlying profit base)	5.6	-	<b>5.7</b>	0.1
Ordinary profit margin (%)	13	5	<b>3</b>	-10
Profit attributable to owners of parent	7.9	3.0	<b>3.0</b>	-4.9
Earnings per share (yen)	54.5	21.7	<b>21.8</b>	-32.7
Cash dividends per share (yen)	17	7	<b>7</b>	-10
ROE (%)	12	-	<b>4</b>	-8
Exchange rate (Yen / \$ US)	130	-	<b>140</b>	-

## 2-4. FY2023 Consolidated Earnings Projection (by Segment)

Projection

					(bil. yen)			
		FY2022	Full-year projections (announced on Aug. 7, '23)	YoY	(Ref.) underlying profit base			
					FY2022	Full-year projections	YoY	
Ferroalloys	Net sales	58.4	54.0	-4.4	-	-	-	
	Ordinary profit	Domestic	7.2	1.0	-6.2	2.5	2.6	0.1
		Overseas	1.9	-1.4	-3.3	1.2	-0.1	-1.3
		9.1	-0.4	-9.5	3.7	2.5	-1.2	
Functional Materials	Net sales	11.3	14.0	2.7	-	-	-	
	Ordinary profit	0.3	1.8	1.5	0.5	2.1	1.6	
Environment	Net sales	5.9	7.0	1.1	-	-	-	
	Ordinary profit	0.3	0.7	0.4	0.7	0.7	0.0	
Electric Power	Net sales	1.7	1.4	-0.3	-	-	-	
	Ordinary profit	0.5	0.3	-0.2	0.5	0.3	-0.2	
Other	Net sales	2.1	1.6	-0.5	-	-	-	
	Ordinary profit	0.2	0.1	-0.1	0.2	0.1	-0.1	
Total	Net sales	79.3	78.0	-1.3	-	-	-	
	Ordinary profit	10.4	2.5	-7.9	5.6	5.7	0.1	

## 2-5. FY2023 Consolidated 1H Results vs. 2H Projections (by segment)

Projection

(bil. yen)

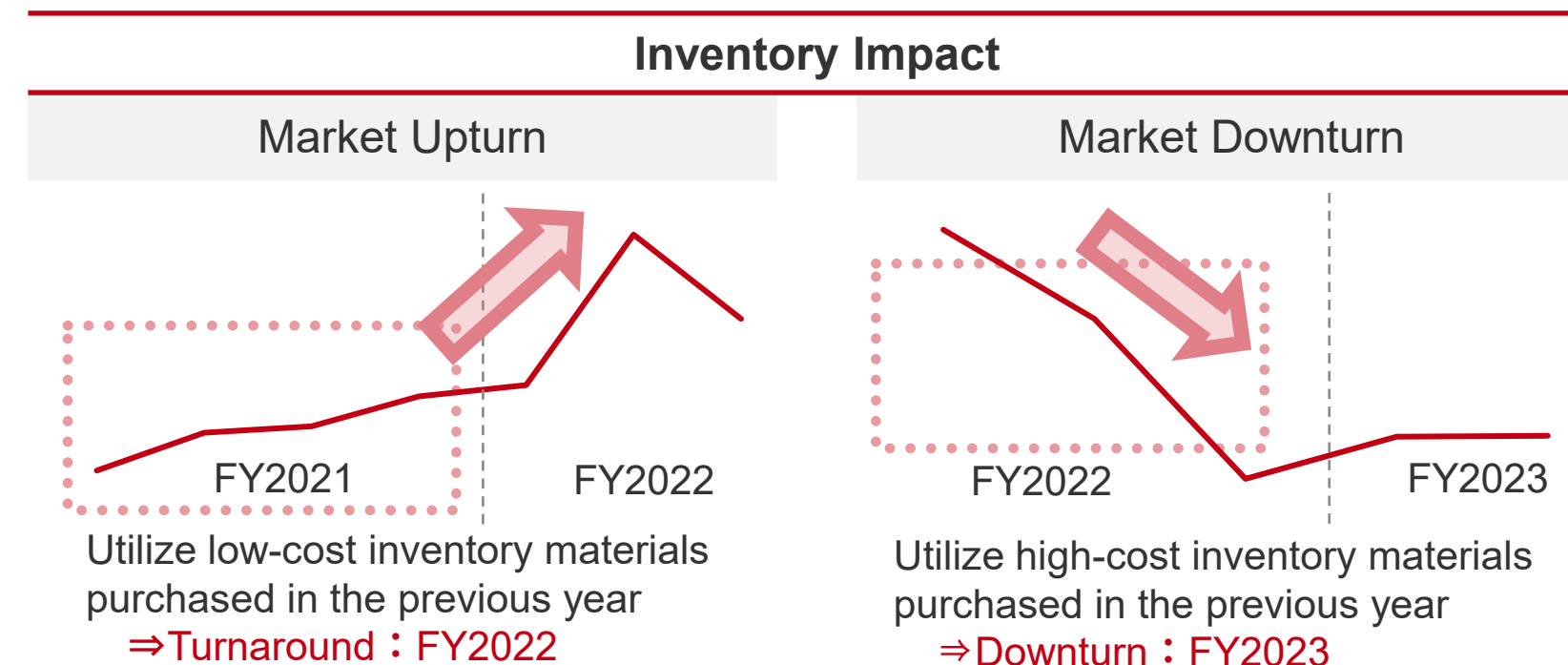
		FY2023			Factors	
		1H results	2H projections	Difference in 1H and 2H		
Ferroalloys	Net sales	28.5	25.5	-3.0	<b>Domestic</b> Due to implementation of planned furnace maintenance (renewal of refractories, approximately 90 days), a significant decline in profits is anticipated.  <b>Overseas</b> Narrowing of the negative gap is anticipated in the 2H due to decrease in the effect of inventory; however, an ordinary profit loss is expected due to further market decline.	
	Ordinary profit	Domestic	1.2	-0.2		-1.4
		Overseas	-0.9	-0.5		0.4
			0.3	-0.7		-1.0
Functional Materials	Net sales	6.3	7.7	1.4	Full-fledged contribution from capacity expansion in the 2H.	
	Ordinary profit	0.5	1.3	0.8		
Environment	Net sales	3.2	3.8	0.6	Due to the progress in selling price improvement, profit is expected to increase in the 2H.	
	Ordinary profit	0.2	0.5	0.3		
Electric Power	Net sales	0.6	0.8	0.2		
	Ordinary profit	0.1	0.2	0.1		
Other	Net sales	0.8	0.8	0.0		
	Ordinary profit	0.0	0.1	0.1		
Total	Net sales	39.4	38.6	-0.8		
	Ordinary profit	1.1	1.4	0.3		



# 2-6. Business Summary (Domestic Ferroalloys Business) ①

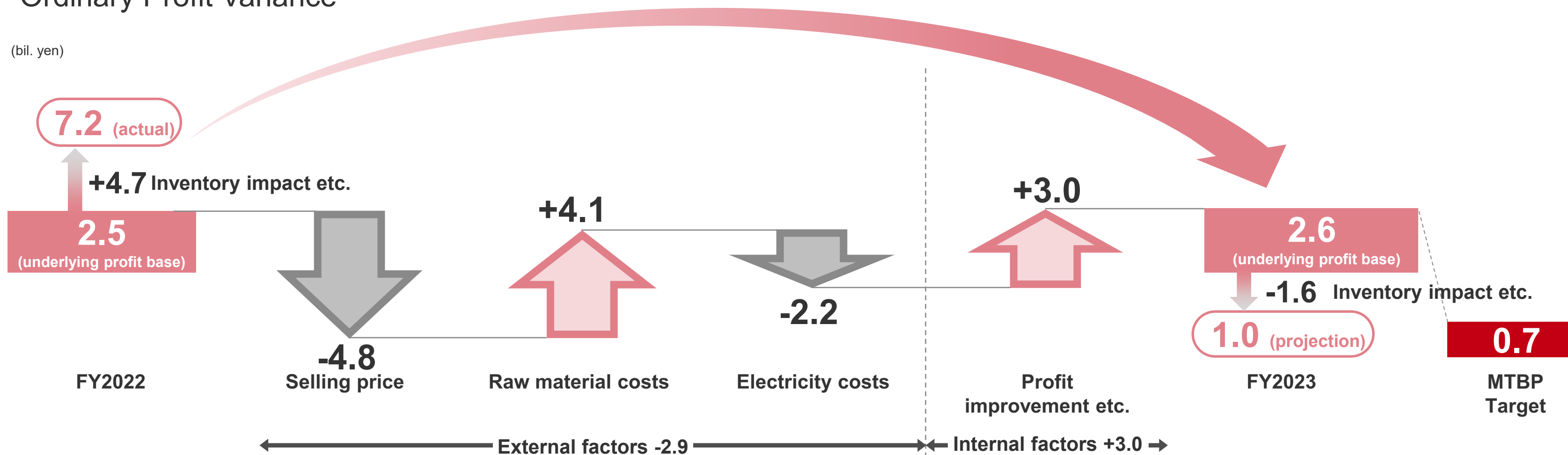
Projection

- Significant decline in high-carbon ferromanganese and manganese ore market.
- Inventory impact has transitioned from positive to negative, as opposed to last year.
- Underlying profit excluding the impact of inventory and other factors remains at almost the same level as the previous year due to improving earnings (change in price scheme, etc.) exceeding negative factors such as an increase in electricity prices, etc.
- Underlying ordinary profit is expected to exceed the Medium-Term Business Plan.



## Ordinary Profit Variance

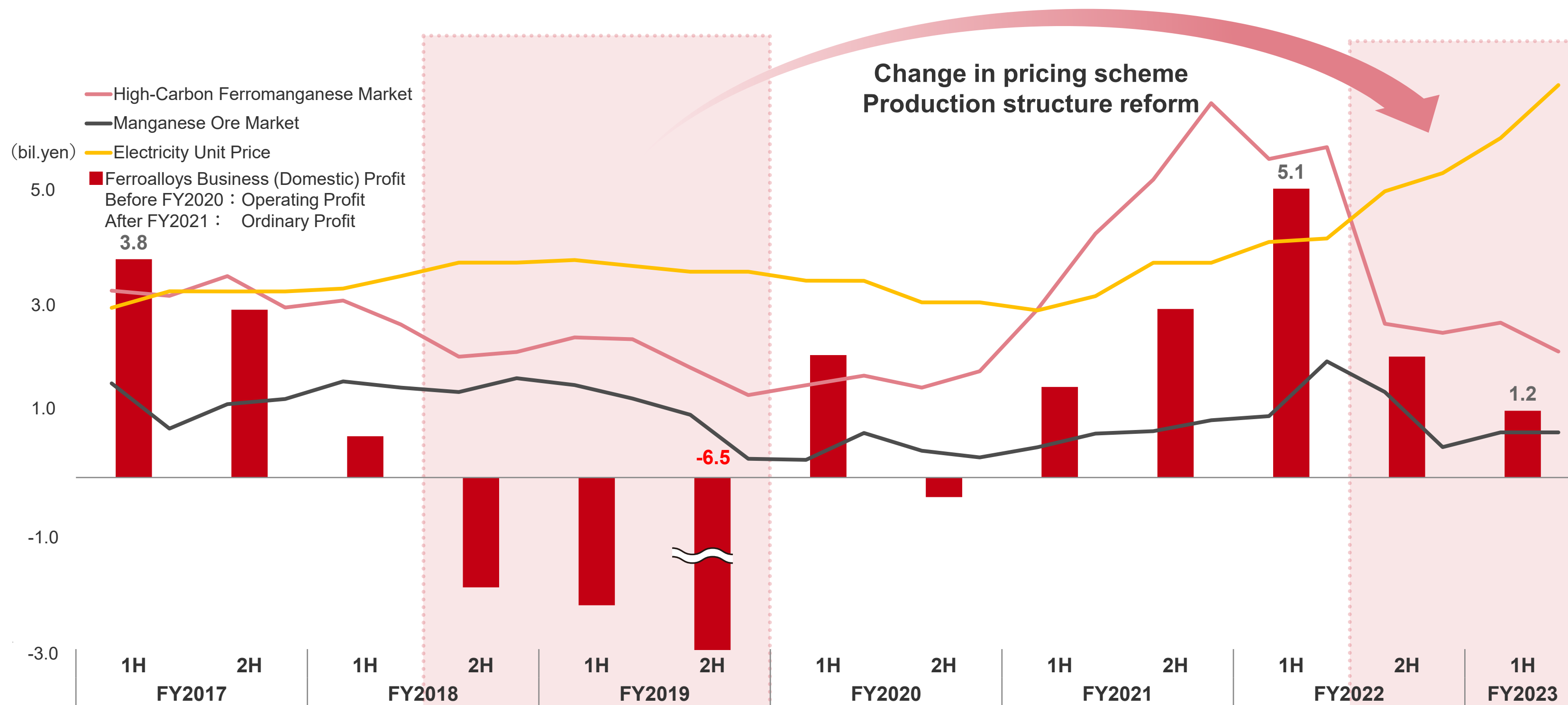
(bil. yen)



## 2-7. Business Summary (Domestic Ferroalloys Business) ②

Projection

- By revising the pricing scheme for our major customers and the production structure reform, we established a system that ensures stable profit even in the face of fluctuating electricity costs and a downturn in the market enabling us to avoid downside risks.

