JFE GROUP

SUSTAINABILITY REPORT 2024

JFE

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JFE Group
SUSTAINABILITY
REPORT 2024

Message from the CEO

September 2024

Yoshihisa Kitano
Representative Director, President and CEO
JFE Holdings, Inc.

We Will Establish a Solid Foundation for the Coming Carbon-Neutral Era, to Become an Essential Part of the Sustainable Development of Society and to Create Safe and Comfortable Lives for People.

JFE Group's Vision

Guided by its corporate vision of contributing to society with the world's most innovative technology, the JFE Group has flexibly responded to a dramatically changing business environment to achieve sustainable growth. Under the Seventh Medium-term Business Plan (hereinafter "medium-term plan") formulated in 2021, the years FY2021 to FY2024 are a time to take on the challenges of the most transformative period in the Group's history to ensure a prosperous future for the planet. Our goal is to enhance medium to long-term corporate value by securing environmental and social sustainability in balance with economic sustainability. We have designated KPIs for material issues of corporate management that were identified for the policies and initiatives of the medium-term plan and promoted sustainability initiatives focused on environmental and social issues as well as essential economic issues for the sustainable growth of the JFE Group.

In particular, we have positioned climate change as a top-priority business issue and formulated the JFE Group Environmental Vision for 2050. The vision provides a roadmap to decarbonization based on the dual goals of reducing CO_2 emissions at JFE Steel and for society as a whole. We are developing technologies to address these challenges as an opportunity for growth.

By shifting focus from quantity to quality and completing structural reforms in the steel business under the medium-term plan, I believe we are well on our way to establishing a management foundation that is unaffected by the external environment, and that we are ready to leap to the next stage. From here on, we will build a solid foundation for surviving the coming carbon neutral era and strive to achieve sustainable growth going forward. The JFE Group will consistently rise to the challenge of transformative change as an essential participant in the sustained development of society and the safety and comfort of daily life.

Addressing Global Environmental Issues

The urgency of climate change has spread around the world. Since the steel business constitutes the core of the JFE Group's operations, climate change is a vital management issue for continuing to do business. With respect to CO_2 emissions, we are working to meet our target of reducing CO_2 emissions by 18% from FY2013 levels by the end of FY2024. In FY2023, we reduced emissions by approximately 17% from FY2013 levels and achieved our related KPI target with solid results. The measures announced in the JFE Group Environmental Vision for 2050 will continue to be implemented.

In FY2023, we decided to introduce an electric arc furnace to the stainless steel manufacturing process in the Chiba district. In addition, we started constructing test furnaces to pursue the double-track development of ultra-innovative technologies such as the carbon recycling blast furnace and hydrogen-based ironmaking with the support of the Japanese government. In FY2024, we began testing at some of these facilities and focusing on completing the development of these technologies by the mid-2030s. Furthermore, we plan to make an investment decision during FY2024 to introduce large electric arc furnaces to the West Japan Works' Kurashiki district, which will enable us to manufacture high-quality steel product that had only been possible through the conventional blast furnace process.

Since FY2023, we also began selling JGreeX™, an eco-friendly steel that generates significantly lower CO_2 emissions during manufacturing compared to conventional products. This is the world's first business model in which the entire supply chain bears the cost of creating environmental value by reducing CO_2. At the same time, it must also be noted that even in Japan the environmental value of green steel is not yet fully recognized. Looking ahead, it will be vital for the public and private sectors to work together to raise awareness of the value of going green, and to share the associated costs across society as a whole in order to build a carbon-neutral society. This approach will enable Japanese products to lead the world in both quality and environmental friendliness, contributing to the development of Japan's economy.

In the engineering business, we are working on offshore wind power generation, waste-to-energy power generation, and CCUS, through which we can also play a role in Japan's energy policy.

JFE Engineering constructed Japan's first manufacturing plant for monopiles (foundation structure for offshore wind power generation) in Kasaoka City, Okayama Prefecture, and began production in April 2024. As the largest supplier of monopiles in Japan, we will operate the Kasaoka Plant, conduct operation and maintenance (O&M) of offshore wind farms, and pursue the research and development of floating offshore wind power generation. In the waste-to-energy power generation business, we already have 11 sites in operation across Japan and 2 overseas, and we will continue to focus our resources as a business that is competitive at the global level by utilizing our overseas design bases, diversifying parts procurement, promoting multinational development, and effectively using digital technology in our O&M operations.

In our efforts to realize a recycling-oriented society, we can contribute in some areas for achieving a circular economy in terms of recycle and reuse, such as waste-to-energy power generation, as mentioned above, supplying power from renewable energy sources, and recycling collected PET bottles. In the engineering business, we will promote initiatives including expanding our overseas operations. Meanwhile, in the steel business, we will enhance our waste reduction efforts by further promoting the supply of high-performance steel products, such as anti-fatigue-damage steel that extends the longevity of infrastructure, and ultra-high-tensile steel that reduces the weight of automobiles, thereby making a Group-wide contribution to a circular economy.

Addressing Social Issues

We also need to focus on social issues to continue to expand corporate value. In particular, since people are the heart of any company, human capital will become increasingly important. We will strive to surpass our previous efforts to acquire and train human resources, strengthen engagement, and increase our investment in human capital management.

The JFE Group adheres to the philosophy of safety first and promotes its initiatives by designating safety-related KPIs related to workplace fatalities (zero occurrences) and lost-workday injuries rates. We maintain a steadfast focus on preventing accidents by prioritizing safety investments of 10 billion yen per year for the entire Group. Furthermore, to safeguard the health of employees and their families, we have set goals such as strengthening health guidance and encouraging people to stop smoking, and every company has established and is actively committed to operating a health and productively management system.

Moreover, in pursuing changes in such areas as entering new business fields and doubling revenues, the integration of various values and ways of thinking—that is, diversity and inclusion—will play a key role in generating novel ideas and solutions. The JFE Group has positioned diversity and inclusion as a vital management concern and is working to establish an environment in which people with diverse backgrounds, including gender, nationality, values, and lifestyles, can demonstrate their abilities. Particularly with regard to supporting female employees, we have set ambitious KPI targets on promoting women to managerial positions and raising the ratio of hiring women and other under-represented groups, and we will continue to pursue various measures from the perspectives of recruitment, retention, placement, and training.

With the recognition that contributing to the realization of a society in which the human rights of each and every individual are respected and protected is not only a corporate social responsibility but also a foundational principle of management, we are particularly committed to upholding respect for human rights across the supply chain as a key management concern. In addition to providing education and training for employees, we will continue to promote risk management at suppliers and Group companies and expand human rights due diligence.

To Our Stakeholders

The JFE Group will continue to protect the global environment while contributing to society through steel, a material that is indispensable for a prosperous future. To this end, we will steadfastly ensure thorough legal and regulatory compliance as the foundation of a trusting relationship with society. At the same time, the Group will work in concert to address environmental issues, such as climate change, realizing a recycling-oriented society, and preserving biodiversity, as well as social issues such as occupational health and safety, diversity and inclusion, and respect for human rights, as opportunities for further growth.

Sustainability Report 2024 provides current and prospective stakeholders with a comprehensive overview of our initiatives to tackle each issue, and I hope it facilitates a broader understanding of the JFE Group's efforts.

Value of Steel

Appealing Qualities of Steel that Create Safe, Comfortable Lives for a Prosperous Global Future

Iron makes up approximately 30% of the Earth's mass. Because of its rich reserves, steel can be mass produced at very low cost. Compared to other materials, the environmental impact of its production is extremely low and it has excellent recyclability. Steel can be recycled repeatedly and reborn as various products (closed-loop recycling) with little or no environmental impact, contributing to the sustainable growth of our society.

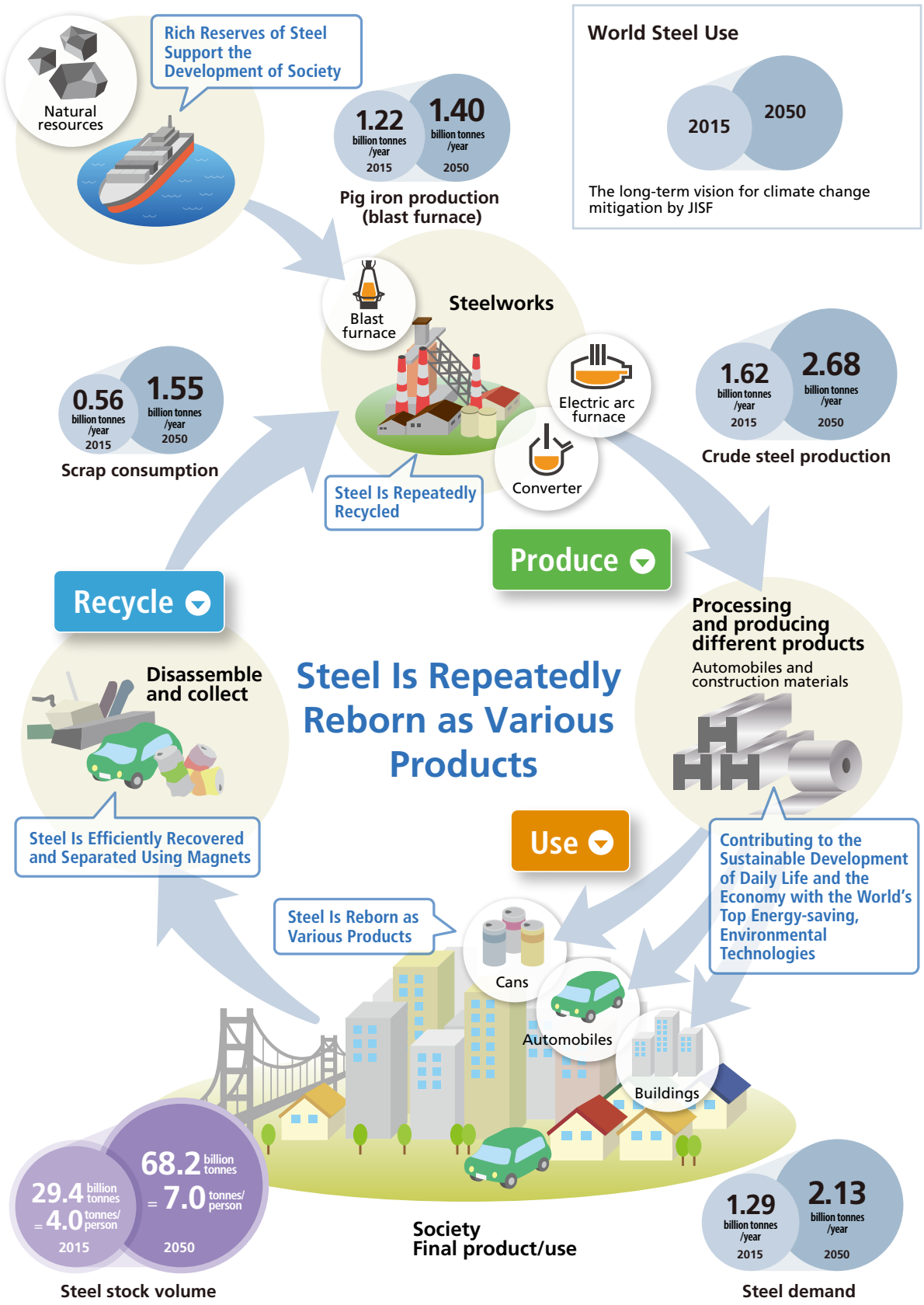
Life Cycle Assessment of Steel

Steel's excellent recyclability contributes to the creation of a sophisticated **value chain (P. 26)** encompassing three components: Produce, Use, and Recycle. Steel products can be repeatedly reborn as various products. It is therefore important that the environmental impact of steel be assessed across its entire life cycle, including at the recycling stage. JFE Steel participates as a key member in an initiative led by the Japan Iron and Steel Federation (JISF) to quantify the environmental impact of the entire life cycle of steel products and developed the ISO/JIS standard* calculation methodology. Corresponding to this standard, materials with higher recyclability are found to have lower environmental impact such as on global warming.

Fifteen blast furnace and electric arc furnace steel manufacturers operating in Japan, including JFE Steel, have compiled and published the national average value for life cycle inventory (LCI) data for different types of steel products for FY2018.

*ISO 20915: Life cycle inventory calculation methodology for steel products (November 2018)
JIS Q 20915: Life cycle inventory calculation methodology for steel products (June 2019)

➤ Contribution to the Development of Calculation in LCA (P.101)


Rich Reserves of Steel Support the Development of Society
Natural resources
1.22 billion tonnes /year 2015
1.40 billion tonnes /year 2050
Pig iron production (blast furnace)
World Steel Use
2015
2050
The long-term vision for climate change mitigation by JISF
Steelworks
Blast furnace
Electric arc furnace
Converter
Steel Is Repeatedly Recycled
0.56 billion tonnes /year 2015
1.55 billion tonnes /year 2050
Scrap consumption
1.62 billion tonnes /year 2015
2.68 billion tonnes /year 2050
Crude steel production
Recycle
Produce
Steel Is Repeatedly Reborn as Various Products
Disassemble and collect
Steel Is Efficiently Recovered and Separated Using Magnets
Processing and producing different products
Automobiles and construction materials
Use
Contributing to the Sustainable Development of Daily Life and the Economy with the World's Top Energy-saving, Environmental Technologies
Steel Is Reborn as Various Products
Cans
Automobiles
Buildings
29.4 billion tonnes = 4.0 tonnes/person 2015
68.2 billion tonnes = 7.0 tonnes/person 2050
Steel stock volume
Society
Final product/use
1.29 billion tonnes /year 2015
2.13 billion tonnes /year 2050
Steel demand

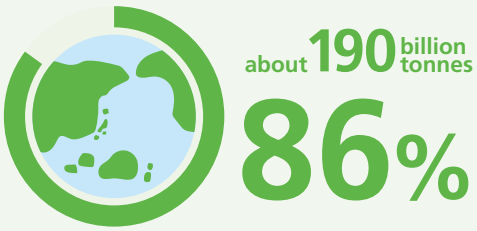
Produce High Economic Efficiency and Low Environmental Impact

The stable mass production of steel serves as the foundation for daily life and society. CO_2 generated by the manufacturing process of steel is extremely low compared to other materials, making it an environmentally sound material. Steel is an essential for society's sustainable development and to create safe, comfortable lives for people everywhere.

Earth, a Planet of Iron (Abundant Resources)

As much as 86% of the Earth's metal resources are iron ore (190 billion tonnes).

Recoverable Reserves of Iron Ore on the Earth

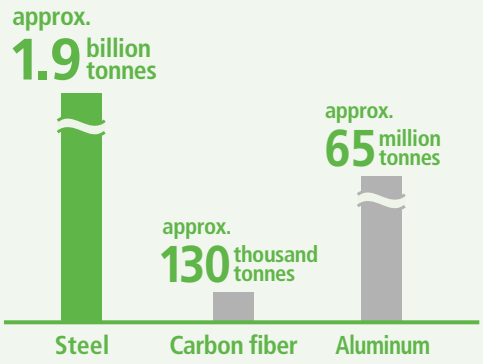


Source: Mineral Commodity Summaries (2024)

Mass Production at Low Cost

With rich reserves and a long history of technological development, iron is mass produced at reasonable prices and supplied stably, thereby contributing to the sustainable growth of society.

Global Demand (2020)



Research: JFE Holdings

Price*

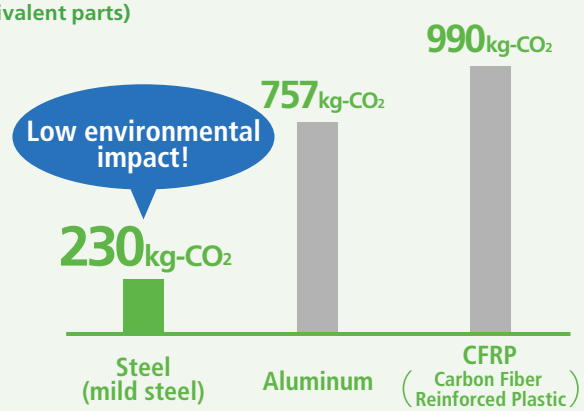
Research: JFE Holdings

*Cost of producing one unit weight of iron is indexed at 1 for comparison with other materials.

Extremely Low Environmental Impact at the Manufacturing Stage when Compared to Other Materials

Greenhouse gas (GHG) emissions of steel at the manufacturing stage is approximately one-fourth to one-fifth of that of aluminum and carbon fiber with equivalent functionality.

GHG Emissions at the Manufacturing Stage of Materials (CO_2 equivalent)
(kg-CO_2/100 kg of steel equivalent parts)



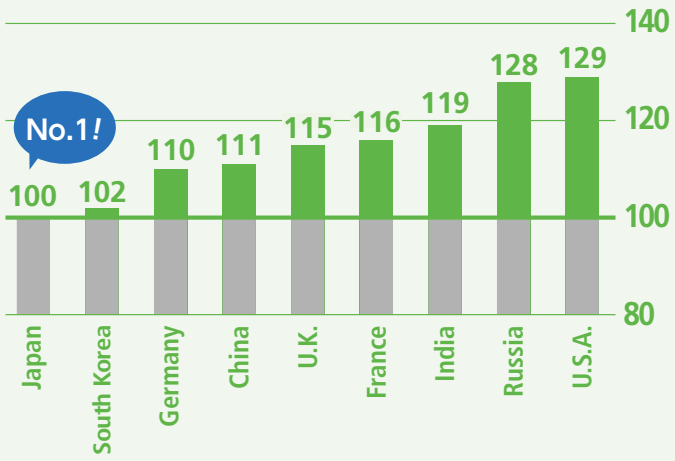
	Steel (mild steel)	Aluminum	CFRP (Carbon Fiber Reinforced Plastic)
GHG emissions per unit weight (CO_2 equivalent) (kg-CO_2/kg)	2.3	11.3	22.0
Functional equivalent weight (kg)	100	67	45

Source: Compiled from data disclosed by WorldAutoSteel

Japan's Steel Industry Boasts the Highest Energy Efficiency in the World

Japan's steel industry (converter steel) produces steel with the lowest environmental impact compared to other major countries. This is a result of its longstanding efforts toward environmental conservation, including developing and spreading the use of energy-saving technologies.

Energy Efficiency by Country, with Japan at 100 (2019)



Source: Research Institute of Innovative Technology for the Earth (RITE)

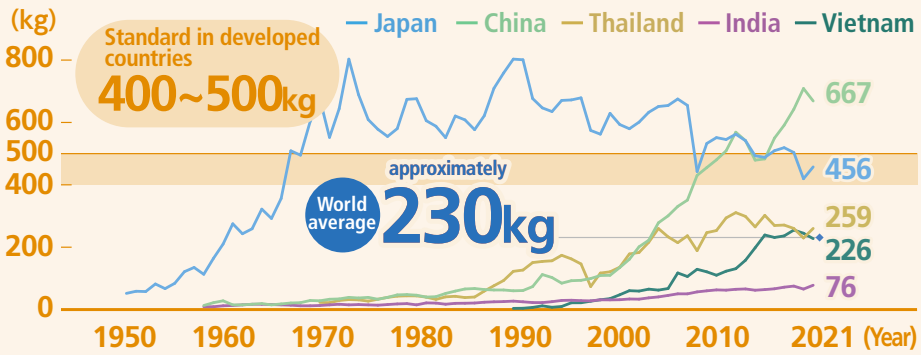
Use Foundation of Daily Life and Society

The use of steel impacts the environment less than other materials. For example, making automobile frames with high tensile strength steel sheets, which have a reduced thickness but retain their strength, considerably decreases the weight while maintaining crash performance, thereby helping to reduce CO_2 emissions for society as a whole.

Potential to Grow on a Global Scale

Global average of annual consumption of steel is approximately 230 kg per capita. The long-term global demand for steel is expected to keep growing alongside the economic development of emerging countries.

Trends in Annual Steel Consumption per Capita by Country (kg/person/year)

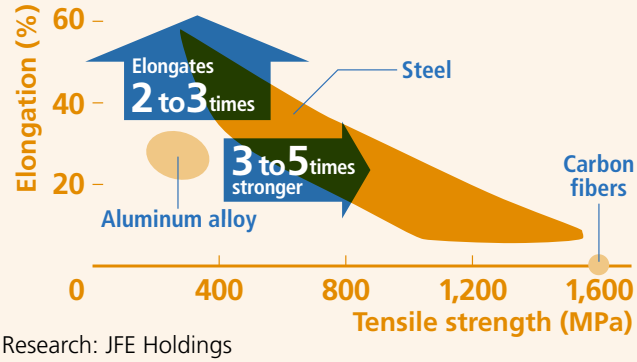


Source: World Steel Association

Potential for Evolution

Steel can be elongated two to three times more than aluminum at the same rigidity and is three to five times stronger at the same extended rate, making it the optimal material for new world-class structures such as TOKYO SKYTREE. And yet there is still potential for further evolution. The emerging needs of society will advance the development of steel and contribute to a productive future.

Comparison of Strength and Elongation between Steel, Aluminum, and Carbon Fiber



Research: JFE Holdings

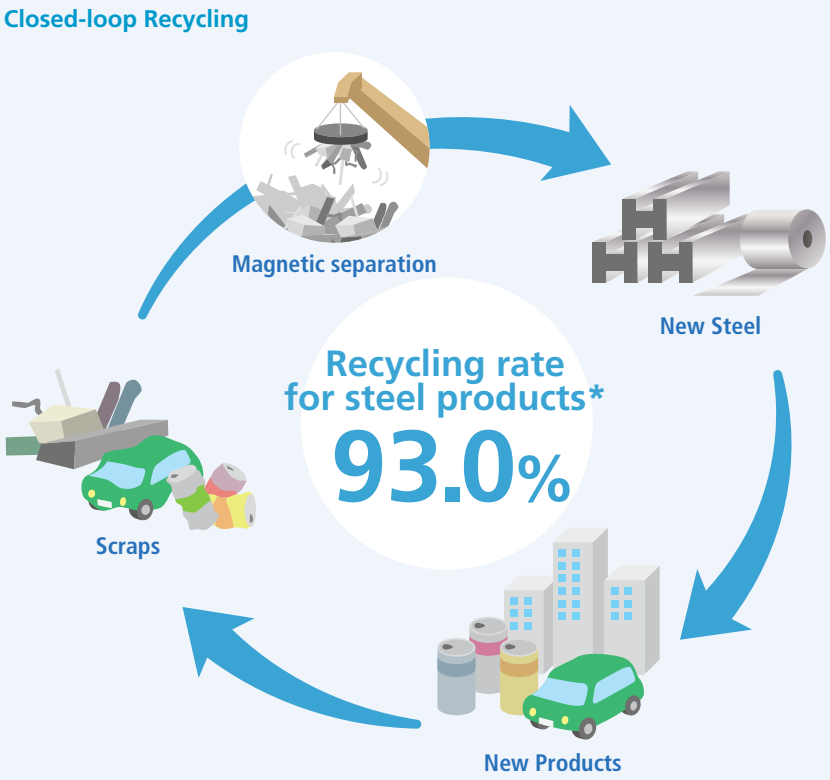
Recycle Excellent Recyclability

Steel is a highly recyclable material that can be easily recovered and separated using magnets. It can be efficiently recovered, separated, and recycled into high-quality, high-functioning products over and over again through closed-loop recycling.

Closed-loop Recycling of Steel

Steel can be recycled a number of times as a raw material for steel products while retaining its original properties. Closed-loop recycling is superior to open-loop recycling* in terms of sustainability, because closed-loop recycling reduces the consumption of natural resources, as well as the amount of environmentally hazardous substances and wastes.

*In open-loop recycling, the material recycling process involves two types of finite recycling which are thermal recycling and cascade recycling. Thermal recycling means that heat generated by incineration is recovered while cascade recycling indicates recycling the material accompanied by the degradation or alteration of the material's properties.



Source: The Japan Iron and Steel Federation

Sustainability Management

Basic Policy

Based on its corporate philosophy of "contributing to society with the world's most innovative technology," the JFE Group will continue to be a company that provides products and services for a prosperous global future for a long time to come.

We also consider it our mission to establish our position as a company essential to society's sustainable development and to create safe, comfortable lives for people everywhere, and become an organization that is highly regarded by society. To realize this mission, we will ensure environmental and social sustainability and establish economic sustainability (stable earnings power). By doing so, we will secure a resilient management foundation for achieving sustainable growth for the Group over the medium to long term and enhance corporate value.

JFE Group Sustainability System

The Group established the JFE Group CSR Council (**JFE Group Sustainability Council** as of April 2023), chaired by the president of JFE Holdings and comprised of the executive vice president (director), corporate officers, full-time Audit & Supervisory Board members, the presidents of operating companies, and other members to oversee and direct the sustainability initiatives of the entire organization, including risk management, from the perspective of preventing damage to the JFE Group's corporate value and enhancing it. Independent, cross-Group committees have been established under the council, including the JFE Group Compliance Committee, JFE Group Environmental Committee, JFE Group Internal Control Committee, JFE Group Information Security Committee, Public Disclosure Committee, and Corporate Value Enhancement Committee. Overseeing and directing the Group's sustainability initiatives, these committees deliberate on Group policies, monitor how they are being instilled across the Group, and share information on the tasks at hand as well as on issues that have materialized and relevant responses. Included in the agenda discussed by the JFE Group Sustainability Council, the Group's basic policies, action plans, content of key initiatives and response to critical circumstances are **reported regularly to the Board of Directors**, which deliberates on the issues and provides the council with direction and supervision.

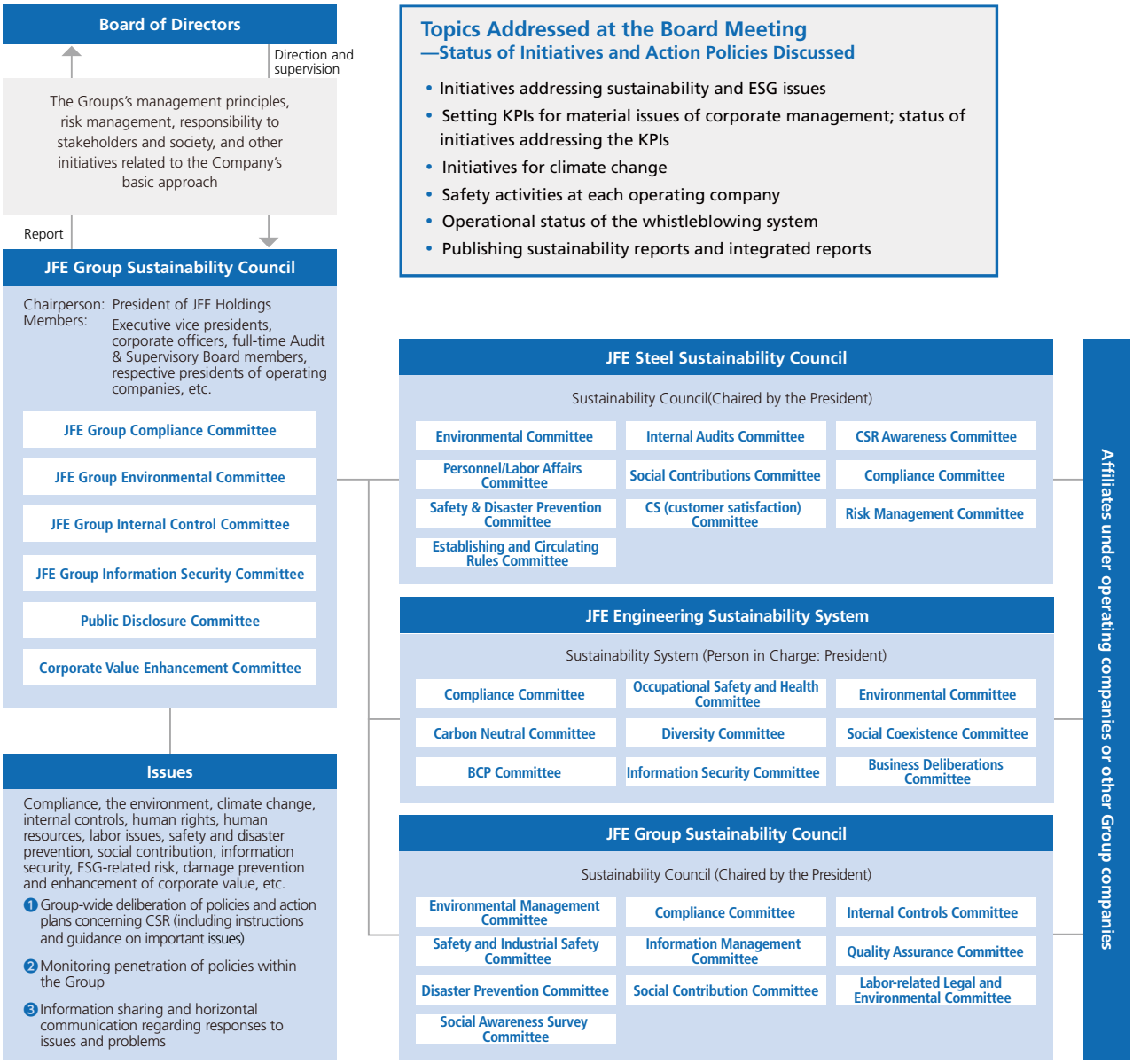
Activities of the Group Sustainability Council

The Group Sustainability Council meets approximately once every three months to discuss wide-ranging issues such as the antimonopoly act, compliance with laws and regulations to prevent corruption such as bribery involving public servants and other officials, human resources, labor issues, safety, disaster prevention, the environment, climate change, quality, financial reports, addressing antisocial forces, risk management including information security and other ESG-related risks, and social contribution. The council deliberates on policies related to Group initiatives, which also include providing instruction and guidance on material issues, monitors the penetration of the policies, and shares information on and carries out horizontal communication regarding our responses to issues and problems.

Cooperation with Operating Companies

The operating companies have also set up respective entities that operate in collaboration with the JFE Group Sustainability Council to promote Group-wide initiatives from the perspective of preventing damage to the JFE Group's corporate value and enhancing that value. JFE Steel established the CSR Council (Sustainability Council as of April 2023) chaired by the president in July 2005, following the establishment of the CSR Section in April 2005. Specific committees and sub-committees in areas such as compliance, global environment, risk management, safety and disaster prevention, customer satisfaction, social contributions, etc., established under the Sustainability Council have been actively conducting the activities in each area, while promoting awareness of sustainability, together with the Group companies. JFE Engineering and JFE Shoji are also working to achieve sustainability through the establishment of committees in areas such as compliance and the environment.

■ Diagram of System for Promoting Sustainability



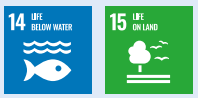
Confirmation and Improvement through the Employee Awareness Survey

The JFE Group conducts a Corporate Ethics Awareness Survey on a regular basis (currently once every three years, twice a year from FY2024) for directors and employees of JFE Holdings and its operating companies to confirm the penetration and thorough compliance of the Group's Corporate Vision, Corporate Values, and Standards of Business Conduct, along with the identification of potential risks. The survey conducted in FY2022 confirmed that many employees acknowledged the vision and corporate policy and are aware of compliance matters when carrying out their work. On the other hand, the survey also brought to our attention issues to address going forward. These are reflected in the specific initiatives of each Group company under the supervision of the JFE Group Sustainability Council and Board of Directors.

Initiatives and Relevant SDGs

The JFE Group engages in initiatives for achieving sustainable growth for the Group over the medium to long term and enhancing corporate value.

The following chart summarizes all activities introduced in this report. Through these activities, the JFE Group intends to contribute to the achievement of the SDGs.

Activities		Related SDGs
Addressing ESG Issues		
Environmental Management (P.46)	• Promotion of Environmental Management System • Environmental Education	
Initiatives to Address Climate Change Issues (P.52)	• Reduction of CO_2 in the Steel Business • Greater Contribution to Reducing CO_2 in Society as a Whole • Scenario Analysis Based on TCFD Recommendations	
Realizing a Recycling-Oriented Society (P.115)	• Reducing Generation and Emission of Co-products and Re-using Co-products • Promoting Recycling • Resource Recycling Solution • Addressing Water-related Risks • Efficient Use of Water • Controlling Air Emissions • Preventing Water Pollution • Management of Chemical Substances and Reduction of Emissions	
Preserving Biodiversity (P.122)	• Biodiversity Initiatives • Commitments to External Initiatives • Products and Technologies to Preserve Biodiversity	
Development and Provision of Eco-Friendly Processes and Products (P.135)	• Major Eco-friendly Products and Technologies in Each Business	
Human Rights (P.166)	• Respecting Human Rights Initiatives • Conducting Human Rights Due Diligence	
Providing Quality Products and Enhancing Customer Satisfaction (P.175)	• Quality Initiatives • Improving Customer Satisfaction • Ensuring Stable Supply	

Activities		Related SDGs
Supply Chain Management (P.182)	• Promoting Green Procurement • Procurement Policy and Initiatives for Each Business	
Human Capital: Occupational Health and Safety (P.186)	• Occupational Health and Safety • Employee Health	
Human Capital: Diversity and Inclusion (P.193)	• Workstyle Reform • Operational Reform • Workforce Diversity Promotion	
Human Capital: Strengthening Human Resource Development (P.197)	• Human Resource Development	
Human Capital: Creating Work Environments that Motive Employees (P.199)	• Developing Dynamic Work Environments	
Community (P.204)	• Local activities • Support for External Organizations • Support for Youth Development • JFE 21st Century Foundation	
Compliance (P.227)	• Adherence to Ethical Standard, Legal Compliance	

Group Sustainability Strategy

Formulating the Seventh Medium-term Business Plan and Identifying Material Issues of Corporate Management

Under the Seventh Medium-term Business Plan (hereinafter "medium-term plan") formulated in 2021, the years FY2021 to FY2024 are a time to take on the challenges of the most transformative period in the company's history to ensure a prosperous future for the planet. Our goal is to enhance medium to long-term corporate value by securing environmental and social sustainability in balance with economic sustainability. We have designated KPIs for material issues of corporate management that were identified for the policies and initiatives of the medium-term plan. We have also been pursuing sustainability initiatives focused on environmental and social issues as well as essential economic issues for the sustainable growth of the JFE Group.

In particular, we have positioned climate change as a top-priority business issue and formulated the JFE Group Environmental Vision for 2050. The vision provides a roadmap to decarbonization based on the dual goals of reducing CO_2 emissions at JFE Steel and for society as a whole. We are developing technologies to address these challenges as an opportunity for growth. JFE will continue to systematically ensure a stable supply of steel, the core of JFE's business, to society as an indispensable material for social development and daily life.

Refer to the following on the progress of the Seventh Medium-term Business Plan.

➤ Seventh Medium-term Business Plan (https://www.jfe-holdings.co.jp/en/sustainability/sus/plan/)

Material Issues of Corporate Management

Action on Material Issues

The JFE Group's actions related to management issues are based on identifying materiality and setting KPIs to minimize negative societal impact and maximize societal value by investing JFE Group's resources from the standpoint of meeting stakeholder needs. In 2016, we determined our material CSR issues (13 issues in 5 focus areas) by comprehensively identifying 35 issues that reflect society's expectations in the context of JFE's business and then by prioritizing the issues through the two criteria of stakeholder expectations and relevance to business (societal impact).

In FY2021, we formulated the Seventh Medium-term Business Plan, recognizing that ensuring environmental and social sustainability (helping to solve critical issues) and establishing economic sustainability (stable earnings power) are key to the JFE Group's sustainable development. Accordingly, **we reorganized our materiality by adding economic issues to our existing CSR issues to identify all our material issues of corporate management**. We will demonstrate the Group's vision of "contributing to society with the world's most innovative technology" by working in concert to address these issues.

Process for Identifying Material Issues of Corporate Management

The JFE Group has been promoting actions that address the material CSR issues identified in 2016 (13 issues in 5 focus areas).

Refer to the following on how we identified material CSR issues up to FY2020.

➤ Material CSR Issues (CSR REPORT 2020) (https://www.jfe-holdings.co.jp/en/sustainability/pdf/csr2020e.pdf)

Refer to the following on the process we used to identify material issues of corporate management in FY2021.

➤ Process for Identifying Material Issues of Corporate Management (CSR Report 2021)
(https://www.jfe-holdings.co.jp/en/sustainability/pdf/csr2021e.pdf)

Contribution to the Sustainable Development Goals (SDGs)

In September 2015, a UN Summit adopted 17 SDGs to be addressed through worldwide efforts to achieve sustainable development. The JFE Group will respond to global community needs and contribute to SDGs through our initiatives on material issues of corporate management.

Corporate Vision: Contributing to Society with the World's Most Innovative Technology

	Areas of Focus	Details	Scope of Influence	Material Issues	Relevant SDGs
Activity	Contribute to resolving climate change issues (initiatives for achieving carbon neutrality by 2050)	•Initiatives for achieving carbon neutrality by 2050 ・Reduce the JFE Group's CO_2 emissions ・Contribute to reduction of CO_2 emissions in society	JFE Group Local communities near manufacturing sites Customers Society	Reduce the JFE Group's CO_2 emissions Contribute to reduction of CO_2 emissions across the society	6 7 9 12 13 14
	Ensure occupational safety and health	•Prioritize safety first •Maintain the physical and mental health of employees and their families	JFE Group Suppliers Business partners	Prevent workplace accidents Ensure the health of employees and their families	3 8
	Recruit and nurture diverse human resources	•Maintain work environments where all personnel can maximize their abilities •Accumulate and hand down technologies and skills	JFE Group Business partners	Pursue diversity and inclusion Strengthen human resources development Create workplaces that motivate employees	4 5 8 9 10
	Reinforce resilience of production and engineering capabilities (realize world-class earnings power through DX and other measures)	•Pursue **world-class earnings power** •**Promote DX** and other measures to improve production efficiency, yields, and labor productivity ・Shift focus of steel business from **quantity to quality (structural reform)** ・Reduce costs to strengthen cost competitiveness and ensure quality competitiveness	JFE Group Customers Society	Increase efficiency and enhance cost competitiveness in production and engineering Raise quality of products and services and ensure reliable supply	9 10 11 12
	Strengthen competitiveness of products and services (promote the growth strategy by providing high value-added solutions)	•**Improve margins** and ensure stable earnings power ・Increase ratio of **high value-added products and services** ・Ensure stable earnings power based on the sales strategy, including **technological solutions** and **expansion of growth businesses**	JFE Group Customers Society	Expand business by increasing value added in products and services with advanced technologies Sales strategies for realizing sustainable growth	7 9 11 12 13 17
Basis of activity	Thoroughly enforce compliance		JFE Group Suppliers Political authorities Society	Ensure adherence to corporate ethical standards and compliance	10 16
	Respect human rights			Respect human rights across the supply chain	

Increased corporate value and sustainable growth

Goals

Contribute to realizing sustainable societies

Corporate Governance (Ensure Fairness, Objectivity and Transparency)

Respect and Maintain Awareness of Human Rights

Risk Management

JFE Holdings is responsible for comprehensive risk management in accordance with its Basic Policy for Building Internal Control Systems. The JFE Group Sustainability Council, chaired by the president of JFE Holdings, consolidates information and strengthens management across the Group to reduce the frequency and impact of risks.