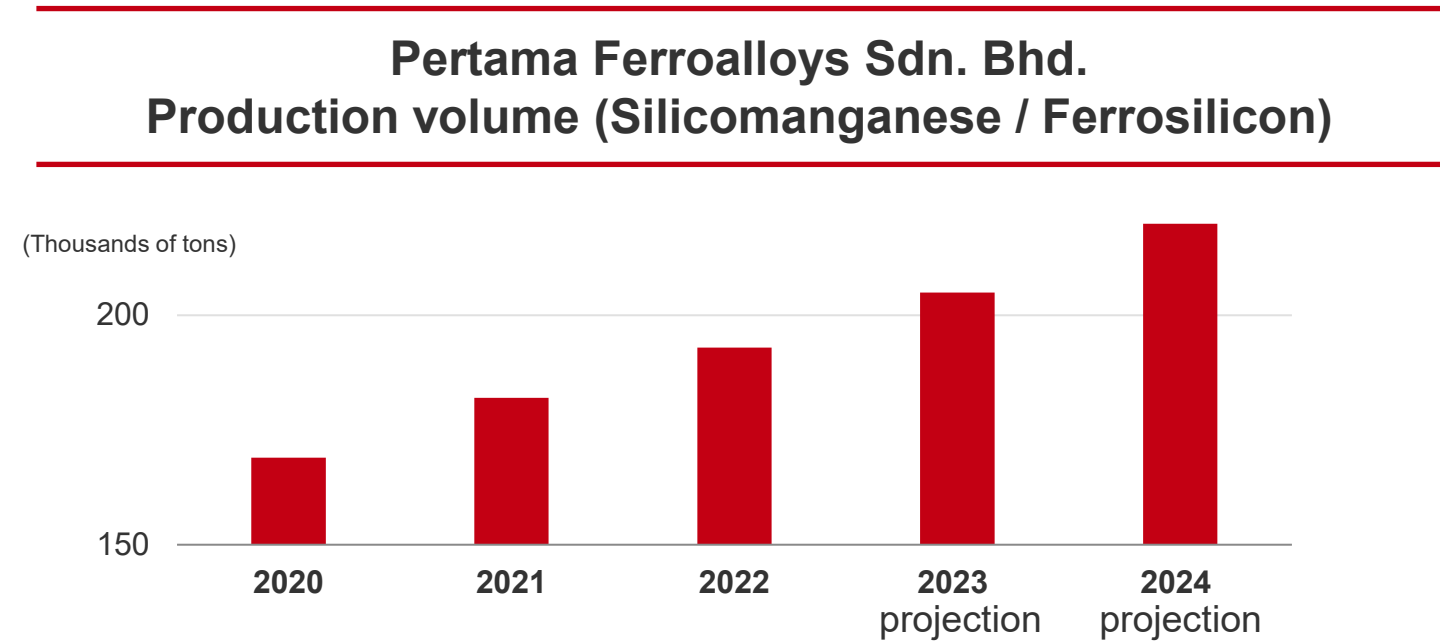


# 2-8. Business Summary (Overseas Ferroalloys Business)

Projection

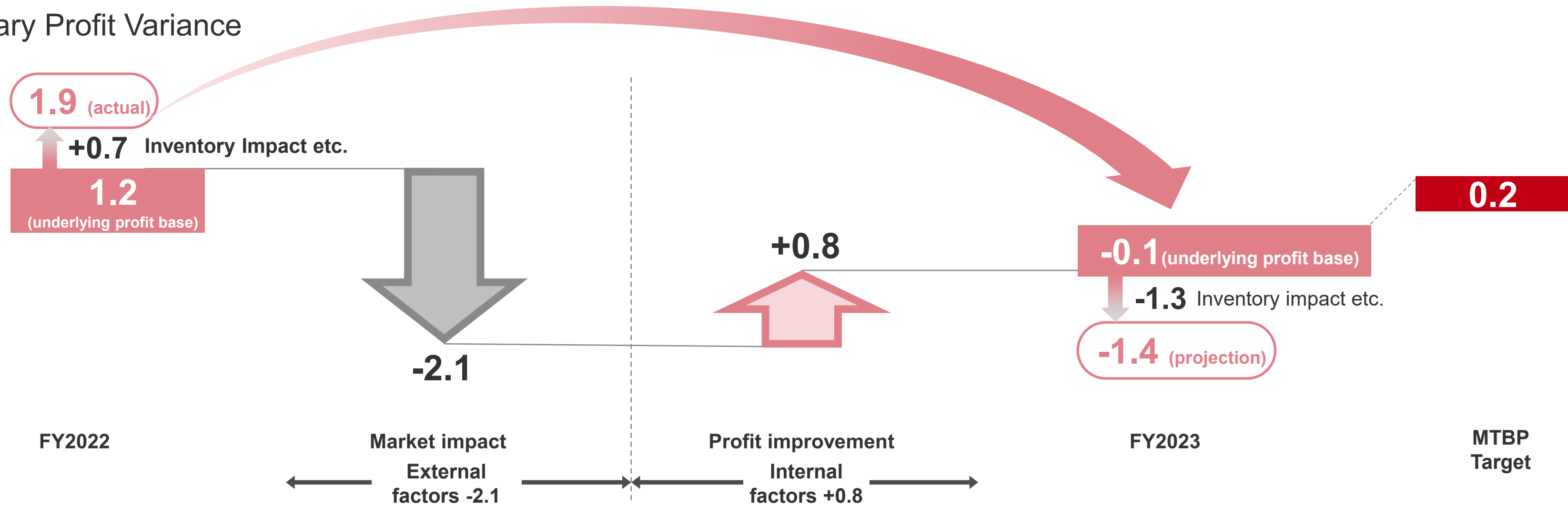
(Pertama Ferroalloys Sdn. Bhd. : ownership ratio 25% Kudumane Investment Holding Ltd. : ownership ratio 25%)

- Significant negative YoY mainly due to the unfavorable silicomanganese and ferrosilicon market and the inventory impact etc.
- Steady improvement in manufacturing capabilities through the realization of stable production at Pertama Ferroalloys Sdn. Bhd.
- Aiming to achieve underlying profitability by establishing a manufacturing system in FY2024.



## Ordinary Profit Variance

(bil. yen)



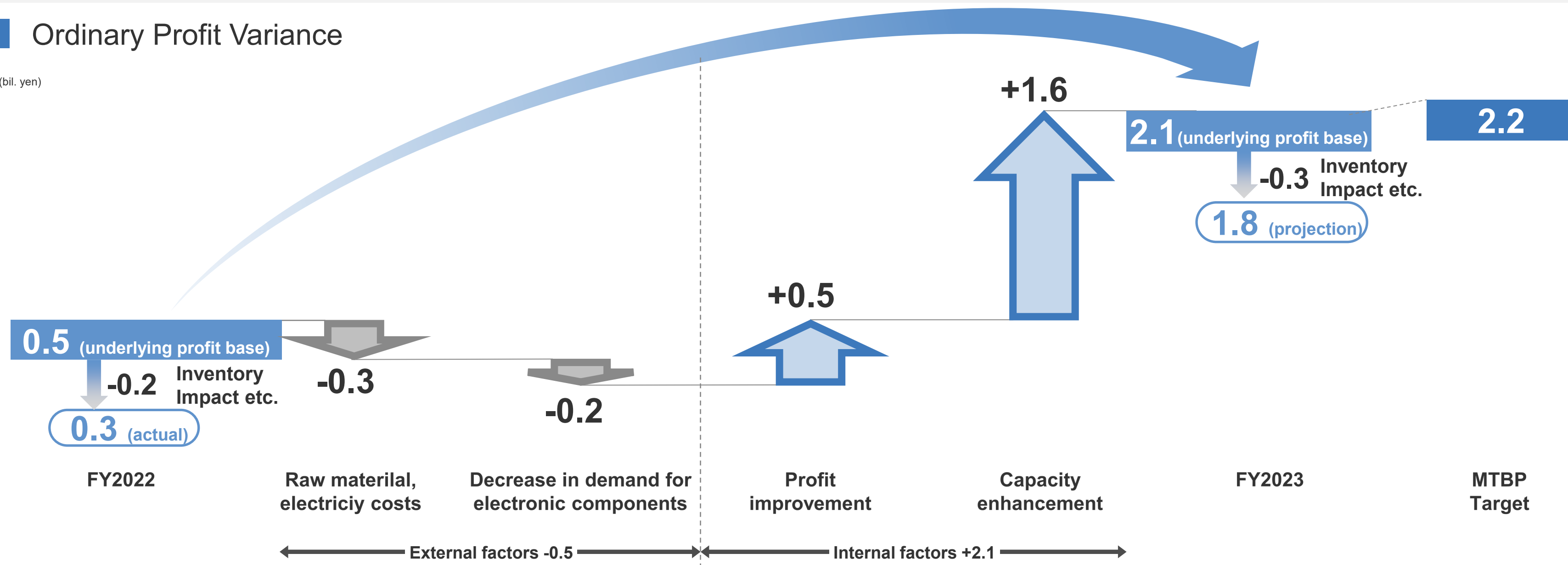
# 2-9. Business Summary (Functional Materials)

Projection

- Ordinary profit significantly increases YoY due to the restarting of ferroboron production and the expansion of cathode materials for lithium-ion batteries production capacity.
- In response to rising electricity costs, we are working on passing on these increases to selling prices.
- Sales of zirconium oxide decreased due to a delay in demand recovering for automotive electronic components. Sales volume expects to recover after FY2024.
- Underlying basis ordinary profit is expected to increase significantly from the previous fiscal year and remain at almost the same level as the MTBP.

## Ordinary Profit Variance

(bil. yen)



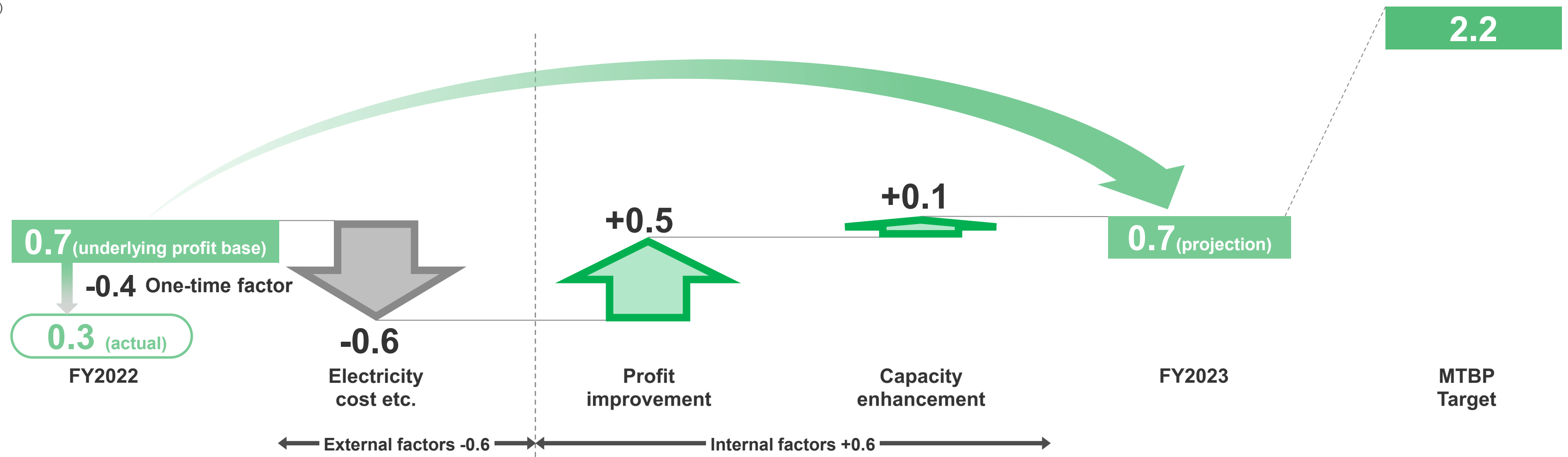
# 2-10. Business Summary (Environment)

Projection

- Environmental systems**
  - Increase in electricity and raw material costs passed on to selling prices.
- Melting & solidification of incineration ash**
  - Increase in electricity costs partially passed on to the customers.
- Secure an underlying profit similar to the previous year. However, the performance is expected to fall significantly short of its MTBP targets, primarily due to delays in collecting incineration ash caused by the financial difficulties faced by municipalities as a result of the impact of COVID-19 as well as halfway progress in passing on the increased electricity costs.**

## Ordinary Profit Variance

(bil. yen)



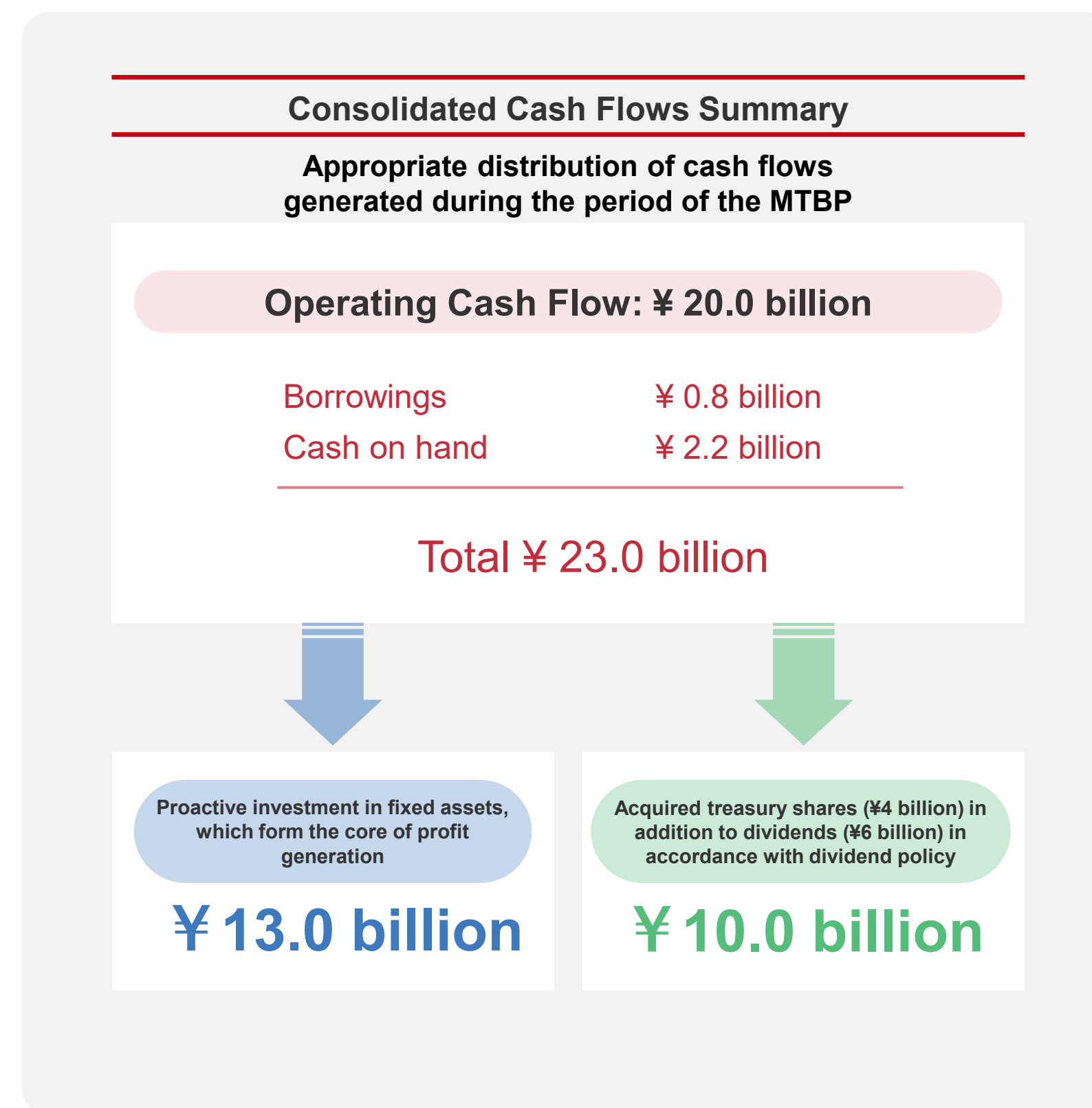
# 2-11. Consolidated Cash Flows

Projection

## Consolidated Cash Flows

(bil. yen)

	FY2023 Projection	FY2021 - FY2023
Profit before income taxes + Depreciation	6.4	28.0
Share of loss (profit) of entities accounted for using equity method (non-cash items)	1.4	-0.3
Other (changes in working capital, etc.)	0.7	-7.7
<b>Cash flows from operating activities</b>	<b>8.5</b>	<b>20.0</b>
Cash flows from investing activities	-6.2	-13.0
<b>Free cash flows</b>	<b>2.3</b>	<b>7.0</b>
Increase (decrease) in borrowings	-1.1	0.8
Cash dividends	-1.7	-6.0
Acquisition of treasury shares	-1.0	-4.0
<b>Cash flows from financing activities</b>	<b>-3.8</b>	<b>-9.2</b>
Cash and cash equivalents at beginning of period	8.9	9.6
Cash and cash equivalents at end of period	7.4	7.4
<b>Net increase (decrease) in cash and cash equivalents</b>	<b>-1.5</b>	<b>-2.2</b>

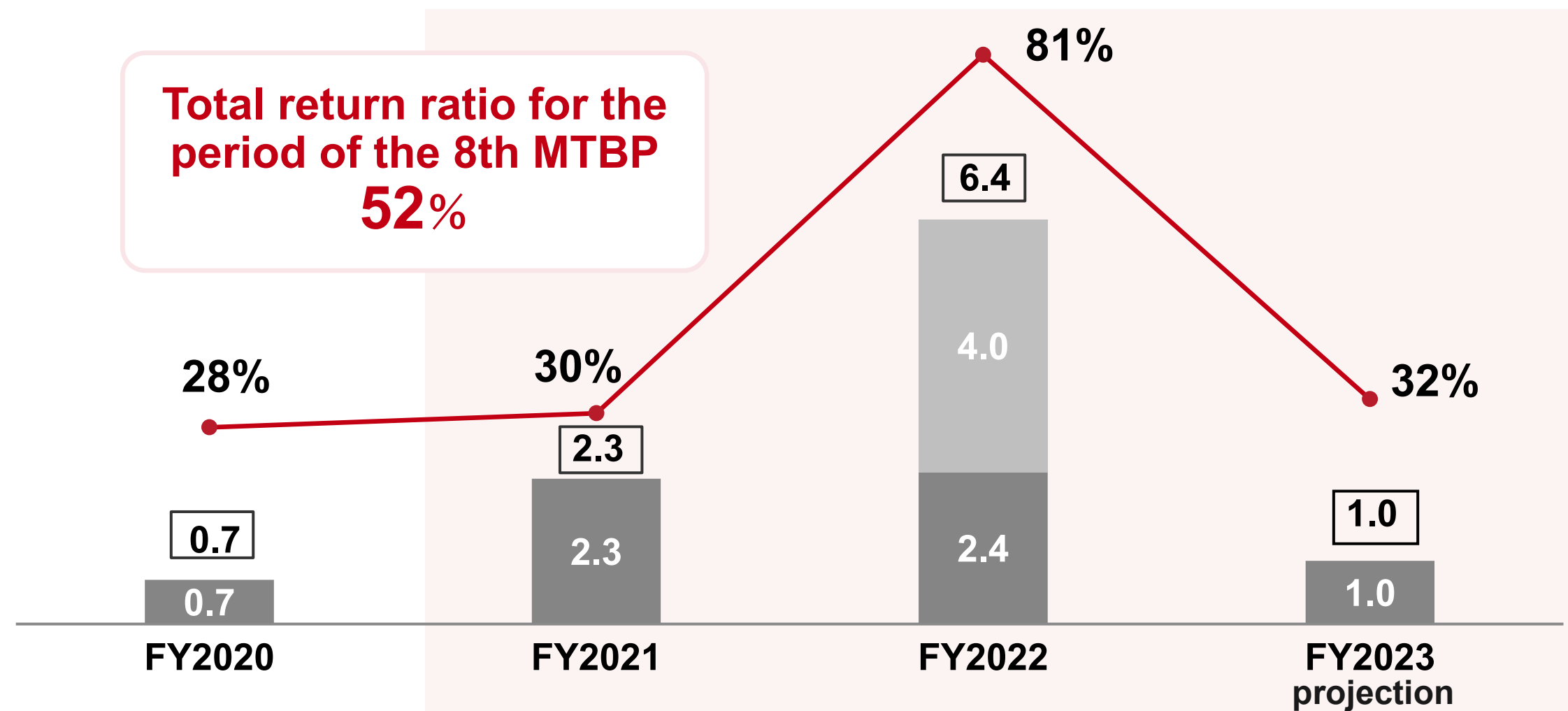


# 2-12. Shareholder Return

Projection

- Dividend for FY2023: Scheduled to be implemented in accordance with the dividend policy (interim ¥3, year-end ¥4 per share) Maintaining the dividend forecast disclosed in May.
- Total return ratio for the MTBP period: 52%

Total return  
  Treasury shares acquisition  
  Cash dividends  
 ● Total return ratio (bil. yen)



**Dividend Policy**

Consol. dividend payout ratio  
Targeting annual ratio of approx. **30%**

**Treasury Shares Acquisition Policy**

Comprehensively considered and examined of;

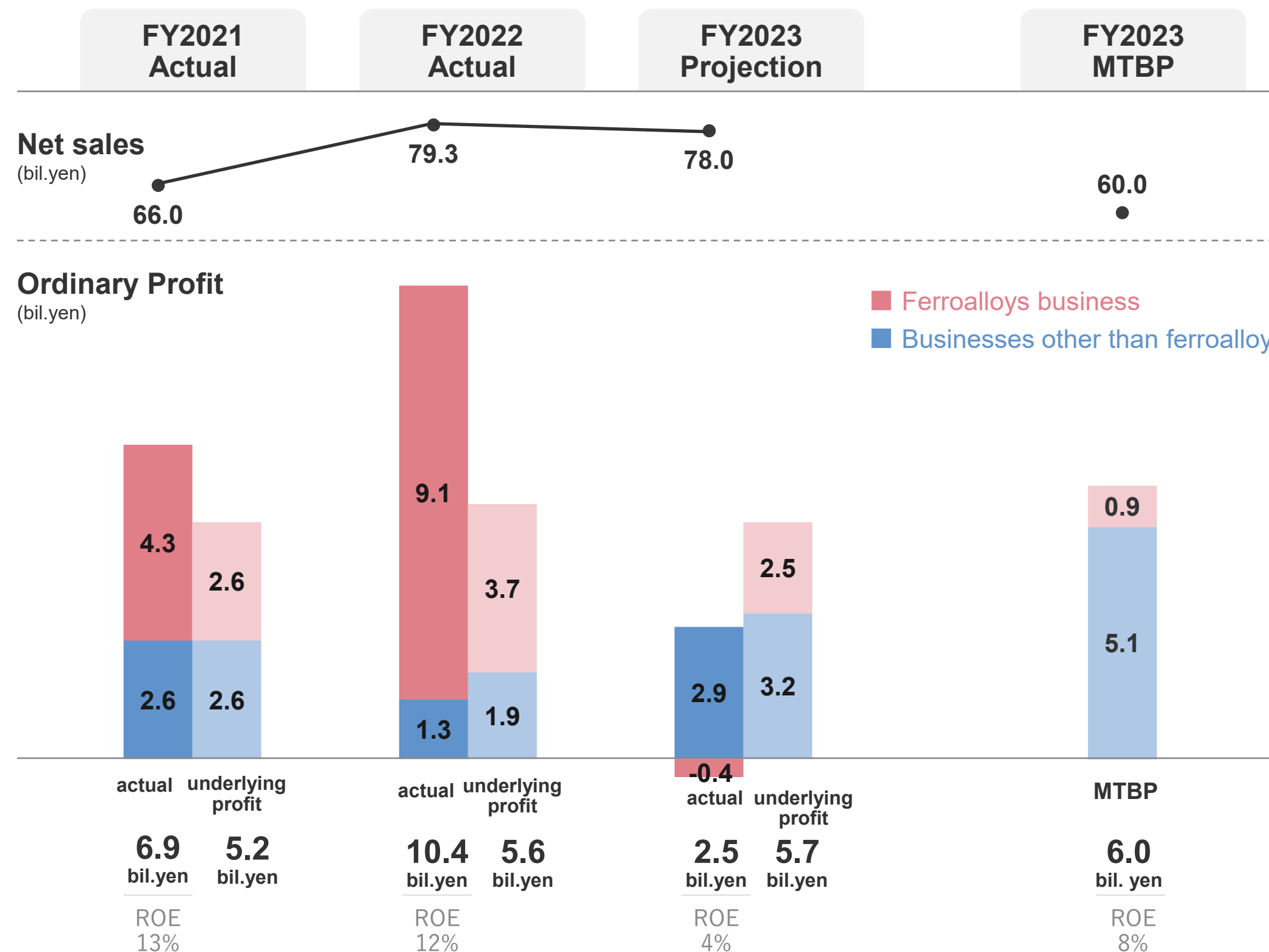
- future business development
- investment plan
- level of retained earnings
- financial results trends etc.

Net sales	54.0	66.0	79.3	78.0
Profit attributable to owners of parent	2.6	7.8*	7.9	3.0

\* Including +2.4 billion yen due to recognition of deferred tax assets.