The executive officer responsible for risk strives to identify potential ESG risks such as those associated with climate change. As necessary, the council confirms and evaluates risks and discusses and determines countermeasures. Key managerial issues are deliberated by the Group Management Strategy Committee.

The Board of Directors supervises initiatives on ESG risks such as those related to climate change and CSR by discussing, making decisions on, and receiving reports about these matters.

Monitoring Method for ESG Risks

Issues that may affect management are monitored by the JFE Group Sustainability Council, Group Management Strategy Committee, and Management Committee. The JFE Group Environmental Committee consolidates information and strengthens management to reduce the frequency and impact of risks and to maximize opportunities.

KPIs for Material Issues of Corporate Management

Performance Evaluation for FY2023 KPIs and Establishment of FY2024 KPIs

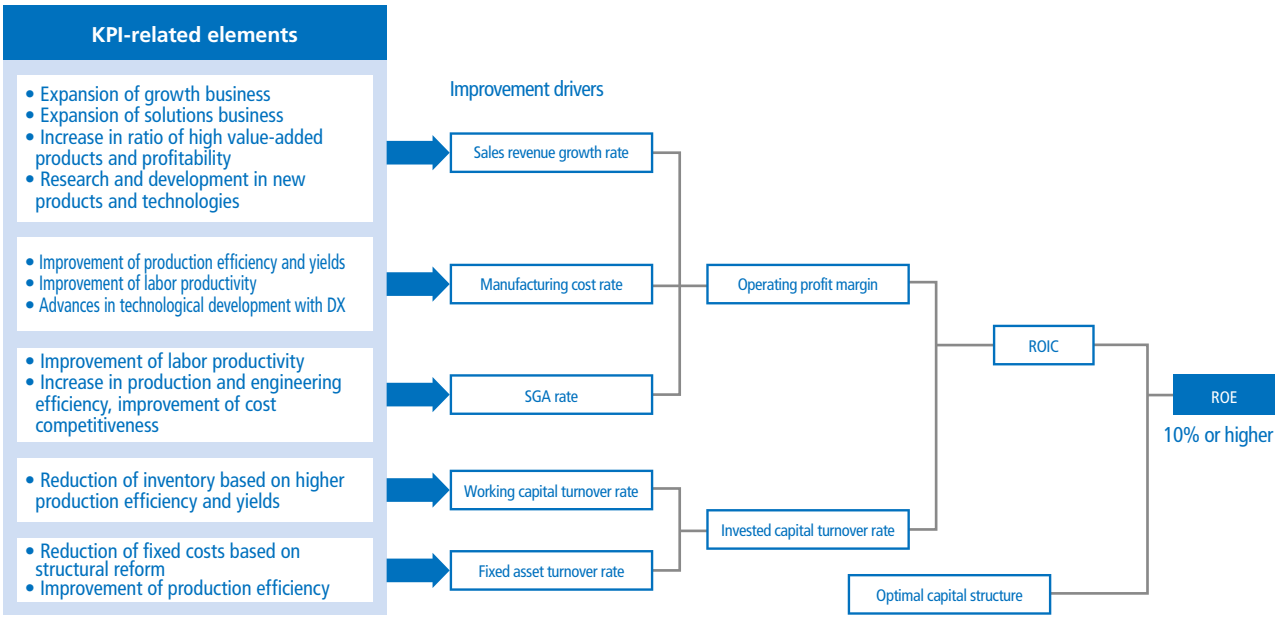
We assessed the performance of KPIs for FY2023 that were established to address material issues of corporate management identified in FY2021 and established KPIs for FY2024 based on the results of the evaluation and third-party opinions. FY2023 performance and KPIs for FY2024 were finalized following discussions by the Management Committee and other organs of each operating company and deliberation by the Group Management Strategy Committee and Board of Directors. Going forward, the Group will continue to work in concert to set KPIs that reflect the characteristics and realities of each operating company and effectively implement the PDCA cycle to promote its initiatives.

Material Issues of Corporate Management and KPIs (P.18)

Enhancing ROE by Achieving the KPIs

The KPIs for each material issue are closely tied to the financial targets. Achieving the KPIs for each issue affects various drivers of improvement, leading to the achievement of the financial target (10% or higher ROE) and results in increasing corporate value over the medium to long term. The connection between these initiatives for material issues and financial targets is deeply shared at operating companies and on the front lines, increasing the effectiveness of these initiatives.

■ Connection between KPI-Related Elements and Financial Targets



Material Issues of Corporate Management and KPIs

Evaluation criteria

Target attributes		○	△	×
Quantitative	Set for each fiscal year	Accomplished 100% or better	Accomplished 80%–99%	Accomplished 79% or less
	Set medium- to long-terms (in case of setting a multi-year target)	Final target accomplished 100% or better	Final target partly accomplished with some results (80% or better with linear interpolation).	Working toward the goal but no results yet (79% or less with linear interpolation).
Qualitative		Fully accomplished with significant results.	Partly accomplished with some results.	Working toward the goal but no results yet.

* In Groupwide evaluations, the lowest result among the companies is taken as the overall result.

ST JFE Steel EN JFE Engineering SH JFE Shoji

Problematic fields		Priority issues	Operating Company	FY2023 KPIs	Initiatives and Results for FY2023	Assessment	FY2024 KPIs
Business activities	Contribute to resolving climate change issues (initiatives for achieving carbon neutrality by 2050)	Reduce the JFE Group's CO_2 emissions	ST	• Achieve 75% of the CO_2 reduction target from energy conservation and technological development for the target of reducing CO_2 emissions by 18% from FY2013 levels by the end of FY2024 • Complete the approval of capital investment plans for reducing CO_2 emissions by 100% cumulatively for CO_2 reduction targets from energy conservation and technological development for the target of reducing CO_2 emissions by 18% from FY2013 levels by the end of FY2024 • Obtain third-party certification, and build a green steel supply structure in the first half of FY2023	• CO_2 reduction target: Achieved 93%	○	• Achieve at least 18% of CO_2 reduction target by the end of FY2024 compared to FY2013 levels • Achieve 100% of the CO_2 reduction target of 3.06 million tons through energy conservation and technological development, as part of the 18% reduction in CO_2 emissions by the end of FY2024 compared to FY2013 levels • Expand adoption of JGreeX™ by stimulating demand for green steel
					• Total investment budget: 101% approved	○	
					• Obtained third-party certification in June 2023, commenced supply of green steel 29,000 tons on a certified basis	○	
			EN	• Reduce CO_2 emissions in its own plants and offices FY2023: 40% reduction from FY2013 levels	• 47% reduction from FY2013 levels (FY2013: 15,600 tons, FY2023: 8,300 tons)	○	• Reduce CO_2 emissions in its own plants and offices FY2024: 40% reduction from FY2013 levels
			SH	• Reduce CO_2 emissions through the procurement of electricity derived from renewable energy FY2023 domestic CO_2 emissions: Reduce by 15% from FY2019 levels (Reduce by 5% per year from FY2019 levels from FY2021 to FY2024)	• 20.7% reduction from FY2019 levels	○	• Reduce CO_2 emissions through the procurement of electricity derived from renewable energy FY2024 domestic CO_2 emissions: Reduce by 20% from FY2019 levels (Reduce by 5% per year from FY2019 levels from FY2021 to FY2024)
		Contribute to reduction of CO_2 across the society	ST	• Launch sales and implement eco-friendly products and technologies*: 15 or more cases in FY2022 (the cumulative total of 60 or more cases for the period from FY2021 to FY2024) * Products and technologies that contribute to saving energy and resources, reduce waste and environmentally hazardous substances, and do not require hazardous substances for manufacturing or use.	• FY2023: 16 (eco-friendly products: 7, technologies: 9) (FY2021–FY2023: 48)	○	• Launch sales and implement eco-friendly products and technologies*: 15 or more cases in FY2024 (cumulative total of 60 or more cases from FY2021 to FY2024) * Products and technologies that contribute to saving energy and resources, reduce waste and environmentally hazardous substances, and do not require hazardous substances for manufacturing or use.
			EN	• Contribute to reduction of CO_2 in society by providing renewable energy power generation facilities and expanding the basis of the recycling business (for plastic, food, etc.) Contribute to reduction in CO_2 emissions (FY2023): 11.5 million tons per year	• Contribute to reduction in CO_2 emissions (FY2023): 11.53 million tons per year	○	• Contribute to reduction of CO_2 in society by providing renewable energy power generation facilities and expanding the basis of the recycling business (for plastics, food, etc.) Contribute to reduction in CO_2 emissions (FY2024): 12 million tons per year
			SH	1. Global resource recycling of steel scrap FY2023 scrap transactions: Above the transaction quantity for FY2020 (FY2024 target: +5% from FY2020)	1. Global resource recycling of steel scrap • 5% reduction from FY2020	×	1. Global resource recycling of steel scrap FY2024 scrap transactions: +5% from FY2020
				2. Increase transaction quantity of fuel for biomass power generation plants and create framework for reliable supply of fuel • FY2023 biomass fuel (palm kernel shells and wood pellets) transactions: Above the transaction quantity for FY2020 (FY2024 target: 100% increase from FY2020) • Diversify supply sources to ensure stable supply	2. Created system for expansion and reliable supply of fuel for biomass power plants • Handling volume: +110% compared with FY2020 • Expanded new suppliers	○	2. Increase transaction quantity of fuel for biomass power generation plants and create framework for reliable supply of fuel • FY2024 biomass fuel (palm kernel shells and wood pellets) transactions: 100% increase from FY2020 • Diversify supply sources to ensure stable supply

Problematic fields		Priority issues	Operating Company	FY2023 KPIs	Initiatives and Results for FY2023	Assessment	FY2024 KPIs
Business activities	Ensure occupational safety and health	Prevent workplace accidents	Groupwide	Groupwide Workplace fatalities: Zero occurrences • Lost-workday injuries rate ST 0.10 or less EN 0.25 or less SH 0.45 or less	Groupwide Workplace fatalities: One occurrence • Lost-workday injuries rate ST 0.06 EN 0.28 SH 0.12 (Work-related accidents and frequency rates are tabulated on a calendar year basis.))	×	Groupwide Workplace fatalities: Zero occurrences • Lost-workday injuries rate ST 0.10 or less EN 0.25 or less SH 0.15 or less
			ST	[Key measures] (1) Reinforce activities to prevent similar injuries Horizontal Companywide deployment of measures, including for close calls, promote workplace activities so employees view past incidents as lessons to learn from (2) Enhance safety Install electromagnetic locks at the secondary mill entrances: 90% by FY2023, 100% by FY2024	[Key measures] (1) Strengthened activities to prevent similar accidents ▸Held Companywide monthly meetings to prevent similar accidents ▸Built an accident reporting database for use at all workplaces (2) Strengthened efforts to promote essential safety ▸Installation of electromagnetic locks at secondary mill entrances in FY2023: 100% ▸Formulated plan to expand the number of sites (replace locks with electromagnetic locks)		[Key measures] (1) Reinforce activities to prevent similar injuries Horizontal Companywide deployment of measures, including for close calls (2) Strengthen efforts to promote essential safety 100% installment of electromagnetic locks at secondary mill entrances versus plan by FY2024
			EN	[Key measures] (1) Implement 100% of the following key measures to prevent injuries with decisive work plans and proper work instructions in order to eliminate serious injuries ▸Pre-operation checks (curing openings in high locations and edges of work floor, ensuring on-site understanding of work plans, and covering and enclosing/turning off of machinery) ▸Strict adherence during operations (use of safety belts, no entry measures/allocation of worksite guides) (2) Multifaceted management of occupational safety and health using IT ▸Monitor worksites, use information communications systems ▸Use safety management operations support system	[Key measures] (1) 100% implementation of key measures to eradicate serious accidents ▸Focused on verifying and advising on work plans, inspecting equipment, and preventing unsafe behavior during site patrols ▸Installed work platforms and handrails for high-altitude work, enforced the use of safety belts, prohibited access near suspended loads and within the operating range of heavy machinery, and checked the covers/guards and power isolation of machinery (2) Multifaceted management of occupational safety and health using IT ▸Used work monitoring and information transmission systems Remote patrols, instruction, and information sharing via webcams and large screens ▸Used a safety management support system Promoted introduction of services such as CCUS/site management support Avoided rework in high places by using drones and 3D scanning Verified construction safety through 3D and time-series simulations		[Key measures] (1) To eliminate serious injuries, conduct pre-operation checks of equipment in use, including work floors Decisive work plans (identify and prevent dangerous risks) Through proper work instructions (awareness of work plans and prohibition of unplanned work), raise awareness of occupational safety of related workers and take measures to prevent accidents Implement 100% of the following: ▸Pre-operation checks Pre-operation checks of equipment to be used, curing openings in high locations and edges of work floor, install handrails, ensure on-site understanding of work plans, and cover/enclose/turn off machinery ▸Strict adherence during operations Use of safety belts, prohibit access under suspended loads or within the operating range of heavy machinery, assign worksite guides, disconnect power when equipment or tools are not in use (2) Multifaceted management of occupational safety and health using IT ▸Use remote monitoring and information communications systems ▸Use safety management operations support system
			SH	[Key measures] (1) 100% implementation of crane operation drills (once a year or more at each company) (2) Review of past incidents at the Company Finish formulating and executing measures for alternative proposals to address past incidents identified as requiring review	[Key measures] (1) Crane operation drills: 100% implementation at least once annually at each company (2) Reviewed our past accidents For all 208 past accidents requiring review, we created and are implementing alternative solutions		[Key measures] (1) 100% implementation of crane operation drills (once a year or more at each company) (2) Advance hardware measures (introduce interlocks for coil lifting equipment) Complete measures for 24 applicable machines in FY2024 (3) Reevaluate and update education system for new employees and reassigned employees
		Ensure the health of employees and their families	Groupwide	1. Provision rates of healthcare guidance Groupwide 60% (2023 target)	1. Provision rates of healthcare guidance ST 71.1% EN 42.7% SH 35.0% *FY2022 results for eligible individuals	×	1. Provision rates of healthcare guidance Groupwide 60%
				2. Reduce rates of smokers (ensure employee health and prevent exposure to passive smoke) Groupwide 1.5% reduction per year (total for operating companies)	2. Reduce rates of smokers (ensure employee health and prevent exposure to passive smoke) Groupwide 0.8% reduction per year (total for operating companies)	×	2. Reduce rates of smokers (ensuring employee health and preventing passive smoking) Groupwide 1.5% reduction per year (total for operating companies)
	Recruit and nurture diverse human resources	Pursue diversity and inclusion	Groupwide	1. Rates for female recruits ST Career-track (white-collar position): Degree of gender parity Career-track (technical position): 10% or more On-site position: 10% or more EN Career-track (white-collar position): Degree of gender parity Technical (Career-track, Production/construction position): 15% or more SH White-collar position: Degree of gender parity	1. Rates for female recruits ST Career-track (white-collar position): 39% Career-track (technical position): 11% On-site position: 7% EN Career-track (white-collar position): 50% Technical (career-track, production/construction position): 14% SH White-collar position: 47%	△	1. Rates for female recruits ST Career-track (white-collar position): Degree of gender parity Career-track (technical position): 10% or more On-site position: 10% or more EN Career-track (white-collar position): Degree of gender parity Technical (career-track, production/construction position) : 15% or more SH White-collar position: Degree of gender parity
				2. Women in managerial positions 10% or more in positions qualified as section manager or above. Of whom, 20% or more to be in management and sales departments (FY2030 target)	2. Women in managerial positions Groupwide 3.9% in positions qualified as section manager or above. Of whom, 7.2% in management and sales departments (total for operating companies)	△	2. Women in managerial positions 10% or more in positions qualified as section manager or above. Of whom, 20% or more to be in management and sales departments (FY2030 target)
				3. Rate of male employees taking childcare leave or time off related to child-rearing Aim for all male employees whose spouses have given birth to take such leave or time off	3. Rate of male employees taking childcare leave or time off related to child-rearing Groupwide childcare leave or time off related to child-rearing	△	3. Rate of male employees taking childcare leave or time off related to child-rearing Aim for all male employees whose spouses have given birth to take such leave or time off

Problematic fields	Priority issues	Operating Company	FY2023 KPIs	Initiatives and Results for FY2023	Assessment	FY2024 KPIs
Business activities	Recruit and nurture diverse human resources	Strengthen human resources development	Groupwide	1. Training hours per person ST 44.9 hours per year EN 23.4 hours per year SH 22.1 hours per year 2. Trained DX personnel ST Cumulative total as of end of FY2023: 610 EN Cumulative total as of end of FY2023: 179	○	1. Training hours per person ST 40 hours or more per year EN 20 hours or more per year SH 20 hours or more 2. Train DX personnel ST Number of internal data scientist trainees: Total of 660 as of end of FY2024 EN Number of employees who took internal data scientist training: Total of 210 as of end of FY2024
		Create work environment that motivate employees	Groupwide	1. Groupwide Annual leave acquisition rate: 89% (total for operating companies) 2. Affirmative response to questions about motivation in engagement survey ST 72% EN 81% SH 80%	○ △	1. Groupwide Annual leave acquisition rate: 75% or higher (total for operating companies) 2. Engagement survey Groupwide Affirmative response to questions about motivation: At least 75%
	Reinforce resilience of production and engineering capabilities (realize worldclass earnings power through DX and other measures)	Increase efficiency and enhance cost competitiveness in production and engineering	ST	1. Improvement in labor productivity • Measures underway to reach milestones in each fiscal year toward achieving 20% improvement in labor productivity (81% progress toward 75% target with linear interpolation) • Approved ¥8.5 billion for 64 projects as planned for investments to improve labor productivity through automation and remote operations in FY2023 • Relocated facilities as planned in line with structural reforms in Keihin district in September 2023 2. FY2023 yield: +1.3% compared to FY2020 (87.4%)	○ △	1. Improvement in labor productivity • Improve labor productivity by 20% by end of FY2024 • Steadily execute investments aimed at improving labor productivity through automation and remote work 2. Stabilize production with DS, improve yields through application of quality prediction technologies FY2024 yields: +2.0% compared to FY2020 * Adjusted for sales composition
			EN	• Big data analysis engineers: Approx. 2,250 (about 1,950 in FY2022)	○	• Increase the efficiency of engineering operations by introducing DX technologies AI and big data analysis engineers utilizing Pla'cello*: 2,400 * Pla'cello: Proprietary data analysis platform using AI
		Raise quality of products and services and ensure reliable supply	ST	1. Quality assurance • Reorganized to strengthen personnel development, budget allocation, and qualification acquisition in the quality assurance department • 74.8% in FY2023 2. Strengthened production infrastructure using DX Companywide CPS installation rate: 60%	○ △	1. Ensure quality • Continue implementing activities for raising awareness of quality compliance for the Company and Group companies in accordance with the Japan Iron and Steel Federation's guidelines for strengthening the quality assurance system • Promote automated transmission of tensile test results among Group companies Targeting six companies: 83.5% introduction ratio in FY2024 (100% in FY2025) 2. Strengthen manufacturing infrastructure using DX Companywide CPS installation rate: 80% or more
			EN	1. Reliably secured certificated managing engineers amid high level of sales 2. Major quality issues: One incident	○ ×	1. Secure a stable number of certified managing engineers 2. Enhance information sharing and verification functions by improving operation of quality management systems No major quality problem
			SH	1. Steady capital investment in the distribution and processing operations Selected and executed necessary investments to ensure stable supply of products in FY2023 Investment amount: ¥16.5 billion 2. Conducted quality audits on Group companies Conducted quality audits at 36 companies (100% audit implementation rate)	○ ○	1. Make consistent investment in processing and distribution operations 2. Conduct quality audits at Group companies Continue conducting quality audits at 36 Group manufacturing affiliate companies in Japan and overseas (same as FY2023) (Audits completed: 100%)

Problematic fields		Priority issues	Operating Company	FY2023 KPIs	Initiatives and Results for FY2023	Assessment	FY2024 KPIs
Business activities	Strengthen competitiveness of products and services (promote the growth strategy by providing high-value-added solutions)	Expand business by increasing value added in products and services with advanced technologies	ST	1. Pursue strategic research and development focusing on priority development fields* Develop new products and technologies FY2023: 20 or more cases (80 or more cases in total from FY2021 to FY2024) * Automobiles, energy, infrastructure construction materials, DX technology, and GX technology	1. Advanced strategic research and development in key development areas* New products and technologies developed: 27 (8 new products, 19 new technologies) (Cumulative total from FY2021 to FY2023: 70) * Automobiles, energy, infrastructure construction materials, DX technology, and GX technology	○	1. Pursue strategic research and development focusing on priority development fields Develop new products and technologies: 20 or more * Automobiles, energy, infrastructure construction materials, DX technology, and GX technology
				2. High-value-added product sales volume ratio in FY2023: 48%	2. FY2023 sales ratio of high-value-added products: 50%	○	2. Increase sales ratio of high-value-added products FY2024 high-value-added product sales ratio: 50%
				3. Aiming to triple revenue in solution business by FY2024 compared with FY2020 levels • Develop new products that feature DS technology, facility diagnosis technology, and safety technology, launch sales activities to customers • Double revenue in solution business by FY2023 compared with FY2020 levels	3. Exceeded the goal of doubling revenue in solution business in FY2022 compared to FY2020 by winning orders and steadily executing contracts Developed and began sales activities for new products utilizing digital solution and maintenance technologies	○	3. Expand the solution business • Triple solution business revenue in FY2024 compared to FY2020 • Win three or more orders for new JFE Resolus™ brand products, lay the groundwork for significant growth in JFE Resolus™ during the next medium-term plan
			EN	1. Develop technologies in four priority fields of waste to resources, carbon neutrality, combined utility services, and DX, and 70% or more of R&D expenses on these four fields	1. R&D expense ratio in the four priority fields: 86%	○	1. Develop technologies in four priority fields of waste to resources, carbon neutrality, combined utility services, and DX Ratio of R&D expenses on these four fields: 70% or more
				2. Number of patent applications: 80 or more per year	2. Number of patent applications: 100 per year	○	2. Number of patent applications: 80 or more annually
		Sales strategies for realizing sustainable growth	ST	• Expand the earnings difference between high-value-added products (A-rank products) and commodity products to ¥6,000 per ton (Achieve 150% of FY2024 target)	• Earnings difference between high-value-added products (A-rank products) and commodity products FY2023: +¥8,200 per ton (roughly double the initial target for FY2024)	○	• Expand the earnings difference between high-value-added products (A-rank products) and commodity products Maintain earnings difference of ¥8,000 per ton (double the target for FY2024)
			EN	Expand the stable earnings base Expand the operating businesses • Sales: ¥260 billion • Expand bases: 3 or more bases Recycling business (food, plastics, electronic appliances, etc.), regional electricity retail new power business, and waste processing business	• Sales of operating businesses: ¥262.3 billion • New bases: 6 bases 4 recycling businesses, 2 waste treatment	○	Expand operating businesses to expand the stable earnings base • Sales: ¥265 billion • Base expansion: 3 or more bases Recycling business (food, plastics, electronic appliances, etc.), regional electricity retail new power business, and waste processing business
			SH	• Increase competitiveness of products and services by improving value added in supply chain management through business expansion Make investments to improve value added in supply chain: 5 or more per year	• Investments to improve value added in supply chain: 5 per year	○	• Enhance the competitiveness of products and services by increasing added value in the supply chain through business expansion Make investments to improve value added in supply chain: 5 or more per year
Basis of activity	Thoroughly enforce compliance	Ensure adherence to corporate ethical standards and compliance	Groupwide	1. Steady execution of training to foster and maintain a sense of compliance (100% attendance from the target audience)	1. Participation rate: 100% (rank-based compliance training, training on different laws and regulations, etc.)	○	1. Steady execution of training to foster and maintain a sense of compliance (100% attendance from the target audience)
				2. Improve employee awareness of ethics reflected in the Corporate Ethics Awareness Survey	2. Addressed issues identified in the FY2022 Corporate Ethics Awareness Survey • Revised and enhanced compliance training to prevent harassment • Expanded the multi-angle evaluation system for management • Continued education on proper labor time management	○	2. Affirmative response rate of 75% or higher to questions related to compliance awareness in the Corporate Ethics Awareness Survey
	Respect human rights	Respect human rights across the supply chain	Groupwide	1. 100% attendance from the target audience for human rights awareness training	1. Participation rate: 100%	○	1. Participation rate of targeted attendees in human rights awareness training: 100%
				2. Implement human rights due diligence	2. Conducted human rights due diligence Promoted the following initiatives to ensure respect for human rights throughout the supply chain: [Created a human rights risk management system for suppliers] Conducted a human rights risk survey using the CSR Procurement Self-Assessment Tool of Global Compact Network Japan for approximately 400 high-priority suppliers, including those in countries with a high risk of human rights violations [Expanded human rights due diligence to Group companies] • In FY2023, conducted human rights risk surveys at approximately 100 major domestic Group companies with considerable exposure to human rights risks in terms of revenue size	○	2. Promote human rights due diligence Promote the following initiatives to realize respect for human rights throughout the supply chain: [Build a system for managing human rights risks of suppliers] • Provide feedback on the results of the FY2023 supplier survey, and offer support for improvement to those identified as needing follow-up support [Expand human rights due diligence to Group companies] • Conduct human rights risk surveys at overseas Group companies, prioritizing those located in countries at high risk of human rights violations • Continue to support the correction and improvement of human rights risks at major domestic Group companies that have already been surveyed, while considering regular risk surveys and methods for checking corrective measures

Progress of the Seventh Medium-term Business Plan

In FY2021, the JFE Group **formulated the Seventh Medium-term Business Plan** for FY2021 through FY2024 to steadily increase corporate value over the medium to long term. Recognizing that the four years covered by the plan will be the most transformative period in the Company's history, we will establish a robust foundation for sustained, long-term growth while steadfastly taking on the challenge of transformation to become an essential part of the sustainable development of society and the safe and comfortable lives of people. We are working to ensure environmental and social sustainability by promoting initiatives addressing climate change issues as outlined in the JFE Group Environmental Vision for 2050 and implementing initiatives for promoting employee success, contributing to local communities, and ensuring respect for human rights throughout the supply chain. We are also striving to ensure economic sustainability based on stable profitability by completing structural reforms and promoting DX strategies in the steel business to raise cost competitiveness. And we are viewing advances in decarbonization as opportunities for pursuing business growth strategies, such as supplying high-performance electrical steel sheets and other products with high added value and expanding renewable power generation.

➤ Seventh Medium-term Business Plan (CSR Report 2021) (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/data/2021/csr2021e.pdf)

Status of Initiatives for the Seventh Medium-term Business Plan

Ensure Environmental and Social Sustainability

Addressing Climate Change Issues

The JFE Group considers addressing climate change as a vital management concern and upholds the **JFE Group Environmental Vision for 2050** for realizing carbon neutrality by focusing on strategies for **reducing CO_2 emissions in its steel business as well as in society as a whole**. In FY2023, we reduced CO_2 emissions in the steel business by 17.5% from FY2013 and will continue our efforts to achieve the target under the medium-term plan of reducing emissions by at least 18%. We are also expanding the construction and operation of plants for renewable energy power generation, waste-to-energy power generation, along with other efforts in the engineering business, which contributed to reducing 11.53 million tonnes of CO_2 emissions in society as a whole in FY2023, as we make steady progress toward achieving our mid-term target of reducing emissions by 12.00 million tonnes.

In the steel business, we intend to reduce CO_2 emissions by at least 30% in FY2030 from FY2013 and to achieve carbon neutrality by 2050. In FY2022, we took our first step forward by formulating a more specific CO_2 reduction plan*1 which positions the timeframe up to 2030 as the transition period for shifting to a low-carbon steel process and the timeframe up to 2050 as the innovation period, during which we will establish and implement ultra-innovative technologies and strive for carbon neutrality. In order to achieve the goal of reducing emissions by 30% or more by FY2030, we expanded the use of scrap in converter furnaces by introducing the eco-friendly Double-slag Refining Process (DRP™) in all districts, which will significantly reduce CO_2 emissions. In addition, we reinforced the electric arc furnace at the Sendai Works and are currently constructing an electric furnace in stainless steel manufacturing in the Chiba district. In the Kurashiki district, we are considering **installing high-efficiency electric arc furnaces** and launch operations to coincide with the renovation of the blast furnace in FY2027, and we will execute the necessary capital investment to achieve these goals. With the support of the NEDO Green Innovation Fund Project, we have been simultaneously developing ultra-innovative technologies since FY2023 with the aim of achieving carbon neutrality in 2050. In the Chiba district, we began construction of **test facilities for the carbon recycling blast furnace***2, and we will accelerate research and development toward the early implementation of ultra-innovative technologies.

We also began supplying JGreeX™, an eco-friendly steel material created using the mass balance method that generates significantly lower CO_2 emissions during the manufacturing process compared to conventional products. We will actively work to establish a market in which customers recognize the value of green steel materials that contribute to realizing a carbon neutral society.

In the area of contributing to the reduction of CO_2 emissions in society as a whole, we decided to invest in the Kurashiki district to triple the current production capacity of electrical steel sheets to improve the efficiency of motors and transformers for EVs. As for our activities overseas, we established a production and sales joint venture for (grain-oriented) electromagnetic

steel sheets with JSW Steel in India and have begun constructing a plant scheduled to start full production in FY2027. In addition to expanding renewable energy power generation and other businesses in the engineering business, the entire Group is working to commercialize offshore wind power generation. In FY2023, we completed construction of a manufacturing plant for monopiles in Kasaoka City, Okayama Prefecture, to establish a system for manufacturing and supplying foundation structure for offshore wind power generation. The plant came online in April 2024. By expanding the supply of eco-friendly products and renewable energy-related businesses, we will contribute reducing CO_2 emissions in society as a whole.

➤ *1 Roadmap to Carbon Neutrality (P.83)

*2 Technology for converting CO_2 emitted from a blast furnace into methane, which is then blown into the blast furnace as a reductant

Addressing Social Issues

For the JFE Group to achieve sustainable growth in the future, addressing social as well as environmental issues is essential. We are implementing **human rights due diligence** toward the realization of a society where human rights are respected and protected. We also revised the JFE Group Basic Policy on Human Rights in April 2023 to further intensify these efforts as part of our ongoing commitment to ensure respect for human rights for all stakeholders, including those in our supply chain.

Ensuring the safety and health of employees is a fundamental requirement for corporate activities, and with regard to safety in particular, we are focused on initiatives for **eliminating major accidents** by making our facilities safer. As planned, we made safety investments of about 10 billion yen per year for the entire Group in FY2023. Meanwhile, we are promoting initiatives on **diversity and inclusion** and workstyle reform to maximize the capabilities of employees with diverse backgrounds. Since FY2022, we have been advancing our efforts by setting more ambitious KPIs for hiring female employees and increasing the ratio of female managers. We will consistently invest in human capital to secure and nurture diverse human resources and create working environments and systems that enable employees to feel pride in their work and fully demonstrate their abilities.

Starting in FY2022, we will calculate **performance-linked remuneration for Directors** based on non-financial indicators related to the environment and society in addition to existing financial indicators. In FY2022, we introduced indicators related to employee safety, and in FY2023 we introduced indicators for climate change beginning as an incentive to accelerate efforts in this area, which we recognize as a top priority.

We will actively promote initiatives addressing ESG issues, particularly climate change, and contribute to the realization of a sustainable society to ensure environmental and social sustainability as set forth in our medium-term plan.

Ensure Economic Sustainability

Shift focus from Quantity to Quality and Promotion of Growth Strategies

In FY2023, we continued to steadily implement the key measures of the medium-term plan to establish economic sustainability. In the steel business, we maintained our efforts to improve sales pricing by reflecting fluctuations in raw material costs and higher prices in various goods, and correcting price levels, which led to a significant improvement of 5,000 yen/tonnes over the previous fiscal year. The ratio of high value-added products increased by 1% from the previous year to 48%, showing steady progress toward the 50% target of the mid-term plan. We will strive to increase the ratio of high value-added products and further improve sales prices and spreads by expanding sales of high-grade, non-oriented electrical steel sheets for EV main motors, large and heavy steel plates for offshore wind power generation, and other products. In September 2023, we suspended the upstream process in the Keihin area, thereby completing the structural reform and making steady progress in subsequent land use based on the OHGISHIMA2050 concept.

In the engineering business, we will strive to increase profits by improving the usage rate of the monopile plant, mainly for offshore wind power projects in Japan starting in FY2025, and by increasing orders in the waste-to-resource and carbon neutrality fields. The trading business posted a record-high segment profit of 48.9 billion yen in FY2023, exceeding the final target of 40 billion yen in the medium-term plan.

Promoting DX Strategy

Our medium-term plan positions DX as a **key for accomplishing the greatest transformation** since our founding. Advanced use of data is one of the key strategic themes in the steel business. Data related to our accumulated expertise in manufacturing high-grade steel, measures for aging facilities and data on predictive management are sources of our competitive strength, and various initiatives are underway to deploy this data. In FY2023, the West Japan Works (Kurashiki Area) became the first large-scale integrated steel works to complete the migration of its core system to a cloud environment for shaped steel products. We also promote migration in other steel works, which will ensure the continuity and development of our business by moving away from legacy systems, while the introduction of the latest technologies such as AI will also enable advanced use of accumulated data and know-how. In addition, we have applied digital-twin technology, constituting the core of cyber physical systems (CPS), to coke furnace design. This allowed us to confirm the effectiveness of the mechanism for partially controlling air supply, leading to quantitative results such as reducing fuel consumption by 5% and CO_2 emissions by 6,600 t/year.

In the engineering business, an AI-supported waste incinerator achieved 92 days of fully automated operation, which is part of our initiatives leveraging our Global Remote Center (GRC), a next-generation service base that remotely monitors incineration plants in Japan and overseas.

We plan to invest around 120 billion yen in DX over the four-year period and have already decided to execute over 80% of the total by FY2023. We will implement our DX strategy in a united Group effort to enhance corporate value and provide new added value to society.

Balancing Effective Investment and Financial Soundness

Aggressive management for medium- to long-term growth requires the establishment of a stable financial base. To this end, we must **balance effective investment based on a "select and concentrate" approach to ensure sufficient profitability and financial soundness**. The balance of interest-bearing debt at the end of FY2023 declined by 32.7 billion yen from the previous fiscal year to 1,830.2 billion yen, due in part to 52.0 billion yen in stock issued to overseas subscribers and 62.4 billion yen in disposal of treasury stock. The Debt/EBITDA ratio, which is the financial target of the medium-term plan, was 3.2 times higher, and the D/E ratio was 58.0%, achieving the mid-term plan target of around 70% a year ahead of schedule. We will continue to secure the necessary funding for investments while ensuring financial soundness by reviewing businesses and assets to thoroughly reduce assets and by improving the cash conversion cycle to reduce inventories.

The JFE Group will complete the measures set forth in the medium-term plan to achieve sustainable growth, enhance corporate value over the medium to long term and overcome difficulties by quickly and accurately responding to unpredictable, rapid changes in the business environment.

■ JFE Group's Performance and Profitability Targets, Dividend Policy, FY2023 Results, and FY2024 Forecast

Performance and profitability targets	Seventh Medium-term Business Plan (final year: FY2024)	FY2023 Results	FY2024 Forecast
Consolidated business profit (excluding steel business inventory valuation difference, etc.)	320.0 billion yen	298.2 billion yen (296.2 billion yen)	260.0billion yen/year (308.0 billion yen)
Profit attributable to owners of parent	220.0 billion yen	197.4 billion yen	205.0 billion yen
ROE	10%	8.6%	8.1%
Debt/EBITDA	About 3 times	3.2 times	—
D/E ratio	About 70%	58.0%	—

Dividend policy	Seventh Medium-term Business Plan	FY2023 Results	FY2024 Forecast
Payout ratio	About 30%	30.9% (100 yen)	34.1% (110 yen)

■ Performance and Profitability Targets, FY2023 Results, and FY2024 Forecast for Operating Companies

Performance and profitability targets for operating companies		Seventh Medium-term Business Plan (final year: FY2024)	FY2023 Results	FY2024 Forecast
Steel business	Per-ton profit (excluding inventory valuation difference, etc.)	10,000 yen/tonnes	10,000 yen/tonnes (10,000 yen/tonnes)	8,000 yen/tonnes (10,000 yen/tonnes)
	Segment profit (excluding inventory valuation difference, etc.)	230.0 billion yen	202.7 billion yen (200.7 billion yen)	165.0 billion yen (213.0 billion yen)
Engineering business	Segment profit	35.0 billion yen	24.3 billion yen	20.0 billion yen
	Sales revenue	650.0 billion yen	539.9 billion yen	580.0 billion yen
Trading business	Segment profit	40.0 billion yen	48.9 billion yen	50.0 billion yen

■ Investment and Asset Downsizing Plans, Cumulative Results up to FY2023

Content		Seventh Medium-term Business Plan (four-year total)	Cumulative Results for FY2021 and FY2023
Investment	Total capital expenditures, investment and loans	Approx. 1,450.0 billion yen	Adopted around 80% of plan
	GX investment*1	Approx. 340.0 billion yen	Adopted around 90% of plan (investments related to offshore wind power-business, expansion in production facility for grain-oriented electromagnetic steel sheets, introduction of electric-arc furnace for stainless steel production, other)
	DX investment*2	Approx. 120.0 billion yen	Adopted more than 80% of plan (system upgrades at steelworks)
Asset downsizing		Approx. 200.0 billion yen	120.0 billion yen

*1 GX investment: Investments for green transformation.
*2 DX investment: Investments for digital transformation.

JFE Group Value Chain

The JFE Group's value chain encompasses upstream and downstream activities across the globe. We seek to address social challenges by identifying the risks and opportunities that the Group must resolve through its business operations and pursue initiatives that tackle those challenges. We will also continue to strengthen the sustainability of the entire Group and implement countermeasures throughout our value chain.

Overview of the Value Chain

Procurement

To ensure stable supply of iron ore and coal used as raw materials in the production of steel products, we purchase from various sources around the world such as Australia, South America, etc., and transport materials to the steelworks on a special vessel. Equipment and materials used at steelworks plants are also purchased globally. JFE Steel has established these JFE Steel Procurement Guidelines in accordance with the JFE Group Standards of Conduct and the JFE Group Basic Policy on Human Rights, to enhance sustainability across its entire supply chain. We share these guidelines with our business partners and promote sustainability initiatives throughout our supply chain.

Manufacturing, Production, and Shipping

The JFE Group is one of the world's largest steelmakers and has cutting-edge technologies for the efficient production and stable supply of high-quality steel products, used in products indispensable to daily life such as automobiles, infrastructure, and home appliances. We also promote resource recycling by recycling steel scrap generated in the process of producing steel products while also repurposing iron and steel slag in cement and other construction materials.

Sales and Usage

The JFE Group is committed to developing eco-friendly products such as high tensile strength steel sheets that help reduce the weight of automobiles as well as electrical steel sheets used in electric vehicles. At the same time, we are engaged in a Groupwide effort to accelerate the commercialization of the offshore wind-power generation business. We work at the frontier of production by responding to the diverse needs of different industries through research and development and by improving production technologies.