# 3-1. Progress of the Eighth Medium-Term Business Plan ①

## Ordinary profit trend



(Underlying profit base: profit excluding inventory impact)

### Summary

- Steady implementation of various measures of the MTBP and pass on the cost increases, such as raw materials and electricity costs.
- However, during the MTBP, we faced challenging business environment due to the impact of “ COVID-19,” “The Russian invasion of Ukraine,” and “Continued monetary tightening in the United States and Europe.” etc. The sales of electronic materials and battery materials have declined due to production cutbacks in EVs, the collection of incineration ash decreased due to the deterioration of municipal fiscal finances, and the inventory impact caused by a significant decline in the ferroalloy market.
- In ordinary profit, the MTBP target for 2023 is expected to almost achieved based on underlying profit excluding the pact of inventory, etc.

### Status Update

#### Ferroalloys business

- Achieved stable earnings through two measures for domestic operations: consolidating the production site and revising the price scheme
- Overseas production and sales volumes increased steadily due to an improvement in the production system, despite the significant impact of market conditions.

#### Businesses other than ferroalloy

##### (functional materials and environmental)

Despite the challenging business environment in FY2023, we are striving to increase revenues by expanding capacity in zirconium oxide and boron oxide, constructing a new incinerator ash No. 4 melting furnace, and restarting ferroboron production. Additionally, we will pass on the higher electricity costs to the selling prices.

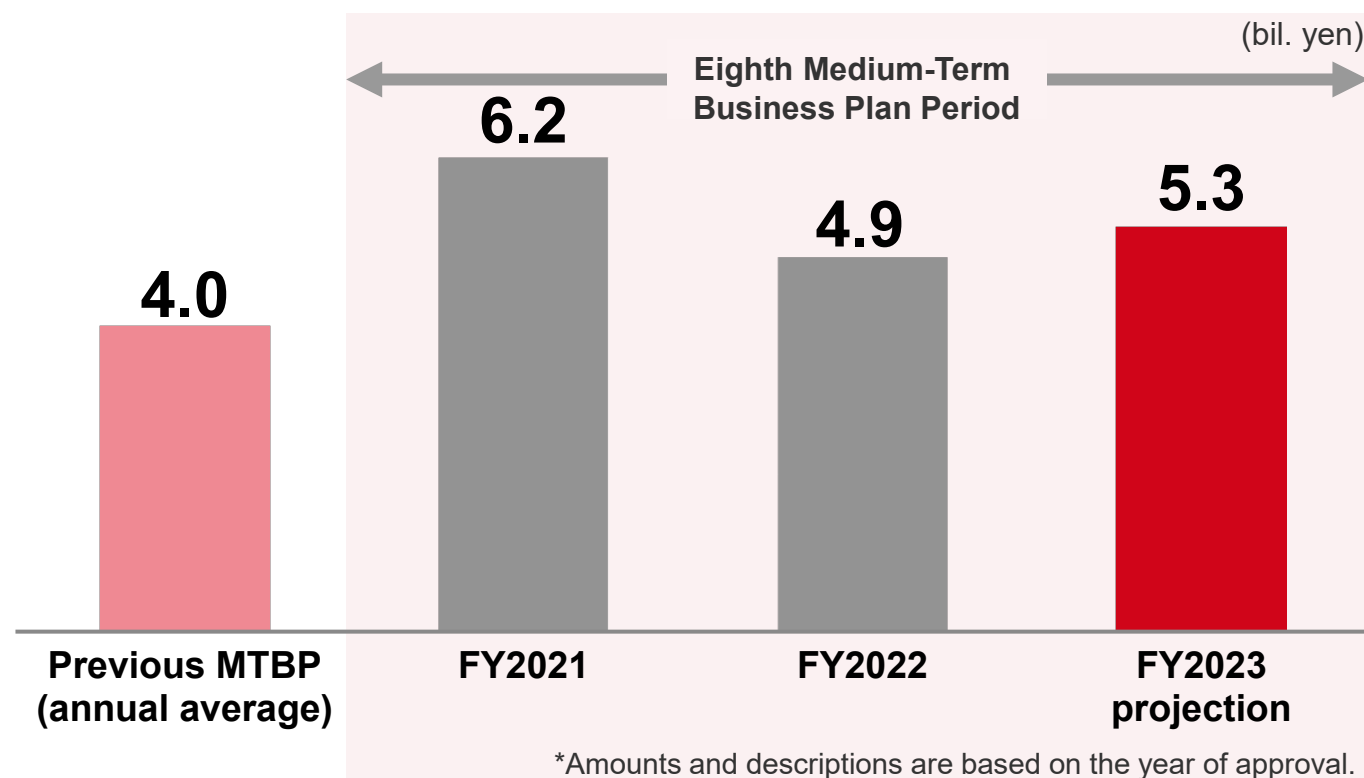


# 3-2. Progress of the Eighth Medium-Term Business Plan ②

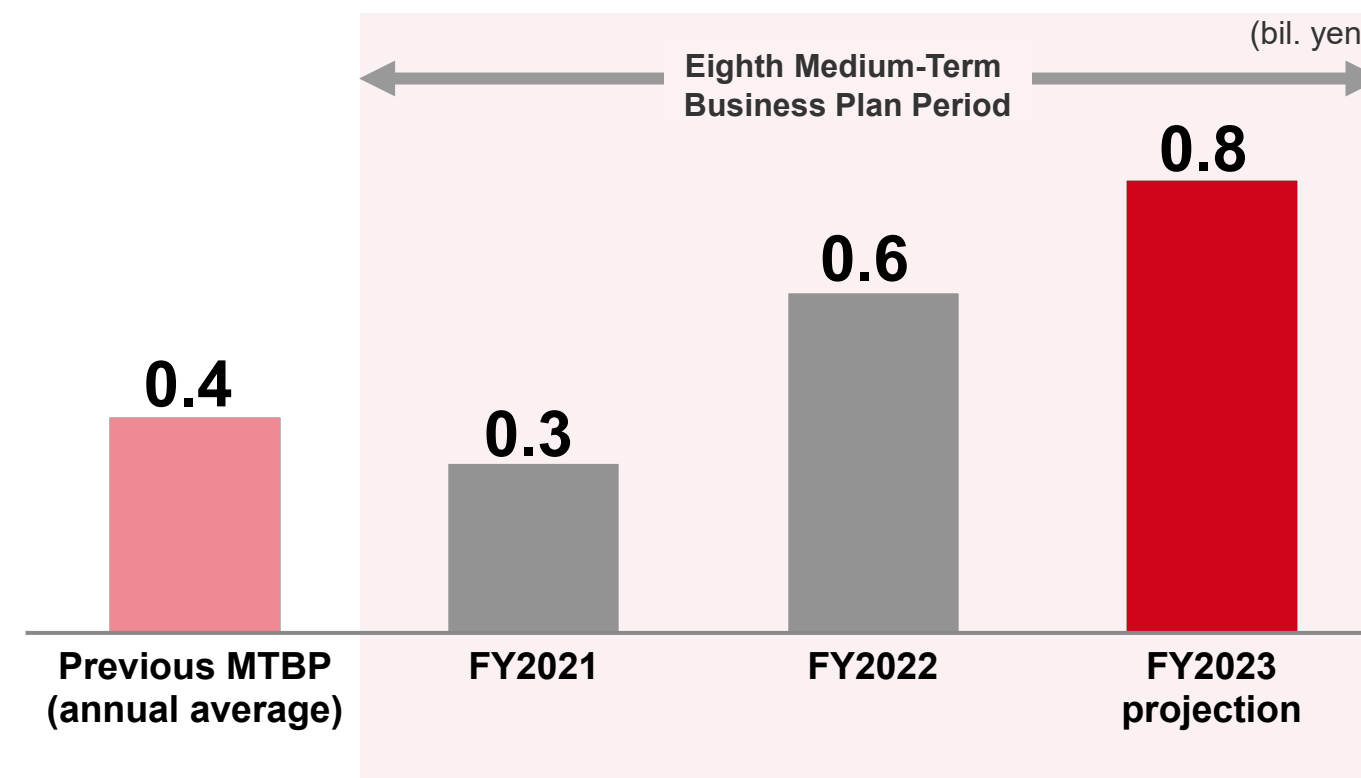
## ■ Accomplishments to date and future measures

		2021	2022	2023 1H (Jan. to Jun.)	2023 2H Jul. ~	
Strengthening Existing Businesses	Ferroalloys	<b>Stabilize profitability in the ferroalloy business</b> <ul style="list-style-type: none"> <li>High-carbon ferromanganese furnace shutdown (Kashima / Dec. '21) Consolidate production to Tokushima Introduction of a new price scheme (Jul. '21)</li> </ul>			<ul style="list-style-type: none"> <li>Pass the increase in electricity prices on to the selling prices (Apr. '23)</li> </ul>	<ul style="list-style-type: none"> <li>Consider green ferroalloy expansion using hydroelectric power generated by Pertama Ferroalloys Sdn. Bhd.</li> </ul>
	Functional Materials	<b>Expand functional materials and environmental businesses</b> <ul style="list-style-type: none"> <li>Expansion of zirconium oxide manufacturing capacity (Tokushima / Sept. '21)</li> <li>Expansion of boron oxide manufacturing capacity (Tokushima / Sept. '21)                             <ul style="list-style-type: none"> <li>Expansion of boron oxide manufacturing facilities (Toyama / Feb. '22)</li> <li>Restart ferroboron manufacturing (Toyama / Nov. '22)</li> </ul> </li> <li>Establishment of the No.4 incineration ash melting furnace (EM4) (CDK / Oct. '22)</li> </ul>			<ul style="list-style-type: none"> <li>Expansion for OEM batteries (Cathode materials for lithium-ion batteries) (May '23)</li> </ul>	<ul style="list-style-type: none"> <li>Ramping up the sales by developing new customers and leveraging the new production capacity</li> </ul>
	Environment					<ul style="list-style-type: none"> <li>Full operation of EM4 by volume expansion of incinerator ash</li> </ul>
Tackling New Businesses	R&D	<b>Further enhancement and strengthen R&amp;D activities</b> <ul style="list-style-type: none"> <li>Strengthening the R&amp;D structure (Jan. '21)</li> <li>Collaborative research with universities, research institutes, and cutting-edge companies (from '21-)</li> </ul>			<ul style="list-style-type: none"> <li>Developing new ion-exchanged inorganic crystals through joint research with Shinshu University (Mar. '23)</li> </ul>	<ul style="list-style-type: none"> <li>Developing and practical application of water treatment circulation equipment utilizing new Ion exchange inorganic crystals</li> </ul>
	Exploring Opportunities to Generate Synergies	<b>Promoting the development of new fields and markets vigorously</b> <ul style="list-style-type: none"> <li>Environmental systems business development center established (Jul. '21)</li> </ul>			<ul style="list-style-type: none"> <li>Investing in venture capital (Apr. '23)</li> </ul>	<ul style="list-style-type: none"> <li>Exploration of opportunities for generating synergies between the invested fund's companies and Nippon Denko</li> </ul>
Strengthening the Corporate Structure to Adapt to the Changing Business Environment	Taking on Challenges to Achieve Carbon Neutrality in 2050	<ul style="list-style-type: none"> <li>Installation of solar power generation facilities (Koriyama / Feb. '22)</li> <li>Endorsement of the GX League (Mar. '22)</li> </ul>			<ul style="list-style-type: none"> <li>Strong promotion of energy conservation in production activities</li> <li>Endorsement of the GX League (May '23)</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of carbon-free ferroalloy production process (Investigation of carbon-neutral energy-saving technologies for ferromanganese production)</li> </ul>
	Providing Products, Technology, and Services that Contribute to a Sustainable Society	<ul style="list-style-type: none"> <li>Contribute to the electrification and automation of automobiles: Zirconium oxide production reinforcement work (Tokushima / Sept. '21)</li> <li>Contribute to the advancement of information infrastructures:                             <ul style="list-style-type: none"> <li>Boron oxide production reinforcement work (Tokushima / Sept. '21)</li> <li>Expansion of boron oxide production facilities (two-production site) (Toyama / Feb. '22)</li> </ul> </li> <li>Contribution to a recycling-based society: Establishment of the No.4 incineration ash melting furnace (EM4) (CDK / Oct. '22)</li> <li>Contribution to strengthening the domestic supply chain: Restarting ferroboron production (Toyama / Nov. '22)</li> </ul>			<ul style="list-style-type: none"> <li>Contributing to a carbon-free society: Expanding cathode materials for lithium-ion battery OEM (Myoko / May '23)</li> <li>Contributing to the domestic supply chain through stable ferroboron manufacturing</li> </ul>	
	D&I- and Human Capital-Oriented Management	<ul style="list-style-type: none"> <li>Kurumin (2nd certification / April '21)</li> <li>Introduction of a system to extend the mandatory retirement age of 65 (Mar. '22)</li> </ul>				<ul style="list-style-type: none"> <li>Establishment of a Junior Board (A quasi-executive committee of mid-level and young employees)</li> </ul>
	Fair & Equitable Purchasing that Also Takes Human Rights & the Environment into Consideration	<ul style="list-style-type: none"> <li>Formulation of Basic Policy on Human Rights (Oct. '22)</li> <li>Establishment of Sustainable Procurement Policy (Oct. '22)</li> </ul>				<ul style="list-style-type: none"> <li>Implementation of human rights due diligence</li> </ul>
	Other	<ul style="list-style-type: none"> <li>Website renewal (Nov. '22)</li> </ul>			<ul style="list-style-type: none"> <li>Issuance of Integrated Report (Mar. '23)</li> </ul>	
	Promotion of DX	<ul style="list-style-type: none"> <li>Introduction of facility management system (Jul. '22)</li> <li>Formulation of DX vision / Roadmap (Oct. '22)</li> </ul>			<ul style="list-style-type: none"> <li>Introduction data analysis management system (Feb. '23)</li> <li>Introduction purchasing control system. (Koriyama, CDK, Jun. '23)</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of core systems (from Jan. '24 to phase-in)</li> <li>Introduction purchasing control system (Toyama, Myoko, Hidaka)</li> </ul>

## Capital Investment Trend



## R&D Trend



- Expansion of production capacity and investment in energy-saving provisions made up to last year are going smoothly and contributing to business performance.
  - ① Newly established No.4 incineration ash melting furnace (EM4) (Chuo Denki Kogyo Co., Ltd.)
  - ② Resumed Ferroboron Production
  - ③ Dual-base production bases of Boron oxide (Toyama Plant, Imizu area)
  - ④ Production capacity expansion for cathode materials for lithium-ion batteries (Myoko Plant)
  - ⑤ Self-consumption solar power generation system (Koriyama Plant)
- Actively promote investments in energy efficiency and decarbonization towards achieving carbon neutrality.
  - ① Business Classification Evaluation System under the Energy Conservation Act: Continue to qualify for S-Class evaluation
    - Inverterization of large dust collectors, more efficient transformers, etc.
  - ② Promoting the transition from fossil fuels to non-fossil energy sources and electricity.
    - Electrification is being examined for calcination furnaces for producing functional materials.

- Accelerate development of new products and technologies.
  - Promote collaborative research with universities and research institutes with advanced technologies
  - Patents for our developed products and technologies: 2 applications filed, 7 applications in preparation

[ Cooperation with external organizations (as of the end of Jun. 2023) ]

Field	# of cases
High functional materials related	7
Carbon neutrality related	9

- Measures for energy saving and decarbonization toward carbon neutrality.
  - Adopted in FS survey phase of the 2023 NEDO public offering business

**“Study on Carbon Neutral Energy Conservation Technologies in Ferromanganese Manufacturing”**

# 3-4. Long-term Business Strategy to Achieve a PBR over 1.0

The next MTBP (from 2024) is scheduled to be announced by the end of 2023

**Management Philosophy :** To help create an affluent future through sustainable growth by developing and providing distinctive products, technologies, and services.  
**Basic Policy :** **To achieve the dual aims of "contributing to the resolution of societal issues through our business activities" and "increasing our corporate value through sustainable growth."**  
⇒Aiming to improve trust and reputation by providing value to a broad range of stakeholders.

## Driving PBR 1.0x Growth: Propelling the Four Pillars

### ① Growth Strategy

**Expand business by aggressively investing in growth fields that contribute to a sustainable society**

- Ferroalloys: : Production increase by Pertama Ferroalloys (Green Ferroalloys + Global Supply Base)
- Functional materials : Investments in production expansion, development and commercialization of new products in response to the electrification of automobiles, etc.
- Environmental systems : Expand sales of hydrogen-related pure water production system and expand business domains for wastewater treatment
- Melting and solidification of incineration ash : Significant business expansion (Perfect recycling into social infrastructure)

**Restructure business portfolio by aggressively investing in growth areas**

### ② Improve and Stabilize Profitability

**To establish a stable and highly profitable structure**

### ③ Financial Strategy

**Transforming to a financial structure that realizes long-term strategies and improves profitability**

- Reinforce non-current assets as a source of profits
- Expand financial leverage to the appropriate scope
- Proactive profit returns to shareholders

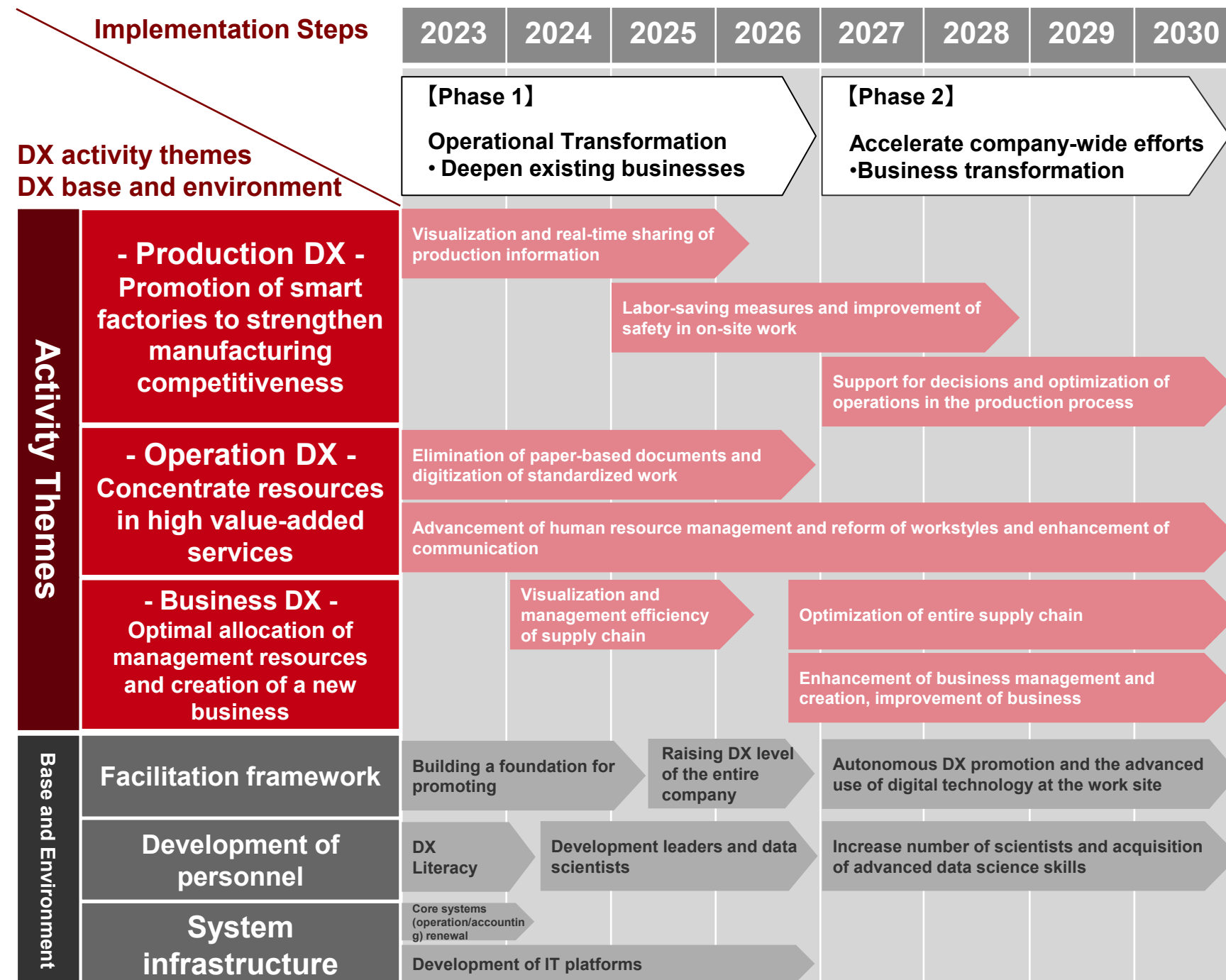
### ④ Sustainability-Related Measures

**Promoting sustainability measures linked to long-term business strategy**

- Human capital management : Investing in human capital and talent recruitment, realizing DE&I, enhancing engagement
- GX : Wood coke, conversion from fossil fuels to electricity, introducing renewable power generations, etc.
- DX : Innovating manufacturing and operational systems through smart factories, etc., and developing DX human resources
- Sustainability procurement: Green procurement, human rights DD, geopolitical risk aversion, supplier selection
- Information disclosure : Proactive disclosure of human capital-related, environmental-related, etc., and strengthening of dialogue with shareholders

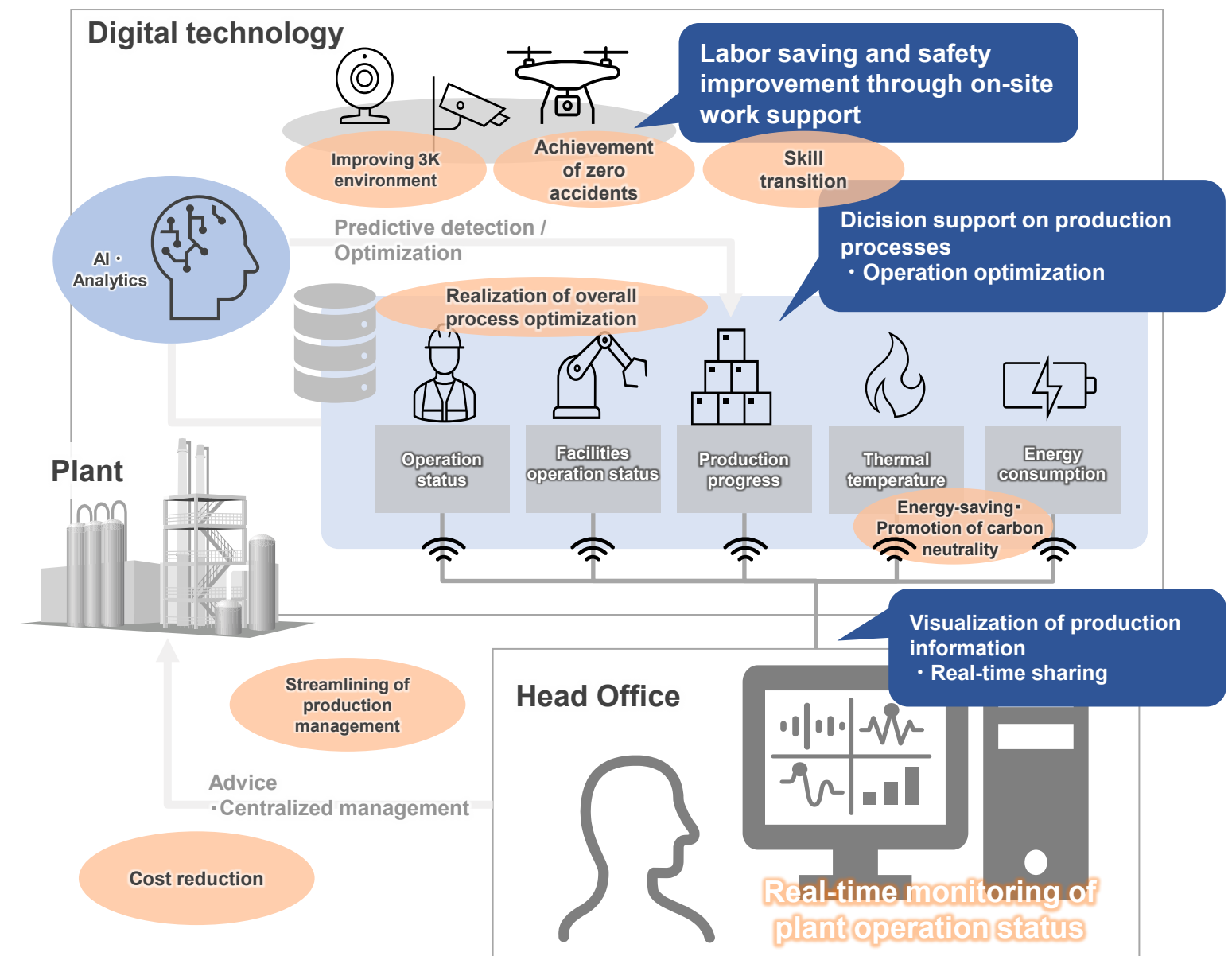
## DX Roadmap (2023-2030)

- Supporting the manufacturing sites digitization in line with DX vision toward 2030. Promoting the company-wide installment of IoT base and software.