Collecting Steel Scrap

Steel products at the end of their product life cycle are collected as steel scrap and recycled as materials for the steel production cycle.

Environment

Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Initiatives to Address Climate Change Issues					
JFE Group views the issue of climate change as a critical managerial concern from the perspective of business continuity, and it considers achieving carbon neutrality by 2050 a top priority. By designating climate change issue as a material issue of corporate management, we are actively tackling the challenge to solve this issue.					
Opportunities - Develop ultra-innovative technologies and ensure - Increased need for renewable energy solutions - Expand electric arc furnace steelmaking and electric arc furnace engineering businesses - Increased need for green steel - Contribute to reduced CO_2 emissions by providing high-performance steel such as high tensile strength steel sheets and electrical steel sheets			●	●	●
Risks - Heightened decarbonization needs in steelmaking process (blast furnace) - Increase in investment burden for introducing ultra-innovative technologies - Introduction of a carbon tax - Supply chain disruptions caused by severer natural disasters natural disasters - Risk of floods associated with rising sea levels	●	●	●	●	●

Key Initiatives

➤ Initiatives to Address Climate Change Issues (P.52)

Related Pages

➤ Policy Engagement (P.90) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
➤ Development and Provision of Eco-Friendly Processes and Products (P.135)
➤ Supply Chain Management (P.182) ➤ Environmental Data (P.235)

Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Realizing a Recycling-Oriented Society					
Given that such issues as resource depletion are expected to intensify on a global scale, even as we strive to realize a recycling-oriented society, the JFE Group is enhancing resource recycling through recycling co-products generated in the iron and steelmaking process and promoting the international recycling of steel scrap. Steel manufacturing also requires large quantities of fresh water for cooling and cleansing products and facilities. For this reason, the efficient use of water resources with due consideration to the source of the water and stakeholders in the area is a key challenge.					
Opportunities - Renewed interest in recyclability of steel - Increased use of scrap - Expand the scrap distribution business			●	●	●
Risks - Shortage of disposal sites for waste generated - Resource depletion - Declining in the grade, rising price and difficulty of obtaining obsolete scrap - Increased environmental impact - Tighter environmental regulations	●	●	●		●
Key Initiatives ➤ Realizing a Recycling-Oriented Society (P.115) **Related Pages** ➤ Development and Provision of Eco-Friendly Processes and Products (P.135) ➤ Environmental Data (P.235)					
Preserving Biodiversity					
Recognizing that natural capital and biodiversity are foundational for realizing a sustainable society, the JFE Group has endorsed the Declaration of Biodiversity by Keidanren and Action Policy and conducts business in harmony with nature across the world. We particularly recognize the preservation of biodiversity as a key challenge and conduct assessments to minimize the ecological impact associated with our business activities.					
Risks - Risk of drought in the water intake area - Risk of pollution in the discharge area	●	●	●		
Key Initiatives ➤ Preserving Biodiversity (P.122) **Related Pages** ➤ Development and Provision of Eco-Friendly Processes and Products (P.135) ➤ Environmental Data (P.235)					

Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Development and Provision of Eco-Friendly Processes and Products					
Under our corporate philosophy of contributing to society with the world's most innovative technology, the JFE Group strives to reduce its environmental impact by developing steel manufacturing processes and providing technologies and products with due consideration for the environment.					
Opportunities - Develop eco-friendly processes and products and ensure competitiveness			●	●	
Risks - Tighter environmental regulations - Increased environmental impact during product use			●	●	●
Key Initiatives ➤ Development and Provision of Eco-Friendly Processes and Products (P.135)					

Social

Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Human Rights					
The JFE Group views respect for human rights as both a corporate social responsibility and a foundation of its business. Our determination to not engage in discrimination in our business activities is clearly expressed in our Standards of Business Conduct, which we have upheld throughout our actions. And we pursue Group-wide initiatives based on the United Nations Guiding Principles on Business and Human Rights.					
Risks - Potential human rights risks	●	●	●	●	●
Key Initiatives ➤ Human Rights (P.166) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Social Data (P.253)					

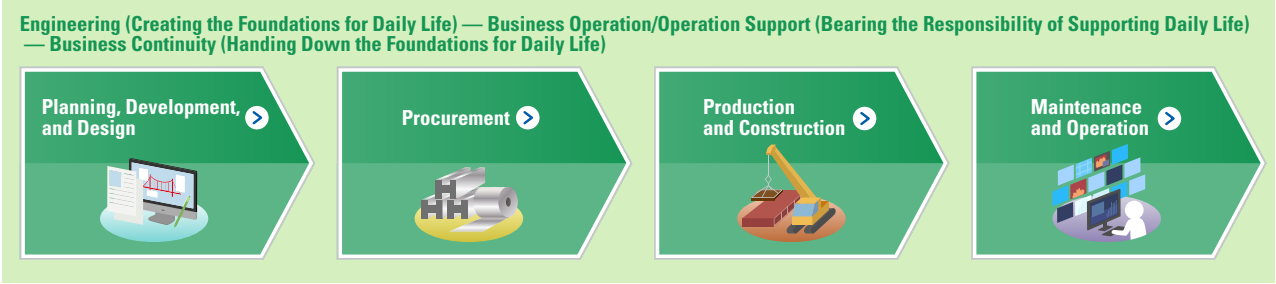
Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Providing Quality Products and Enhancing Customer Satisfaction					
The JFE Group provides steel products used in diverse areas that are indispensable to daily life, such as automobiles, infrastructure, and home appliances. One of our key responsibilities is to serve customers by meeting their quality requirements and providing a stable supply of products.					
Opportunities - Expansion of sustainable procurement and development of a structure for stable procurement - Ensure competitiveness through stable production and stable quality	●	●	●	●	●
Risks - Disruptions to the supply chain associated with climate change-related disasters and natural disasters such as earthquakes - Lose credibility with customers due to issues related to production and quality - Declining in the grade, rising price and difficulty of obtaining obsolete scrap	●	●	●	●	●
Key Initiatives ➤ Providing Quality Products and Enhancing Customer Satisfaction (P.175) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Social Data (P.253)					
Human Capital					
The JFE Group strives to recruit human resources with different backgrounds and nurture employees who will support its business activities, create workplace environments and systems in which employees feel rewarded in their work and fully demonstrate their abilities, and realize new workstyles that are free from the constraints of time and location. We do this to achieve sustainable corporate growth as well as to comply with laws and regulations.					
Opportunities - Secure excellent human resources through workstyle reform			●		
Risks - Labor shortage - Labor risks - Culture of passing down technical skills is dying out - Occurrence of accidents, including occupational injuries	●	●	●	●	●
Key Initiatives ➤ Human Capital (P.184) ➤ Diversity and Inclusion (P.193) ➤ Strengthening Human Resource Development (P.197) ➤ Creating Work Environments that Motivate Employees (P.199) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Social Data (P.253)					

Governance

Challenges in the Value Chain	Procurement		Manufacturing, Production, and Shipping	Sales and Usage	Collecting Steel Scrap
	Raw Material Iron Ore/Coal	Machinery			
Compliance					
In expanding our businesses in and outside of Japan, it is important that JFE maintains relationships of trust with all stakeholders, including its customers, shareholders, and local communities. Trust can only be built upon a strong foundation of ensuring thorough compliance. It is therefore extremely important to conduct training on corruption prevention and other compliance training, so that all members of the organization can deepen their knowledge and awareness of compliance and perform their jobs accordingly.					
Risks - Legal risks such as violations of antitrust law or competition law	●	●		●	
Key Initiatives ➤ Compliance (P.227) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Governance Data (P.259)					
Information Security					
The JFE Group formulates various rules on information security management to prevent information leakage and system failure due to cyber-attack or improper system use and continually raise the level of its information security management.					
Risks - Information leakage and system failure due to cyber-attack or improper system use	●	●	●	●	●
Key Initiatives ➤ Risk Management (P.231) **Related Pages** ➤ Governance Data (P.249) ➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)					

Engineering Business

Overview of the Value Chain



Engineering (Creating the Foundations for Daily Life)

The JFE Group has built many high-functioning, high-quality facilities in fields such as energy, the environment, and bridges while satisfying the needs of our customers every step of the way, from design to delivery. We have combined and evolved the technologies for processing and assembling in shipbuilding business and technologies relating to materials and combustion in the steel business to create next-generation energy and to address environmental issues. Many of our technologies support society. In addition, we are assembling our resources to develop new business models and new technologies based on existing technologies. We produce high-quality products at low cost by establishing production sites, including one of the largest steel structure production factories in Japan, overseas bases centered on Asian countries, and global engineering structures.

Business Operation/Operation Support (Bearing the Responsibility of Supporting Daily Life)

The JFE Group engages in many private-public initiatives in the field of public services by applying the operational and maintenance know-how acquired over many years, primarily with regard to the environment and water and sewage plants. Furthermore, we build plants, engage in the recycling business and renewable energy business, and take the initiative to realize a recycling-oriented sustainable society. Going forward, we intend to expand our initiatives even further.

Business Continuity (Handing Down the Foundations for Daily Life)

The JFE Group is committed to the construction, operation, and maintenance of infrastructure facilities such as plants related to energy and environment, bridges, and coastal structures to hand down safe and secure foundations for the next generation.

Environment

Challenges in the Value Chain	Planning, Development, and Design	Procurement	Production and Construction	Maintenance and Operations
Initiatives to Address Climate Change Issues				
The JFE Group strives to reduce CO_2 emissions in society through its eco-friendly products and technologies, including renewable energy technologies and energy-saving products in its engineering business. The Group designates climate change issue as a material issue of corporate management and is tackling the challenge to solve this issue.				
Opportunities - Increased need for renewable energy solutions - Increased demand for CCU*1/CCS*2 facilities - More sophisticated needs in the energy-environment area - Increased response to climate change related disasters (disaster prevention and mitigation, disaster waste processing) - Increased demand for waste to resource technology (food waste power generation)	●	●	●	●
Risks - Supply chain disruptions caused by severer natural disasters - Effects of meteorological disasters - Risk of floods associated with rising sea levels - Tighter environmental regulations	●	●	●	●
Key Initiatives ➤ Initiatives to Address Climate Change Issues (P.52) **Related Pages** ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104) ➤ Development and Provision of Eco-Friendly Processes and Products (P.135) ➤ Supply Chain Management (P.182) ➤ Environmental Data (P.235)				
Realizing a Recycling-Oriented Society				
Given that issues such as resource depletion and environmental pollution are expected to intensify on a global scale, even as we strive to realize a recycling-oriented society, our resource recycling solutions include operating our own waste recycling and energy supply businesses, in addition to constructing and providing plants for waste incineration and sludge digestion to customers. We also provide total management of water and sewage systems, including maintenance and operations, to secure vital lifelines and are thereby contributing to reducing the negative impact on the water environment.				
Opportunities - Increased demand for waste to resource technology (plastics recycling, food waste power generation) - Need for improving operational efficiency and reducing environmental impact	●	●	●	●

*1 Carbon dioxide capture and utilization
*2 Carbon capture and storage

Challenges in the Value Chain	Planning, Development, and Design	Procurement	Production and Construction	Maintenance and Operations
Risks - Shortage of disposal sites for waste generated - Prevention of resource depletion - Violation of environmental regulations and laws		●	●	●

Key Initiatives

➤ Realizing a Recycling-Oriented Society (P.115)

Related Pages

➤ Development and Provision of Eco-Friendly Processes and Products (P.135)

➤ Environmental Data (P.235)

Preserving Biodiversity

Recognizing that natural capital and biodiversity are foundational for realizing a sustainable society, the JFE Group has endorsed the Declaration of Biodiversity by Keidanren and Action Policy and conducts business in harmony with nature across the world. We particularly recognize the preservation of biodiversity as a key challenge and conduct assessments to minimize the ecological impact associated with our business activities.

Risks - Risk of drought in the water intake area, risk of pollution in the discharge area		●	●	●

Key Initiatives

➤ Preserving Biodiversity (P.122)

Related Pages

➤ Development and Provision of Eco-Friendly Processes and Products (P.135)

➤ Environmental Data (P.235)

Development and Provision of Eco-Friendly Processes and Products

Under its corporate philosophy of contributing to society with the world's most innovative technology, the JFE Group will contribute to meeting social challenges related to reducing environmental impact through business operations that focus on the environment and recycling fields as growth sectors.

Opportunities - Need for improving operational efficiency and reducing environmental impact - Need for cost reduction and energy saving	●		●	●

Key Initiatives

➤ Development and Provision of Eco-Friendly Processes and Products (P.135)

Social

Challenges in the Value Chain	Planning, Development, and Design	Procurement	Production and Construction	Maintenance and Operations
Human Rights				
The JFE Group views respect for human rights as both a corporate social responsibility and a foundation of its business. Our determination to not engage in discrimination in our business activities is clearly expressed in our Standards of Business Conduct, which we have upheld throughout our actions. And we pursue Group-wide initiatives based on the United Nations Guiding Principles on Business and Human Rights.				
Risks - Potential human rights risks	●	●	●	●
Key Initiatives ➤ Human Rights (P.166) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Social Data (P.253)				
Providing Quality Products and Enhancing Customer Satisfaction				
The JFE Group has developed a global engineering system encompassing one of the largest steel structure production factories in Japan, overseas bases centered on Asian countries, and global engineering structures. We intend to maximize customer satisfaction by complying with the Group-wide quality policy, providing high-quality products and services, and reinforcing our after-sales service system.				
Opportunities - Expansion of sustainable procurement and development of a structure for stable procurement - Implement requested functions - Need for cost reduction and energy saving - Expand the business scale through privatization of public services	●	●	●	●
Risks - Lose credibility with customers due to issues related to production and quality	●			●
Key Initiatives ➤ Providing Quality Products and Enhancing Customer Satisfaction (P.175) **Related Pages** ➤ Social Data (P.253)				

Challenges in the Value Chain	Planning, Development, and Design	Procurement	Production and Construction	Maintenance and Operations
Human Capital				
The JFE Group intends to establish its position as a company that is essential to the sustainable development of society while also creating safe, comfortable lives for people everywhere. So that it can continue to enhance corporate value under an increasingly complex and rapidly changing business environment, each and every employee must be able to provide support. We established the JFE Group's Basic Policy on Human Resource Management and the JFE Group Health Declaration and are working on measures to maximize the abilities and vitality of our employees by investing in human capital.				
Opportunities - Maximize human capital through physical and mental health - Saving labor through new technology - Need for remote monitoring and automation due to a lack of human resources	●	●	●	●
Risks - Occurrence of accidents, including occupational injuries - Disruptions to the supply chain caused by COVID-19 - Labor shortage - Labor risks - Culture of passing down technical skills is dying out	●	●	●	●

Key Initiatives

➤ Human Capital (P.184)
➤ Occupational Health and Safety (P.186)
➤ Diversity and Inclusion (P.193)
➤ Strengthening Human Resource Development (P.197)
➤ Creating Work Environments that Motivate Employees (P.199)

Related Pages

➤ Supply Chain Management (P.182) ➤ Social Data (P.253)

Governance

Challenges in the Value Chain	Planning, Development, and Design	Procurement	Production and Construction	Maintenance and Operations
Compliance				
In expanding our businesses in and outside of Japan, it is important that JFE maintains relationships of trust with all stakeholders, including its customers, shareholders, and local communities. Trust can only be built upon a strong foundation of ensuring thorough compliance. It is therefore extremely important to conduct training on corruption prevention and other compliance training, so that all members of the organization can deepen their knowledge and awareness of compliance and perform their jobs accordingly.				
Risks - Legal risks such as violations of antitrust law or competition law		●		●
Key Initiatives ➤ Compliance (P.227) **Related Pages** ➤ Supply Chain Management (P.182) ➤ Governance Data (P.259)				
Information Security				
The JFE Group formulates various rules on information security management to prevent information leakage and system failure due to cyber-attack or improper system use and continually raise the level of its information security management.				
Risks - Information leakage and system failure due to cyber-attack or improper system use	●	●	●	●
Key Initiatives ➤ Risk Management (P.231) **Related Pages** ➤ Governance Data (P.259) ➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)				

Stakeholder Engagement

The JFE Group strives to maintain agreeable and favorable relationships with all stakeholders, including Stakeholder Engagement shareholders, customers, clients, employees, and local communities, for the sustainable growth and medium- to long-term increase of corporate value.

JFE Group Standards of Business Conduct

2 Be open to society

Proactively disclose corporate information and engage in constructive dialogues with diverse stakeholders to enhance our corporate value.

Engagement with Stakeholders

■ **Engagement with JFE's Major Stakeholders**

Stakeholder	Major Communication Methods, etc.	Others	
		Frequency (per year)	Scale, etc.
Scale, etc.	Ordinary general meeting of shareholders	1	Approx. 230,000 shareholders
	Individual meetings, primarily with institutional investors and securities analysts	In Japan: 54 companies (181 meetings) Overseas: 86 companies (150 meetings)	
	Meetings with shareholders, primarily ESG managers or those with voting rights at institutional investors	In Japan: 25 companies (44 meetings) Overseas: 18 companies (25 meetings)	
	Investor meetings and ESG Briefings for analysts and persons responsible for ESG	5	Approx. 1,100 persons in total
	Web-based briefings for individual investors		Over 2,000 views
	Business site and plant tours for individual shareholders	14	Approx. 1,900 persons
	Newsletters (JFE Dayori)	2 (mid-year and year-end)	Approx. 300,000 copies per issue
	Various reports, including integrated reports and sustainability reports*1	1	Approx. 23,000 copies
	Information via websites, etc., for shareholders and investors	As needed	
Customers	Communication through sales activities and sales support for quality assurance	As needed	Conducted at each operating company
	Interviews and questionnaires, such as those related to customer satisfaction	As needed	Conducted at each operating company
	Information via websites (product information), etc.	As needed	
Suppliers	Communication through purchasing activities	As needed	Conducted at each operating company
	Briefings and exchanges of opinion	As needed	Conducted at each operating company
	Information disclosure and other communication through the website	As needed	

Stakeholder	Major Communication Methods, etc.	Others	
		Frequency (per year)	Scale, etc.
Employees	Communications through daily operations and in the workplace	As needed	
	Internal newsletters and intranet	As needed	
	Various labor-management committees	2 to 4	Management and labor unions at each operating company
	Corporate Ethics Hotline	As needed	FY2023: 134 cases
	Various training sessions	As needed	Position-specific, compliance, human rights, etc.
	Family days*1 (visits by employee families, lunch at employees' cafeteria), etc.	As needed	Conducted at each operating company
	Corporate Ethics Awareness Survey	Once every 3 years (once every 2 years starting in FY2024)	Conducted at JFE Holdings and operating companies
	Engagement Survey (employee satisfaction survey)*2	1	Conducted at JFE Holdings and operating companies
	Management feedback (360 degree analysis)*3	1	Conducted at JFE Holdings and JFE Steel, and JFE Engineering
Local communities	Communication through local residents' association, events, etc.	As needed	
	Events at manufacturing bases (festivals, etc.)	1 per region	Approx. 170,000 persons per year
	Plant tours	As needed	More than 80,000 persons per year
	Cleanup activities (vicinity of manufacturing bases, regional cleaning, etc.)	As needed	
	Sports promotion (baseball or jogging workshops, various sports competitions, etc.)	As needed	
	Others (dispatch of lecturers to elementary schools, craft workshops, workplace experience events, etc.)	As needed	
	Information via websites (environmental info, etc.)	As needed	
	Social contribution through JFE 21st Century Foundation (http://www.jfe-21st-cf.or.jp/eng/index.html) (various research support, regional activity support, etc.)	As needed	

*1 Number of issues published is for the integrated report, and the sustainability report is only posted online.
*2 Questionnaire targeting all employees for surveying the level of satisfaction and applying results to initiatives and operations.
*3 Corporate officers and managers are evaluated by co-workers and subordinates and receive feedback.

Engaging Our Shareholders and Investors

We work to disclose information accurately, fairly and in a timely and appropriate manner as well as strive for active communication.

We established the Investor Relations and Corporate Communications Department as an organization responsible for communication with domestic and international shareholders and investors, and to promote constructive dialogue as well as provide management with the information acquired, with the aim of maintaining and improving the relationship of trust.

Returns to Shareholders

The JFE Group regards returning profits to shareholders as a top management concern and follows the basic policy of actively paying dividends while establishing a sustainable and highly profitable structure for the Group as a whole, investing in growth, and improving its financial position. The Group's basic policy under the Seventh Medium-term Business Plan is to achieve a payout ratio of about 30%.

General Meetings of Shareholders

General meetings of shareholders are opportunities for dialogue with shareholders, so JFE sends invitations at the earliest possible date to maximize attendance and avoid overlapping with the shareholder meetings of other companies. The company has been posting an invitation on its website at the earliest possible date while allowing online voting for shareholders who are unable to attend. JFE also strives to provide the same information to overseas investors as it does in Japan by, for example, disclosing the convocation notice in English.

For more information on the General Meetings of Shareholders, please refer to the following.

➤ **General Meetings of Shareholders** (https://www.jfe-holdings.co.jp/en/investor/stock/general_meeting/index.html)

Policy on Constructive Dialogue with Shareholders and Investors

The JFE Group endeavors to enhance corporate value sustainably through dialogues with shareholders and investors, and it has established the Investor Relations and Corporate Communications Department to be responsible for promoting such constructive dialogue. The director supervising the department and director in charge are also responsible for promoting constructive dialogues with shareholders and investors, and the department takes the lead in ensuring organic collaboration between relevant departments by appropriately sharing information.

To promote active dialogue, JFE holds various briefings for institutional investors, including announcements of medium-term business plans and financial results by executive directors, and also arranges for visits to investors in Japan and overseas. With regard to individual shareholders and investors, JFE organizes briefings on corporate activity and tours of plants and other sites. Opinions, questions, and other information obtained through these dialogues are regularly collected and reported to directors, Audit & Supervisory Board members, and corporate officers.

In conducting the dialogues, JFE prevents any leaks of insider information and ensures fair disclosure by adhering to its disclosure policy. In addition, important press releases and IR materials are disclosed in English to provide the same information to overseas investors as to those in Japan.

For more on this, please refer to the following information.

➤ **Investor information** (https://www.jfe-holdings.co.jp/en/investor/index.html)

➤ **Plant tours (special benefit for shareholders) (Japanese only)** (https://www.jfe-holdings.co.jp/investor/stock/factory_tour/index.html)

➤ **Disclosure policy** (https://www.jfe-holdings.co.jp/en/investor/management/disclosure-policy/index.html)

Engaging Our Customers

The Group believes that the stable supply of products and services and reliable quality assurance, along with advancing research and development, are necessary to meet customer needs.

We will work to establish win-win relationships by continuously meeting customer needs and the trust they place in us.

For more on this, please refer to the following information.
➤ Provide Quality Products and Enhance Customer Satisfaction (P.175)

Engaging Our Suppliers

As a key business partner, we actively promote sustainability initiatives in cooperation with suppliers. We have established a basic purchasing (procurement) policy to promote fair and honest procurement activities and build sound relationships with suppliers.

For more on this, please refer to the following information.
➤ Supply Chain Management (P.182)

Engaging Our Employees

With the recognition of top management that creating workplaces to provide pride and satisfaction for all is essential for maximizing the potential of individuals, we have formulated the Basic Policy on Human Resource Management and Health Declaration and are conducting various activities toward attaining the goals.

For more on this, please refer to the following information.
➤ Human Capital (P.184)

Engaging the Local Community

To ensure business continuity at manufacturing bases where steelworks are located and elsewhere, constructing a relationship of trust with citizens in local communities and realizing coexistence and prosperity are crucial.

We will pursue various activities with the aim of realizing sustainable growth and regional development, including continued initiatives toward ensuring safety and reducing our environmental impact.

For more on this, please refer to the following information.
➤ Community (P.204)

Environmental Communication

The JFE Group gives utmost priority to communicating with all stakeholders, including in matters relating to the environment. In addition to disclosing environmental information, the Group carries out extensive two-way communication between the public and the business community by supporting and participating in environment-related activities outside the Group.

Disclosing Environmental Data

The East Japan Works of JFE Steel discloses real time environmental data on local air and water quality. Visitors can review this information in the first-floor lobby of the Visitor Center in the Chiba District and in the Amenity Hall and the first-floor lobby of the Keihin Building in the Keihin District.

Environmental data display in the Keihin District

Environmental data display in the Keihin District

Commercial Video and Special Website about JFE

We created a commercial video and special website featuring the JFE Group's initiatives for a sustainable future to bring the Group closer to stakeholders. The video and website are titled "Sus-tetsu-nable!" with the word "tetsu" meaning iron inserted into the word "sustainable." We hope that the video and website will help the public better understand iron as an essential element for social infrastructure and recognize the Group's efforts as an indispensable member of society.

➤ Special website "Sus-tetsu-nable!" (Japanese Only) (https://www.jfe-holdings.co.jp/sus-tetsu-nable/)

ecobeing Environmental Website

The JFE Group provides support to ecobeing, a web magazine operated by KLEE INC., which disseminates information on the environment under the slogan, "Let's talk more with the Earth!" The website series, ecopeople, has featured people from a variety of fields and also introduced JFE Group employees and initiatives. In 2022, the magazine covered JFE Steel's BETTER RECYCLE Shonan, featuring the project for addressing plastic pollution by increasing the application of steel sheets for can-making along with those involved in the project in and outside the company, among other environmental initiatives beyond the JFE Group. By supporting this website magazine from an objective standpoint, the JFE Group seeks to help stimulate public discussion and awareness about ESG and the SDGs.

Please see the following for further details.
➤ ecobeing (Japanese only) (https://www.ecobeing.net/)
➤ BETTER RECYCLE Shonan (Japanese only) (https://www.ecobeing.net/ecopeople/2022_summer/04.html)

Sponsoring Midori no Komichi Environmental Diary

The JFE Group sponsors the Midori no Komichi (Green Trail) environmental diary project hosted by Green Cross Japan with the hope that children will become more aware of environmental issues by keeping diaries of their activities and thoughts about ecology.

Please see the following for further details.
➤ Midori no Komichi Environmental Diary (Japanese only) (https://www.midorinokomichi.net/)

Participation in Environmental Exhibitions Such as EcoPro2023 and Tokyo Bay Festival 2023

The JFE Group's business activities for protecting the environment have been presented at various environmental exhibitions.

In December 2023, the JFE Group participated in one of the largest environmental exhibitions in Japan, EcoPro2023, held at Tokyo Big Sight. Under the theme, "For a Prosperous Global Future—the JFE Group Collective Efforts to Address Climate Change," we displayed our initiatives for reducing CO_2 emissions in the steel business as well as technologies, mainly in engineering, that help reduce emissions across all of society. Many people, predominantly elementary and junior high school students, visited our booth to observe the Group's climate change initiatives by participating in VR-based plant tours and using models to gain hands-on experience.

In 2023, J Bio Food Recycle Corporation, a Group company of JFE Engineering, received the Minister of Agriculture, Forestry and Fisheries Award at the FY2023 6th Eco Pro Awards sponsored by the Sustainable Management Promotion Organization (SuMPO) for its project, "Food Recycling System with a Double-Recycling Loop – Creating a Regional Circular and Ecological Sphere with Electricity and Fertilizer," and the award ceremony was held at EcoPro2023.

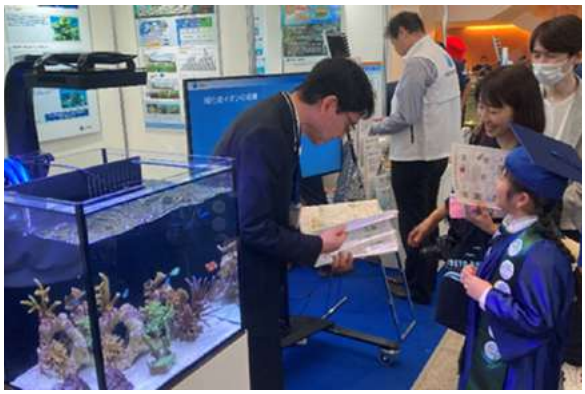
The JFE Group's booth at EcoPro2023


The event drew many children as well as adults

The JFE Group's eight companies jointly participated in the WIND EXPO at Tokyo Big Sight in February 2024. The WIND EXPO is one of the Smart Energy Week expos, a set of simultaneous expositions about seven new energy fields, and Japan's largest wind energy exposition. This year, we conveyed the JFE Group's ability to generate synergies and provide new added value through collaboration. We also introduced JFE Engineering's manufacturing plant for monopiles through a dynamic video taken by a drone, showing the inside of the plant, just before it began operations. This joint exhibit deepened our relationships with a wide range of visitors. We will continue to encourage efforts in the offshore wind power generation business and win more orders.

JFE Group's booth at WIND EXPO

In October 2023, JFE Steel took part in Tokyo Bay Festival 2023, an event held in Yokohama City to appreciate the bounty of Tokyo Bay, and presented the company's involvement in the regeneration of the marine environment and contribution to biodiversity through its steel slag products. The event offered a great opportunity for the company to showcase to the many visitors how its products contribute to the SDGs.


JFE Steel's booth at Tokyo Bay Festival 2023

Environment: Executive Summary

The JFE Group strives to maintain its businesses in harmony with the environment for the prosperity of society. We have positioned climate change as a key management concern and formulated the JFE Group Environmental Vision for 2050 toward achieving carbon neutrality by 2050. To this end, we are exploring ways to reduce CO_2 emissions in steelmaking processes and expand our contribution to reducing CO_2 emissions in society as a whole. The entire Group is working in concert to establish a framework for environmental management and address climate change and other environmental issues such as environmental protection and the effective use of resources.

The JFE Group systematically addresses climate change by reflecting the TCFD's philosophy in its management strategies. In the steel business, we created a roadmap for achieving carbon neutrality by 2050 and are working on CO_2 emission reduction initiatives toward short-, medium-, and long-term targets. Our overall goals are to reduce CO_2 emissions by 18% by the end of FY2024, compared to FY2013, and by more than 30% in FY2030. Until 2030, we will continue to shift to low-carbon steelmaking processes and at the same time develop ultra-innovative technologies, mainly the carbon-recycling blast furnace, to achieve carbon neutrality by 2050. This year, we achieved some progress on the construction work for the test furnaces in verifying each technology and started to apply some of them for tests. In the first half of FY2023, we started supplying the JGreeX™ brand, a variety of green-steel products that will significantly lower CO_2 emissions in the steel manufacturing process based on the mass balance approach, compared to conventional products. There are several plans to adopt JGreeX™ in shipbuilding and for other applications, and we are expanding supplies.

In the engineering business, we plan to contribute 25 million tonnes of CO_2 reduction to society as a whole in FY2030 by provisioning renewable energy power generation facilities. We also intend to further expand our renewable energy power generation by leveraging the Group's collective strength and accelerating the offshore wind power generation business. This year, we completed the construction of the country's first monopile manufacturing plant and started production in April 2024.

We are developing and providing environmentally sound processes and products as part of our contribution to the environment through our businesses, including the reduction of our environmental impact as stated in our environmental policy. In addition, we have set aggressive targets to manage initiatives such as effectively using resources in the mainstay steelmaking processes, preventing air and water pollution, and efficiently using water resources, and we are actively addressing these concerns. Furthermore, we are striving to minimize the impact on the ecosystem surrounding our business sites and analyzing the impact on diversity of using our steel slag products.

Targets and Results for Environment-Related Material Issues of Corporate Management

➤ Material Issues of Corporate Management and KPIs (P.18)

Key Initiatives

- Promoting the acquisition of Environment Management System certification, conducting internal and external environmental audits
- Executing initiatives for achieving the JFE Group Environmental Vision for 2050 (P. 52) and carbon neutrality
- Expanding the supply of JGreeX™, green steel products based on the mass balance approach (P. 61)
- Development of ultra-innovative technologies (P. 63), mainly the carbon-recycling blast furnace
- Group-wide effort to accelerate the commercialization of the offshore wind-power generation business (P. 77)
- Development and provision of environmentally sound products and processes
- Development of products that take advantage of steel's excellent recyclability, contribution to reducing plastic waste
- Effective use of water resources (P. 119) in steelmaking processes (high recirculation rate)
- Improvement and assessment of the environment at and around business sites, contribution to biodiversity (P. 127) from using steel slag products

Environmental Management

Basic Policy

JFE Group companies are developing innovative technologies and international cooperation for the protection of the global environment by operating in harmony with the global environment, as well as protecting it, in accordance with the Group's environmental philosophy and policy.

Environmental Philosophy

The JFE Group puts top priority on protecting and enhancing the global environment to maintain its business in harmony with the environment and ultimately for the prosperity of society as a whole.

Environmental Strategies

1. Reduce the environmental impact of all businesses
2. Contribute through technologies and products
3. Contribute through businesses for resource conservation and energy efficiency
4. Communicate with society
5. Facilitate international cooperation

Management Structure

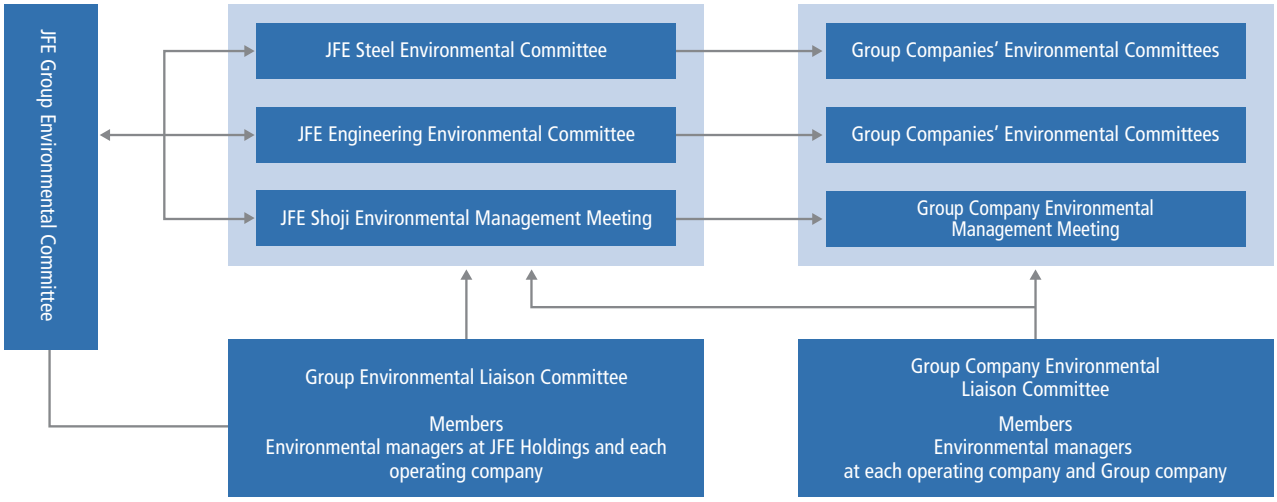
Framework for Environmental Management

The JFE Group Environmental Committee, chaired by the president of JFE Holdings and operating under the JFE Group Sustainability Council, sets goals for environmental protection, monitors the progress of these initiatives and works to improve the Group's overall environmental performance. Key issues for corporate management such as climate change are deliberated at the Group Management Strategy Committee as well and reported to the Board of Directors. The board oversees environmental challenges by discussing the reported material. Additionally, specialized committees set up by JFE Group operating companies and affiliates implement specific activities.

In our Seventh Medium-term Business Plan, we positioned climate change as a top-priority business concern and formulated the JFE Group Environmental Vision for 2050. To this end, we are aggressively pushing forward to achieving our CO_2 reduction targets and achieving carbon neutrality by 2050.

For further details, refer to:
➤ System for Promoting Sustainability (P.10)
➤ Seventh Medium-term Business Plan (P.22)
➤ JFE Group Environmental Vision for 2050 (P.52)

■ **Environmental Management System**



Initiatives

Environmental Management System

Acquiring ISO 14001 certification is a key part of every JFE Group company's environmental program. All global production sites of JFE Steel and JFE Engineering and major offices of JFE Shoji have been certified, encompassing 67% of 43,994 employees at 82 companies covered in this report and 52% of all sites. In FY2023, there were no major violations of environmental laws or regulations by Group companies (air, water, soil, etc.) that resulted in a fine or other penalty.

For quantitative data related to ISO 14001 for each business, please refer to the following information.

➤ **List of ISO 14001-certified companies** (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/environment/env_manage/iso14001.pdf)

JFE Steel Environmental Committee and Environment Management Committees Provide Appropriate Management Supervision

JFE Steel maintains Environment Management Departments at its head office and in each business office, as well as an Environmental Committee, chaired by its president and Environment Management Committees in each local office.

➤ **Environmental Management System (Environmental Strategies) (Japanese only)**
(https://www.jfe-steel.co.jp/research/environment.html)

JFE Engineering Environmental Committee Oversees Environmental Management

JFE Engineering maintains an Environment Management Department at each of its major locations, including production sites and branch offices as well as all divisions in charge of products. The Environmental Committee, chaired by the president, oversees environmental management for the entire company. Under its Environmental Management System, JFE Engineering works to minimize environmental impact at production sites, branch offices and construction sites and contribute to environmental protection through all products and services. The major strategies for FY2024 are (1) promote environmental contribution through products for mitigating global warming and climate change, (2) promote environmental protection, effective energy conservation, and resource recycling in business activities, and (3) ensure thorough compliance with environmental laws and regulations. We are reflecting these strategies into the related operations. These strategies are incorporated into related operations and are addressed.

JFE Shoji Expand ISO 14001 Certification Acquisition Coverage

JFE Shoji obtained ISO 14001 certification for its head office, Osaka branch, and Nagoya branch in 2000 and later expanded the scope of certification to all domestic offices. JFE Shoji also applies the same environmental management system to domestic Group companies, promoting the same environment management activities and striving for the same certification. Overseas coil centers are also planning to acquire ISO 14001 certification.

Environmental Audit

In addition to the regular internal and external audits at ISO 14001-certified sites, the audit and environment departments at each operating company's head office conduct independent environmental audits at their production sites.

JFE Steel Conduct Detailed Audits

Once a year, JFE Steel's Audit Department and the Environment, Disaster Prevention and Recycling Department conduct an environmental audit at each operational site. JFE Steel categorizes Group companies based on the result of risk assessment considering owned equipment and conducts detailed audits every one to five years using checklists.

Document audit at a domestic Group company on-site audit at a domestic Group company

On-site audit at a domestic Group company

JFE Engineering Conduct Audits to Confirm Compliance with Environmental Laws and Regulations

JFE Engineering places a top priority on complying with environmental laws and regulations.

The Safety and Environment Department conducts annual audits at about 50 locations selected from the manufacturing sites, construction sites in Japan, and Group companies to confirm compliance with environmental laws and regulations. JFE Engineering also conducts internal audits on its own environmental management system to evaluate and enhance the effectiveness of various environment-related initiatives. Furthermore, environmental inspections are conducted at all construction sites by the department responsible for construction to verify compliance with the laws and regulations, and annual self-checks are conducted at the Tsurumi, Tsu, and Kasaoka manufacturing sites to confirm legal compliance.

JFE Shoji Conduct Internal Audits and Environmental Audits

At JFE Shoji, the ISO Environmental Audit Department annually confirms that processing centers and warehouses of ISO 14001-certified Group companies comply with relevant environmental laws and regulations. For non-certified Group companies, the department conducts an environmental audit every three years.

For quantitative data related to environmental audits, please refer to the following information.

➤ Environmental Data (P.235)

Environmental Education

The JFE Group actively provides education to foster a corporate culture of environmental protection. Education at operating companies includes training for new recruits and newly promoted employees as well as specific environmental-protection training by position and job.

For Group-wide environmental training, we hold an annual Review Session on Environment-Related Laws and Regulations, to which lawyers specialized in environment-related laws and regulations are invited to give lectures on the latest information related to the enactment and revision of these laws, as well as associated violations and court decisions. Employees from wide-ranging departments, including the environment, disaster prevention, legal affairs, general affairs, and manufacturing departments of the operating companies and their group companies, who are involved in environment-related activities, attend these annual sessions as the basis for planning their activities, such as educating employees and raising awareness about the Group's policies and initiatives.

JFE Steel Promote Pollution Control Managers Acquire Qualifications

JFE Steel encourages employees to obtain qualifications as pollution-control managers. A training program for environmental managers at group companies was launched in FY2011. In addition, JFE Steel provides employees with training to ensure compliance with environmental laws, disseminates information about regulatory revisions at its Environmental Liaison Committee meetings for Group companies, and organizes brush-up training in waste management skills for on-site personnel.

JFE Engineering Provide General Environmental Education

JFE Engineering educates all employees about environmental issues to increase their understanding of the company's policies and initiatives. To ensure proper environmental management at production and construction sites, training is often tailored to specific employee operations, helping to enhance their capabilities. In FY2023, JFE Engineering launched an initiative to identify training needs at greater detail, such as automatically tracking the number of employees participating in trainings via video-distribution.

JFE Shoji Provide General Environmental Training and Specialized Training for Internal Audit Staff

JFE Shoji provides all employees with general environmental training in compliance with ISO 14001 and specialized training for internal audit staff. All employees within the scope of certification receive a pocket-size ISO Employee Card to carry with them so they can check the details of ISO 14001 activities at any time. In addition, each company performs a self-check using its own extensive checklist to ensure understanding and rigorous compliance with environmental laws. Also, JFE Shoji provides environmental training to new executives and information about revised laws and regulations to environmental management personnel.

For quantitative data related to environmental education, please refer to the following information.

➤ Environmental Data (P.235)

Environmental Impact Reduction Initiatives

The JFE Group regards co-existence and mutual prosperity with local communities, the global environment, and society at large as a critical managerial challenge in terms of business continuity. It strives to control air and water pollutant emissions and aggressively invests in environmental protection. Related internal controls and education are steadily being strengthened as well. Also, the transfer and widespread application of proprietary technologies, mainly in developing countries, contribute to pollution prevention on a global scale.

For quantitative data related to reducing environmental impact, please refer to the following information.
➤ Environmental Data (P.235)

Controlling Air Emissions

JFE Steel

Initiatives to Further Reduce SOx and NOx Emissions

JFE Steel is installing low-nitrogen oxides (NOx) burners in reheat furnaces, switching to low-sulfur fuels and deploying desulfurization and denitration devices in sintering plants, all major sources of sulfur oxides (SOx) and NOx emissions. It has concluded agreements with local administrations that stipulate conditions that are stricter than the total volume restrictions required by the Air Pollution Control Law. The company is continuing to further control emissions at a level that is less than the amount set forth in the agreement. In addition, the company suppresses dust dispersion through measures that include enhancing on-site cleaning, installing sprinklers and windbreak fences in raw material yards, and improving the performance of dust collectors.

JFE Engineering

Appropriate Management in Place to Restrict SOx and NOx Emissions

To ensure compliance with the Air Pollution Control Law and relevant local regulations, JFE Engineering properly manages facilities that emit soot and smoke at its Yokohama head office, Tsurumi works, and Tsu works, so NOx and Sox emissions from those facilities are maintained at a level sufficiently lower than the total annual volume restriction (NOx: 18,000 Nm^3, Sox: 100 Nm^3). In addition, efforts are being made at construction sites to protect the environment through the use of construction machinery and on-site vehicles in compliance with the Automotive NOx and PM Law and Act on Regulation, Etc. of Emissions From Non-road Special Motor Vehicles (Off-Road Vehicle Law).

Management of Chemical Substances and Emission Control

JFE Steel

Initiatives to Reduce VOC Emissions

JFE Steel lowers its environmental impact by voluntarily reducing the chemical substances it releases. Release and transfer amounts of substances subject to Japan's Law concerning Pollutant Release and Transfer Register (PRTR Law) are reported in accordance with the law.

The Japan Iron and Steel Federation formulated a voluntary action plan to reduce VOC emissions by 30% from FY2000 levels by FY2010. As part of this action plan, JFE Steel set a target for reducing emissions to 1,078 tonnes or less. As a result of our initiatives, we achieved a significant reduction that exceeded the 30% reduction target in FY2010 and have been consistently cutting VOC emissions, by more than 50%. Going forward, we will continue to maintain the emissions below 1,078 tonnes and take the necessary steps to prevent any increase.

Emissions of benzene and dichloromethane are kept at low levels. We will continue to set targets for the two substances and maintain low emissions levels.

JFE Engineering

Management of Chemical Substances in Accordance with the PRTR Law

Major chemical substances subject to the PRTR Law for the JFE Engineering works in Tsurumi, Tsu, and Kasaoka include organic solvents such as xylene used for painting products, manganese and its compounds generated during welding. We report the release and transfer amounts of these substances in accordance with the law.

PCB Waste Management at JFE

Polychlorinated biphenyl (PCB) waste is properly stored and managed at the JFE Group's facilities. High concentration PCB waste is treated in accordance with guidelines set by the Japan Environmental Storage & Safety Corporation (JESCO). The Yokohama Eco Clean Plant of J&T Recycling Corporation treats insulating oil contaminated with slight amounts of PCB, helping to reduce pollutants both in and outside the JFE Group.

Environmental Accounting

Basic Policy

The JFE Group is saving energy and reducing its environmental impacts by making its production facilities increasingly efficient and introducing more environmentally friendly equipment. Any equipment or facilities related to energy conservation and environmental protection are categorized as environmental investment, while all activities related to environmental protection and impact reduction are categorized as environmental expenses.

Through these environmental investments and expenses, we are working to lower unit-based CO_2 emission to prevent global warming and to reduce final-disposal waste by maintaining a high recycling rate to effectively use natural resources. We are also striving to reduce emissions of pollutants into the water and air, which contributes to environmental protection and ensures thorough compliance with statutory regulations concerning exhaust gas emissions and discharged water.

For quantitative data related to environmental accounting, please refer to the following information.

➤ Environmental Data (P.235)

Related Links

➤ Material Flow (P.235)
➤ JFE Steel: Environmental Initiatives (Japanese only) (https://www.jfe-steel.co.jp/research/environment.html)
➤ JFE Engineering: 360° JFE Engineering—Protecting Natural Environments (https://www.jfe-eng.co.jp/en/360_jfe_engineering/#env)
➤ JFE Shoji: Environment Management (https://www.jfe-shoji.co.jp/en/csr/environment/)

Initiatives to Address Climate Change Issues

Basic Policy

Climate change is a critical business concern for the JFE Group from the perspective of business continuity. Our steel business, which emits 99.9% of the Group's total CO_2 emissions, has been developing various technologies for saving energy and reducing these emissions. We have applied these technologies to steel manufacturing processes to enable production with low levels of CO_2 emission intensity.

Furthermore, we have developed and maintained a variety of eco-friendly products and technologies, including high-performance steel materials that help save energy when customers use them, as well as renewable energy power generation.

We will continue to develop and promote the widespread use of these processes and products. We consider this as an opportunity to apply the technologies we have fostered across the globe and at the same time contribute to tackling climate change.

JFE announced its endorsement for the TCFD recommendations in May 2019 and has identified climate change-related issues based on the scenario analysis advocated in the TCFD to formulate strategies for sustainable growth. In September 2020, JFE disclosed its target of reducing CO_2 emissions in FY2030 in the steel business, which accounts for most of the Group's CO_2 emissions. It also **announced its intention to achieve carbon neutrality by 2050**, ahead of the Japanese government's announcement of the same goal.

In February 2022, **the target of reducing CO_2 emissions in FY2030 was revised upward to 30% or more, compared to FY2013,** considering advances in measures for carbon neutrality and improvement of external surroundings in the steel sector.

To achieve these targets, the JFE Group will work hard to reduce CO_2 emissions and energy consumption.

JFE Group Environmental Vision for 2050

The JFE Group intends to strengthen sustainability through solutions that address global climate change issues while restructuring its business in response to changes in the environment surrounding the steel business. We regard 2020 as a milestone year for further reinforcing our efforts to tackle climate change, and we are actively promoting initiatives for reducing CO_2 emissions.

In 2021, we positioned climate change as a top-priority issue in the Seventh Medium-term Business Plan and **formulated the JFE Group Environmental Vision for 2050 toward achieving carbon neutrality by that year.**

We will systematically address climate change by **reflecting the TCFD's principles in the business strategies** of our JFE Group Environmental Vision for 2050. In the steel business, we **will reduce CO_2 emissions by 18% from FY2013 levels by the end of FY2024.** In addition, we announced that **the target of reducing CO_2 emissions in FY2030 is 30% or more, compared to FY2013,** in the steel business. To explore all possibilities for realizing carbon neutrality in 2050, we will take on the challenge of developing ultra-innovative technologies such as **carbon-recycling blast furnaces developed with our proprietary technology** while also adopting a multitrack approach for pursuing other technologies. In our engineering business, we will widen our contribution to the reduction of CO_2 in society as a whole by expanding and advancing renewable power generation and carbon-recycling technologies, supplying high-performance steel products, and other initiatives. Furthermore, we will apply Group strengths to accelerate the commercialization of **our offshore wind-power business.**

JFE Group Environmental Vision for 2050

- **Climate change is a critical business concern for JFE, and we are aiming to achieve carbon neutrality by 2050.**
- **We will accelerate our research and development of new technologies and pursue ultra-innovative technologies.**
- **We will seek business opportunities that allow us to enhance corporate value by contributing to CO_2 emissions reduction across society.**
- **The principles of TCFD will be reflected in our business strategies and systematically deployed.**

The Target of Reducing CO_2 Emissions in FY2024 (Seventh Medium-term Business Plan Initiatives)

▶Reduce steel-business CO_2 emissions in FY2024 by 18%, compared to FY2013 (steel business)

The Target of Reducing CO_2 Emissions in FY2030

▶Reduce steel-business CO_2 emissions in FY2030 by 30% or more, compared to FY2013 (steel business)

Initiatives for Carbon Neutrality by 2050

(1) Reduce steel-business CO_2 emissions

- ▶ Pursue ultra-innovative technology for carbon-recycling blast furnaces and CCU.
- ▶ Develop hydrogen-based ironmaking (direct reduction) technology.
- ▶ Leverage top-in-class electric arc furnace technology for high-quality, high-performance steel manufacturing, high efficiency, etc.
- ▶ Develop transitional technologies for carbon neutrality, including ferro coke, increased use of steel scrap in converters, energy savings, and low-carbon energy transformations.

(2) Expand contributions to CO_2 emissions reduction in society

- ▶ JFE Engineering: Expand and develop renewable energy power generation and carbon-recycling technologies. (Reduce CO_2 emissions by 12 million tonnes in FY2024 and 25 million tonnes in FY2030)
- ▶ JFE Steel: Develop and market eco-products and eco-solutions.
- ▶ JFE Shoji: Increase trading in biomass fuels, steel scrap, etc., and strengthen business in supply chain management (SCM) for eco-products.

(3) Offshore wind-power generation business (Group-wide effort to accelerate commercialization of the offshore wind-power business)

- ▶ JFE Engineering: Manufacture monopiles and other seabed-fixed structures for offshore wind-power generation.
- ▶ JFE Steel: Produce large and heavy plates by using new continuous casting machine in Kurashiki.
- ▶ JFE Shoji: Carry out SCM for steel materials and processed products.
- ▶ Japan Marine United Corporation: Manufacture offshore wind-power generation floating structures and construct work vessels.
- ▶ Group-wide: Operation and maintenance (O&M) making maximum use of Group resources.

Notes.

1. Carbon-recycling blast furnace: A technology that converts CO_2 from the blast furnace into methane, which is then used as reducing material in the blast furnace
2. CCU: Carbon dioxide capture and utilization
3. Transitional technologies: Technologies that advance the transition to carbon neutrality
4. Ferro coke: Innovative blast furnace raw material that improves the reduction efficiency of iron ore and reduces CO_2 generation from the blast furnace

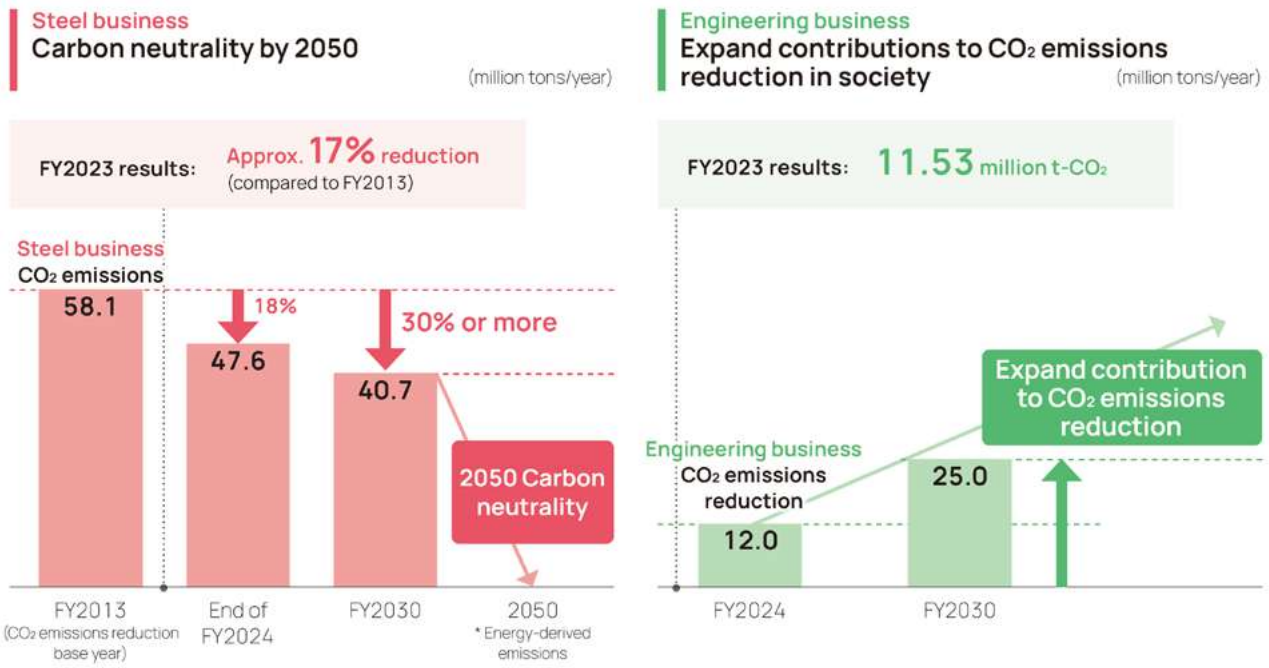
➤ Seventh Medium-term Business Plan (P.22)

➤ JFE Group Environmental Vision for 2050, Presentation Material
(https://www.jfe-holdings.co.jp/en/common/pdf/investor/climate/2021-210525-release01.pdf)

Developing processes to mass produce high-quality, high-performance steel with zero CO_2 emissions is essential for a sustainable world. Huge R&D and equipment replacement costs will be inevitable as JFE executes strategies targeting carbon neutrality. Society must decide how these costs should be shouldered, including government support.

Working toward the lofty goal of carbon neutrality by 2050, JFE is focusing on establishing the necessary decarbonization technologies as quickly as possible, ahead of global competitors, assuming that we have the decarbonization infrastructure in place and ability to compete on an equal footing globally.

■ JFE Group's Activities for Carbon Neutrality



Information Disclosure Based on TCFD Recommendations

On May 27, 2019, JFE Holdings announced its endorsement for the final report of the Task Force on Climate-related Financial Disclosures (TCFD)*.

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

*The TCFD was established by the Financial Stability Board (FSB) at the request of G20 finance ministers and central bank governors.

Climate-related risks and opportunities will significantly impact medium- to long-term corporate finance. To reduce the risk of instability in the financial market, the G20 called on the FSB to establish the TCFD. The TCFD considers disclosure methodologies that can be used to appropriately assess climate-related risks and opportunities and releases its findings as a final recommendations report.

It is important for investors to accurately understand the financial impact of climate-related risks and the opportunities of investee companies when they make financial decisions. In this context, the task force recommends disclosures to be made in four core elements of organizational management: governance, strategy, risk management, and metrics and targets.

For the TCFD content index, click on the following link.

➤ Guideline Content Indices (P.278)

Governance (Management Structure: JFE Group)

Under the JFE Group Standards of Business Conduct, the JFE Group actively strives to exist in harmony with the global environment and create a society that is comfortable and convenient. We are aware that efforts to protect the global environment, such as reinforcing our environmental protection activities and addressing climate change issues, are extremely important for creating a sustainable society.

In FY2016, we identified the mitigation of global warming as a material CSR issue to facilitate the PDCA cycle and promote appropriate management of ongoing initiatives, such as reducing CO_2 in the iron and steelmaking processes and developing and providing eco-friendly products. In 2021, we relaunched the initiative as a top priority by adding economic perspectives to the material issues and by selecting other vital matters of importance. As part of this effort, we set our goal for helping to address climate change (initiatives to achieve carbon neutrality by 2050) as an area of focus and identified reducing the JFE Group's CO_2 emissions and contribution to CO_2 emissions reduction in society as two material issues.

The JFE Group Environmental Committee, chaired by the president of JFE Holdings and operating under the **JFE Group Sustainability Council,** sets goals for environmental protection, monitors the progress of these initiatives and works to improve the Group's overall environmental performance.

Key managerial issues such as climate change and other environmental challenges are deliberated on by the **Group Management Strategy Committee** and reported to the **Board of Directors.** The board also deliberates on these issues and supervises the initiatives.

■ Examples of Climate Change-Related Agenda Items Involving Board of Directors Decisions and Reports

- Declaration of endorsement for the final TCFD recommendation report
- Information disclosure consistent with TCFD recommendations (scenario analysis and other information)
- Formulation of the Seventh Medium-term Business Plan, JFE Group Environmental Vision for 2050
- Review the CO_2 emissions reduction target for FY2030
- Use of climate-related metrics to determine executive remuneration

➤ Corporate Governance System (P.215)
➤ Framework for Environmental Management (P.46)

JFE Group's Climate Change Strategy

Various risks and opportunities related to climate change are integrated into the JFE Group's business strategy. The Group formulated the Seventh Medium-term Business Plan as the main guide for business operations from FY2021 to FY2024, and we positioned efforts to address climate change as the key to achieving sustainable growth and increased value over the medium to long term. Under the plan, the Group defined ensuring environmental and social stability as a core strategy and **formulated the JFE Group Environmental Vision for 2050 for achieving carbon neutrality by 2050**. Then we concentrated our efforts on our business strategy and **reflected the principles of the TCFD recommendations in our management strategy**, enabling us to systematically address climate change. Furthermore, we are disclosing information based on the TCFD recommendations, including the scenario analysis, leveraging them to identify and evaluate risks and opportunities, and reflecting them in our management strategy.

For further details on the Results of Scenario Analysis and the JFE Group Environmental Vision for 2050, refer to the following source material.

➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
➤ JFE Group Environmental Vision for 2050, Presentation Material
(https://www.jfe-holdings.co.jp/en/common/pdf/investor/climate/2021-210525-release01.pdf)

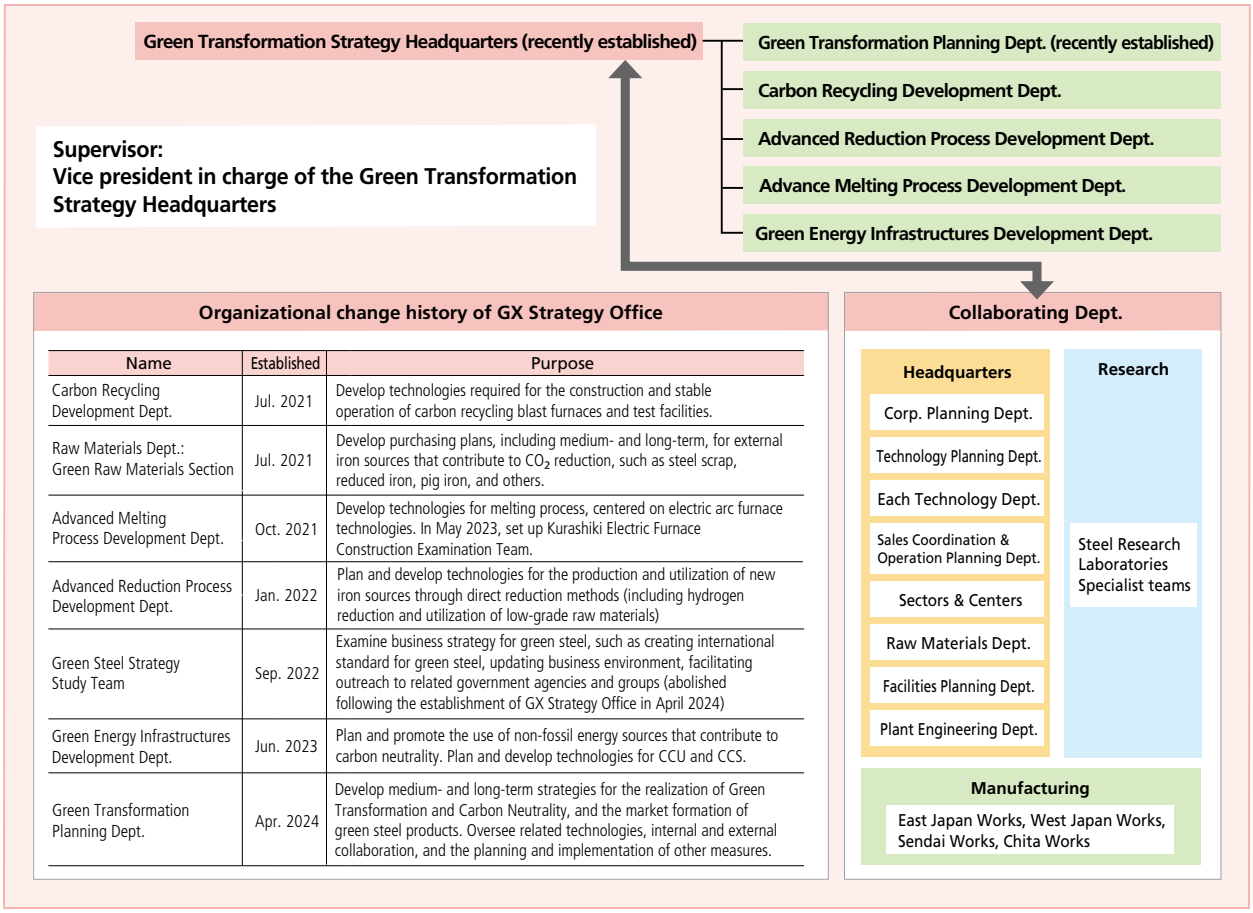
In the JFE Group Environmental Vision for 2050, our efforts to achieve carbon neutrality are based on the following three key strategies: reduce CO_2 emissions at JFE Steel, expand contributions to the reduction for society as a whole, and accelerate Group-wide commercialization of the offshore wind-power business. In the steelmaking process, along with efforts to reduce CO_2 emissions, we will also actively work on reducing environmental impact through reusing water resources and energy, developing environmentally sound products and process technologies, and providing resource recycling solutions.

JFE Steel's Management Structure to Promote Carbon Neutrality

Governance (Management Structure: JFE Steel)

The key for ensuring JFE Steel's sustainable growth is to develop and implement a medium- to long-term strategy for realizing Green Transformation (GX). In addition to developing and investing in technologies related to carbon neutrality, other necessary tasks are required for increasing the sales of green steel products, such as forming new markets and strengthening cooperation with government authorities. In April 2024, the Green Transformation Strategy Headquarters was established to formulate and promote a Company-wide strategy to realize Green Transformation. The office is comprised of the recently established Green Transformation Planning Department and departments responsible for developing technologies, specifically the Carbon Recycling Development Department, Advanced Reduction Process Development Department, Advanced Melting Process Development Department, and Green Energy Infrastructures Development Department . The Green Transformation Planning Department is responsible for developing medium- and long-term strategies for realizing Green Transformation and the market formation and sales of green steel products. It also oversees related technologies, internal and external collaboration, and the planning and implementation of other measures.

■ JFE Steel's Management Structure to Promote Carbon Neutrality



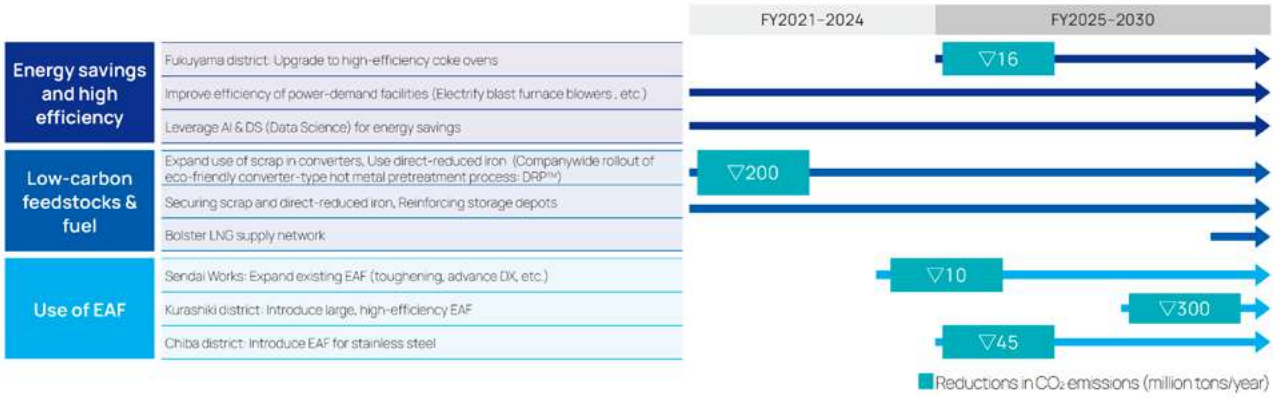
Name	Established	Purpose
Carbon Recycling Development Dept.	Jul. 2021	Develop technologies required for the construction and stable operation of carbon recycling blast furnaces and test facilities.
Raw Materials Dept.: Green Raw Materials Section	Jul. 2021	Develop purchasing plans, including medium- and long-term, for external iron sources that contribute to CO_2 reduction, such as steel scrap, reduced iron, pig iron, and others.
Advanced Melting Process Development Dept.	Oct. 2021	Develop technologies for melting process, centered on electric arc furnace technologies. In May 2023, set up Kurashiki Electric Furnace Construction Examination Team.
Advanced Reduction Process Development Dept.	Jan. 2022	Plan and develop technologies for the production and utilization of new iron sources through direct reduction methods (including hydrogen reduction and utilization of low-grade raw materials)
Green Steel Strategy Study Team	Sep. 2022	Examine business strategy for green steel, such as creating international standard for green steel, updating business environment, facilitating outreach to related government agencies and groups (abolished following the establishment of GX Strategy Office in April 2024)
Green Energy Infrastructures Development Dept.	Jun. 2023	Plan and promote the use of non-fossil energy sources that contribute to carbon neutrality. Plan and develop technologies for CCU and CCS.
Green Transformation Planning Dept.	Apr. 2024	Develop medium- and long-term strategies for the realization of Green Transformation and Carbon Neutrality, and the market formation of green steel products. Oversee related technologies, internal and external collaboration, and the planning and implementation of other measures.

JFE Steel's Strategy to Reduce CO_2 Emissions

The JFE Group has adopted a multipronged approach, including the development of ultra-innovative technologies, to achieve carbon neutrality by 2050. In the steel business, we have set a target for reducing CO_2 emissions by 18% as of the end of FY2024 and by 30% or more by FY2030, compared to FY2013. We have defined the period up to 2030 as a transition phase and the period after that as an innovation phase. In the transition phase, we will focus more on initiatives to reduce emissions through an expanded application of low-carbon technologies to steadily advance toward achieving the CO_2 reduction target in FY2030. In this phase, we will also accelerate the development of ultra-innovative technologies to prepare for the innovation phase. In the innovation phase, we will advance initiatives for the wise use of resources, including the commercialization of carbon-recycling blast furnaces that leverage our proprietary carbon-recycling technology and direct reduction steelmaking, as well as the expansion of CCU applications. Furthermore, we will undertake CO_2 sequestration through CCS to create a carbon-neutral society together with local communities and industrial complexes. We will achieve carbon neutrality through initiatives under these three themes.

Transition to Low-Carbon Steel Processes

Our multi-pronged approach includes developing ultra-innovative technologies for achieving carbon neutrality by 2050. We have defined the period up to 2030 as a transition phase and the period after that as an innovation phase. In the transition phase, the steel business is promoting energy-saving and high-efficiency improvements in existing processes and the use of electric furnace technology. We anticipate that achieving the CO_2 reduction target for FY2030 may require investments and loans of around one trillion yen, and approximately 300 billion yen has been approved by FY2023. We intend to steadily advance toward obtaining the necessary investments and loans to achieve the reduction target.



Development of Electric Arc Furnace Process Technology

An electric arc furnace process is one of the JFE Group's development efforts in steelmaking technologies for carbon neutrality. With this technology, steel products are manufactured by melting steel scrap and direct-reduced iron in an electric arc furnace. So far, we have managed to reduce CO_2 emissions from this steelmaking process down to one-quarter of that of the blast furnace-converter method. We are striving to eliminate CO_2 emissions generated by the electric arc furnace process in the future by using the aforementioned hydrogen-reduced iron as the raw material and non-fossil electricity.

Although the electric arc furnace process has the advantage of reducing CO_2 emissions, there are two major problems compared to the blast furnace-converter method: the productivity of the electric arc furnace process in general is about 30% lower than that of the blast furnace-converter method, and the use of scrap as the raw material inevitably increases the concentration of impurities, which limits the production of high-quality, high-performance steel products. We are working to address these issues, for utilizing Transition Finance, to establish technologies that will enable the production of high-quality, high-performance steel with high productivity using the electric arc furnace process. The innovative electric furnace is the super-advanced technology that can be most quickly implemented. We view it as a replacement for one of the blast furnaces in Kurashiki District, which is due for refurbishment in FY2027. We are planning to make the investment decision within FY2024, subject to government support, and begin operation in FY2027.

Use Electric Arc Furnaces to Increase the Use of Scrap

JFE Steel is planning to increase the production capacity of the electric arc furnaces in the Sendai Works by approximately 0.14 million tonnes per year by FY2024 through reinforcing the electric arc furnaces in the Sendai Works, implementing capacity-boosting DX measures, and improving the load handling equipment. This is expected to result in a reduction of approximately 0.10 million tons of CO_2 emissions per year.

We are planning to install a new electric arc furnace in the Chiba district for stainless steel production. This will allow the facility to replace part of the feedstock from molten iron from blast furnaces with scrap and thus reduce CO_2 emissions. This could increase by up to six times the volume of scrap used, and we expect to reduce CO_2 emissions by a maximum of about 450,000 tons per year.

Furthermore, in the Kurashiki district, we are considering switching to a newer process technology by replacing one of the blast furnaces, which needs to undergo preventive maintenance within the period of 2027–2030, with a large, high-efficiency electric arc furnace.

Feasibility Study on New Venture Business to Secure Reduced Iron Supply

In the transition phase up to 2030, we expect a shortage in domestic scrap supply. The use of direct-reduced iron is considered an effective way to supplement this in the production of high-quality steel using electric arc furnaces and in the reduction of CO_2 emissions from blast furnaces.

JFE Steel has agreed with EMSTEEL, the largest steel producer in the UAE, and ITOCHU Corporation (ITOCHU) to jointly conduct detailed feasibility studies on the establishment of a supply chain of reduced iron with low carbon emissions. Under a joint venture to be established in the UAE, we are focusing on producing direct-reduced iron with low carbon emissions from the second half of FY2025 using CCUS (EOR*), which takes full advantage of the geographic location of the UAE.

*Enhanced oil recovery

Collaboration to Establish a Supply Chain of Ferrous Raw Material for Green Ironmaking with Low Carbon Emissions

JFE Steel regards the use of green ferrous raw material as a key initiative for reducing CO_2 emissions. We are participating as a core member in the establishment of a reduced iron supply chain with low carbon emissions along with ITOCHU and EMSTEEL, and we are jointly pursuing a detailed feasibility study with Abu Dhabi as a candidate project site.

At the Japan-UAE Business Forum that was held on July 17, in the presence of Japanese Prime Minister Fumio Kishida, JFE Steel has signed and exchanged a memorandum of understanding (MOU) with ITOCHU, EMSTEEL, and the Abu Dhabi Ports Group (ADPG) to develop collaborative systems for the establishment of a supply chain to handle ferrous raw material for green ironmaking with low carbon emissions.

ADPG, the state-owned port operator and economic and industrial zones developer in Abu Dhabi in which the project is planned to be developed, owns 10 ports and 550km^2 of economic and industrial areas. The parties have agreed that ADPG will participate fully in project-related port development and operations, land leasing and services, and infrastructure development. Collaboration with ADPG will provide the undertaking with access to a suitable site for building a distribution and logistics system capable of stably importing raw materials and shipping products for the envisioned supply chain.

● Overview of EMSTEEL
Company name: EMSTEEL
Representative: HE Engineer Saeed Ghumran Al Remeithi (Group CEO)
Business: Steel

● Overview of ADPG
Company name: Abu Dhabi Ports Group
Representative: Captain Mohamed Juma Al Shamisi
Business: Port operations, shipping, logistics and special economic zone development

Improve productivity of the electric arc furnace process

To improve productivity of the electric arc furnace process, the JFE Group have developed ECOARC™, our proprietary, eco-friendly, high-efficiency electric arc furnace, and installed it at our operating companies. With this technology, a shaft is attached to the upper part of the electric arc furnace and is used to continuously feed scrap materials into the furnace. It uses the high-temperature exhaust gas from the furnace to preheat the scrap material, allowing for subsequent high-efficiency and high-speed melting. As well as improving the productivity of the electric arc furnaces, the technology also reduces the energy (electricity) required for the melting process.

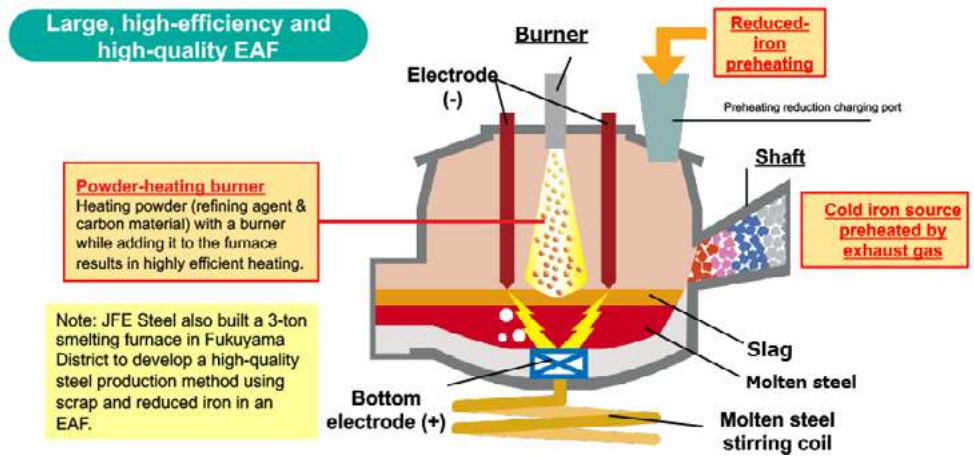
The Group already has achieved industry-leading productivity and energy (electricity) efficiency with these technologies, but we are working to raise productivity even further.

Overview of the Demonstration Tests

We are developing a process that reduces the electric arc furnace's melting power consumption and also enables high-speed melting of cold iron sources (scrap and reduced iron). We will verify the following during demonstration tests.

- Optimal methods for preheating and feeding reduced iron
- Methods for using heating burners
- Optimal methods for molten steel stirring

■ Research and Development for Electric Arc Furnaces



Manufacturing Higher-Grade Steels Using the Electric Arc Furnace Process

The electric arc furnace process uses scrap and reduced iron as raw materials. The higher concentration of impurities in these materials, such as copper, causes material degradation, including surface defects and reduced workability in steel sheets and deterioration of properties in electrical steel sheets. We are working on two technologies to address the issue, one to remove impurities and another to detoxify impurities, so that we can use the electric arc furnace process to produce high-quality steel products such as steel sheets for automobiles and electrical steel sheets.

East Japan Works (Chiba District) to Produce Stainless Steel with Electric-Arc Furnace

JFE Steel has decided to install a new electric-arc furnace at the No. 4 steelmaking shop at the East Japan Works (Chiba district) in the second half of FY2025 (planned). Scrap melting capacity is expected to increase by up to six times compared to the conventional process, to approximately 300,000 tonnes per year (planned), and CO_2 emissions are expected to be reduced by up to about 450,000 tonnes per year. We have defined the period up to 2030 as a transition phase toward carbon neutrality and consider the electric furnace process to be an effective means of reducing CO_2 emissions. Looking ahead, we will continue to develop ultra-innovative technologies in a multi-pronged approach and make steady progress toward realizing carbon neutrality.

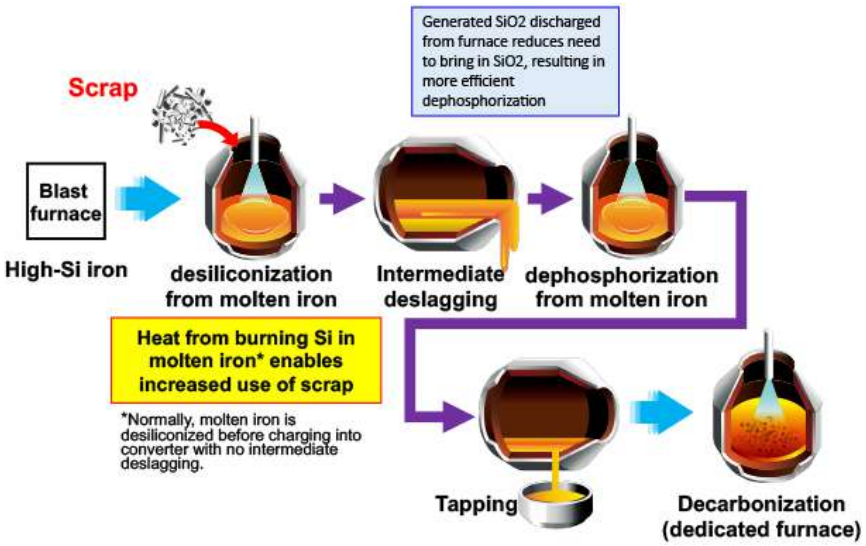
Increased Use of Scrap Iron in Steelmaking

JFE Steel completed introducing the Double-slag Refining Process (DRP™), an eco-friendly converter-type molten-iron pretreatment process, in all of its sites in 2021. This increased the amount of scrap iron to be used in converters, leading to reduced CO_2 emissions.