## Smart Factory (Tokushima Plant Functional Materials)

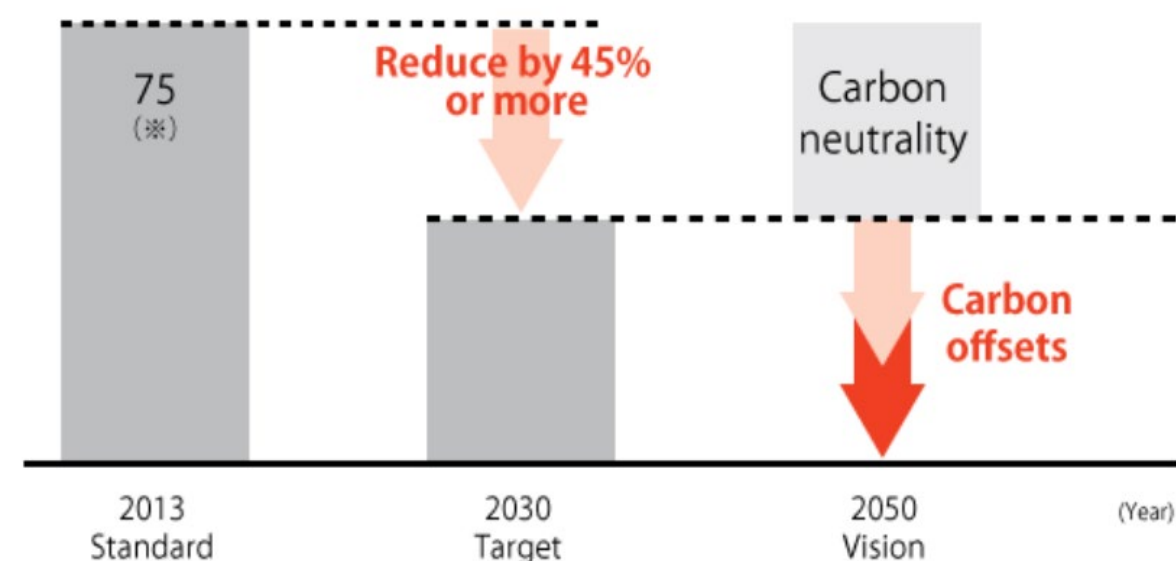
- Build a system to visualize on-site data and, share and utilize it in an integrated manner.
- Realizing optimal manufacturing and creation of new value through digital transformation.



Measures to energy saving and decarbonization toward carbon neutrality.

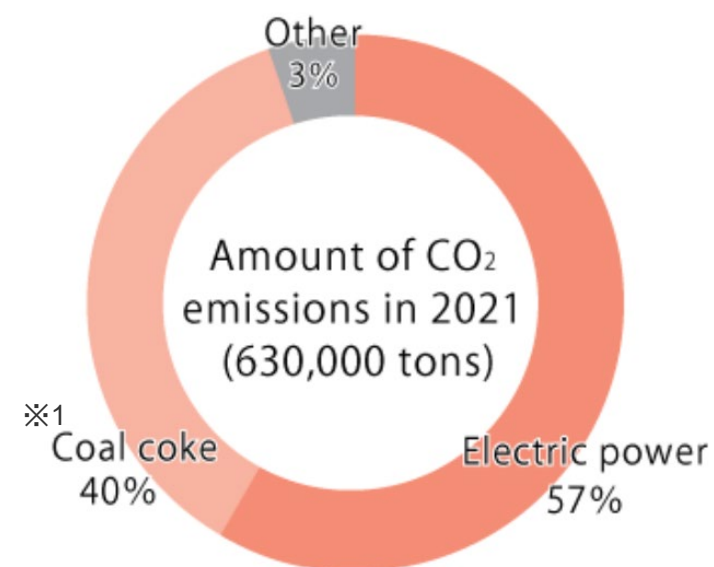
## Scenarios for reducing CO2 emissions

(1)  
CO2 emissions of the Nippon Denko Group (10,000 tons/year)



Scenarios: Scope 1, Scope 2  
Note: The applicable year of the CO2 emission factor for general electricity utilities has changed (form document published on March 29, 2022)

(2)  
CO2 emissions ratio by energy source of the Nippon Denko Group



※1: Reducing agent for manganese ore mainly in ferroalloy manufacturing

## Energy conservation activities

Efforts to reduce energy consumption unit and achievement under the Agency for Natural Resources and Energy's Business Classification Evaluation System based on the Energy Conservation Act, the Nippon Denko is recognized as an **"S Class Excellent Operator"** for the third consecutive year.

Adopted in FS survey phase of the 2023 NEDO public offering business

Theme : **Study on Carbon Neutral Energy Conservation Technologies in Ferromanganese Manufacturing**

Widely exploring new reduction techniques to replace coal coke. Survey processes capable of decarbonization and expected high energy-saving effects.

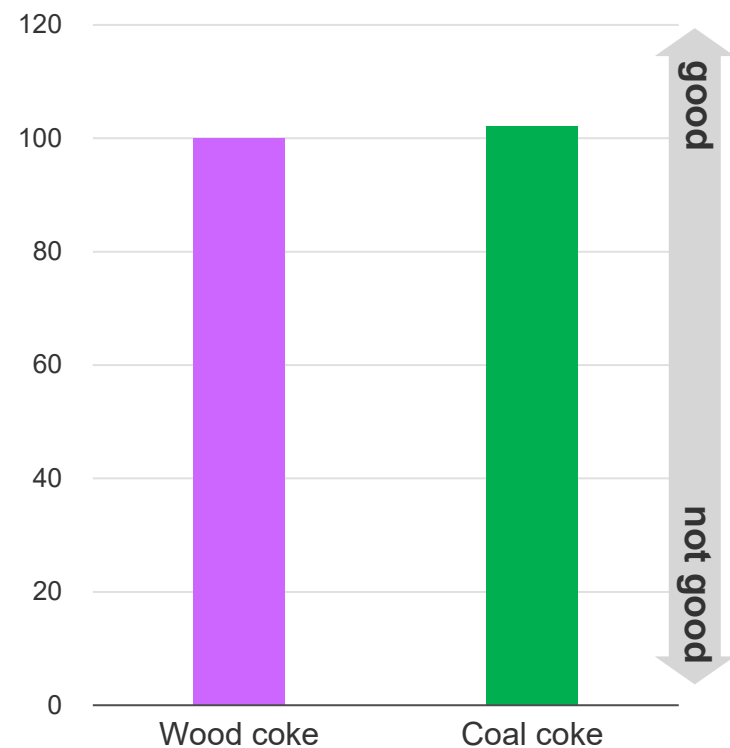
### [Candidates for manganese ore's new reduction techniques]

- ① Sustainable wood coke reduction
- ② Hydrogen reduction (including HYDROGRAPHY PLASMA REDUCTION)
- ③ Green methane reduction
- ④ Green synthetic carbon reduction
- ⑤ Electrolytic reduction of molten oxide (electroreduction)

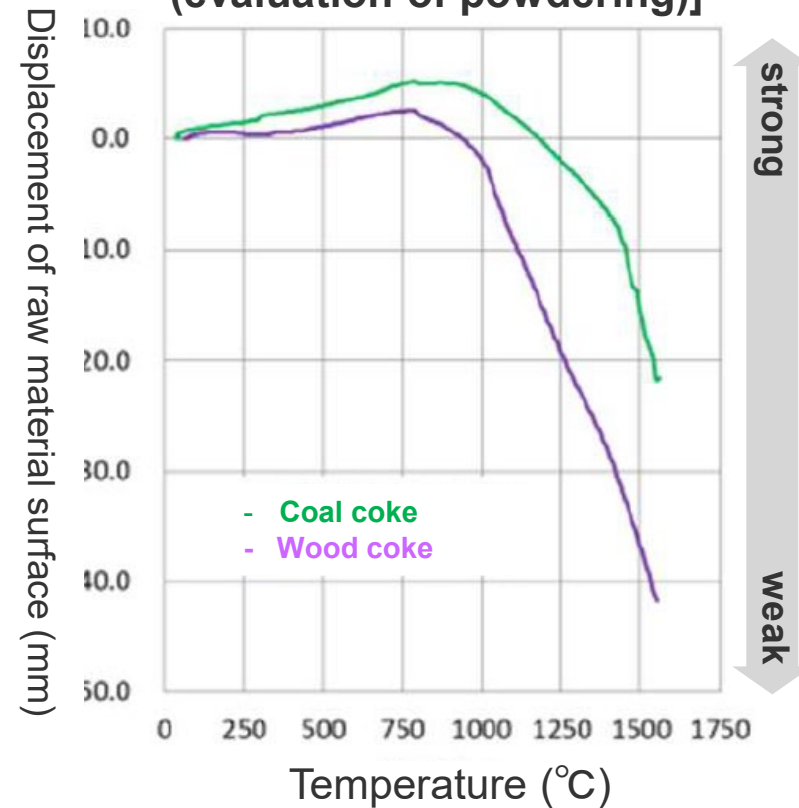
## Research and development on reducing the use of wood coke

### Performance evaluation

[Reducibility test (yield evaluation)]



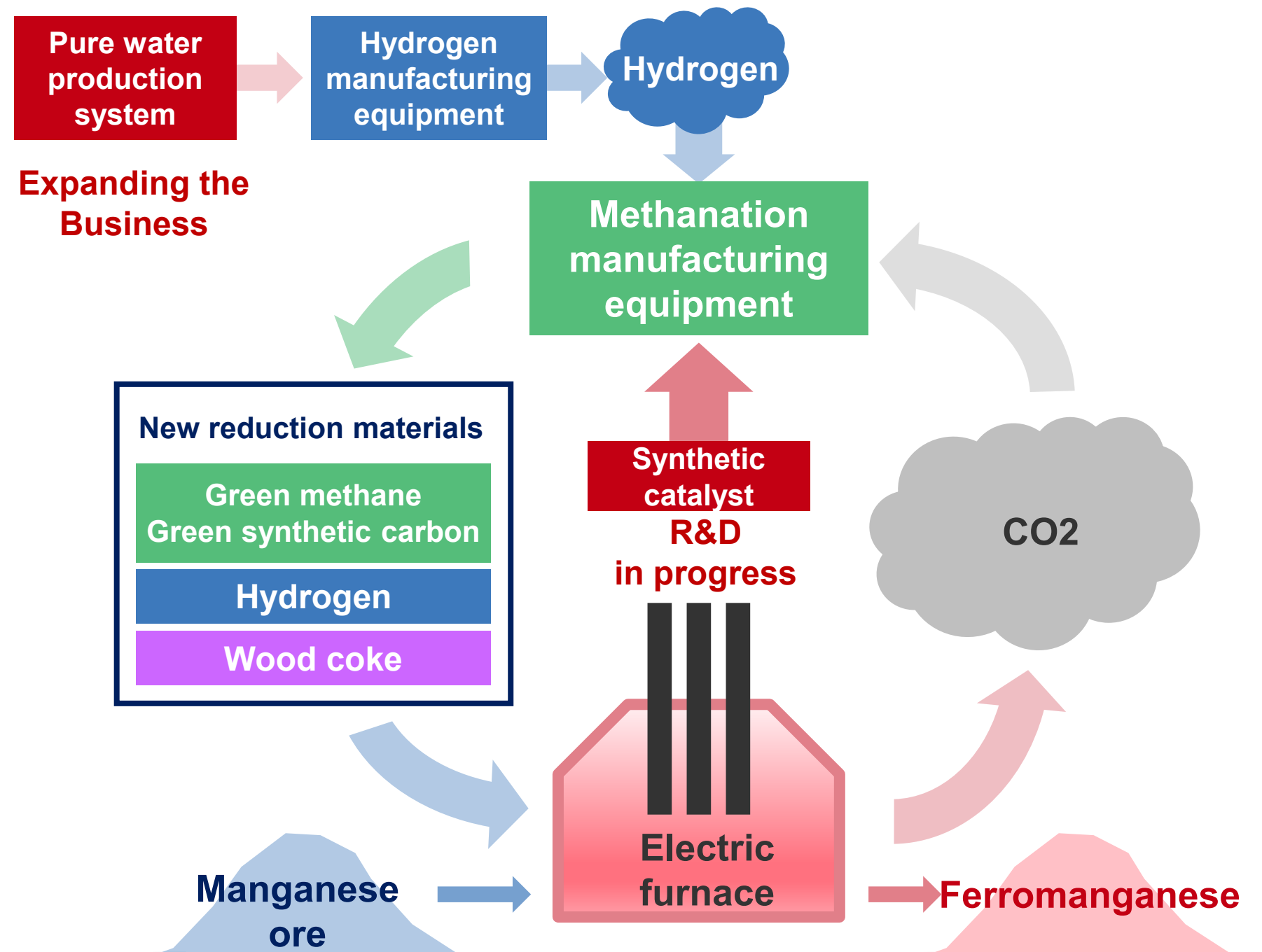
[High-temperature strength test (evaluation of powdering)]



- In the reducibility performance test of manganese ore, there is no significant difference between wood coke and coal coke: Great potential for substitution for wood coke.
- However, wood coke has low strength at high temperatures: Operation in an actual furnace is a major issue.
- Therefore, two approaches, namely, improvement of wood coke and technological improvement at the time of operation of an actual reactor, are adopted.