DRP makes full use of silicon in molten iron as a heat source, thereby increasing the amount of scrap iron to be used in converters. It allows reducing the molten-iron blending ratio (molten iron vs. scrap charged into the converter) to 82%, down from 90% through conventional methods.

The Company introduced this process in all of its steelmaking facilities, and the increased use of scrap iron in converters enabled us to reduce CO_2 emissions by approximately 0.60 million tons per year in FY2022. In the future, we will develop technologies to increase heating margins to further boost the use of scrap and invest in facility expansion to reduce CO_2 emissions by about 2 million tons per year by FY2030.

■ Eco-friendly converter-type molten iron pretreatment process DRP™: Double-slag Refining Process



Started supplying JGreeX™ green steel products

■ Name origin: JFE + Green + GX
We invited the relevant departments to propose names and selected this name from the suggestions because it clearly expresses being a green steel product provided by JFE Steel.

■ Logo design:
The logo combines the letter X with an arrow to express our intention to move forward toward carbon neutrality.

In the first half of FY2023, JFE Steel began supplying JGreeX™, a brand of green steel products that significantly reduce CO_2 emissions in the steel manufacturing process compared to conventional products. With the current technology, it is difficult to immediately supply green steel products with significantly lower or zero emissions, so the reductions created by our technologies are allocated to any steel products by applying the mass balance method*1 and then supplied as green steel products. With regard to the amount of CO_2 emission reductions and the emission intensity of each product, we have obtained a third-party certification from Nippon Kaiji Kyokai (ClassNK), which verified 600,000 tonnes of CO_2 emission reductions in FY2022.

In October 2023, JGreeX™ was selected by Sumitomo Corporation for its new office building, tentatively named Suidobashi PREX (Photo 1) . This was the first application of green steel materials in both the real estate and construction industries. In October of the same year, it was selected for transformers that will be manufactured in Europe. Grain-oriented electrical steel was selected. This was the first order for JGreeX™ outside of Japan and its first use in electrical steel sheets.

Its application in shipbuilding is expanding. In December 2023, shipping company Kawasaki Kisen Kaisha, Ltd. selected JGreeX™ for an Ultramax dry bulk carrier*2 to be built by Imabari Shipbuilding Co., Ltd. (Photo 2). All steel materials*3 used in the construction of this vessel will be JGreeX™ products, making it one of the world's largest ships made entirely of green steel. JFE Steel expects to supply 7,000 tons of JGreeX™ products starting in 2024, and the vessel is slated for commissioning in 2026. Separately, shipping company Daiichi Chuo Kisen Kaisha selected JGreeX™ for two coastal dry bulkers to be built by Higaki Shipbuilding Co., Ltd., and based on this development, JFE Steel expects to supply 7,000 tons of JGreeX™ products between 2024 and 2026. All told, JGreeX™ has now been selected by five companies for a total of nine dry bulk vessels, bringing JFE Steel's total expected supply of JGreeX™ products to approximately 36,000 tons. In June 2024, the first bulk carrier built entirely with JGreeX™ was launched (Photo 3). A naming and launch ceremony was held at the headquarters of Higaki Shipbuilding Co., Ltd., with the ship receiving the name BRIGHT QUEEN. It is the world's first ship built entirely with green steel. This is the first of two bulk carriers that Higaki Shipbuilding is constructing for shipping company NYK Bulk & Projects Carriers Ltd. (NBP) and for which JGreeX™ was selected back in June 2023. The vessel is also expected to be the first to receive the a-EA (GRS)*5 designation, indicating a hull structure made of green steel materials, in accordance with new environmental guidelines*4 developed by ClassNK, a Japanese non-profit NGO engaged in ship classification and environmental protection.

In January 2024, JGreeX™ was selected for pinback buttons (can badges) produced and sold by MoNo Factory, marking the first use of JGreeX™ in consumer products as well as tin-plated steel. In February 2024, JFE Steel started selling JGreeX™ green steel to Hock Seng Hoe, a leading steel wholesaler in Singapore that wholesales steel plates for shipbuilding, construction and offshore structures in Southeast Asia. This marks the first sale of JGreeX™ to a Southeast Asian company. In June 2024, JGreeX™ was selected by the world leading manufacturer of IT data center transformers in the United States, marking the first application of JGreeX™ in that country. In July 2024, it was selected for use in resource-recycling containers (Photo 5: LOOPOX) and logistics warehouses (Photo 6: tentatively named Shin-Harumi Warehouse) , with additional applications expected.

Reduction of CO_2 throughout the supply chain is rapidly progressing. JFE Steel will contribute to the decarbonization of society by expanding its capacity for supplying JGreeX™ and further reducing CO_2 emissions through the use of advanced low-carbon technologies as well as energy-saving, high-efficiency technologies.

*1 Consolidate the environmental value of CO_2 emission reductions from the entire product manufacturing process, allocate the value to some steel products, and regard them as having low CO_2 emission intensity.
*2 Cargo ships that transport large quantities of dry cargo

*3 Steel products purchased directly by shipbuilding companies

➤*4 Environmental guidelines developed by ClassNK, a Japanese non-profit NGO
(https://www.classnk.or.jp/hp/ja/hp_news.aspx?id=10943&type=press_release)

*5 Advanced Environmental Awareness (GRS). The vessel is expected to receive this designation when it enters service in September 2024.

■ Photo 1

■ Photo 2

■ Photo 3

■ Photo 4

■ Photo 5

LOOPOX containers with removable and reusable JGreeX™ handles
(410 x 340 x 200 mm; approx. 1.5 kg; load capacity: 30 kg)

■ Photo 6

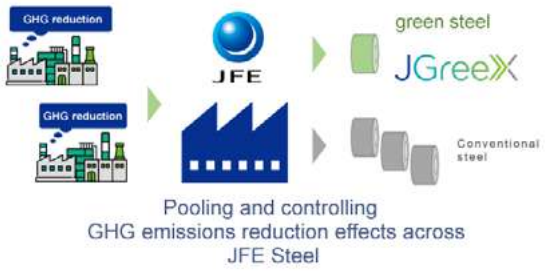
■JGreeX™ Adoption Status in Dry Bulk Carriers

	Shipping Company	Status	Related News Release
1	NYK Bulk & Projects Carriers, Ltd.	Launched in June 2024	June 20, 2023 Large Cargo Ships to be Made Exclusively with JFE Steel's JGreeX™ Green Steel (https://www.jfe-steel.co.jp/en/release/2023/230620-2.html)
2	NYK Bulk & Projects Carriers, Ltd.	—	
3	MOL Drybulk Ltd.	—	
4	Toko Kaiun Kaisha, Ltd.	—	
5	Kawasaki Kisen Kaisha, Ltd.	—	December 20, 2023 JFE Steel's JGreeX™ Green Steel Selected for Large Dry Bulk Carrier—Working with Shippers to Promote the Value of CO_2 Reduction (https://www.jfe-steel.co.jp/en/release/2023/231220.html)
6	Daiichi Chuo Kisen Kaisha	—	
7	Daiichi Chuo Kisen Kaisha	—	
8	NYK Bulk & Projects Carriers, Ltd.	—	
9	NYK Bulk & Projects Carriers, Ltd.	—	

■ Overview of green steel JGreeX™

Supply start	First half of FY2023
Supply capacity	Approx. 260,000 tons (FY2023)
Target products	All steel products produced by JFE Steel
Certification body	Nippon Kaiji Kyokai (ClassNK)

■ Overview of the steel mass balance approach



STEP.1
Calculate the emissions intensity of any steel product to apply this approach
STEP.2
Identify emissions reduction projects and determine their emissions reduction levels
STEP.3
Issue a reduction certificate based on the determined reduction level, grant the certificate, and supply steel materials.

*This certificate and the GHG emission reductions listed in this certificate do not represent carbon credits and cannot be transferred or sold to third parties.
*The scope of GHG emissions calculation is within the scope of Scope 1, Scope 2 and Scope 3.
*Reduction allocations are within the scope of Scope 1 and Scope 2.

Innovations toward Carbon Neutrality

We will work on developing carbon-recycling blast furnaces (CR blast furnaces), hydrogen steelmaking (direct reduction), and electric arc furnace process (high-efficiency, large-scale electric arc furnaces) in a multi-pronged approach to achieve carbon neutrality by 2050 as announced in the JFE Group Environmental Vision for 2050. We are particularly focused on a technology that combines a CR blast furnace and CCU, which allows us to efficiently mass produce high-grade steel and reuse the CO_2 in the blast furnace. This technology is focused on achieving virtually zero emissions by using the remaining CO_2, which cannot be fully reused to manufacture basic chemicals such as methanol.

Demonstration Tests for NEDO Project (GREINS) for Hydrogen Utilization in Iron and Steelmaking Processes

JFE Steel formed a consortium with Nippon Steel Corporation, Kobe Steel, Ltd., and the Japan Research and Development Center for Metals and jointly commissioned the Green Innovation Fund Project (GREINS) of the New Energy and Industrial Technology Development Organization (NEDO) for Hydrogen Utilization in Iron and Steelmaking Processes, and work toward achieving carbon neutrality by 2050.

In order to further advance the development of ultra-innovative technologies to achieve carbon neutrality by 2050, JFE Steel has decided to construct all the necessary facilities for the demonstration tests for the project centrally in the East Japan Works (Chiba district) to increase the efficiency of the development effort. We will work together with consortium members to accelerate the development of ultra-innovative technologies.

Details of the Planned Demonstration Tests
- Carbon-recycling pilot blast furnace (150m³)
  Start construction in 2023, start demonstration tests in April 2025, complete demonstration tests by 2026
- Direct reduction compact bench pilot furnace
  Start construction in 2023, start demonstration tests in the second half of 2024, complete demonstration tests by 2026
- Pilot electric arc furnace (10 t pilot furnace)
  Start construction in 2023, start demonstration tests in the second half of 2024, complete demonstration tests by 2025

Details for each are as follows.

Technical Features of a CR Blast Furnace

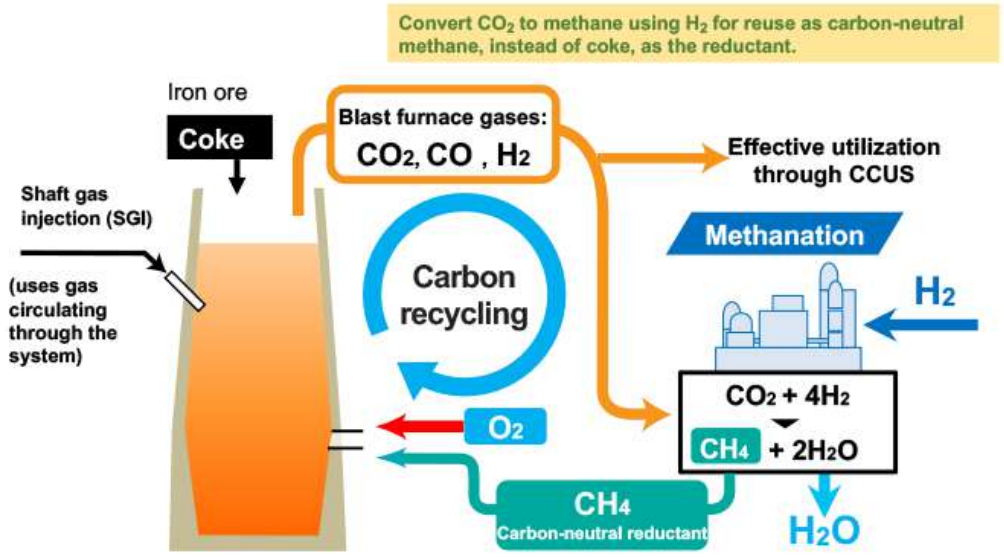
The CR blast furnace incorporates an ultra-innovative technology that converts CO_2 in the furnace exhaust gas into carbon-neutral methane through methanation, which is then reused as reducing material in the furnace. The technology is expected to reduce CO_2 by 50% in the blast furnace process and to ultimately help achieve carbon neutrality by leveraging CCU/CCUS. The thermal efficiency of the process can be further enhanced by replacing the air blown into the blast furnace with pure oxygen, as the energy used to heat the nitrogen in the air can then be used to heat methane. In addition, the lack of nitrogen facilitates the separation of CO_2, so the equipment necessary to separate CO_2 for methanation can be more compact and efficient while more effectively using gas at CCUS.

Overview of the Demonstration Tests

We are planning to develop a process that converts the CO_2 produced in the blast furnace into methane using hydrogen, allowing the carbon to be repeatedly used in the furnace as a reducing agent and thus reducing CO_2 emissions. We will verify the following during demonstration tests.

- Methods for blowing a large volume of methane along with oxygen into the furnace
- Applications for the heating burner that uses the circulation gas
- Methods for linking the operations of the furnace and the methanation facility that converts CO_2 from the blast furnace gases to methane

■ Overview of Carbon-recycling Directs Furnaces



Development of Direct Hydrogen Reduction Technology (Carbon-Recycling Direct Reduction Process)

Hydrogen reduction ironmaking technology is another steelmaking process that the JFE Group is working on to achieve carbon neutrality. With this technology, the natural gas currently used in direct reduction ironmaking is replaced by 100% hydrogen to eliminate CO_2 emissions when iron ore is reduced.

Technology for Processing Raw Materials

Currently, the only raw material that can be used for direct reduction ironmaking is high-grade iron ore. Its production volume, however, is limited, and we expect it will become even more difficult to obtain in the future if direct reduction ironmaking were to expand worldwide.

To address this, JFE and one of its iron ore suppliers, BHP, are collaborating in the development of a new raw material processing technology for low- and medium-grade ores, which are currently used as raw materials for blast furnaces due to their large production volume. We are hoping that this new technology will allow us to use low- and medium-grade ores as raw materials for direct reduction ironmaking, thus expanding the raw material sourcing for direct reduction ironmaking.

Technology for Pre-Heating Raw Materials, Technology for Heating Hydrogen Gas

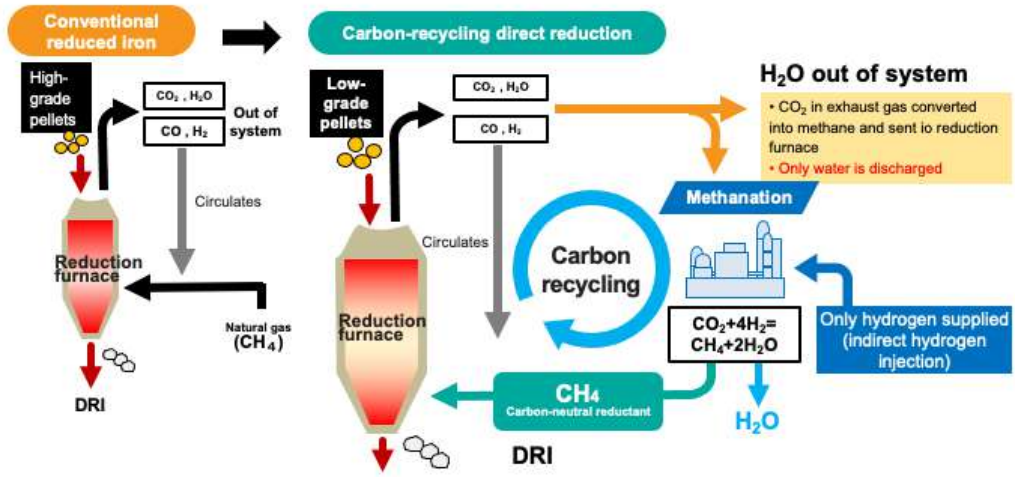
One challenge of hydrogen reduction is that the reduction of iron ore by hydrogen is an endothermic reaction, which means that heat must be applied externally for the reaction to proceed. A sufficient reduction reaction may not take place if there is not enough heat. Thus, technologies for heating raw materials and hydrogen gas must be developed.

Overview of the Demonstration Tests

We are developing a process to convert the CO_2 produced in the direct-reduction furnace into methane using hydrogen, allowing the carbon to be repeatedly used in the furnace as the reducing agent and thus reducing CO_2 emissions. We will verify the following during demonstration tests.

- Optimal methods for recycling CO_2 through methanation
- Methods for using low-grade ores

■ **Carbon-Recycling Direct Reduction Process**



Practical Applications of CO_2 Utilization Technologies

JFE Steel is working on the Optimum System for Methanol Synthesis Using CO_2, an R&D project, in collaboration with the Research Institute of Innovative Technology for the Earth (RITE) (Figure 1). On-site construction of a test facility commenced in FY2022 in the Fukuyama district of the West Japan Works, with operations scheduled to start in FY2023 and integrated practical application tests to be completed by the end of FY2025. The project focuses on establishing an optimal overall methanol synthetic system, mainly by developing technologies for low-cost CO_2 separation and high-efficiency methanol synthesis. The ultimate goal is to combine this newly established system with carbon-recycling blast furnaces and other ironmaking processes to achieve large-scale CCU process.

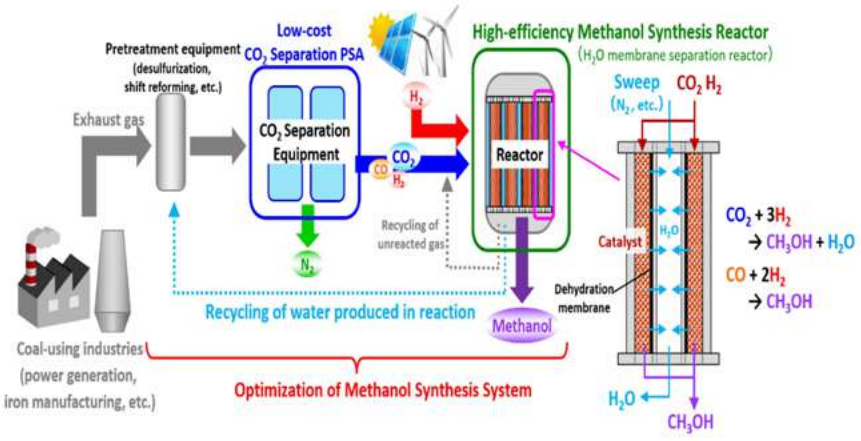
JFE Steel is also working on an R&D project, Innovative CO_2 Sequestration Technology through Quick, Large-quantity Carbonation of Steel Slag, in collaboration with Ehime University (Figure 2). Construction for a practical application test facility is scheduled to commence in FY2023 in the Chiba district of the East Japan Works. The process principles will be verified by FY2022, and tests will be conducted during the FY2024–FY2025 period. The project will develop a new technology to sequester the CO_2 generated from ironmaking processes such as carbon-recycling blast furnaces and from nearby thermal power plants in slag, and at the same time verify technologies for recovering heat after carbon sequestration and for converting the steel slag to roadbed materials and other products.

Japan Petroleum Exploration Co., Ltd. (JAPEX), JGC Holdings Corporation (JGC HD), Kawasaki Kisen Kaisha, Ltd. ("K" LINE), The Chugoku Electric Power Co., Inc. (EnerGia), Nippon Gas Line Co., Ltd. (NGL), and JFE Steel have agreed to jointly evaluate the establishment of a CCS (Carbon Capture and Storage)*1 value chain originated from Japan and concluded a Memorandum of Understanding (MOU). The six companies will conduct the joint evaluation, collaborating with the CCS commercialization project development, to establish the CCS value chain, from CO_2 separation and capture at JFE Steel's steelworks and EnerGia Group's power plant to marine transportation (including domestic marine transportation in the Setouchi area) of liquefied CO_2 to the receiving point(s) in Malaysia, including estimation of required facilities and costs.

By executing the joint evaluation for the early commercialization of the CCS project, JAPEX, JGC HD, "K" LINE, JFE Steel, EnerGia, and NGL aim to contribute to realizing carbon neutrality by 2050, including the realization of a de-carbonized society in Asia targeted by the Asia Energy Transition Initiative (AETI)*2.

*1 A technology for capturing CO_2 from exhaust gases and storing it underground.
*2 The Japanese Government's initiative announced in May 2021 for simultaneously achieving sustainable economic growth and carbon neutrality in Asia.

■ **Figure 1**



■ **Figure 2**

➤ Development and Provision of Eco-friendly Processes and Products (P.135)

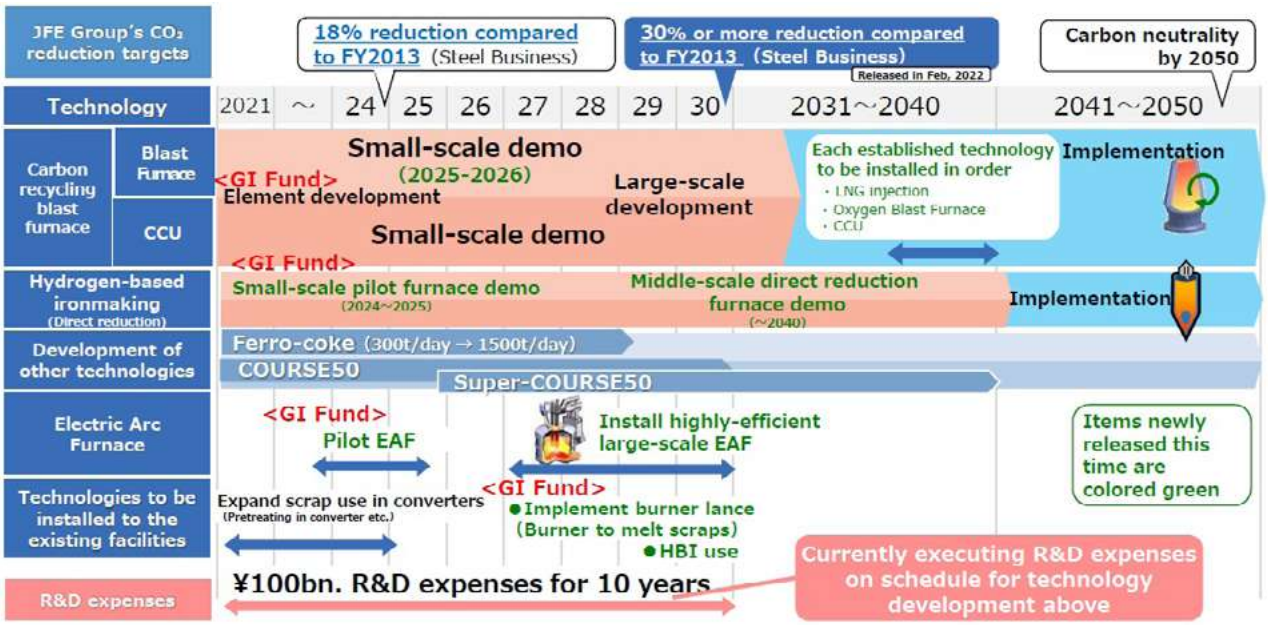
■ Related Products and Technologies

Reduce CO_2 Emissions at JFE Steel		
Carbon neutrality	Key Initiatives	JFE Steel Carbon Neutrality Strategy Briefing (https://www.jfe-steel.co.jp/en/company/pdf/carbon-neutral-strategy_220901_1.pdf)
		JFE Steel Challenge to Achieve Carbon Neutrality through Green Transformation (https://www.jfe-steel.co.jp/en/movie/#movie-gx)
	Demonstration tests	Demonstration Tests for NEDO's Hydrogen Utilization in Iron and Steelmaking Processes project (Japanese only) (https://www.jfe-steel.co.jp/release/2022/06/220615-2.html)
Green steel products	Begin supplying green steel products	JFE Steel to Begin Supplying JGreeX™ Green Steel (https://www.jfe-steel.co.jp/en/release/2023/230508-2.html)
	Adoption of green steel products	"JGreeX" Green Steel Selected by Sumitomo Corporation for its New Office Building in Tokyo – the first application in the real estate and construction industries (https://www.jfe-steel.co.jp/en/release/2023/231002.html)
		First Transformers Made with JGreeX™ Green Steel to be Produced in Europe (https://www.jfe-steel.co.jp/en/release/2023/231026.html)
		JGreeX™ Green Steel Selected for Large Dry Bulk Carrier - Working with Shippers to Promote the Value of CO_2 Reduction (https://www.jfe-steel.co.jp/en/release/2023/231220.html)
		MoNo Factory to Use JGreeX™ Green Steel to Produce Pinback Buttons (https://www.jfe-steel.co.jp/en/release/2024/01/240129.html)
		JFE Steel to Sell JGreeX™ to Singapore-based Steel Wholesaler Hock Seng Hoe (https://www.jfe-steel.co.jp/en/release/2024/02/240201.html)
		First Dry Bulk Carrier Made Entirely with JFE Steel's JGreeX™ Green Steel Launched (https://www.jfe-steel.co.jp/en/release/2024/06/240606.html)
		JGreeX™ Green Steel Selected by the world leading manufacturer of IT data center transformers in the U.S. (https://www.jfe-steel.co.jp/en/release/2024/06/240620.html)
		JGreeX™ Green Steel Selected for Use in Resource-recycling Containers (https://www.jfe-steel.co.jp/en/release/2024/07/240716.html)
		"JGreeX" Green Steel Selected for Construction of New Logistics Warehouse - First application in Japan's Hokkaido region (https://www.jfe-steel.co.jp/en/release/2024/07/240723.html)

Reduce CO_2 Emissions at JFE Steel		
Carbon-recycling blast furnace	Carbon-recycling blast furnace technology	JFE Steel Carbon Neutrality Strategy Briefing: Reducing CO_2 via CR Blast Furnaces (https://www.jfe-steel.co.jp/en/company/pdf/carbon-neutral-strategy_231108_1.pdf)
		Challenge Zero: Challenge for development of super-innovative technologies focusing on Carbon-recycling Blast Furnace+CCU (https://www.challenge-zero.jp/en/casestudy/812)
	CCU/CCUS	Challenge Zero: Technology of CO_2 utilization (https://www.challenge-zero.jp/en/casestudy/391)
New technology to process raw materials for hydrogen reduction ironmaking	Development of technology for direct hydrogen reduction	JFE Steel Carbon Neutrality Strategy Briefing: Direct Hydrogen Reduction (https://www.jfe-steel.co.jp/en/company/pdf/carbon-neutral-strategy_231108_1.pdf)
	Collaboration with a material supplier	JFE Steels and BHP to address decarbonization in steelmaking process (https://www.jfe-steel.co.jp/en/release/2021/210210.html)
Expanded use of scrap and reduced iron	Eco-friendly converter-type molten iron pretreatment process DRP™	Increased Use of Scrap Iron in Steelmaking Process to Reduce CO_2 Emissions (https://www.jfe-steel.co.jp/en/release/2022/220621.html)
	Feasibility study on new venture business to secure reduced iron supply	Feasibility Study on Building a Supply Chain of Reduced Iron with Low Carbon Emissions (https://www.jfe-steel.co.jp/en/release/2022/220901.html)
		Collaboration to Establish a Supply Chain of Ferrous Raw Material with Low Carbon Emissions (https://www.jfe-steel.co.jp/en/release/2023/230718.html)
	Development of electric arc furnace process technology	JFE Steel Carbon Neutrality Strategy Briefing: Large, High-efficiency EAFs (https://www.jfe-steel.co.jp/en/company/pdf/carbon-neutral-strategy_231108_1.pdf)
	Adoption of electric arc furnace process technology	JFE Steel's Chiba District Facility to Produce Stainless Steel with Electric-arc Furnace (https://www.jfe-steel.co.jp/en/release/2023/230508-1.html)
CO_2 utilization and storage technology	CO_2 utilization technology	Novel Processes for Manufacturing Valuable Materials Using Coal-Derived CO_2 Selected for NEDO Projects (https://www.jfe-steel.co.jp/en/release/2021/211015.html)
	Testing for practical use	JFE Steel Moves Ahead with Testing CO_2-utilization Technologies Aimed at Achieving Carbon Neutrality (https://www.jfe-steel.co.jp/en/release/2022/220620-2.html)

Reduce CO_2 Emissions at JFE Steel		
CO_2 utilization and storage technology	Establish CCS value chain	Agreed on Joint Evaluation with JFE Steel Corporation to Establish CCS Value Chain Originated from Japan Aligned with CCS Study in Malaysia (https://www.jfe-steel.co.jp/en/release/2023/230619.html)
		KEPCO and JFE Steel signed a MOU to jointly study possible CCS Projects (https://www.jfe-steel.co.jp/en/release/2023/231019.html)
		The Chugoku Electric Power and Nippon Gas Line Participate in the Joint Evaluation to Establish CCS Value Chain Originated from Japan for the CCS Project in Malaysia (https://www.jfe-steel.co.jp/en/release/2024/02/240226.html)

■ Roadmap to Carbon Neutrality in 2050



Source: Material for the JFE Group's investors' meeting held on May 6

➤ Seventh Medium-term Business Plan (P.22)

➤ JFE Group Environmental Vision for 2050, Presentation Material
(https://www.jfe-holdings.co.jp/en/common/pdf/investor/climate/2021-210525-release01.pdf)

Expand Contributions to CO_2 Emissions Reduction in Society

The JFE Group promotes various initiatives to reduce CO_2, mainly through JFE Engineering's businesses. Furthermore, in areas where demand is expanding, such as electrical steel sheets, we are working with the relevant operating companies to maximize the effectiveness of these initiatives.

Contribution to CO_2 Reduction through our Engineering Business

Demand is expected to rise for power generation plants using renewable energy sources that do not emit carbon. Through JFE Engineering, the JFE Group is handling the design, procurement, construction, and operation of various renewable energy generation plants including biomass, geothermal, solar, and onshore wind power. We are also working to increase the amount of power generated at waste treatment facilities in order to promote recycling and the effective use of resources.

Furthermore, we are actively engaged in the retailing of electricity, which uses these renewable energies as the main power source, supporting the establishment and operation of new regional electricity companies that focus on local production and consumption of energy using renewable sources, and in expanding the Multisite Energy Total Service (JFE-METS), which optimizes energy use for multiple sites within the same corporate group through centralized management.

As new initiatives for carbon neutrality, we are developing a technology to safely and efficiently transport large amounts of hydrogen, ammonia, and CO_2, and working on demonstrating a process that separates and collects CO_2 for reuse from the exhaust gas of waste treatment facilities.

As new initiatives for material recycling, we are working on bottle-to-bottle, an effort through which collected PET bottles are recycled and used as raw material for bottles, and the recycling of solar panels that are discarded due to age-related deterioration.

These will contribute to reducing CO_2 emissions in society by 12 million tonnes by FY2024 and 25 million tonnes by FY2030.

The following key initiatives contributed to CO_2 reduction in FY2023.

Large-Scale Biomass Power Generation

Started construction work for the Tahara Biomass Power Plant, one of the largest woody biomass combustion power plants in Japan, with an output of 112,000 kW.

Tahara Biomass Power LLC, a joint venture between JFE Engineering Corporation, Chubu Electric Power Co., Inc., Toho Gas Co., Ltd., and Tokyo Century Corporation, has started construction work on the Tahara Biomass Power Plant. The plant, to be constructed in Tahara, Aichi Prefecture, is one of the largest woody biomass power plants in Japan, with an output of 112,000 kW, and is scheduled to start operations in September 2025.

Food Waste Recycling Power Generation

Construction of a new food waste recycling biogas power generation plant in Fukuoka, Fukuoka Prefecture: J&T Recycling's first food recycling business in Kyushu.

J&T Recycling Co., a subsidiary of JFE Engineering, and Kankyou Agency have jointly established Fukuoka Bio Food Recycle Co. Ltd. in Fukuoka City to engage in the food waste recycling and biogas power generation business, in which food waste is collected and fermented to produce methane gas, which is then used as fuel to generate power. The plant to be built for the project will accept up to 100 tonnes of food waste per day and generate electricity using methane gas produced by microbial fermentation as fuel (output: 1,560 kW, estimated annual generation: approx. 12,000 MWh). The project will also support the secondary use of fermented sludge and digested liquid generated in the treatment process on nearby agricultural land.

We have other projects for expanding our food waste power generation businesses throughout Japan, including Tohoku Bio Food Recycle Corporation, which is started its food waste power generation in Sendai in May 2022, and Sapporo Bio Food Recycle Corporation in Sapporo, which is constructing a new plant to expand its capacity.

Multisite Energy Total Service (JFE-METS)

The House Foods Group has agreed to adopt the Multisite Energy Total Service at 18 sites across 8 group companies, driving CO_2 reduction.

JFE Engineering has signed a basic agreement with House Foods Group Inc. to provide JFE-METS. We will install a gas cogeneration system at the House Foods Shizuoka Plant and use JFE-METS to supply surplus electricity from the system and electricity provisioned by the JFE Group to 18 sites across 8 companies in the House Foods Group nationwide. The service is expected to reduce CO_2 emissions by approximately 16.3% and energy consumption by approximately 21.5% (compared to FY2022) at these sites. Operations commenced in April 2024.

CCUS

Contract received for the construction of CO_2 liquefaction, storage and loading/unloading facilities, a large-scale, long-distance, lower cost transportation system for liquid CO_2 to realize a CCUS society.

JFE Engineering has received an order from Japan CCS Co., Ltd. to construct its CO_2 liquefaction, storage, and loading/unloading facilities (EPC project). The EPC project is aimed at constructing part of the facilities to be used in the NEDO project: Research, Development and Demonstration of CCUS Technology / Large-scale CCUS demonstration testing at Tomakomai / Demonstration testing on CO_2 Transportation. We will be involved in the design and construction of onshore facilities capable of liquefying and storing 10,000 tonnes per year of CO_2 separated and recovered from coal combustion gas supplied by the Maizuru plant of Kansai Electric Power Co.

PET Bottle Recycling (Bottle-to-Bottle)

Kyoei J&T Recycling Corporation's West Japan PET Bottle MR Center to start full commercial operation.

Kyoei J&T Recycling, a subsidiary of JFE Engineering, after starting the operations of the flake manufacturing plant in October 2021, has completed the construction of the pellet production line and started full-scale commercial operations at the PET bottle recycling raw material manufacturing plant (West Japan PET Bottle MR center) in Tsu, Mie Prefecture. With an annual processing capacity of 60,000 tonnes (approximately 10 million bottles per day), the plant can recycle approximately 10% of the total number of PET bottles shipped nationwide.

By producing flakes and pellets from used PET bottles and supplying them to bottle manufacturers, we contribute to the production of plastic bottles using 100% recycled materials, which generates 63% less CO_2 than the production of crude oil-derived pellets.

Contribute to CO_2 Reduction through Group Collaboration

The JFE Group leverages the respective strengths of each operating company and maximizes their synergies by linking projects. Three main projects being implemented through Group collaboration are: (1) initiatives related to the electrical steel sheet strategy, (2) initiatives in the Keihin waterfront areas, and (3) initiatives in the offshore wind power generation business. We will contribute to CO_2 reduction and carbon neutrality by developing projects that combine the technologies and know-how of each company.

Electrical Steel Sheets Strategy

Electrical steel sheets are widely used as core materials for electrical equipment such as motors and transformers and therefore play an important role in determining the performance of this electrical equipment. JFE Steel is contributing to reducing CO_2 emissions on a global scale by supplying high-performance electrical steel sheets.

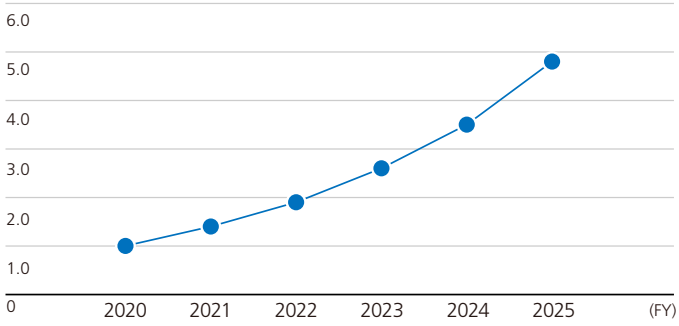
Non-Oriented Electrical Steel Sheets—Expand and Strengthen Production Capacity at the West Japan Works (Kurashiki District)

In order to achieve carbon neutrality for society as a whole, a major shift is required in the social structure, from a society that relies on fossil fuels for energy to one that primarily uses carbon-free energy sources. Transitioning to a future society in which electric vehicles (EVs) are the main mobility platform and where zero-emission electricity is the main energy source will depend on highly efficient motors, for which the key materials are high-performance, non-oriented electrical steel sheets.

Our high-grade non-oriented electrical steel sheets improve the performance of EV motors. Their excellent low iron loss property contributes to higher efficiency, while their high magnetic flux density supports downsizing. These characteristics are highly regarded, and many automobile manufacturers use them in products. Demand for such high-grade non-oriented electrical steel sheets is expected to grow rapidly, and to meet this demand, we are investing approximately 49 billion yen at the West Japan Works (Kurashiki district) to double its production capacity in the first half of FY2024.

Furthermore, as the shift toward EVs accelerates, we expect the demand for high-grade non-oriented electrical steel sheets to grow even more rapidly. We have therefore decided to further strengthen the production capacity high-grade non-oriented electrical steel sheets at the West Japan Works (Kurashiki district). Furthermore, we plan to make an additional investment of approximately 46 billion yen to triple the manufacturing capacity of high-grade non-oriented electrical steel sheets for EV main motors by the end of FY2026 (including the effect of the investment already made).

■ Demand for Non-Oriented Electrical Steel Sheets (Calculated by JFE, 2020 results = 1.0)



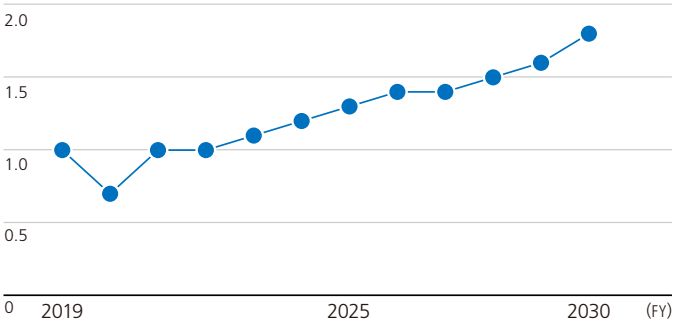
Grain-Oriented Electrical Steel Sheets—Establish a Joint Venture Company with JSW

The global demand for grain-oriented electrical steel sheets in transformers is expected to increase due to continuously growing demand for electric power and the expanding adoption of renewable energy. The demand for grain-oriented electrical steel sheets, particularly in India, is expected to increase by 1.8 times in 2030, compared to 2019.