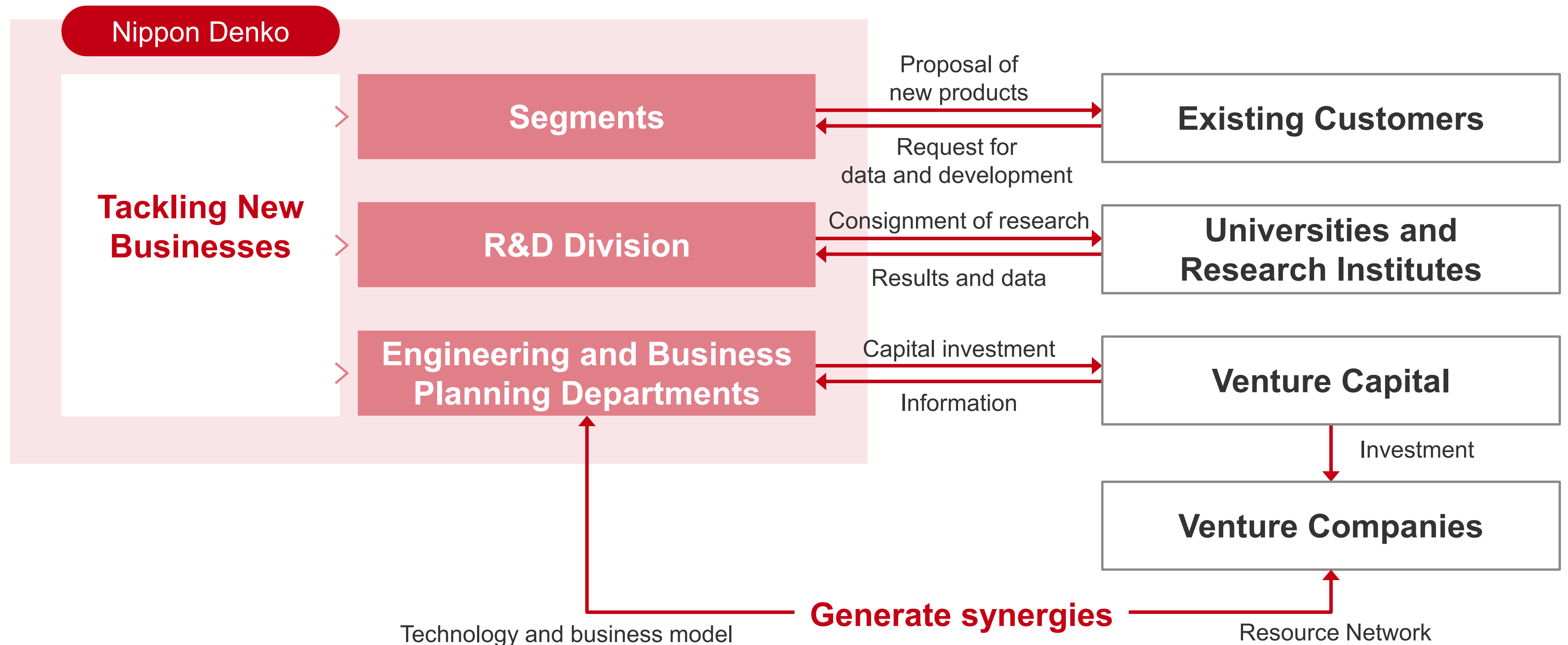
## Image of CO2 zero emissions in ferromanganese production

In parallel with the investigation and development of manganese ore's new reduction technique, Nippon Denko aims to build a sustainable cycle that utilizes our established products and technologies.



# 3-8. Tackling New Businesses ①

- **Trilateral external collaboration to expand our business and create business synergies**
  - Adding a new system for creating synergies with venture companies, the Nippon Denko will further accelerate the application and expansion of our technology and knowledge.



## Development of New Ion-Exchange Inorganic Crystals

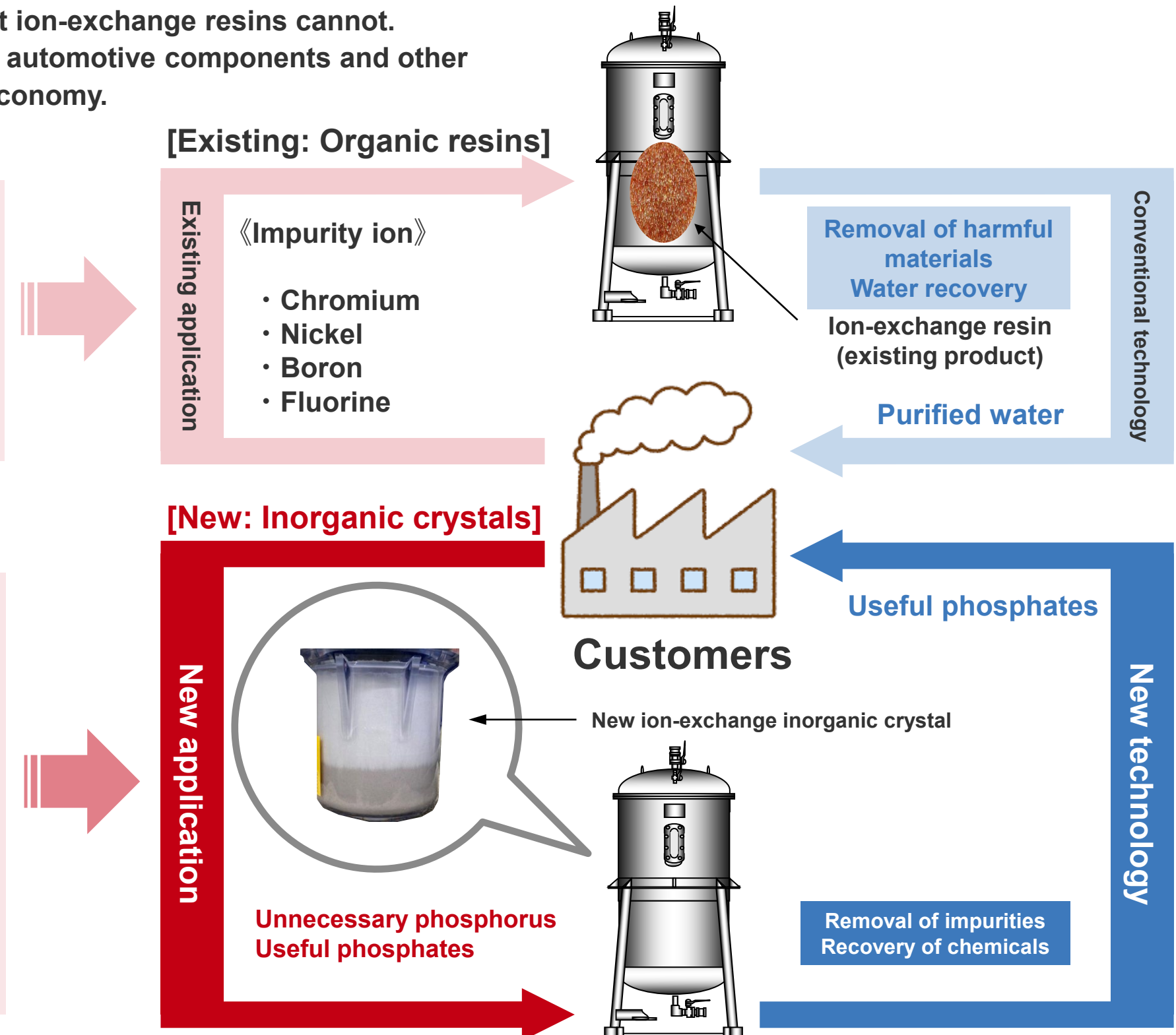
Nippon Denko has collaborated with Verne Crystal Inc. (a venture company of Shinshu University) and Shinshu University to develop a new ion-exchange inorganic crystal with water treatment functions that ion-exchange resins cannot. Our achievement lies in enabling long-lasting durability of plating solutions used in automotive components and other applications, making a significant contribution to the advancement of the circular economy.

### ■ Ion-exchange resin (existing product)

- An organic material that removes all impurity ions contained in water.
- Used for purification of factory wastewater such as chromium, boron, nickel, etc. and equipment for pure water production.

### ■ Ion-exchange inorganic crystals (new product)

- An inorganic material that can selectively and efficiently remove specific impurity ions.
- It can selectively adsorb unwanted ions (phosphorous acid) contained in electroless nickel plating effluent, leaving useful ions (hypophosphorous acid), and can reuse effluent.
- Patent processing: Developed a water treatment circulatory system utilizing ion-exchange inorganic crystals, aiming for commercialization in two years.





## Venture capital fund investments

Explore opportunities to generate synergies with venture companies through fund investments.

- Invested in “EEI Fund 5 Innovation and Impact Investment”, which is a fund specializing in the environmental energy field, in April 2023.
- Aiming to develop new businesses through collaboration with venture companies that have new technologies and business models.

### Outline of “EEI Fund 5 Innovation and Impact Investment”

<b>Operating Company</b>	Energy & Environment Investment, Inc.
<b>Investment Period</b>	2022 to 2032 (extended for up to 2 years)
<b>Investment Targets</b>	<ul style="list-style-type: none"><li>■ Venture companies with business models and technologies that contribute to the realization of a sustainable society, with a focus on decarbonization.</li><li>■ Venture companies with business models and technologies that contribute to drastic innovation with the aim of achieving carbon-neutrality in 2050.</li></ul>

# 4-1. FY2023 First Half Consolidated Financial Results

Appendix

	FY2022			FY2023			YoY
	Q1	Q2	1H	Q1	Q2	1H	
Net sales	19.8	18.6	38.4	20.7	18.7	<b>39.4</b>	1.0
Operating profit	3.7	2.2	5.9	1.4	0.5	<b>1.9</b>	-4.0
Ordinary profit	4.1	3.0	7.1	0.5	0.6	<b>1.1</b>	-6.0
Ordinary profit margin (%)	21	16	18	2	1	<b>3</b>	-
Profit attributable to owners of parent	3.1	2.5	5.6	0.1	0.7	<b>0.8</b>	-4.8
Earnings per share (yen)	20.8	17.0	37.8	1.1	4.7	<b>5.8</b>	-32.0

(bil. yen)

## 4-2. FY2023 First Half Consolidated Financial Results (by Segment)

Appendix

(bil. yen)

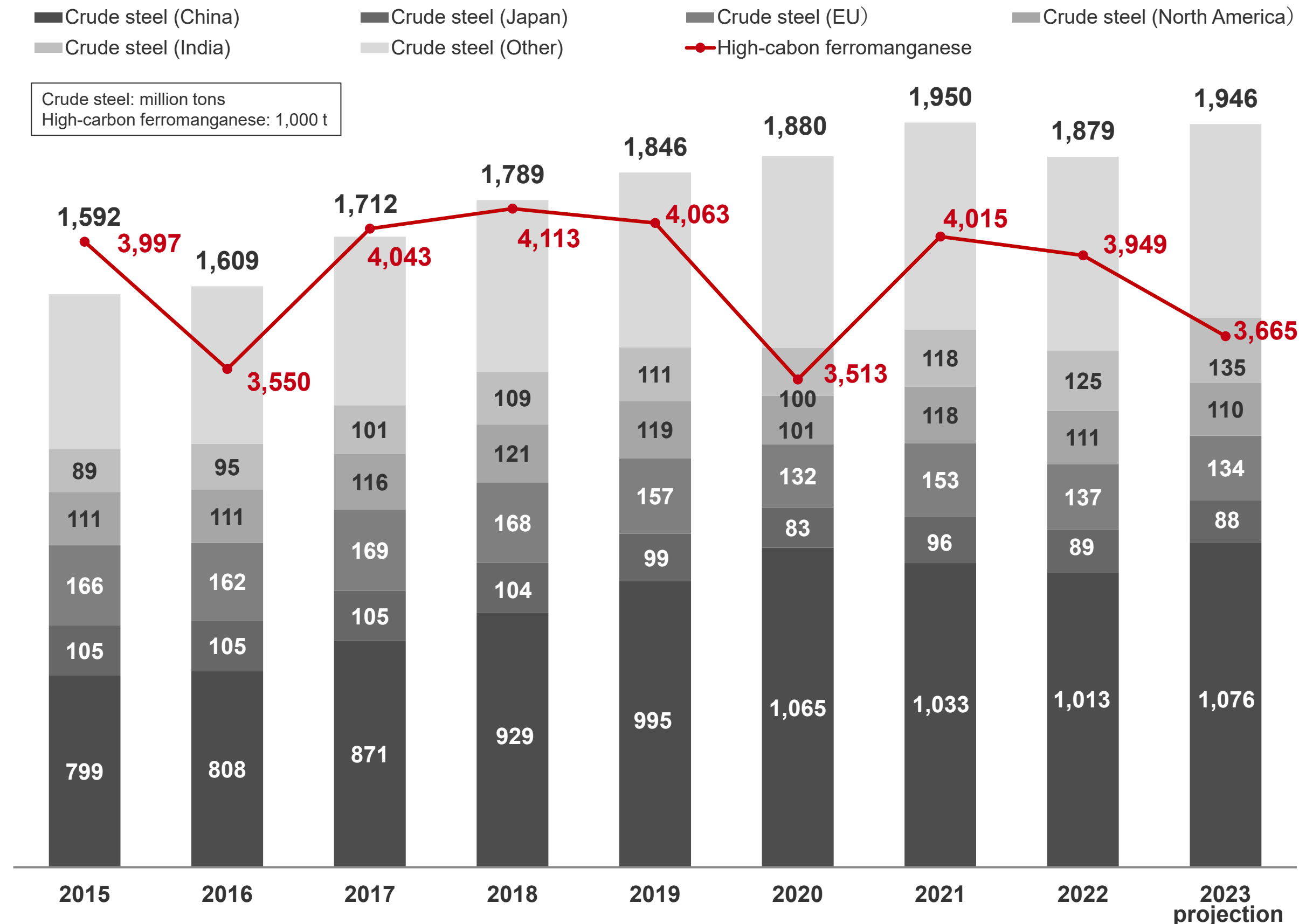
		FY2022			FY2023			YoY
		Q1	Q2	1H	Q1	Q2	1H	
Ferroalloys	Net sales	14.9	13.1	28.0	15.9	12.6	28.5	0.5
	Ordinary profit	3.8	2.3	6.1	0.5	-0.2	0.3	-5.8
Functional Materials	Net sales	3.0	2.9	5.9	2.7	3.6	6.3	0.2
	Ordinary profit	0.2	0.3	0.5	0.0	0.5	0.5	-0.0
Environment	Net sales	1.4	1.4	2.8	1.6	1.6	3.2	0.4
	Ordinary profit	0.2	0.1	0.3	0.0	0.2	0.2	-0.1
Electric Power	Net sales	0.2	0.5	0.7	0.2	0.4	0.6	-0.1
	Ordinary profit	-0.1	0.2	0.1	-0.1	0.2	0.1	-0.0
Other	Net sales	0.4	0.6	1.0	0.4	0.4	0.8	-0.2
	Ordinary profit	-0.0	0.1	0.1	-0.0	0.0	0.0	-0.1
Total	Net sales	19.8	18.6	38.4	20.7	18.7	39.4	1.0
	Ordinary profit	4.1	3.0	7.1	0.5	0.6	1.1	-6.0

# 4-3. Management Indicators

Appendix

	(mil. yen)							
	2015	2016	2017	2018	2019	2020	2021	2022
Net sales	82,902	58,486	71,346	73,944	70,477	54,004	65,978	79,341
Operating profit	2,046	1,717	9,639	1,701	-5,572	5,434	8,436	8,815
Ordinary profit	211	1,614	9,239	1,947	-6,426	3,063	6,870	10,367
Profit attributable to owners of parent	-14,181	-116	7,988	2,352	-14,240	2,615	7,768	7,949
Total assets (end of FY)	92,827	84,563	98,447	99,786	85,224	86,171	95,888	104,943
Shareholder equity (end of FY)	63,596	61,232	70,702	69,009	54,206	56,367	64,256	69,187
Interest-bearing debt (end of FY)	10,630	7,891	7,230	12,749	18,704	19,354	17,759	21,052
Equity-to-asset ratio (end of FY)	68.5%	72.4%	71.8%	69.2%	63.6%	65.4%	67.0%	65.9%
Total number of issued shares (Thousands of shares)	146,741	146,741	146,741	146,741	146,568	146,776	146,853	146,931
Treasury shares (Thousands of shares)	306	306	308	309	1	2	8	7,092
Net assets per share (yen)	434.30	418.16	482.83	471.28	369.84	384.04	437.58	494.76
Basic earnings per share (yen)	-96.84	-0.80	54.55	16.06	-97.20	17.83	52.91	54.45
Dividends per share (yen)	5.00	5.00	13.00	5.00	-	5.00	16.00	17.00
Return on equity (ROE)	-20.0%	-0.2%	12.1%	3.4%	-23.1%	4.7%	12.9%	11.9%
Return on assets (ROA)	-15.3%	-0.1%	8.1%	2.4%	-16.7%	3.0%	8.1%	7.6%
Return on sales (ROS)	0.3%	2.8%	13.0%	2.6%	-9.1%	6.5%	10.4%	13.1%
Highest share price during the period (yen)	329	266	545	528	249	320	410	459
Lowest share price during the period (yen)	207	145	242	193	148	108	263	272

# 4-4. Crude Steel & High-Carbon Ferromanganese Production Trend



## FY2023 1H Overview

### Global crude steel (1H)

- Global crude steel production remained flat year-on-year.
- India and China increased year-on-year due to brisk infrastructure investment.

### Domestic crude steel (1H)

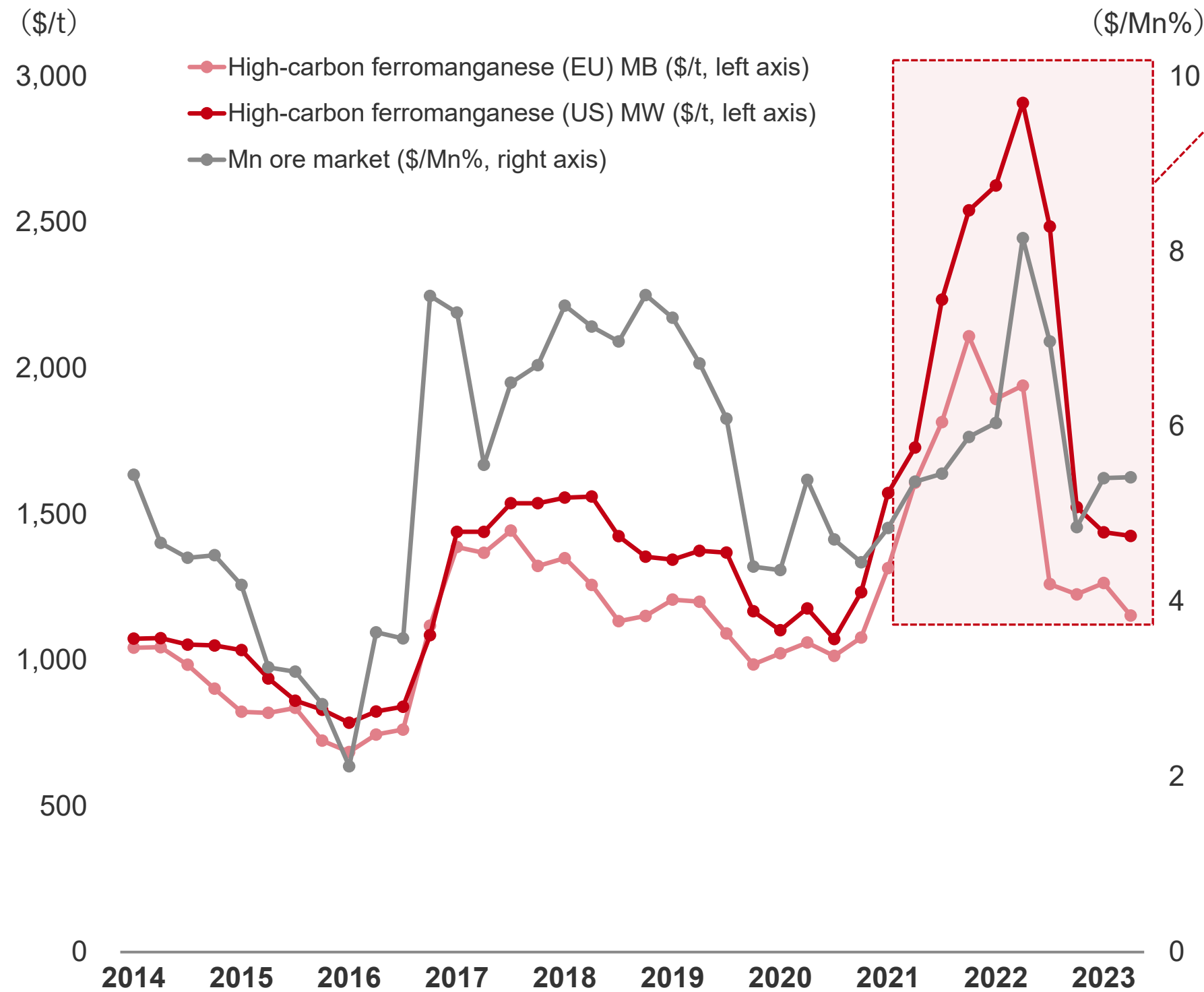
- Automotive production is on a recovery trend due to the easing of the shortfall of semiconductors, but the construction sector remains sluggish, which resulted in a year-on-year decrease of 4.7%.

### Global high-carbon ferromanganese production

- While the market is on a downward trend, India continues to produce at the same level as the previous year. However, there has been a decrease in production globally.
- Possibility of global production adjustment from the 2H of the fiscal year on the background of weakening global market conditions and rising production costs.

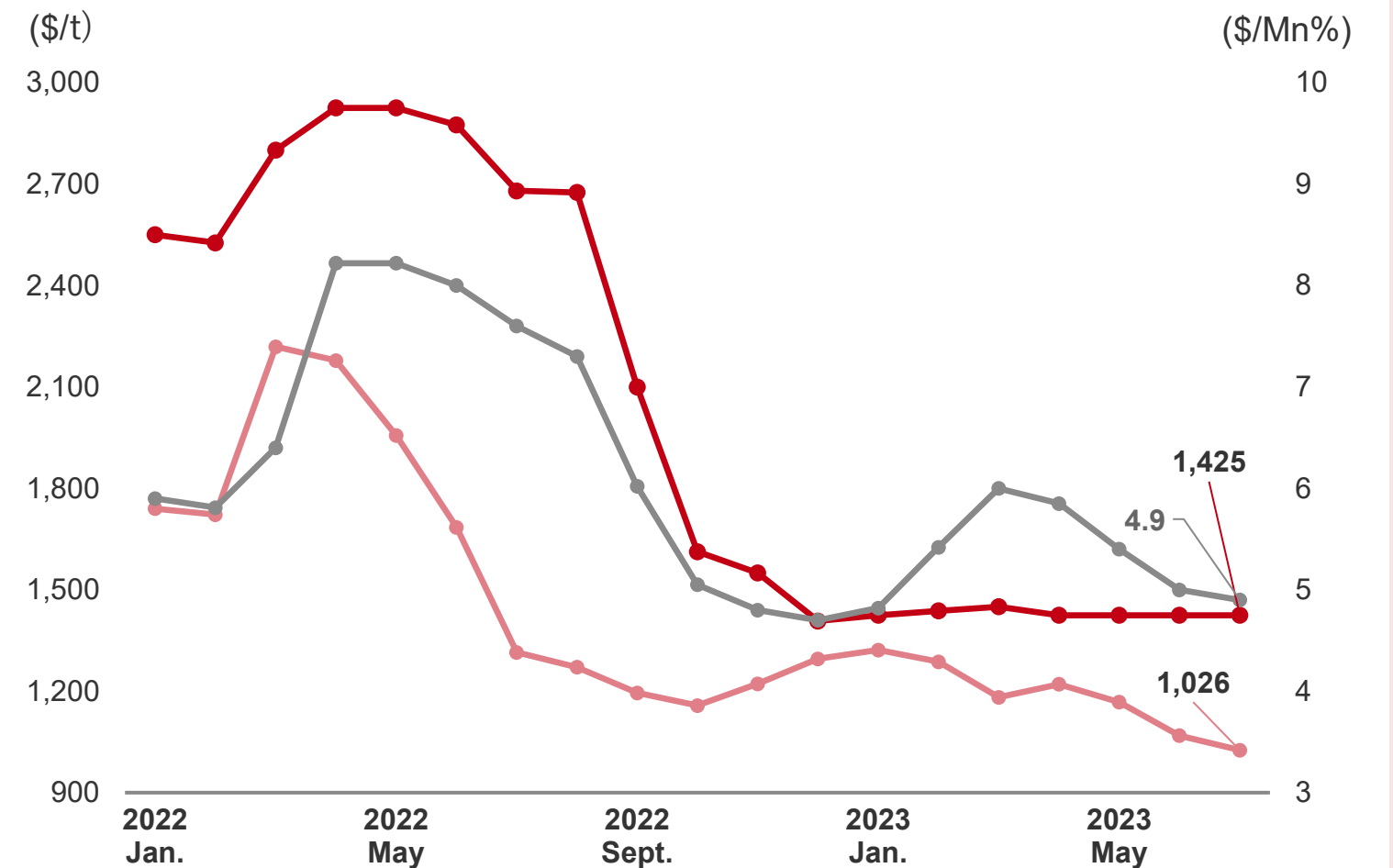
# 4-5. High-Carbon Ferromanganese / Manganese Ore Market Prices

## Quarterly Market Trends



## Expanded / Monthly Market Trends

(Jan. 2022 to Jul. 2023)



	July 2022	July 2023	Change
High-carbon ferromanganese EU (\$/t)	1,315	1,026	-289
High-carbon ferromanganese US (\$/t)	2,680	1,425	-1,255
Manganese ore CIF China (\$/Mn%)	7.6	4.9	-2.7



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