To this end, in August 2023, JFE Steel and JSW Steel Limited (JSW) signed an agreement to establish a grain-oriented electrical steel sheet manufacturing joint venture company, JSW JFE Electrical Steel Private Limited. We will work with JSW to establish an integrated manufacturing system for this type of steel sheet in India. By locally manufacturing a full line-up of mainly high-grade, energy-efficient grain-oriented electrical steel sheets, in which JFE Steel has accumulated expertise over many years, the joint venture will contribute to the development of a greener power transmission and distribution infrastructure in India and to the remarkable growth of the Indian economy.

The total investment between the two companies is planned to be 670 million dollars, and we plan to begin full production in FY2027.

■ Demand for Grain-Oriented Electrical Steel Sheets in India (Calculated by JFE, 2019 results = 1.0)



Signed an agreement to establish a grain-oriented electrical steel sheet manufacturing joint venture company

Further Expanding the Global Supply Chain for the Steel Sheets Business (JFE Shoji)

The key factor in initiatives for countering climate change, including those for reducing CO_2 emissions, is minimizing electricity loss and using generated electricity without loss. Motors found in places such as power plants, factories and homes are responsible for 40–50% of all electricity consumed globally. In Japan, the ratio is approximately 55%. Improving the efficiency of motors by 1% in Japan would contribute to the equivalent of a 500,000 kW-class power generation plant in energy savings. Motors for electric vehicles, which are expected to become increasingly popular as we move toward a decarbonized society, and industrial motors that are essential for factory automation, need to become even more efficient and lighter through downsizing. In addition, continuous improvement in efficiency is required in transformers, which are essential for distributing electricity from source to factories and homes, in order to minimize energy loss in power transmission and distribution.

JFE Shoji has established a stable global supply chain that includes sourcing high-quality electrical steel sheets which are essential for improving the efficiency of motors and transformers from JFE Steel and other manufacturers and processing the products for meeting customer needs. Customers who require high-quality electrical steel sheets, such as manufacturers of motors and transformers, typically operate manufacturing facilities across the globe. To align with this trend, the company has been working to expand its electrical steel sheets supply chain bases in Japan, America, China, and ASEAN, and recently it has also established a new processing base in Serbia with the aim of starting operations in FY2025. JFE Shoji will continue to take actions to capture demand, such as by reinforcing its stamping facilities at locations in and outside Japan to establish the world's number one global distribution and processing system for high-quality electrical steel sheets. By further expanding its supply chain and processing capabilities and collaborations with alliance companies, JFE Shoji is striving to significantly improve the distribution and processing of electrical steel sheets.

■ Related Products and Technologies

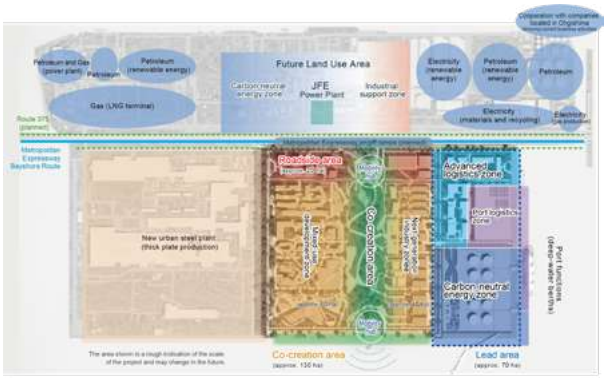
Expand contributions to CO_2 emissions reduction in society		
Contribution to CO_2 Reduction through the Engineering Business	Large-scale biomass power generation	Started Construction Work for the Tahara Biomass Power Plant, One of the Largest Woody Biomass Combustion Power Plants in Japan, with an Output of 112,000 kW (Japanese only) (https://www.jfe-eng.co.jp/news/2022/20220601.html)
	New regional electricity	Regional Electricity Retail Businesses in Partnership with the Local Municipal Governments Establishing New Regional Electricity Businesses (FY2022 CSR, P. 116) (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/data/2022/csr2022e.pdf)
	Multisite energy total service	House Foods Group Has Agreed to Adopt Multisite Energy Total Service at 17 Sites across 8 Group Companies: Driving CO_2 Reduction (Japanese only) (https://www.jfe-eng.co.jp/news/2022/20220926.html)
	Food waste recycling	Food Waste Recycling Business (FY2022 CSR, P. 115) (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/data/2022/csr2022e.pdf)
		Construction of a New Food Waste Recycling Biogas Power Generation Plant in Fukuoka, Fukuoka Prefecture: J&T Recycling's First Establishment of Food Recycling Business in Kyushu (Japanese only) (https://www.jfe-eng.co.jp/news/2022/20220401.html)
	Carbon-neutral world	Contribution to Creating a Carbon-Neutral World Through the Transport of Hydrogen and CO_2 (FY2022 CSR, P. 114) (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/data/2022/csr2022e.pdf)
		Contract Received for the Construction of CO_2 Liquefaction, Storage and Loading/Unloading Facilities—a Large-Scale, Long-Distance, Lower Cost Transportation System for Liquid CO_2 to Realize a CCUS Society (Japanese only) (https://www.jfe-eng.co.jp/news/2023/20230111.html)
	PET bottle recycling	Kyoei J&T Recycling Corporation's West Japan PET Bottle MR Center to Start Full-Scale Commercial Operations (Japanese only) (https://www.jfe-eng.co.jp/news/2022/20220421.html)

Expand contributions to CO_2 emissions reduction in society		
Electrical steel sheets	JNRF™	JFE Steel Develops JNRF™ Silicon-Gradient Steel Sheet for High-Speed Motors—Minimizes High-Frequency Iron Loss And Improves High Magnetic Flux Density (https://www.jfe-steel.co.jp/en/release/2020/201203.html)
	Facility expansion	JFE Steel to Expand Electrical Steel Sheet Production Capacity at Kurashiki Facility (https://www.jfe-steel.co.jp/en/release/2021/210401.html)
		JFE Steel Formally Decides to Further Expand Electrical Steel Sheet Capacity of the Kurashiki facility (https://www.jfe-steel.co.jp/en/release/2023/230522-1.html)
	Supply chain for electrical steel sheets	JFE Steel & JSW Steel Proposes Grain-Oriented Steel Sheet Manufacturing JV in India (https://www.jfe-steel.co.jp/en/release/2021/210507.html)
		About the Basic Agreement to Establish a Joint Venture Company in India to Manufacture Grain-Oriented Electrical Steel with JSW Steel Limited (https://www.jfe-steel.co.jp/en/release/2023/230522-2.html)
		About the Joint Venture Agreement to Establish a Joint Venture Company in India to Manufacture Grain-Oriented Electrical Steel with JSW Steel Limited (https://www.jfe-steel.co.jp/en/release/2023/230803-2.html)
		Establish a Global Supply Chain in Electrical Steel Sheet Business (https://www.jfe-holdings.co.jp/en/sustainability/environment/product/#pro_ global_supply)
High Tensile Strength Steel Sheets (HITEN) for automobiles	Development of high tensile strength steel sheets for automobiles	JFE Steel and thyssenkrupp Steel Europe Launch High-tensile Steel Sheets Capable of Cold Forming for Use in Automobile Frames (https://www.jfe-steel.co.jp/en/release/2022/220404.html)
		JFE Steel 1.5 GPa-Grade High-Tensile Strength Cold-Rolled Steel Sheets Adopted for First Time in Vehicle Body Structural Parts (https://www.jfe-steel.co.jp/en/release/2020/201223.html)

Initiatives for Achieving Carbon Neutrality in the Keihin Waterfront Areas

JFE Holdings has released OHGISHIMA 2025 , the JFE Group's conceptual plan for the reuse of land currently occupied by JFE Steel's East Japan Works (Keihin District), following the suspension of blast furnace operations and other upstream processes there, and in accordance with Kawasaki City's land use policy. The concept is to create fields of innovation and enterprise that will address the complex challenges involved in the pursuit of carbon neutrality. Through implementation of its OHGISHIMA 2050 plan, the JFE Group aims to convert the land for use on projects that will offer significant public benefit and help address some of the key challenges Japan faces. By attracting new industries and creating jobs that will benefit the country over the next 100 years, the JFE Group hopes to contribute to the sustainable development of local communities and society as a whole.

Artist's impression of the Ohgishima district as envisioned in 2050



Land use zoning in Ohgishima

Initiatives for Developing a Hydrogen Supply Hub in the Carbon-Neutral Energy Zone

The Lead Area of the Ohgishima district has been designated as a Carbon-neutral Energy Zone, where hydrogen supply facilities will be deployed. Dramatically improved access to these facilities will support carbon neutrality and innovation across the entire district.

Since April 2022, JFE Holdings, ENEOS Corporation, and JERA Co., Inc. are conducting a joint study on establishing a hydrogen and ammonia receiving and supply base. As part of this effort, we are considering using the deep-water wharves and adjacent land areas of the Ohgishima district. In March 2023, the Kawasaki waterfront area was selected as a candidate site for receiving liquefied hydrogen for the Liquefied Hydrogen Supply Chain Commercialization Demonstration Project, a joint initiative by Japan Suiso Energy Ltd. and ENEOS Corporation that is part of NEDO's Green Innovation Fund Project: Large-scale Hydrogen Supply Chain Establishment. The three companies have been actively exchanging information, and on July 2024, JFE Steel and Japan Suiso Energy Ltd. signed a land-lease agreement to initiate the necessary construction work in preparation for starting the commercialization demonstration in FY2028.

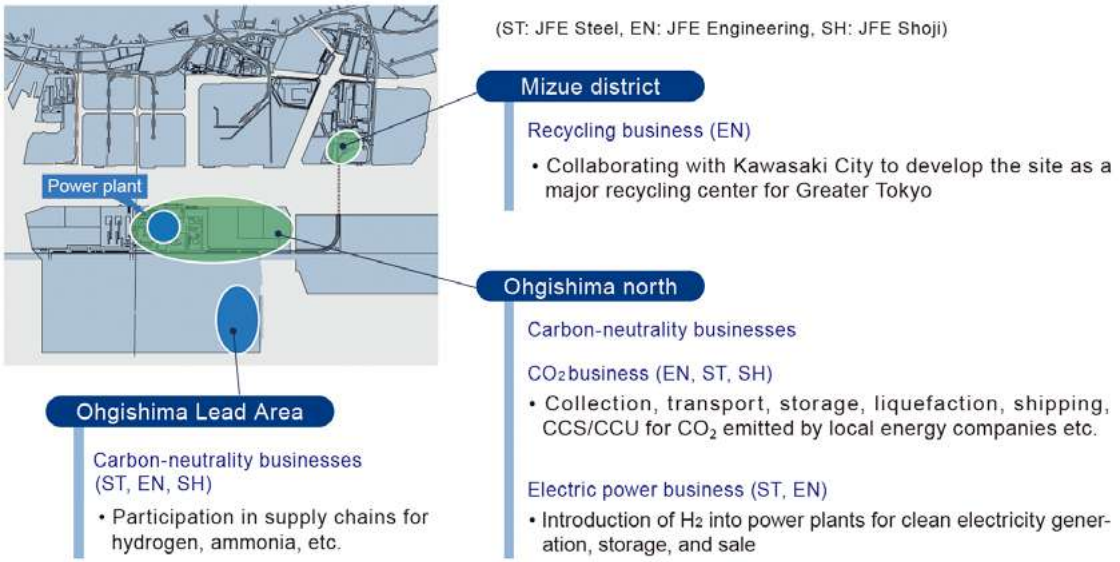
The JFE Group intends to play a role in building a stable and economical supply chain for hydrogen and other decarbonized fuels, starting with Ohgishima, and to contribute to realizing carbon neutrality in the Keihin waterfront areas and for society as a whole.

Signed a land-lease agreement with Japan Suiso Energy Ltd.

Initiatives for Developing a Recycling Hub in the Mizue District

In order to promote the sustainable development of the Keihin waterfront areas, the JFE Group is focused on comprehensive land management, encompassing site sales, leasing, and business use. In the Mizue district, we are collaborating with Kawasaki City to develop the site as a major recycling hub for the Greater Tokyo region. JFE Engineering's group company J&T Recycling Corporation established J-Circular System Co., Ltd. as a pioneering project with JR East and other companies, and in April 2024 it started constructing the J Circular System Kawasaki Super Sorting Center, a plastic recycling facility that will be one of the largest in the Greater Tokyo area. The facility is scheduled to begin full-scale operations in April 2025.

■ Land management target areas in the Keihin waterfront areas



Accelerate Group-Wide Commercialization of the Offshore Wind Power Business

Offshore wind power generation is a key initiative of the Japanese government's Green Growth Strategy to achieve carbon neutrality by 2050. We will participate in this effort by leveraging the Group's collective strength with our engineering business acting as the main driver. Specifically, the Group will work on commercializing the manufacturing and O&M* of foundation structures (monopiles, jackets) in addition to establishing a supply chain encompassing material procurement, manufacturing, and O&M. We anticipate this will significantly contribute to the JFE Group's efforts to achieve carbon neutrality as well as the government's strategy to achieve carbon neutrality.

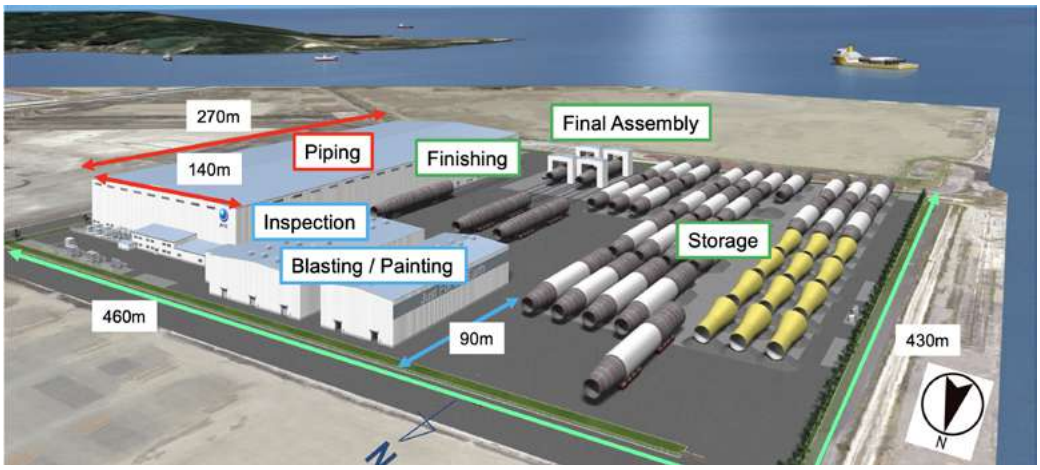
*Operation and maintenance

JFE Engineering Construction of Monopile Manufacturing Base Completed

JFE Engineering has completed construction of the monopile manufacturing plant in Kasaoka, Okayama Prefecture and operations commenced in April 2024. Monopiles are the foundational structural components for offshore wind power generation and are extremely large steel structures, approximately 10 m in diameter, 100 mm thick, and 100 m long. The plant is the only one in Japan capable of manufacturing such large structures. It was designed for production efficiency, implementing manufacturing processes based on the experiences gained in the manufacturing of large steel structures at the Tsu Works. The plant site includes extensive grounds and a quay from which manufactured structures can be directly shipped, as well as state-of-the-art equipment such as large-diameter bending machines and welding machines for extra-thick plates. When operating at full capacity, the plant is capable of manufacturing up to 100,000 tonnes annually, and it is expected to significantly contribute to the establishment of a domestic supply chain in the offshore wind power generation business and to the realization of carbon neutrality.

■ Overview of New Monopile Manufacturing Plant (Kasaoka)

Construction site	Kasaoka City, Okayama Prefecture (JFE Steel West Japan Works Fukuyama area)	Investment amount	Approximately 40 billion yen* (plant building, mechanical equipment, quay reinforcement) *Includes the facility reinforcement cost of the Tsu Works.
Construction start	June 2022	Site area	Approximately 20 ha (includes storage area)
Operation start	April 2024	Production capacity	Approximately 80,000–100,000 tonnes per year (Approx. 50 sets)
Length of shipping quay	200 m (quay total length: 400 m)	Quay depth	–11 m



Monopile manufacturing plant during its construction (May 2023)

JFE Steel

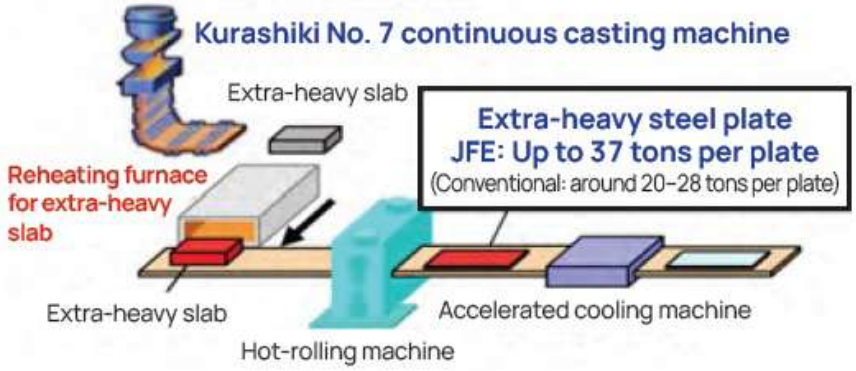
Large and Heavy Steel Plates for Offshore Wind Power Generation

The large and heavy steel plate J-TerraPlate™, produced with the No. 7 continuous caster of the Kurashiki Plant at the JFE Steel's West Japan Works, has been selected for the first time for the production of monopile foundations for offshore wind power generation.

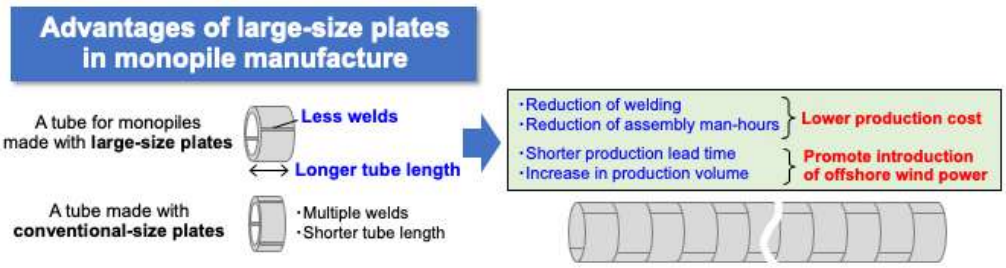
Offshore wind turbines have recently grown in size, requiring larger monopiles and other foundational structures to support them. The monopiles are manufactured by welding ultra-thick steel plates, resulting in increased welding workloads that require monopile manufacturers to improve the efficiency of the operations. Using larger and heavier steel plates makes it possible to reduce the volume of welding operations, compared to conventional small-size plates, and also helps to raise process efficiency while lower manufacturing costs.

We have been investing in equipment at the plate mills and other facilities to manufacture and supply steel plates of up to 37 tonnes (previously limited to around 20 to 28 tonnes per plate in general), the largest in Asia and capable of supporting wind turbines in harsh offshore environments over the long term and in large quantities using the extra-large slabs produced with the state-of-the-art No. 7 continuous casting machine. These investments have resulted in the first-time adoption of this product for the production of monopile foundations.

■ Manufacturing Process of Large and Heavy Steel Plates for Offshore Wind Power Generation

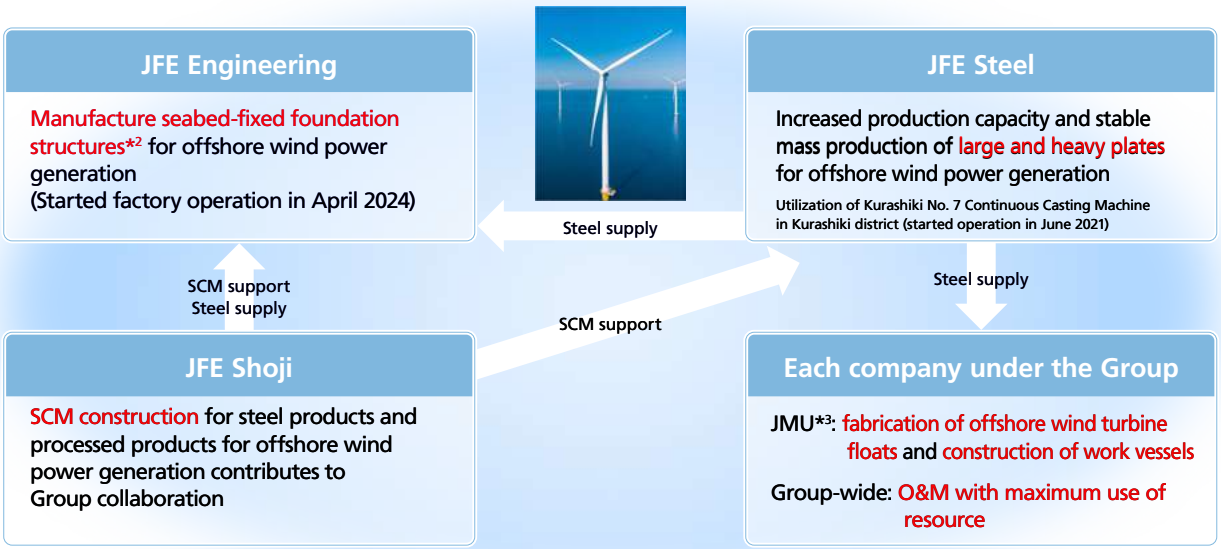


■ Advantages of Using Large and Heavy Steel Plates for Monopiles



■ Commercialization of Offshore Wind-Power Business

- By commercializing our manufacturing of foundation structures (monopiles), we will become the forerunner in the business of offshore wind-power generation and establish a supply chain across the entire Group, including foundation manufacturing and O&M.*1
- We will strive to expand business in the field of renewable energy by leveraging the JFE Group's collective strengths (synergies), with JFE Engineering as the main player.



*1 Operation and maintenance. Apply expertise of maintenance and analysis technologies.
*2 Seabed-fixed foundation structures: monopiles, jackets, etc.
*3 Japan Marin United Corporation (equity method affiliate)

■ Technologies of Group Companies

Category	Company	Details
Foundation structures	JFE Engineering	Seabed foundations (monopiles, jackets, etc.)
	Japan Marine United	Floating foundations (semi-submersible)
	JFE Steel	High-quality, large and heavy steel plates, high-strength steel (reduced using HBL series steel plates)
Construction	Japan Marine United	SEP vessels (self-elevating platform)
	JFE Engineering	JFE-RAPID (cable laying method)
		Battery systems for power storage
	GECOSS	Stands for large steel structures
	JFE Steel	Natural stone substitute materials (use of steel slags)
O&M (operation and maintenance)	JFE Engineering	Technologies for remote monitoring and operation
	JFE Advantech	Vibration measurement equipment and systems, sea monitoring tools (water quality, sea conditions)
	Japan Marine United	Offshore support vessels (work vessels)
	JFE Plant Engineering	Wind turbine maintenance (diagnosis and repair)
	JFE Technos	Technologies and expertise in planning, constructing, and maintaining onshore turbines
	JFE Techno-Research	Equipment evaluation and analysis for corrosion, fatigue, vibration, etc., diagnosis of remaining service life, strength and durability testing and evaluation techniques for large structures
Supply chain	JFE Shoji	Contribution to optimizing offshore wind power generation project execution

JFE Shoji

Building a Supply Chain for the Offshore Wind Power Generation Industry

Initiatives toward carbon neutrality are expanding around the world to tackle the shared issue of climate change. Japan has set its goal to achieve carbon neutrality by 2050 and formulated the Sixth Strategic Energy Plan in 2021 to lay out strategies to that end. These ambitious strategies include reducing greenhouse gas emissions by 46% in FY2030, boosting renewable energy in its electricity mix to 36–38%, and increasing the ratio of wind in the renewable energy mix to 5% (generating capacity of 23.6 GW) compared to the 0.9% (generating capacity of 4.5 GW) in FY2019.

As for offshore wind power generation, the industry is planning projects that will achieve 10 GW capacity by 2030 and 30–45 GW by 2040. Steadfast efforts are also being made to adopt a large number of internationally competitive technologies, such as the adoption of a demonstration project for a floating offshore wind power generation system under the Green Innovation Fund.

JFE Shoji is collaborating with a local enterprise that manufactures the windmill foundations in Taiwan, which is leading in the offshore wind power generation market, and have been achieving progress regarding supply chain of steel materials for foundation structures. Looking ahead, the company will capitalize on the knowledge acquired and contribute to the realization of carbon neutrality by establishing a supply chain that supports the domestic production of goods and the local economy while also meeting customer demand in the offshore wind power generation industry in Japan.

Adapting to Climate Change (Contribution to Achieving Societal Resilience)

Contributions to Disaster Prevention and Mitigation and Increased National Resilience

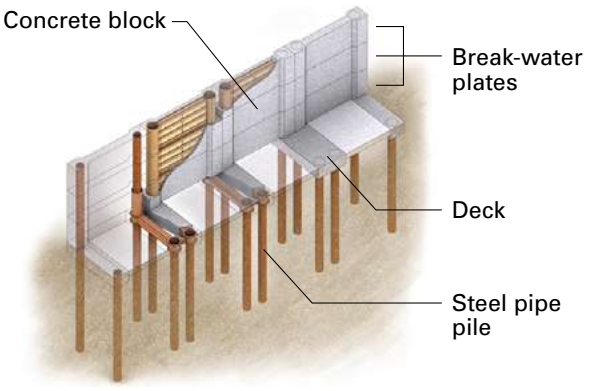
The JFE Group is not only focused on reducing CO_2 emissions (climate change mitigation); we also intend to contribute to the resilience of society in general by adapting to climate change.

With infrastructure such as hybrid tide embankments and permeable steel slit dams, the Group will contribute to preventing and mitigating disaster-related damage to infrastructure critical to daily life and economic activities, and to strengthening their resilience.

Hybrid Tide Embankments

Hybrid tide embankments are made of steel and concrete. Because of their hybrid structure, they require shorter construction time and less space.

Concrete blocks for hybrid tide embankments are precast at a JFE Group factory, while steel pipe piles for foundations are installed at the construction site, thereby reducing the time required for on-site construction by about 60%. This arrangement does not require large amounts of materials, equipment, or workers on site, so it does not interfere with other construction work. Furthermore, compared to a conventional embankment structure, the land area occupied by the embankment can be reduced by about 80%, saving considerable space. We will continue to apply and advance our technology to further contribute to disaster prevention in the region.



Cross section


Hybrid tide embankments

➤ JFE Engineering Infrastructure Using Steel Structures (Japanese only)
(https://www.jfe-eng.co.jp/products/bridge/co01.html)

Permeable Steel Slit Dams

A permeable steel slit dam is a steel pipe structure installed in a river to trap debris flows.

Made of strong steel pipes to withstand the impact of driftwood and huge debris, it has large openings to let water and sediment to pass through, which prevents the water level from rising upstream during floods and also ensuring that debris does not flow downstream. Since it does not block the flow of water, unlike a dam, it can be shaped to the slope of a riverbed to protect the ecosystem. The JFE Group is working to expand the use of permeable steel slit dams by reducing installation costs and shortening the construction period through structural innovations.

Permeable steel slit dams

Terre Armée Method

The Terre Armée method drove the spread of the reinforced soil technology in Japan. This reinforced soil wall construction method was introduced to Japan about half a century ago, and since then, it has been used in a variety of situations, mainly in domestic infrastructure development, such as highway and other road structures, and the construction of airports, schools, and defense facilities. By applying layers of steel reinforcement in the embankment, friction between the steel strips and the earth results in a vertically strong structure that exhibits excellent earthquake resistance.

JFE Shoji Terre One Corporation, a subsidiary of JFE Shoji, has developed a new Terre Armée method, with an innovative fail-safe system . The feature helps to visually confirm the health of structures after being subject to unforeseen forces, such as massive earthquakes. Being able to easily detect the internal anomalies of reinforced embankments helps to determine the safety of the infrastructure and schedule necessary maintenance work in a timelier manner.

We will contribute to building disaster-resistant roads and towns by promoting the Terre Armée method and by expanding sales of other products that contribute to disaster prevention, disaster mitigation, and national land resilience.

Application in highway walls for National Route No. 3, Kumamoto Prefecture)

Fail-Sensor indicator
(red indicating internal anomalies)

JFE Group's Strategy and Alignment with the Paris Agreement

Under the JFE Group Environmental Vision for 2050, the JFE Group designed a roadmap for achieving carbon neutrality, which included our short-, medium-, and long-term CO_2 emission reduction targets. Until 2030, the Group will focus on fully using existing technologies to promote decarbonization while at the same time developing the ultra-innovative technologies needed to achieve carbon neutrality. The Group will then focus on commercializing the ultra-innovative technologies in the 2030s and 2040s, when we expect the required social infrastructure to be in place, to accelerate decarbonization toward achieving carbon neutrality by 2050.

The technology roadmap for Transition Finance toward decarbonization in the iron and steel sector, published by the Japanese Ministry of Economy, Trade, and Industry (METI), outlines a path for accelerating decarbonization and achieving carbon neutrality by introducing innovative technologies, with the same assumption that social infrastructure such as hydrogen supply and CCUS will be in place by the 2040s. This technology roadmap is aligned with Japan's Nationally Determined Contribution (NDC) based on the Paris Agreement, and is therefore aligned with the Paris Agreement.

In 2022, the JFE Group issued transition bonds through a public offering, which was selected as the first model example in the iron and steel sector for METI's Transition Finance Model Projects in FY2021. During the evaluation process for this issuance, the Group's initiatives were certified by a third party as being aligned with METI's roadmap. We can therefore deduce that they are also aligned with the Paris Agreement.

➤ **METI: Technology Roadmap for Transition Finance in the Iron and Steel Sector**
(https://www.meti.go.jp/policy/energy_environment/global_warming/transition/transition_finance_technology_roadmap_iron_and_steel_eng.pdf)

➤ **METI: Transition Finance Case Study**
(https://www.meti.go.jp/policy/energy_environment/global_warming/transition/transition_finance_case_study_jfehd_eng.pdf)

Risk Management (Climate Change)

JFE Holdings is responsible for comprehensive risk management in accordance with its Basic Policy for Building Internal Control Systems. The JFE Group Sustainability Council, chaired by the president of JFE Holdings, consolidates information and strengthens management across the Group to reduce the frequency and impact of risks.

The executive officer responsible for risk strives to identify potential ESG risks such as those associated with climate change. As necessary, the council confirms and evaluates risks and discusses and determines countermeasures. Key managerial issues are deliberated by the Group Management Strategy Committee.

The Board of Directors supervises initiatives on ESG risks such as those related to climate change and CSR by discussing, making decisions on, and receiving reports about these matters.

Climate-related risks are identified and evaluated based on a scenario analysis conducted under the framework recommended by the TCFD in 2017. Key factors that may affect management are selected for further analysis and incorporated into formulating business strategies, such as the Seventh Medium-term Business Plan.

Monitoring Method for Climate Change-Related Risks

Issues that may affect management are monitored by the JFE Group Sustainability Council, Group Management Strategy Committee, and Management Committee. Measures are implemented based on a quarterly report on climate change-related risks deliberated by the specialized committees of each Group company (e.g., the Environmental Committee). The JFE Group Environmental Committee consolidates information and strengthens management to reduce the frequency and impact of risks and to maximize opportunities.

Countermeasures Based on Monitoring

1. Group-wide deliberations
2. Monitoring penetration of policies within the Group
3. Monitoring deployment of policies throughout the Group

For further details, refer to the following links.

➤ System for Promoting Sustainability (P.10)
➤ Risk Management (P.231)
➤ Environmental Management (P.46)

Metrics and Targets (Medium- and Long-Term Targets and Results in FY2023)

The JFE Group's steel business is led by its operating company, JFE Steel, which is a member of the Japan Iron and Steel Federation (JISF). The JFE Group is promoting the JISF's Commitment to a Low Carbon Society, which focuses on the Three Ecos initiatives and the development of innovative new iron and steelmaking processes. Under the initiative, the JISF's target for FY2030 had originally been to reduce emissions by 9 million t-CO_2. However, with the end of Phase I of this initiative in 2020, it was rebranded as the JISF's Carbon Neutrality Action Plan, and the Phase II target (FY2030 target) was revised to a 30% reduction in energy-derived CO_2 emissions in FY2030, compared to FY2013. JFE Steel is aggressively pursuing the achievement of this goal.

In addition, JISF has formulated and announced the Long-term Vision for Climate Change Mitigation in 2030 and beyond, which is intended to realize zero-carbon steel. JFE Steel played a key role in formulating this vision. Furthermore, in 2021, the JISF announced the "Basic Policy of the Japan steel industry on 2050 Carbon Neutrality sought by the Japanese government," declaring that the Japanese iron and steel industry will boldly take on the challenge of realizing zero-carbon steel.

The JFE Group intends to increase sustainability through solutions that address global climate change while restructuring to respond to developments in the environment facing our steel business. We considered 2020 to be the landmark year for further reinforcing our efforts to tackle climate change, and we declared our target to reduce CO_2 emissions in the steel business in FY2030 by 20% or more, compared to FY2013, and to achieve carbon neutrality by 2050.

In May 2021, the JFE Group placed top priority on its climate change initiatives and formulated the JFE Group Environmental Vision for 2050 as part of the Seventh Medium-term Business Plan, under which we will strive to achieve carbon neutrality by 2050. The Group also disclosed new CO_2 emissions reduction targets, and in February 2022, the FY2030 target for the steel business was revised upward to 30% or more, compared to FY2013. Major Group companies of JFE Steel have formulated CO_2 reduction targets at the same level as JFE Steel. The Group companies in Japan and overseas work together to incorporate efforts to address climate change issues into their business strategies. The Group will systematically pursue the reduction of CO_2 emissions by incorporating the TCFD's principles in its management strategies.

JFE Group's CO_2 Reduction Targets

Seventh Medium-term Business Plan Initiatives

■ Reduce steel-business CO_2 emissions in FY2024 by 18%, compared to FY2013 (JFE Steel).
Furthermore, JFE Steel's major group companies have also set their own CO_2 reduction targets for FY2024 to ensure that these targets are achieved. With this, more than 99% of the total CO_2 emissions of the entire JFE Steel Group is accounted for.
■ The target of reducing CO_2 in FY2030: 30% or more, compared to FY2013 (JFE Steel)

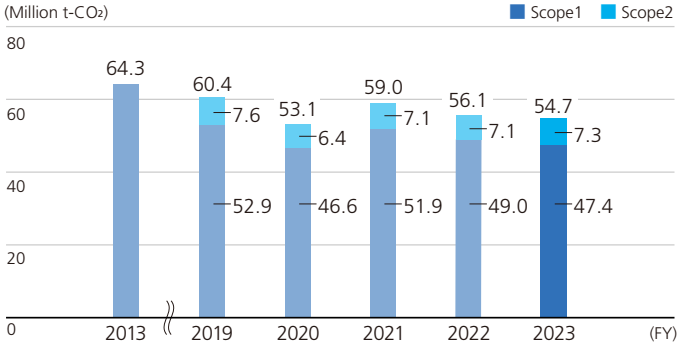
Initiatives for Carbon Neutrality by 2050

■ Reduce CO_2 emissions at JFE Steel
· Pursue ultra-innovative technologies mainly for carbon-recycling blast furnaces and CCU
· Develop hydrogen-based ironmaking (direct-reduction) technology
· Develop electric arc furnace process technology
■ Expand engineering business contributions to CO_2 emissions reduction in society
· Reduce CO_2 emissions by 12 million tonnes in FY2024 and 25 million tonnes in FY2030
■ Offshore wind-power generation business
· Accelerate commercialization of our offshore wind-power business by applying the strengths of the Group

➤ JFE Group Environmental Vision for 2050, Presentation Material
(https://www.jfe-holdings.co.jp/en/common/pdf/investor/climate/2021-210525-release01.pdf)

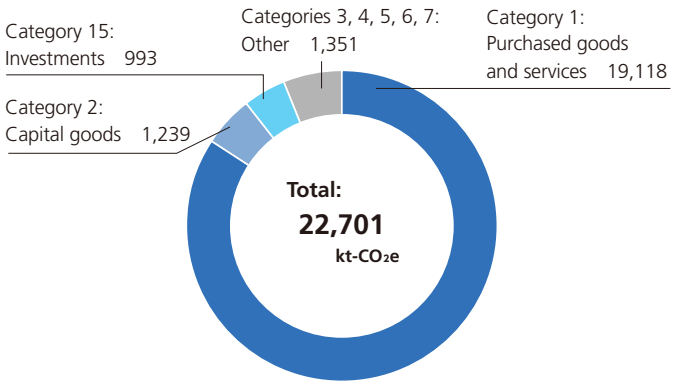
CO_2 Emissions of the JFE Group

■ CO_2 Emissions of the JFE Group



Notes:
- Data cover 75 companies
  JFE Steel and 26 major domestic and overseas subsidiaries
  JFE Engineering and 11 major domestic and overseas subsidiaries
  JFE Shoji and 35 major domestic and overseas subsidiaries
- Data for JFE Steel include CO_2 emissions from non-energy sources.
- Starting with FY2018, data for JFE Steel's subsidiaries and JFE Engineering's subsidiary include CO_2 emissions from non-energy sources.
- FY2013 figure includes data for the Sendai Works of JFE Bars & Shapes Corporation.
- Since FY2021, the figures include data for an expanded list of JFE Steel, JFE Engineering, and JFE Shoji major subsidiaries.

■ **Scope 3 Emissions of the JFE Group (FY2023)**



Coverage:
(Categories 1, 2, 3, 4, 5) JFE Steel, 21 JFE Steel major domestic subsidiaries, JFE Engineering, 1 JFE Engineering major subsidiary, and JFE Shoji
(Category 6, 7) JFE Steel, 21 JFE Steel major domestic subsidiaries, JFE Engineering, 12 JFE Engineering major domestic and overseas subsidiaries, and JFE Shoji
(Category 15) Japan Marine United, and 10 JFE Steel equity-method affiliates (7 domestic and 3 overseas)
Sources: Green Value Chain Platform (Ministry of the Environment) and others

For more on quantitative data related to CO_2 emissions, refer to the following information.

➤ Environmental Data (P.235)

JFE Steel

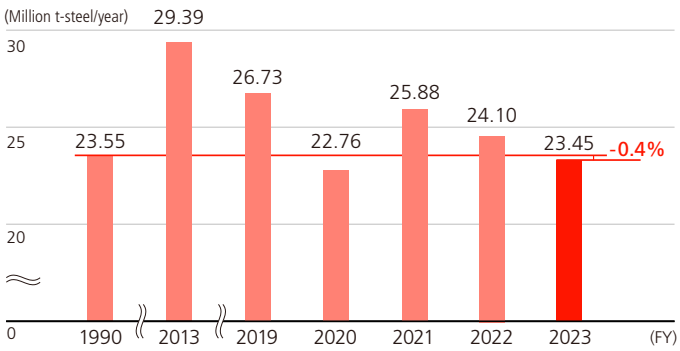
Initiatives to Save Energy and Reduce CO_2

JFE Steel has always aggressively pursued CO_2 reduction and energy savings, including the introduction of energy-saving equipment.

JFE Steel

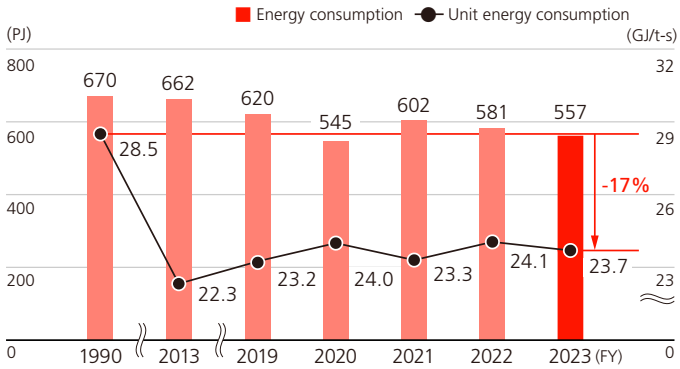
Energy Consumption and CO_2 Emissions in FY2023

■ **Production of Crude Steel of JFE Steel**



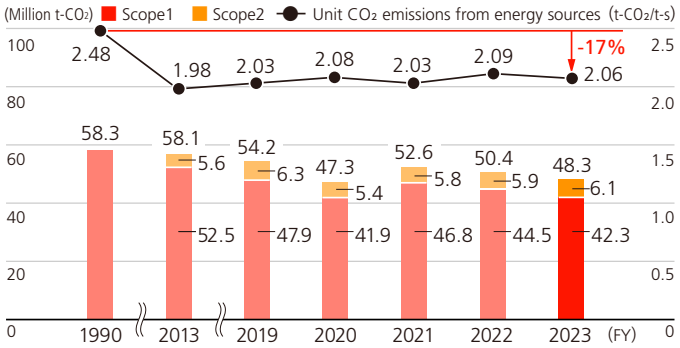
Note: FY2013 figure includes data for the Sendai Works of JFE Bars & Shapes Corporation.

■ Energy Consumption and Unit Energy Consumption of JFE Steel



Note: FY2013 figure includes data for the Sendai Works of JFE Bars & Shapes Corporation.

■ CO_2 Emissions from Energy Sources and Unit CO_2 Emissions of JFE Steel



Notes:
- The CO_2 emissions and emission intensity in FY2023 are calculated using the CO_2 emission factor for electricity purchased in FY2022, adopted by the Japan Iron and Steel Federation's Commitment to a Low Carbon Society.
- FY2022 data was revised by applying the CO_2 emission factor for electricity purchased in FY2022, as adopted by the Japan Iron and Steel Federation's Commitment to a Low Carbon Society.
- FY2013 figure includes data for JFE Bars & Shapes Corporation's Sendai Works.

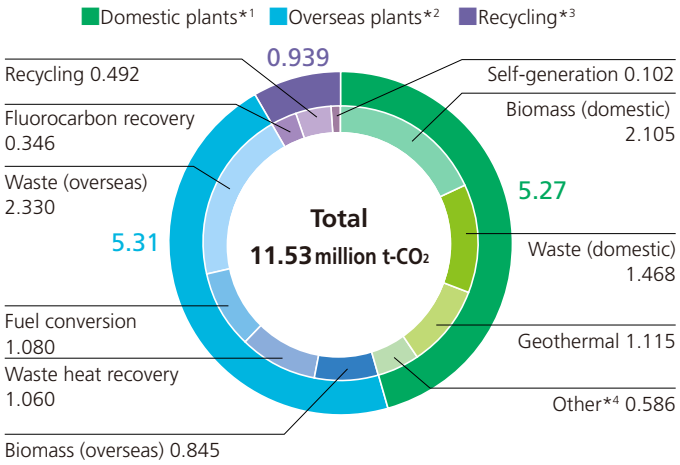
JFE Engineering

Initiatives to Reduce CO_2 Emissions through Business Operations

JFE Engineering contributes to CO_2 emissions reductions in society as a whole through its business operations, such as by expanding renewable energy generation and constructing and operating plastic and food recycling plants. In FY2023, the Company contributed to reducing 11.53 million tonnes of CO_2 emissions (a 3% increase compared to FY2022) across society. JFE Engineering will further expand its business and contribute to CO_2 emissions reductions of 12 million tonnes in FY2024 and 25 million tonnes in FY2030.

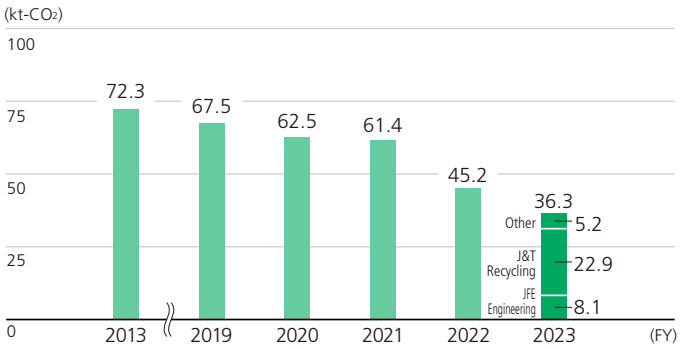
In addition, since FY2021 we have been implementing such initiatives as subscribing to on-site solar power PPA and zero-emission electricity plans at the Yokohama office and a low-emission electricity plan at the Tsu Works. As a result, in FY2023 we have achieved a 28% reduction in CO_2 emissions, compared to FY2013. We have also been working on reducing waste and implementing energy-saving activities at our steelworks and in our offices. The Company will steadfastly conduct business in ways that save resources and are environmentally sound, including expanding the use of renewable energy.

■ JFE Engineering's Contribution to CO_2 Emissions Reductions (FY2023)



*1 Data cover JFE Engineering.
*2 Data cover JFE Engineering and Standardkessel Baumgarte GmbH (SBG), a German subsidiary of JFE Engineering Corporation.
*3 Data cover J&T Recycling Corporation and JFE Urban Recycle Corporation.
*4 Other includes digestion gas, geothermal, solar, wind, waste heat recovery, fuel conversion, energy service, and logistics products.

■ JFE Engineering Group's CO_2 Emissions from Energy Sources



Notes:
- Data cover JFE Engineering and 11 major domestic and overseas subsidiaries.
- FY2021 figure includes data for an expanded list of JFE Engineering major subsidiaries.

JFE Shoji

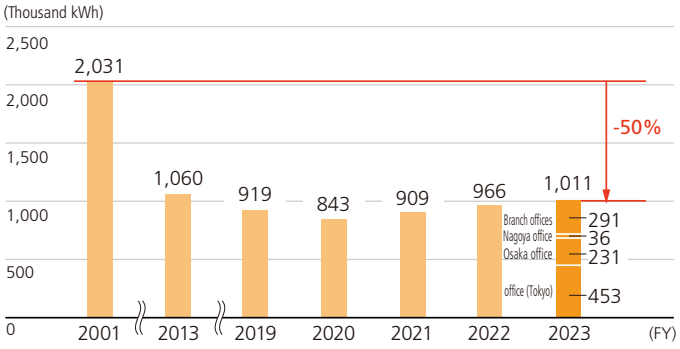
Energy Reduction Initiatives in Accordance with Environmental Strategies

Under the environmental strategies formulated in 2001, JFE Shoji is continuously implementing initiatives to reduce paper and electricity consumption and strictly manage waste separation as part of its energy reduction efforts.

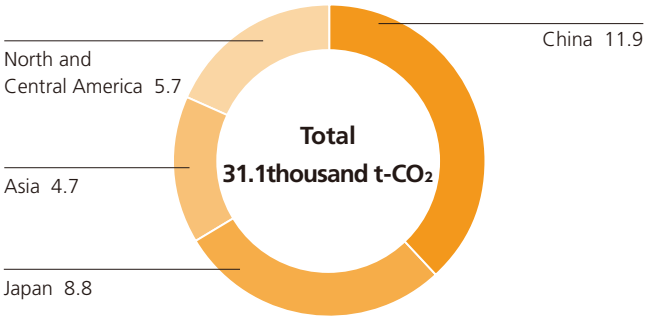
In terms of reducing paper consumption, the company continues to use recycled paper to conserve natural resources, and we also ensure that documents are printed in black and white using both sides of the paper. We are also promoting paperless meetings through the use of large monitors and web conferencing systems. Consequently, the amount of paper used per employee is on a downward trend. As for electricity consumption, JFE Shoji is reducing its environmental impact by introducing motion-sensor lighting and energy-saving equipment through office renovations, implementing leave-on-time days, improving operational efficiencies through robotic process automation (RPA), and other measures.

In addition, the company has established a new goal in the domestic operating companies to reduce CO_2 emissions by installing solar panels and purchasing electricity derived from renewable energy sources. In February 2023, we completed installing solar panels, which in October began generating electricity at JFE Shoji Coin Center Corporation in Shizuoka and then at Tochigi Shearing Corporation, a Group company that processes steel plates. As a result of this and other ongoing efforts to reduce the amount of electricity consumed, CO_2 emissions in FY2023 in the domestic operating companies were reduced by 20.7%, compared to FY2019.

■ Electric Power Consumption by JFE Shoji



■ CO_2 Emissions of the JFE Shoji Group (FY2023)



Note:
Data cover CO_2 emissions from electricity use by JFE Shoji and 35 major domestic and overseas subsidiaries (steel-processing companies).

Policy Engagement

Steel Industry Initiatives

The Japan Iron and Steel Federation (JISF) Initiatives

Long-term Vision for Climate Change Mitigation

JFE Steel is proactively engaged in a variety of activities as a member of the Japan Iron and Steel Federation (JISF). The JISF has been focusing on achieving the goals for 2020 under its Commitment to a Low Carbon Society (renamed the Carbon Neutrality Action Plan in FY2021). Furthermore, in November 2018, the JISF formulated and published its Long-term Vision for Climate Change Mitigation for 2030 and beyond, with JFE Steel playing a central role in its development. This document lays out the industry's challenge for realizing zero-carbon steel and explains the pathway for achieving the 2°C scenario for steelmaking and the necessity of ultra-innovative technologies to achieve the 1.5°C scenario. Also, on February 15, 2021, the JISF announced the "Basic Policy of the Japan steel industry on 2050 Carbon Neutrality sought by the Japanese government," declaring that the Japanese iron and steel industry will boldly accept the challenge of realizing zero-carbon steel.

➤ Relevance with the JISF's Long-term Vision for Climate Change Mitigation (P.106)

JISF's Carbon Neutrality Action Plan

In February 2021, the JISF declared that the Japanese steel industry will boldly take on the challenge of realizing carbon neutrality. The Plan on Commitment to a Low Carbon Society was amended and renamed as the Carbon Neutrality Action Plan, and the Phase II target (2030 target) was revised.

In the Eco Process of the plan, an ambitious 2030 target was set taking into account new perspectives such as the expansion of scrap use as well as the maximum introduction of best available techniques (BATs) based on energy efficiency already among the highest in the world.

Regarding Eco Product, which is intended to reduce GHG emissions at the product use stage, high-performance steel is expected to play a particularly major role in the promotion of offshore wind power and electrification of automobiles, which are among the 14 fields of the government's Green Growth Strategy. Accordingly, the Japanese initiative will accelerate practical global warming measures from a global perspective by making visible the conventional quantitative evaluation of the five types of high-performance steel.

As for Eco Solutions, the JISF will develop a system for introducing appropriate technology for transferring and spreading the production process for decarbonized steel in the Asian regions, where steel production is expected to expand.

Furthermore, regarding Innovative Technology Development, the JISF will take on the challenges of technologies such as direct hydrogen reduction and high-performance steel production using electric arc furnaces under the Green Innovation Fund, in addition to COURSE 50 and ferro-coke.

■ Overview of the Carbon Neutrality Action Plan

Eco Process
Cut energy-related CO_2 emissions (total volume) in FY2030 by 30% compared to the FY2013 level by adopting BATs to promote energy conservation, using waste plastics, adopting innovative technologies that are currently under development and scheduled to be in use around 2030, and using raw fuel with less CO_2 emissions.

Eco Product
Contribute to CO_2 emissions reduction by domestically and internationally supplying high-performance steel. This steel will reduce CO_2 emissions when used in the final product. The reduction potential in 2030 is estimated to be approximately 42 million t-CO_2 for the five steel products that have been quantitatively evaluated for their contribution to reducing emissions.

Eco Solution

Contribute to reducing CO_2 emissions worldwide by transferring and spreading the Japanese steel industry's advanced energy-saving technologies and facilities to the world's steel industry. Estimated contribution on CO_2 emissions reduction is 80 million t-CO_2 in 2030.

Innovative Technology Development

Contribute to carbon neutrality by boldly developing technologies in the following four areas.

- Hydrogen reduction technology using in-house hydrogen
- Low-carbon technology using CO_2 contained in externally sourced hydrogen or blast furnace exhaust gas
- Direct hydrogen reduction technology
- Impurity removal technology for electric furnace using direct reduced iron

Assessment of the FY2022 Carbon Neutrality Action Plan (Phase II) Results (JISF)

Total volume of energy-related CO_2 emissions in FY2022 was 150.23 million tonnes, which represents a decrease of 44.20 million tonnes, or 22.7%, compared to FY2013. The achievement rate of the FY2030 target (to reduce 30% from FY2013) has progressed to 75.8%. Energy-related CO_2 emissions and energy consumption are both declining, given continued energy-saving efforts.

While the energy efficiency of the Japanese steel industry is among the highest in the world, vigorous efforts are made to promote greater energy savings by having businesses engaged in this effort draw upon subsidies to promote investment in saving energy and other actions.

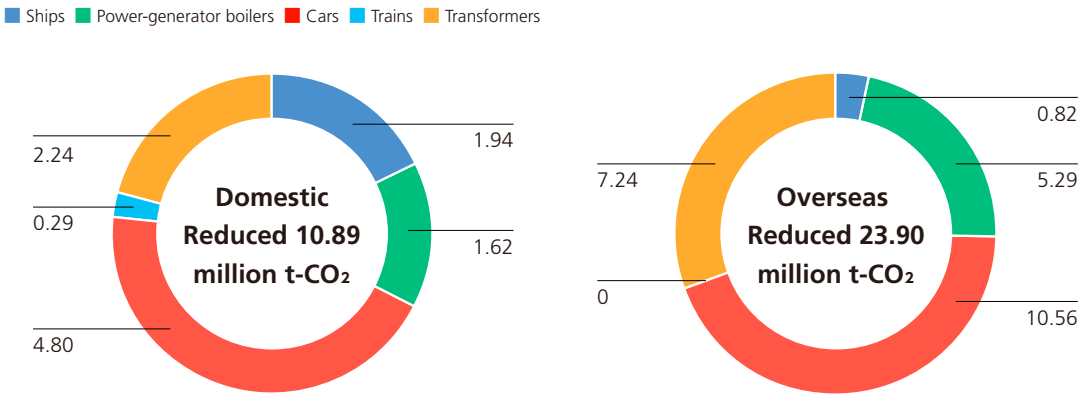
Reduced CO_2 Emissions through High-Performance Steel Materials (Effects of Eco Products)

The Japan Iron and Steel Federation (JISF) estimates the CO_2 emissions reduction impact of using high-performance steel materials. It is estimated that the use of five major high-performance steel materials in cars, transformers, ships, power generator boilers, and trains in Japan and overseas (FY2022 production: 4.36 million tonnes, 5.0% of crude steel production) helped reduce CO_2 emissions by 34.79 million tonnes (10.89 million tonnes in Japan, 23.90 million tonnes overseas) in FY2022.

Notes:

- Calculations made by the Institute of Energy Economics, Japan
- The five materials are steel sheets for automobiles, directional electrical steel sheets, thick steel sheets for shipbuilding, steel tubes for boilers, and stainless steel sheets.
- Domestic reduction figures are calculated in comparison with FY1990, while the overseas reduction figures are calculated in comparison with FY2003 for automobiles and ships, with FY1998 for steel pipes for boilers and FY1996 for electrical steel sheets.

■ CO_2 Reduction Resulting from the Use of Five High-Performance Steel Materials in Japan and Abroad (FY2022)



Related Links

- The Japan Iron and Steel Federation (JISF): Climate Change Policy page (https://www.jisf.or.jp/en/activity/climate/index.html)
- Japan Iron and Steel Federation (JISF): LCA of Steel Products page (https://www.jisf.or.jp/en/activity/lca/index.html)
- Japan Iron and Steel Federation (JISF): Publication of ISO 20915 (https://www.jisf.or.jp/en/activity/lca/iso/index.html)
- Japan Iron and Steel Federation (JISF): Publication of JIS Q 20915 (https://www.jisf.or.jp/en/activity/lca/iso/index.html)
- Japan EPD Program by SuMPO (https://ecoleaf-label.jp/en/)

Initiatives in the Business Community

Initiatives in Green/Transition Finance

JFE Holdings has established the Green/Transition Finance Framework and issued transition bonds through a public offering in 2022, which was selected as the first model example in the iron and steel sector for METI's Transition Finance Model Projects in FY2021. Achieving carbon neutrality will require significant, long-term investments in capital and R&D. We will continue to leverage transition financing and diversify our funding methods.

Formulated the Technology Roadmap for Transition Finance in the Iron and Steel Sector

The technology roadmap for Transition Finance toward decarbonization in the iron and steel sector, published by the Japanese Ministry of Economy, Trade, and Industry (METI), outlines a path for accelerating decarbonization and achieving carbon neutrality by introducing innovative technologies, with the same assumption that social infrastructure such as hydrogen supply and CCUS will be in place by the 2040s. In the process of drawing up this roadmap, JFE Steel's Fellow, Hiroyuki Tezuka , a member of the Japan Iron and Steel Federation's Energy Technology Committee, participated as a specialist in the taskforce formulating the roadmap. The roadmap is aligned with Japan's nationally determined contribution (NDC) based on the Paris Agreement and is therefore aligned with the agreement.

Green/Transition Finance Framework

The JFE Group developed this framework based on the "Green Bond Principles 2021" of the International Capital Market Association (ICMA), the "Green Loan Principles 2023" of the Loan Market Association (LMA), the Asia Pacific Loan Market Association (APLMA), the Loan Syndication & Trading Association (LSTA), the "Green Bond Guidelines (2022)," the "Green Loan Guidelines (2022)" of the Ministry of the Environment, the "Climate Transition Finance Handbook 2023" of the ICMA, and the "Basic Guidelines on Climate Transition Finance (May 2021)" of the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment. Since our initiatives have been certified by a third-party organization as being aligned with METI's roadmap, this framework of the JFE Group is also aligned with the Paris Agreement.

- METI: Technology Roadmap for Transition Finance in the Iron and Steel Sector
  (https://www.meti.go.jp/policy/energy_environment/global_warming/transition/transition_finance_technology_roadmap_iron_and_steel_eng.pdf)
- METI: Transition Finance Case Study
  (https://www.meti.go.jp/policy/energy_environment/global_warming/transition/transition_finance_case_study_jfehd_eng.pdf)
- Green/Transition Finance Framework (Japanese only)
  (https://www.jfe-holdings.co.jp/common/pdf/release/2024/01/240119.pdf)
- Transition Finance Report—Funds Raised, Allocated, and Their Impact (Japanese only)
  (https://www.jfe-holdings.co.jp/common/pdf/sustainability/environment/climate/impact_report_2024.pdf)

Adoption Status for the Green Innovation Fund Projects

The JFE Group is fully leveraging the New Energy and Industrial Technology Development Organization (NEDO)'s Green Innovation Fund project, and we are conducting research and development in collaboration with other companies in the industry toward realizing carbon neutrality. JFE Steel is working on a NEDO project called Utilizing Hydrogen in Steelmaking Processes (GREINS), while JFE Engineering is focusing on carbon neutrality in the material cycles and waste management sector as well as on lowering the cost of offshore wind power generation.

Utilizing Hydrogen in Steelmaking Processes (GREINS)

JFE Steel formed a consortium with Nippon Steel Corporation, Kobe Steel, Ltd., and the Japan Research and Development Center for Metals and jointly commissioned the Utilizing Hydrogen in Steelmaking Processes (GREINS) project to achieve progress toward carbon neutrality by 2050. The project scale is approximately 573.7 billion yen*1, and the four companies involved are receiving a total of approximately 449.9 billion yen*2 of financial support.

*1 Source: Project summary document (May 24, 2024) on NEDO's Utilizing Hydrogen in Steelmaking (GREINS) project
*2 This includes incentives subject to change depending on project progress and other factors at each stage gate.

COURSE50

In the area of developing hydrogen reduction technologies that use in-house hydrogen, we intend to achieve a 30% reduction of CO_2 emissions through hydrogen reduction along with separation and capture of CO_2 from blast furnace gases. The first facility is expected to come online by 2030, followed by other plants by 2050. JFE Steel is in charge of examining the combustion behavior of pulverized coal and reduction furnace gas and evaluating the entire process.

▶ Project scale: Approx. 72.7 billion yen*1, Financial support scale: Approx. 43.6 billion yen*2 (total for the four companies)

*1 The project scale is calculated based on the level of financial support and the subsidy rate.
*2 This includes incentives subject to change depending on project progress and other factors at each stage gate.

Carbon-recycling pilot blast furnace

In the area of developing low-carbon technologies using CO_2 contained in externally sourced hydrogen or blast furnace exhaust gas by developing and combining these technologies with other low-carbon techniques, such as using biomass and reduced iron as raw materials, we hope to achieve a greater than 50% reduction of CO_2 emissions from the blast furnace steelmaking process by 2030 through the use of medium-scale test blast furnaces, which are larger than one-fifth the size of a full-scale furnace. JFE Steel is in charge of developing carbon recycling blast furnace operation technology and elemental technology as well as overall process evaluation and review.

▶ Project scale: Approx. 285.3 billion yen*1, Financial support scale: Approx. 238.6 billion yen*2 (total for the four companies)

*1 The project scale is calculated based on the level of financial support and the subsidy rate.
*2 This includes incentives subject to change depending on project progress and other factors at each stage gate.

Direct reduction compact bench pilot furnace

In the area of developing direct hydrogen reduction technology, we intend to demonstrate the method using medium-scale test blast furnaces, which are larger than one-fifth the size of a full-size furnace, applying a technology for directly reducing the CO_2 emissions of low-grade iron ore with hydrogen by more than 50%, compared to the current blast furnace method, by 2030. JFE Steel is in charge of examining operational fluctuations and wide-ranging methanation reaction characteristics using the new bench pilot furnace, investigating reduction pulverization and gas composition that both suppresses clustering and achieves a high reduction rate, evaluating the microstructure using high-precision equipment, determining gas composition and the level of iron ore reduction and carbonization, and optimizing shape and forming.

▶ Project scale: Approx. 136.9 billion yen*1, Financial support scale: Approx. 114.1 billion yen*2 (total amount for the four companies)

*1 The project scale is calculated based on the level of financial support and the subsidy rate.
*2 This includes incentives subject to change depending on project progress and other factors at each stage gate.

Pilot electric arc furnaces

In a project for developing impurity removal technology for electric arc furnaces using direct reduced iron, demonstrations of a large-scale electric arc furnace process (processing capacity of approximately 300 tonnes) will be conducted to verify its control of the concentration of impurities (components affecting the product) to the same level as standard blast furnace methods (phosphorus 150 ppm, nitrogen 40 ppm or less), toward the goal of manufacturing high-grade steel suitable for car body panels and other parts with the directly reduced iron made from low-grade iron ore. JFE Steel is in charge of evaluating and examining the new heat sources and scrap iron preheating using a small-scale test electric furnace with a capacity of 10 tonnes and developing technologies for dephosphorization and denitrification of molten steel using an ex-core refining furnace with a capacity of 3 tonnes.

▶ Project scale: Approx. 40.4 billion yen*1, Financial support scale: Approx. 30.6 billion yen*2 (total for the four companies)

*1 The project scale is calculated based on the level of financial support and the subsidy rate.
*2 This includes incentives subject to change depending on project progress and other factors at each stage gate.

➤ NEDO: A new research focus under the Green Innovation Project: Hydrogen Utilization in Iron and Steelmaking Processes (Japanese only) (https://www.nedo.go.jp/news/press/AA5_101738.html)
➤ NEDO: Hydrogen Utilization in Iron and Steelmaking Processes (https://green-innovation.nedo.go.jp/en/project/utilization-hydrogen-steelmaking/)
➤ Consortium of the Green Innovation Fund Project: Utilizing Hydrogen in the Steelmaking Process (https://www.greins.jp/en/)

Carbon Neutrality in the Material Cycles and Waste Management Sector

The Ministry of the Environment's "Draft Medium- and Long-term Scenarios for Net Zero Greenhouse Gas Emissions in the Material Cycles and Waste Management Sector by 2050 " estimates future GHG emission and waste volume based on multiple hypothetical scenarios. It describes that even if the 3Rs (reduce, reuse, recycle) combined with heat recovery are implemented to the maximum extent possible and waste treatment facilities are expanded and consolidated, a considerable volume of waste will still require thermal treatment (incineration and thermal pyrolysis), which indicates that effective treatment of food waste through methods such as methane fermentation will be necessary. It is also expected that waste will become increasingly dominated by biomass as the 3Rs and material conversion are more strongly encouraged in response to the growing importance of resource recycling. The material cycles and waste management sector, which has traditionally relied on methods that release CO_2 into the atmosphere, such as incineration, need to reduce GHG emissions from its own sector and strive for carbon neutrality. Also, the waste treatment system must be reformed to become a major source of biomass-oriented carbon for the entire industrial sector. However, the constant fluctuation in the quantity and characteristics of waste materials (composition, calorific value, moisture content, and so forth) depending on the region, season, and weather, impedes the recovery and stable, efficient use of carbon, which increases the challenge of applying technologies such as carbon capture in other sectors. To address these issues and facilitate widespread implementation, JFE Engineering and Sekisui Chemical Co., Ltd. are jointly working on a project to develop waste-to-chemical

technology for Green Ethanol production by integrating advanced gasification and biochemical conversion technologies .

▶Project scale: Approx. 34.7 billion yen*, Financial support scale: Approx. 23.7 billion yen (total for the two companies)

*This includes incentives subject to change depending on project progress and other factors at each stage gate.

➤ NEDO: Achieving Carbon Neutrality in Waste and Resource Circulation
(https://green-innovation.nedo.go.jp/en/project/waste-resource-circulation-carbon-neutral/)

➤ NEDO: Achieving Carbon Neutrality in Waste and Resource Circulation (Japanese only)
(https://www.nedo.go.jp/news/press/AA5_101724.html)

Efforts to Lower the Cost of Offshore Wind Power Generation

The offshore wind power generation market is expected to expand rapidly in the coming years. Capturing this market will require establishing a technology for mass-producing floating offshore wind power generation facilities at a low cost. The Ministry of Economy, Trade and Industry and NEDO have therefore decided to implement a floating offshore wind power generation demonstration project as a Green Innovation Fund project, toward commercializing floating offshore wind power generation. The project is intended to develop and demonstrate the necessary elemental technologies and the integration designs for a floating offshore wind power generation system. The project will receive financial support of about 85 billion yen* from NEDO and is scheduled to run from FY2024 to FY2030. JFE Engineering and Japan Marine United Corporation are participating in the project while working to lower the cost for offshore wind power generation.

*This includes incentives subject to change depending on project progress and other aspects at each stage gate.

➤ METI: Offshore Wind Power Generation Demonstration Project (Japanese only)
(https://www.meti.go.jp/press/2024/06/20240611007/20240611007.html)

➤ NEDO: Floating Offshore Wind Power Generation Demonstration Project (Japanese only)
(https://www.nedo.go.jp/news/press/AA5_101750.html)

➤ NEDO: Cost Reductions for Offshore Wind Power Generation
(https://green-innovation.nedo.go.jp/en/project/offshore-wind-power-generation/)

Participation in the GX League

The Ministry of Economy, Trade and Industry has established the GX League, a forum that invites companies to work on GX; take up the challenge of GX in cooperation with the government, academic, and economic sectors; discuss how to transform the overall economic and social system; and drive the creation of new markets. We believe that its goal is aligned with the JFE Group's overall objective for climate change initiatives, and JFE Steel has been participating in the GX League since its establishment.

As part of its activities within the GX League, JFE Steel has been proactively participating since March 2023 in the Working Group for Studying How to Add Value to Green Products, and in December 2023, the WG published a document entitled "How to Add Value to Green Products." The document recognizes that companies wanting to invest more in decarbonization need to see the value in the level of emissions reduced through their initiatives and that this value also needs to be recognized in the global market. It presents draft guidelines on how to add value to green products and outlines some example initiatives, including JFE Steel's JGreeX™. It also introduces measurement and calculation methods for the green value of products, effective allocation, and economic utilization methods.

In addition, based on the ideas presented in the document, the Interim Report of the Study Group on the GX Product Market which Contributes to Demand Creation for Strengthening Industrial Competitiveness and Achieving Emission Reductions, published by the Ministry of Economy, Trade and Industry in March 2024, suggested "reduction achieved" as a new GX value.

➤ Final Report for the GX League (Japanese only) (https://gx-league.go.jp/action/wg/)
➤ Document regarding how to Add Value to Green Products (full version, in Japanese only)
➤ Document regarding how to Add Value to Green Products (summary version, in Japanese only)

Investment in the GX Acceleration Agency

The GX Acceleration Agency is a certified corporation established in April 2024 by the Ministry of Economy, Trade and Industry, as stipulated in the Act on Promoting a Smooth Transition to a Decarbonized Growth-oriented Economic Structure. In order to achieve GX investment of over 150 trillion yen over the next 10 years, the GX Acceleration Agency will provide financial support as debt guarantees, operate a carbon emissions trading system, and collect fossil fuel surcharges. JFE Holdings invested in the GX Acceleration Agency at the time of its establishment.

➤ GX Acceleration Agency (https://www.gxa.go.jp/en/)

Recommendations to Policymakers

8th GX Implementation Council

In February 2023, the cabinet approved the Basic Policy for the Realization of GX to simultaneously achieve three goals through Green Transformation (GX): decarbonization, stable energy supply, and economic growth. In July of the same year, the cabinet also approved the Strategy for Promoting Structural Transition based on Decarbonization (GX Promotion Strategy). Growth-oriented Carbon Pricing (CP) Concepts is the decarbonization initiative based on this strategy and is currently being actively pursued toward its realization and implementation.

At the 8th GX Implementation Council, held in November 2023, JFE Steel's President Kitano (then-Chairman of the Japan Iron and Steel Federation) explained the efforts being made by the Japanese steel industry to achieve carbon neutrality, and he called for long-term government support measures corresponding to the support provided by the government in Europe, the U.S., and China for the huge research and development and capital investment costs. He also expressed the need for long-term government support for converting to innovative processes and dealing with the increase in operational costs for non-fossil fuels, electricity, and other sources, as actions for stimulating demand for green steel materials with high environmental value through, for example, public procurement, measures to ensure the international competitiveness of industrial electricity prices, and support for building new infrastructures, including a hydrogen supply chain and a CCS scheme.

➤ Cabinet Secretariat: the 8th GX Implementation Council (Japanese only)
(https://www.cas.go.jp/jp/seisaku/gx_jikkou_kaigi/dai8/index.html)

56th Meeting of the Advisory Committee for Natural Resources and Energy's Strategic Policy Subcommittee

The 56th Meeting of the Advisory Committee for Natural Resources and Energy's Strategic Policy Subcommittee was held on June 6, 2024 to embark on formulating Japan's 7th Strategic Energy Plan. At this meeting, JFE Holdings' President Kitano gave a presentation entitled Energy Policy to Help JFE Steel Achieve Decarbonization, during which he recommended policies to promote the use of green steel products and energy policies to reduce uncertainty from the business environment related to GX. President Kitano announced that the company plans to invest in converting to the innovative electric arc furnace process at the Kurashiki district by the end of this fiscal year, based on the premise of government support, and he explained that the company also intends to build a mass production system for high-quality green steel products that could not be manufactured with existing electric furnaces. In addition, he stated that actions are required to support capital investment and operational costs as well as policies promoting the use of green steel products for Japan to compete internationally in green products. He also discussed the need to establish infrastructures for supplying decarbonized electricity and non-fossil fuels such as hydrogen and ammonia, and remarked that the government must take a leading role as the policymaker and promote DX as a national strategy, to use decarbonization as an opportunity to revive the Japanese economy.

➤ Agency for Natural Resourced and Energy: 56th Meeting of the Advisory Committee for Natural Resources and Energy's Strategic Policy Subcommittee (Japanese only)
(https://www.enecho.meti.go.jp/committee/council/basic_policy_subcommittee/2024/056/)

Participation in External Initiatives & Lectures

TCFD Consortium

The TCFD Consortium was established as a forum for companies that support the TCFD recommendations to collaborate in promoting its initiatives and continue discussions on effective disclosure of corporate information and ways for financial institutions to utilize the disclosed information to make appropriate investment decisions. JFE Holdings supports the recommendations of the final TCFD report and also participates in this consortium.

SPEED Research Group

The SPEED (Special Project on Eco-innovation and Eco-business for Sustainable Development) Research Group contributes to the development of eco-innovations and eco-businesses through industry-academia-government collaboration and international cooperation. JFE Holdings participates in this research group and is involved in activities such as information sharing and opinion exchange with government, universities, research institutions, and companies.

JFE Engineering Japan Climate Leaders' Partnership (JCLP)

JFE Engineering is a member of the Japan Climate Leaders' Partnership (JCLP). Established in 2009, the JCLP is a coalition of Japanese corporations that encourage the industrial community to fully recognize the urgency of climate change and take more decisive action to create a sustainable, decarbonized society. Companies fulfill their corporate responsibility by demonstrating leadership in the transition to a decarbonized society. The Company is participating in the Decarbonization Consortium, JCLP's platform for encouraging information sharing and collaboration between companies and is actively engaged in creating opportunities to learn from companies at the frontline of decarbonization efforts, and collaborating with other companies to create new solutions.

JFE Shoji United Nations Global Compact

In 2021, JFE Shoji became a signatory to the United Nations Global Compact, affirming its support for these principles. JFE Shoji will comply with the Ten Principles of the Global Compact and endeavor to achieve the SDGs. In addition, we are also a member of the Global Compact Network Japan, the local network of the Global Compact. The company has designated "Contribute to resolving climate change issues" as a material issue of corporate management. We are using the decarbonization initiatives of other participating companies as references for driving our own initiatives to reduce CO_2 emissions in the JFE Group and society as a whole.

Lectures and Publications

The JFE Group is gives talks at various events to increase awareness of our efforts to combat climate change.

- Lecture: "JFE Steel's Initiatives for Achieving Carbon Neutrality and the Challenges" at the Joint General Meeting of Okayama Employers' Association & Okayama Music Culture Association (main host: Okayama Employers' Association)
  Date: June 26, 2024
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Article: "Chain of custody approaches in the steel sector and the role of GHG reduction certificates"
  Published on the website of the World Steel Association (Climate Action > Chain of Custody)
  Date of publication: April 8, 2024
  URL: https://worldsteel.org/climate-action/chain-of-custody/

- Lecture: "JFE Steel's Initiatives for Achieving Carbon Neutrality and the Challenges" at the Workshop for Students Tackling the Climate Change Issues (main host: the Executive Committee of the Workshop for Students Tackling the Climate Change Issues (chaired by Yukari Takamura, professor at the Institute for Future Initiatives, The University of Tokyo), co-hosts: the Ministry of the Environment, the University of Tokyo, the Tokyo Institute of Technology, Kyushu University, Keio University, and others)
  Date: March 13, 2024
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Roundtable session: "IRA and GX Strategy: U.S.-Japan Partnership for a Net-Zero World"
  Main hosts: U.S. Embassy in Tokyo, U.S.-Japan Council, and the Institute of Energy Economics, Japan
  Date: March 3, 2024
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Lecture: "JFE Steel Carbon Neutral Strategy Briefing—JFE's Approach for Green Steel at Low-Carbon Transition for the Built Environment" (hosts: IES/IStructE Joint Committee, NUS (National University of Singapore))
  Date: March 1, 2024
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Lecture: "JFE Group's Carbon Neutral Strategy" at TECH+ Forum Manufacturing and Decarbonization Day 2024 Feb. (host: TECH+ Seminar Office of Mynavi Corporation)
  Date: February 15, 2024
  Lecturer: Seiya Kitajima (Senior Executive Officer, JFE Holdings, Inc.)

- Lecture: "JFE Group's Carbon Neutral Strategy" during the 16785th JPI Special Seminar (host: Japan Planning Institute)
  Date: February 14, 2024
  Lecturer: Seiya Kitajima (Senior Executive Officer, JFE Holdings, Inc.)

- Lecture: "JFE Group's Carbon Neutral Strategy" at the Carbon-Neutrality in Materials Industry Forum (host: Yano Research Institute Ltd.)
  Date: December 19, 2023
  Lecturer: Ikufumi Sumi (Leader, Global Environment Team, Green Transformation Strategy Dept., JFE Steel Corporation)

- Lecture: "JFE Group's Carbon Neutral Strategy" at the 2nd Support Seminar for Green Growth (host: Okayama Prefecture Industrial Promotion Foundation (public interest incorporated foundation))
  Date: December 19, 2023
  Lecturer: Noriaki Sueto (Business Planning Dept. Manager, JFE Holdings, Inc.)

- Lecture: "Latest Technology in Energy and Environment in the Steel Industry and Measures against Global Warming" in the Tokyo Institute of Technology's Advanced Course in Science and Technology—Advanced Science and Technology in Energy and Environment
  Date: December 13, 2023
  Lecturer: Ikufumi Sumi (Leader, Global Environment Group, Technology Planning Dept., JFE Steel Corporation)

- Lecture: Final report of the GX League's Working Group for Considering Added Value to Green Products
  Release date: December 4, 2023
  Publisher: Ministry of Economy, Trade and Industry
  URL: https://gx-league.go.jp/news/2023120401/ (Japanese only)

- Lecture: Guidelines for green steel upon the application of the mass balance approach, published under "Initiatives in the Steel Industry Green Steel" on the Japan Iron and Steel Federation's website
  Date of publication: October 26, 2023
  URL: https://www.jisf.or.jp/business/ondanka/kouken/greensteel/documents/2023_greensteel_guideline.pdf

- Lecture title: "JFE Group Environmental Vision for 2050—JFE's Approach for Green Steel"
  Event: GGX×TCFD Summit
  Date: October 5, 2023
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Articles: "Carbon neutrality of Steel, the Fundamental Material—Full-Scale Transition to New Manufacturing Processes" (published in the September issue) and "Japan's First Monopile Manufacturing for Offshore Wind Power Generation by Maximizing Group Synergy" (published in the November issue)
  Produced through an interview by Masako Konishi (WWF Japan) for the "paint a future" section of the bimonthly magazine Chikyu Ondanka, published by Nippo Co., Ltd.)
  URLs: https://www.wwf.or.jp/activities/data/20230929_climate01.pdf (September issue)
  https://www.wwf.or.jp/activities/data/20231125climate01.pdf (November issue)

- Article: "LCA of Steel Materials and Initiatives for CO_2 Reduction" in the Journal of Chemical Engineering of Japan, June 2024, volume 088
  Author: Shiro Watakabe (Global Environment team, Green Transformation Planning Dept., JFE Steel Corporation)

Global Scale Initiatives

Global Actions to Address Global Warming

ISO 14404 is an international standard proposed by The Japan Iron and Steel Federation (JISF) to the International Organization for Standardization (ISO) as a methodology for the globally unified calculation of CO_2 intensity from iron and steel production, ultimately to assess the energy efficiency of steelworks. The Japanese steel industry is addressing global warming through international public-private collaborations, including ISO 14404-based assessment of steelworks in developing countries and recommending specific technologies best suited to India and ASEAN countries. It is continuing this effort together with the Ministry of Economy, Trade and Industry (METI) in order to enhance ISO 14404 so it can be applied to steel manufacturing facilities with more complex structures.

JFE Steel is also addressing global warming by participating in international activities, such as the Japan India Public and Private Collaborative Meeting, the Japan-ASEAN Steel Initiative and the Japan-China Steel Industries Exchange. In addition, JFE Steel is involved as a member of World Steel Association (WSA)'s Climate Action data collection programme, which uses ISO 14404 as the standard for measurement and calculation.

➤ WSA: Climate Action data collection programme
(https://worldsteel.org/steel-topics/environment-and-climate-change/climate-action/climate-action-data-collection/data-providers/)

■ **WSA Climate Action data collection programme certification**

WSA Climate Action Data Collection Programme—Contributing to Developing the LCA of Steel Material

Accurately evaluating the environmental impact of products requires assessment and quantification of impact over their entire life cycles, from raw resource mining to material production, product manufacture, use, and final disposal. Life cycle assessment (LCA) is one evaluation method.

After final products such as automobiles and buildings finish their mission in society, all of their steel components can be recycled and reused. This closed loop recycling ability is an excellent characteristic of steel materials. Taking this into account through LCA reveals that steel can be viewed as having extremely low environmental impact compared to other materials.

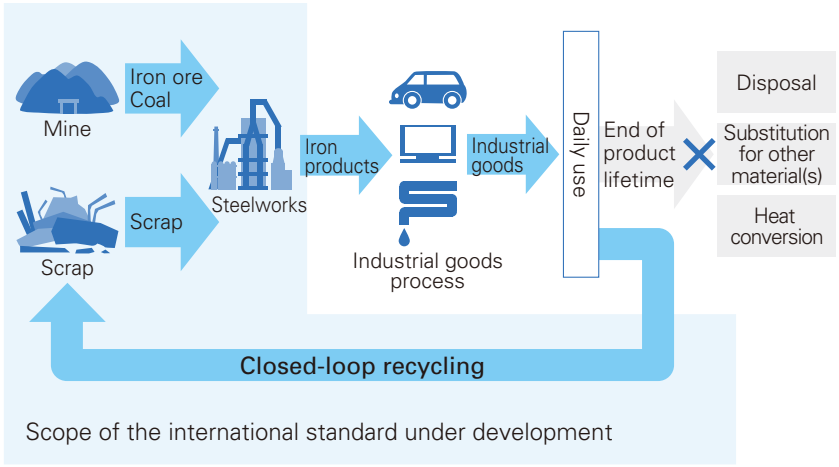
JFE Steel played a major role in the development of ISO 20915 (Life Cycle Inventory Calculation Methodology for Steel Products) and JIS Q 20915 (Life Cycle Inventory Calculation Methodology for Steel Products), initiatives led by The Japan Iron and Steel Federation (JISF), which takes into account the impact of recycling and provides life cycle inventory (LCI) calculation methods specific to steel products.

In addition, 15 Japanese manufacturers of blast furnaces and electric arc furnaces joined forces to calculate the Japanese average for LCI of different steel products. Calculations based on their FY2018 operational data were also published.

JFE Steel acquired SuMPO EPD labels, the Japan Environmental Product Declaration program run by the Sustainable Management Promotion Organization (SuMPO), for three steel sheet products for cans (tinplate, laminated steel sheet JFE Universal Brite, and tin-free steel), five building material products (H-beams, JFE Super HISLEND-H beams, extra-thick H beams, construction steel plates, and construction steel columns), three steel plate products (for offshore structures and wind power equipment, ship building, and UOE steel pipes), three steel pipes (welded steel pipe, seamless steel pipe, and Kakuhot™ seamless square steel pipe for building structures), and eight types of steel bar and wire rod products manufactured at the West Japan Works (Kurashiki district) and Sendai Works. We will continue to leverage SuMPO EPD labels to help customers promote environmental protection and to strengthen communications with them.

➤ Value of Steel (P.04)

■ **Life Cycle of Steel Materials**



Global Actions to Address Global Warming

1st Japan-Korea Green Steel Joint seminar

The 1st Japan-Korea Green Steel Joint Seminar was held in Seoul, South Korea, on Thursday September 21, 2023, jointly organized by the Japan Iron and Steel Federation and the Korea Iron and Steel Association. The seminar was attended by representatives from both countries, including Masaaki Izumiyama, Chairman of the Global Environment Committee of the Japan Iron and Steel Federation (Nippon Steel Corporation), and Byun Young-man, Vice Chairman of the Korea Iron and Steel Association, as well as guests of honor, including Daisuke Matsuno, Director of the Metals Division of the Ministry of Economy, Trade and Industry of Japan, and Oh Choong-jong, Director of the Metals and Ceramics Division of the Ministry of Trade, Industry and Energy of the Republic of Korea. Around 100 people from the steel industry and government organizations from both Japan and South Korea attended the seminar and exchanged opinions on wide-ranging topics related to carbon neutrality in the steel industry.

Japan India Public and Private Collaborative Meeting

The Japan Iron and Steel Federation has held the Japan-India Steel Industry Public-Private Collaborative Meeting annually since 2011 with support from the Ministry of Economy, Trade and Industry, and JFE Steel attends this meeting every year. At the meeting, we recommend policies to the Indian steel industry, drawing on the technology and experience of Japan's steel industry, which boasts the world's highest energy efficiency, and we also consider energy-saving support from Japan, including financial support.

The FY2023 meeting was held in Japan in November and introduced policies for achieving carbon neutrality in both Japan and India, initiatives by Japanese and Indian steel companies to achieve carbon neutrality, and efforts by the Japanese steel industry during the transition period, including green steel brands. JFE Steel will continue to play a major role in this meeting and contribute to CO_2 reduction in India by transferring Japanese energy-saving technologies.

Japan-ASEAN Steel Initiative

In May 2014, the Japan Iron and Steel Federation and the ASEAN Iron and Steel Council (AISC) signed a memorandum of understanding to promote regional collaboration the areas of the environment, standardization, and trade. The Japan-ASEAN Steel Initiative was launched as a public-private environmental effort to strengthen cooperation in environmental and energy-saving efforts in ASEAN countries. As part of its activities, the initiative developed a Technologies Customized List (electric arc furnaces) as well as a Technologies Customized List (blast furnaces), which include energy-saving, environmental protection, and recycling technologies for electric arc furnaces and blast furnaces suitable for the ASEAN steel industry.

This year, the ASEAN JAPAN Steel Initiative Webinar 2024 was held in February 2024. Representative organizations from ASEAN included ACE (ASEAN Centre for Energy), SEAISI (South East Asia Iron and Steel Institute), ministries and agencies related to steel and energy conservation in each country, as well as steel organizations and their members, while participants from Japan included the Ministry of Economy, Trade and Industry, the Energy Conservation Centre, the Japan Iron and Steel Federation, and members of these organizations. The meeting discussed initiatives for carbon neutrality in the steel industry in Japan and ASEAN countries, including the GX League, projects in emerging countries that contribute to energy efficiency, Japanese steel manufacturer roadmaps to carbon neutrality and energy-saving operational improvements, energy-saving technologies of engineering companies, and initiatives for carbon neutrality by Thai and Indonesian companies.

Japan-China Steel Industry Environmental Protection and Energy Conservation Technology Conference

This conference has been held since 2005, based on the memorandum of understanding that was signed at the Japan-China Steel Industry Environmental Protection and Energy Conservation Technology Conference, held in Beijing in July 2005 with the participation of top executives from both countries' steel industries. The purpose of the conference is to raise the level of environmental conservation and energy saving in both countries through information exchanges between technical experts from steel manufacturers in Japan and China. The importance of this conference has been growing as it helps to promote not only sound development of the steel industry in both countries but also the effective use of resources and environmental conservation.

The FY2023 event was held in Makuhari, Chiba City, in January 2024. Both countries shared innovative technology

developments for carbon neutrality, the Carbon Border Adjustment Mechanism (CBAM), the Green Steel/EPD Platform, and the latest energy-saving and CO_2 reduction technologies. JFE Steel's Vice President Hironori Fukushima (Chairman of the Japan Iron and Steel Federation's Environment and Energy Policy Committee) attended the meeting to represent Japan, along with JFE Steel's senior Executive Officer Takeshi Asahina and Fellow Hiroyuki Tezuka. They led lively discussions on preventing global warming through cooperation between the public and private sectors of both countries.

Lecture Events

The JFE Group provides lectures at various events to raise awareness overseas of our efforts to address climate change.

- Lecture: "Green steel with applying mass balance method" at the Korea-Japan Green Steel Joint Seminar
  Date: September 21, 2023
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Lecture: "JFE Steel's Environmental Vision 2050" during the India-Japan Public and Private Collaborative Meeting on the Iron and Steel Industry in FY2023
  Date: November 29, 2023
  Lecturer: Shiro Watakabe (Global Environment Team, Green Transformation Planning Dept., JFE Steel Corporation)

- Lecture: "Transition Finance and Green Steel upon the Application of the mass Balance Approach" at the 14th Japan-China Steel Industry Environmental Protection and Energy Conservation Technology Conference
  Date: January 24, 2024
  Lecturer: Hiroyuki Tezuka (Fellow, JFE Steel Corporation)

- Lecture: "JFE Steel's Environmental Vision 2050"
  during the ASEAN Japan Steel Initiative (AJSI) Webinar
  Date: February 6, 2024
  Lecturer: Shiro Watakabe (Global Environment team, Green Transformation Planning Dept., JFE Steel Corporation)

Scenario Analysis in Line with the TCFD Recommendations

Initiatives

The JFE Group intends to achieve carbon neutrality by 2050, and it leverages the scenario analysis in line with the TCFD recommendations to **identify and assess climate change-related risks and opportunities and to strengthen the resilience of its organizational strategy**. Please refer to the Initiatives to Address Climate Change Issues page for governance, strategy, risk management, metrics, and targets for climate change-related issues in line with the TCFD recommendations.

➤ Initiatives to Address Climate Change Issues (P.52)

Milestones Related to Climate Change around JFE's Business and JFE's Initiatives

1997 Kyoto Protocol adopted at COP3 in Kyoto
2008 JISF's Voluntary Action Plan launched
2013 JISF's Commitment to a Low Carbon Society launched
2015 Paris Agreement adopted at COP21
2017 TCFD published the final report of its recommendations
2018 JISF announced the Long-term Vision for Climate Change Mitigation, Zero Carbon Steel
2019 **JFE Group announced its endorsement for the final report of the TCFD recommendations**
JFE Group published a scenario analysis in line with the TCFD recommendations
2020 Keidanren launched the Challenge Zero initiative
Ministry of Economy, Trade and Industry published a list entitled Companies Taking on the Zero-Emission Challenge
JFE Group published its targets in its medium- to long-term vision (target for 2030 and achieving carbon neutrality by 2050)
Prime Minister Suga declared Japan will achieve carbon neutrality by 2050
2021 JISF announced the Basic Policy of the Japan Steel Industry on 2050 Carbon Neutrality Aimed by the Japanese Government
JFE Group published its roadmap for achieving carbon neutrality in 2050 in the JFE Group Environmental Vision for 2050
Japanese government formulated the Green Growth Strategy Through Achieving Carbon Neutrality in 2050
2022 **JFE Group announced that the CO_2 emissions reduction target for FY2030 for JFE Steel has been revised upward to 30% or more compared to FY2013**
JISF published the "Evaluation of the Phase I Target (FY2020 Target)" and Phase II (FY2030 target) of reducing the total volume of energy-related CO_2 emissions by 30% in its "Activities to Combat Global Warming—Report of JISF's Carbon Neutrality Action Plan (Commitment to a Low Carbon Society) (March 2022)."
2023 The Act Concerning the Promotion of a Smooth Transition to a Decarbonized Economic Structure (the "GX Promotion Act") was enacted.

The Challenge Zero (Innovation Challenges Toward a Net Zero Carbon Society) is a new joint initiative by Keidanren (Japan Business Federation) and the Japanese government for proactively publicizing and supporting companies and organizations that pursue innovative actions toward realizing a decarbonized society as the long-term goal of the Paris Agreement.

The JFE Group endorses the Challenge Zero declaration and will rise to the challenge of pursuing innovation.

The Ministry of Economy, Trade and Industry (METI), in collaboration with Keidanren and the New Energy and Industrial Technology Development Organization (NEDO), has been tackling a project called the Zero-Emission Challenge. The project is preparing a list of companies generating innovation toward realizing a decarbonized society and providing investors and other stakeholders with useful information on them. At the TCFD Summit 2021 on October 5, 2021, approximately 600 companies, both listed and unlisted, were announced as Zero Emissions Challenge Companies. These organizations are boldly accepting the challenge of innovation to realize a decarbonized society, and the JFE Group was selected as one of them.

The JFE Group publishes information on specific initiatives through the following website.

➤ Challenge Zero (https://www.challenge-zero.jp/en/member/34)

➤ Zero-Emission Challenge (https://www.meti.go.jp/english/press/2021/1005_002.html)

Scenario Analysis

Tools and Methods

Scenario analysis is used to portray an accurate understanding of climate-related risks and opportunities and assess implications to the current business strategy, thereby enabling an organization to establish strategies that reflect the results of the assessment. As our business could be significantly affected by climate change, we have created both a 2°C scenario and a 4°C scenario. In FY2022, we expanded the scope to also include a 1.5°C scenario.

All three scenarios are based on those developed by the International Energy Agency (IEA). Analysis was conducted under the assumption that uniform carbon pricing is implemented by major emitting countries to increase the feasibility of achieving the 1.5°C target. Under the long-term scenario analysis, our goal is to achieve carbon neutrality by 2050. We conducted risk assessments that take into account the prospect of achieving the 2°C scenario and the necessity of ultra-innovative technology for the 1.5°C scenario (IPCC 1.5°C Special Report) in steelmaking for carbon neutrality by 2050.

<table>
<tr><th colspan="2">Selected Scenario</th><th>1.5/2°C Scenario</th><th>4°C Scenario</th></tr>
<tr><td rowspan="2">Reference Scenario</td><td>Transition Risks</td><td>Transition scenarios developed by the IEA
· Sustainable Development Scenario (SDS)*1
· 2°C Scenario (2DS)*2
· IPCC Special Report on Global Warming of 1.5°C
· NZE2050*3</td><td>Transition scenarios developed by the IEA
· New Policies Scenario (NPS)*1
· Reference Technology Scenario (RTS)*2</td></tr>
<tr><td>Physical Risk</td><td colspan="2">Climate change projection scenario developed by the Intergovernmental Panel on Climate Change (IPCC)
· Representative Concentration Pathways (RCP) Scenario*4</td></tr>
<tr><td colspan="2">How Society will Look</td><td>Dynamic policies will be adopted and technical innovations will progress to limit the average temperature rise by the end of this century to 2°C and realize sustainable development.
Assume a society in which our business is affected by social changes accompanying transition to a decarbonized society.
· Worldwide/industry-wide uniform carbon pricing*5
· Increase in the ratio of sales of electric vehicles to overall vehicle sales</td><td>Despite new policies implemented in each country based on approaches under the Paris Agreement, the average temperature will rise by about 4°C by the end of this century.
Assume a society in which our business is affected by temperature rise and other climate change.
· Increase in the occurrence of flooding
· Sea level rise</td></tr>
</table>

*1 Source: IEA's World Energy Outlook 2018

*2 Source: IEA's Energy Technology Perspectives 2017

*3 Source: IEA's Net Zero by 2050—A Roadmap for the Global Energy Sector

*4 Source: IPCC Fifth Assessment Report

*5 When carbon pricing differs from country to country, a gap opens in international competitiveness between countries that impose strict CO_2 emissions regulations and those with less strict regulations. This will result in carbon leakage where CO_2 emissions of a strict climate policy country are reduced as production and investment decline while production and investment increase in other countries with laxer emission constraints, thereby increasing their nations' CO_2 emissions. One reference scenario, SDS, assumes the implementation of carbon pricing in developed countries and some developing countries. We took this into account in formulating the 2°C scenario based on the assumption that uniform carbon pricing is introduced to major emitting countries to push toward achieving the 2°C scenario target.

Scope of Business and Period for Analysis

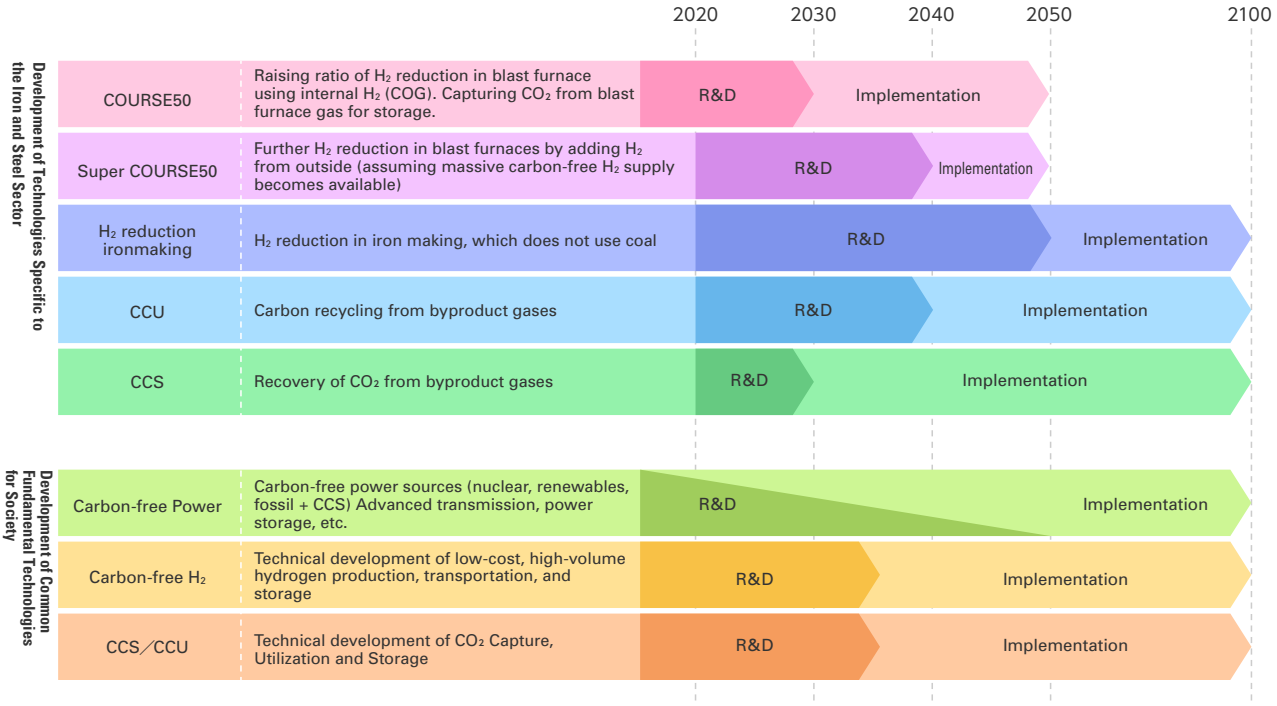
This analysis covers the following businesses: the steel business by JFE Steel, the engineering business by JFE Engineering, the trading business by JFE Shoji, and businesses carried out by some of the other Group companies. The period covered is up to 2050.

Relevance with the JISF's Long-term Vision for Climate Change Mitigation

The Japan Iron and Steel Federation (JISF) has been working toward its Commitment to a Low Carbon Society, and Phase I of this initiative ended in FY2020. From FY2021, the effort was rebranded as the Carbon Neutrality Action Plan, and the Phase II target (FY2030 target) was revised. In November 2018, the JISF also formulated and published the Long-term Vision for Climate Change Mitigation for 2030 and beyond. JFE Steel played a central role in the formulation of this long-term vision. The vision represents the industry's challenge toward realizing zero-carbon steel and lays out the prospect of achieving the 2°C scenario for steelmaking and necessity of ultra-innovative technologies to achieve the 1.5°C scenario. Furthermore, on February 15, 2021, the JISF announced the "Basic Policy of the Japan Steel Industry on 2050 Carbon Neutrality Aimed by the Japanese Government," which declares that the Japanese iron and steel industry will boldly accept the challenge of realizing zero-carbon steel.

The JFE Group's scenario analysis is intended to ensure resiliency in our Group's business strategy during the intermediate stages of these long-term challenges.

■ **Efforts to Achieve Zero Carbon Steel**



➤ JIFS: Challenges towards Carbon Neutrality (https://www.carbon-neutral-steel.com/en/)

Process to Identify Key Factors that Impact the Business

STEP 1: Examine the entire value chain from a holistic perspective and sort out factors that impact the businesses under analysis (for more information on risks and opportunities in the value chain, refer to:
➤ JFE Group Value Chain (P. 26)

STEP 2: Examine all factors at an overview level and identify key factors by taking into account the level of impact and stakeholder expectations and concerns

	1.5/2°C Scenario	4°C Scenario
Impact on Procurement		5. Unstable raw materials procurement due to increased occurrence of climatic hazards
Impact on Direct Operation	1. Decarbonization of iron and steelmaking process 2. Increased needs for effective utilization of steel scrap	6. Damage to production bases and offices caused by climatic hazards
Impact on Product and Service Demand	3. Change in demand for automotive steel, etc. 4. Increase in demand for solutions to enhance decarbonization	7. National resilience

Axis for identifying key factors:
- Level of impact (possibility of risks and opportunities arising × Level of impact if manifested)
- Expectations and concerns of stakeholders

Results of Scenario Analysis

Climate change is a critical concern from the perspective of business continuity for JFE Group management. Our steel business, which emits 99.9% of the Group's total CO_2 emissions, has been developing technologies for saving energy and reducing CO_2 emissions. We have actively addressed the risks by applying these technologies to steel manufacturing. We will continue to develop processes to further reduce environmental impact while at the same time seeking to turn this challenge into an opportunity for addressing climate change by deploying the technologies we have fostered across the globe.

The JFE Group has developed and maintained a variety of eco-friendly products and technologies, including high-performance steel materials that help save energy when customers use them, as well as renewable energy power generation. We view the current challenges as an opportunity and are contributing to addressing climate change. As automobiles in general become lighter in weight along with the broader adoption of electric vehicles, we will support the transition by improving the functions of the JFE Group's high tensile strength steel sheets and electrical steel sheets. In addition, we will help reduce CO_2 emissions in society by further disseminating renewable energies and implementing recycling initiatives as well as energy conservation.

To achieve the long-term goal of the Paris Agreement of keeping the global average temperature increase well below 2°C compared to pre-industrial levels and to strive to limit it more strictly to 1.5°C, the Group will continue to develop and disseminate innovative technologies and contribute to the prevention of global warming. We will also support national resilience by providing steel for social infrastructure and construction to address the emerging risks associated with the growing severity of meteorological disasters.

Analysis Results

	Changes in Society	Risks/Opportunities		Expectations and Concerns of Stakeholders for the JFE Group	Strategies/Initiatives	Financial Impact (Estimate for 2030)*	
						Details	Amount/Scale
1.5/2°C Scenario Key Factor ❶ **Decarbonization of Iron and Steelmaking Process**	Increasing social demand for decarbonized iron and steelmaking process	Implement innovative technology to realize decarbonization at a large scale	Opportunity	JFE will lead in the business of supplying steel materials with high environmental value by implementing innovative technologies such as electric arc furnaces	• Deploy existing low-carbon technologies • Introduce large-scale electric arc furnaces capable of manufacturing high-quality steel • Increase use of low-carbon direct reduced iron • Develop and implement innovative technologies • Conduct studies for the practical application of CCUS • Expand supply capacity for JGreeX™ • Lobby to create demand for steel materials with high environmental value • Collaborate with companies in the JISF to promote steel materials with high environmental value	Increased sales of steel materials for their environmental added value	+120 to 150 billion yen per year
			Transition risk	More investment will be needed to implement innovative technologies	• Strengthen the revenue base • Secure funds for investment/technological development • Lobby for government support • Expand sales of JGreeX™	GX-related investment amount between 2023–2030	Approx. −700 billion yen
		Introduction of carbon pricing	Transition risk	• Financial burden will increase due to carbon pricing • Emission reduction targets will be more aggressive and stricter due to environmental changes	• Establish reliable CN technologies • Engage with policymakers to achieve CN	Increased carbon pricing burden	For every 1% reduction in emissions not achieved −10 billion yen per year
1.5/2°C Scenario Key Factor ❷ **Increased Needs for Effective Utilization of Steel Scrap**	Increasing interest for electric arc furnace method for its lower CO_2 emissions	Higher competition and prices for cold iron sources (scrap and reduced iron)	Transition risk	The cost of purchasing cold iron sources will increase	• Collaborate with customers/users to collect scraps • Establish technologies for using low-grade/difficult-to-use scrap • Participate in the reduced iron supply chain project • Expand scrap trading volume • Reduce manufacturing cost • Pass the cost to steel product prices	Increased cost of purchasing cold iron sources	Up to approx. −50 billion yen per year
		Increased electricity demand due to switching from blast furnace process to electric arc furnace process	Transition risk	Manufacturing cost will rise due to increased electricity usage (using more electricity and generating less by-product gas)	• Reduce manufacturing cost • Pass the cost to sale prices • Secure a stable supply of electricity • Lobby for steel product prices	Increased manufacturing cost due to switching processes (increase in electricity usage is equivalent to 0.5 nuclear power plant output)	Confidential for business reasons
1.5/2°C Scenario Key Factor ❸ **Change in Demand for Automotive Steel**	Shift in demand for automobiles	Changes in the product mix due to EV production, etc.	Opportunity	Sales will increase for electrical steel sheets used in EV motors	• Strengthen production capacity for electrical steel sheets • Establish processing bases and supply chain structure for steel sheets globally	Increased sales of electrical steel sheets	Confidential for business reasons
			Opportunity	Sales will increase for high-tensile steel due to improved collision safety performance	• Increase production capacity for high-tensile steel sheets	Increased sales of high-tensile steel sheets	
			Transition risk	Sales will decrease for steel materials due to a shift away from internal combustion engines and a shift toward using multi materials	• Develop high-performance products	Decreased sales of steel sheets for automobiles	Minimal impact
1.5/2°C Scenario Key Factor ❹ **Increase in Demand for Solutions to Enhance Decarbonization**	Transition to decarbonized society	Increase in demand for decarbonization solutions businesses	Opportunity	Renewable energy-related businesses will expand	• Expand the business undertaking the entire construction and operation of renewable energy power plants (biomass, geothermal, solar, offshore wind, etc.)	Sales of JFE Engineering's CN-related business	Approx. 200 billion yen per year
			Opportunity	Business of disseminating eco solutions (advanced energy-saving technologies developed and applied in Japan) to developing countries will expand	• Solutions business for low-carbon steelmaking technologies	Increased sales of overseas solutions business	Under assessment
4°C Scenario Key Factor ❺ **Unstable Raw Materials Procurement due to Increased Occurrence of Climatic Hazards**	Increasingly devastating climate hazards caused by temperature rise	Raw materials procurement becomes unstable	Physical risk	• Sales will decrease due to reduced production • Raw material cost will increase	• Establish alternative procurement and dispersed supplier bases, engage in stockpiling • Acquire raw material rights	Decreased sales of steel materials due to raw material shortages	For every 1% decrease in annual sales volume Approx. −30 billion yen/year
4°C Scenario Key Factor ❻ **Damage to Production Bases and Offices Caused by Climatic Hazards**	Increasingly devastating climate hazards caused by temperature rise	Damage to manufacturing bases from typhoons, heavy rain, and droughts	Physical risk	Sales will decrease due to reduced production	• Implement measures against flood and drought damage at manufacturing bases	Decreased production and sales due to flood and drought	No impact, as measures have already been taken
4°C Scenario Key Factor ❼ **National Resilience**	Increasingly devastating climate hazards caused by temperature rise	Strengthen infrastructures and disaster resiliency	Opportunity	Infrastructure reinforcement orders will increase	• Strengthen infrastructure reinforcement-related businesses in Japan and overseas • Strengthen sales of infrastructure-related steel materials	Increased sales of JFE Engineering's infrastructure construction business	Difficult to calculate at this point

Note: Assessment results are estimated outcomes based on scenario analysis and do not represent actual performance.

Overview of Scenario Analysis Assessment and JFE Group's Focus

Timeframe: short term (2024) ⇒until 2024, medium term (2030) ⇒until 2030, long term (2050) ⇒until 2050 (final)

FOCUS Key Factor (1) Decarbonization of Iron and Steelmaking Process

Supply steel materials with high environmental value through implementation of innovative technologies such as electric arc furnaces

Short term (2024) Medium term (2030)

JFE Steel has been committed to developing energy-saving technologies toward increasing the efficiency of the iron and steelmaking process and decarbonization. These initiatives have helped JFE Steel acquire technologies that realize the world's top energy efficiency in iron and steelmaking. Taking advantage of the increasing public demand for decarbonized iron and steelmaking processes, we will deploy these low-carbon technologies at each of our steelworks and expand our capacity to supply steel products with high environmental value that are manufactured using these technologies. The rising worldwide support for decarbonization is expected to drive greater demand for low-CO_2 emission steel products, such as in the automobile industry, where CO_2 emissions must be managed throughout the supply chain. In the IEA's Net Zero Emissions by 2050 Scenario (NZE), the share of steel production using electric arc furnaces is expected to increase to 37% by 2030 and 53% by 2050. Since steel production using electric arc furnaces emits less CO_2 than using blast furnaces, customer demand may shift to products manufactured using the former. During the transition period, we are considering the introduction of large-scale electric arc furnaces capable of producing high-performance, high-quality steel materials that could only be made previously using the blast furnace process. In addition to meet customer needs for products that reduce environmental impact, in the first half of FY2023 JFE Steel began supplying JGreeX™, a brand of green steel products that significantly reduce CO_2 emissions in the steel manufacturing process compared to conventional products. At present, it is difficult to immediately supply green steel products with significantly lower or zero emissions, so the reductions created by our technologies are allocated to any steel products by applying the mass balance method and then supplied as green steel products. Reduction of CO_2 throughout the supply chain is rapidly progressing and JFE Steel will contribute to the decarbonization of society by expanding its capacity for supplying JGreeX™ and further reducing CO_2 emissions through the use of advanced low-carbon technologies as well as energy-saving, high-efficiency technologies.

Moreover, further progress in these initiatives will depend on gaining broader recognition of the environmental value of these steel materials. We are also actively lobbying to boost demand for steel materials with high environmental value.

Long term (2050)

In the long term, we will develop carbon-recycling blast furnaces (CR blast furnaces), hydrogen steelmaking, and electric arc furnaces while striving to achieve carbon neutrality by 2050, as stated in the JFE Group Environmental Vision for 2050. In particular, we have been focusing on a technology that combines a CR blast furnace with CCU. This is an ultra-innovative technology that targets net zero CO_2 emissions by drastically reducing CO_2 emissions from the blast furnace process, maximizing its ability to efficiently produce high-grade steel in mass volume, and enabling CO_2 reuse in the blast furnace. The remaining CO_2 that cannot be fully reused in the furnace will be further reduced by manufacturing basic chemicals such as methanol.

More investment needed to implement innovative technologies

Short term (2024) Medium term (2030)

The investment need to implement innovative technologies such as electric arc furnaces presents a risk. In order to achieve the CO_2 reduction target for FY2030, we are assuming that investment and financing on a scale of 1 trillion yen may be required, and we have approved approximately 300 billion yen from FY2021 to FY2023. We are working to strengthen our revenue base, carry out research and development using the Green Innovation Fund and other sources, lobby for government support, and expand sales of JGreeX™ to continue making these capital investments.

Long term (2050)

International expectations have been rising for organizations to seek pathways for achieving the 1.5°C scenario. We believe the necessary actions are not significantly different from the 2°C scenario. In the 1.5°C scenario, however, the development and implementation of decarbonizing technologies would need to further accelerate, requiring significantly more R&D costs and capital investment. A public infrastructure capable of supplying cheap and ample green hydrogen and electricity would also need to be in place. We believe that addressing these issues will require more support from the government and collaboration across society, including a mechanism for broadly sharing the financial burden and a long-term government strategy for supplying green hydrogen and electricity.

Financial burden will increase due to carbon pricing, and emission reductions targets will be more aggressive and stricter due to environmental changes

Short term (2024) Medium term (2030) Long term (2050)

Various approaches to carbon pricing have been introduced around the world, and in Japan, emissions trading and the introduction of growth-oriented carbon pricing are being discussed in line with the GX Promotion Law for achieving carbon neutrality by 2050. In Europe, the introduction of a border adjustment tax (CBAM regulation) is being discussed, and ahead of its full application from 2026, the transitional phase started on October 1, 2023, in which reporting obligations are imposed on importers of goods in scope. Countries are taking different approaches to pricing carbon, and the scope of the levies also differ. While carbon pricing still involves many moving parts, we need to closely monitor future trends and consider the impact of these changes. On the other hand, we also believe that carbon pricing could be an important system for ensuring that steel products with environmental value are properly evaluated worldwide. We are recommending that the government takes steps to ensure that the system is appropriately designed.

FOCUS Key Factor (2) Increased Need for Effective Utilization of Steel Scrap

Cost of purchasing cold iron sources (scrap/reduced iron) will increase

Short term (2024) Medium term (2030) Long term (2050)

There is a growing interest in the electric arc furnace process because of its low carbon footprint, and its adoption is progressing worldwide. Even as the JFE Group takes full advantage of its electric arc furnaces, it is installing these furnaces at the Chiba District of the East Japan Works and also considering installing a large electric arc furnace at the Kurashiki district of the West Japan Works. We expect that demand for cold iron sources (scrap and reduced iron) will increase, and there is a risk it will become difficult to procure the cold iron sources necessary to maintain the quality of steel and maintain production. To this end, we are working to ensure a stable supply by collecting high-grade scrap generated by our customers and developing technologies for using low-grade or difficult-to-use scrap. In addition, we are striving to ensure the stable procurement of direct reduced iron through our participation in the reduced iron supply chain project with Emirates Steel.

Manufacturing cost will increase due to converting from blast furnace process to electric arc furnace process

Short term (2024) Medium term (2030) Long term (2050)

Converting from the blast furnace process to an electric arc furnace requires a lot of electricity. In addition to the electricity needed to melt the cold iron source in the electric furnace, more will be needed to make up for the heat from the by-product gas of the blast furnace, which currently is the main source of heat for the reheat furnaces and other processes in the steelworks. Consequently, we need a power infrastructure that can stably provide a large amount of electricity at competitive prices. We are actively making recommendations to policymakers with the aim of meeting these needs.

FOCUS Key Factor (3) Change in Demand for Automotive Steel

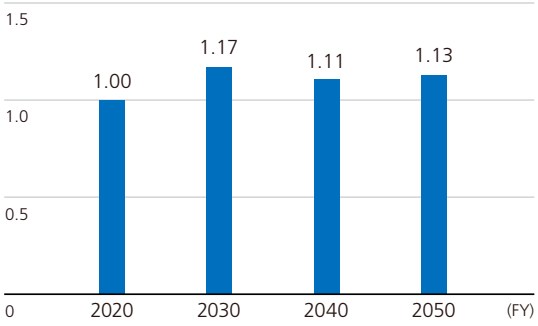
Changes in the product mix due to EV production and other factors

Short term (2024) Medium term (2030) Long term (2050)

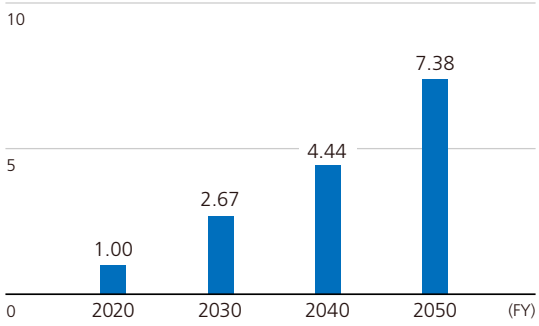
As electric vehicles become more widely adopted, we expect to see changes in the types of steel materials required for automobiles. Demand for electrical steel sheets used in EV motors is rapidly expanding, and we expect changes in the product mix of steel materials, such as materials to offset the increased weight of batteries and stronger frames to protect them. The JFE Group has decided to take advantage of this trend by strengthening our production capacity for electrical steel sheets, and we are currently tripling production capacity for non-oriented electrical steel sheets at the Kurashiki district of the West Japan Works. In addition, JFE Steel has developed a cold-rolled steel sheet boasting 1.5 GPa-grade tensile strength as an eco-product and has put it into practical use as an automotive steel sheet. Furthermore, it has developed a multi-material structure that uses a small amount of fiber resin to maximize steel quality. In this new structure, a highly ductile, strong adhesive resin is sandwiched between a body part made of an ultra-high strength steel plate and a part made of a thin steel plate. This structure is capable of further reducing the weight of automobile frame parts and also improving collision safety performance. We will continue developing and proposing various products and technologies that meet customer needs.

In the meantime, aluminum and carbon fiber reinforced plastic are potential alternative materials for reducing the weight of cars. It has been pointed out, however, that the production cost of these materials and the amount of CO_2 emitted throughout their life cycles is higher than those of steel. Therefore, under the 2°C scenario, which assumes the introduction of a carbon pricing whereby the price differential between steel and alternative materials will be larger. Under this scenario, while the trend of using multi-materials may show some progress for luxury cars, their use would be limited for economy cars. Moreover, considering a situation in which all panels used for doors and other parts of a luxury car were changed to aluminum, the effect on weight reduction could be expected to be 5% of all materials used in luxury and economy cars together.

■ **Estimated World Demand for Automotive Special Steel**



■ **Estimated World Demand for Automotive Electrical Steel Sheets**



Vertical axis: Steel demand (comparison by year with the year 2020 as 1.00)
Source: Estimated by JFE Holdings based on the reports from METI's Strategic Commission for the New Era of Automobiles

FOCUS Key Factor (4) Increase in Demand for Solutions to Enhance Decarbonization

Increase in demand for decarbonization solution businesses

Renewable Energy Power Generation Short term (2024) Medium term (2030) Long term (2050)

Demand for power generation plants using non-carbon emitting renewable energies is expected to increase. The JFE Group engages in designing, procuring, constructing, and operating biomass power generation*1, geothermal power generation*2, solar power generation*3, and onshore wind power generation plants in its engineering domain.

We will also focus on offshore wind power generation, which the Japanese government has positioned as one pillar of its Green Growth Strategy to achieve carbon neutrality by 2050. Specifically, we plan to manufacture and market monopiles and other seabed-fixed structures with JFE Engineering as the main driver. JFE Engineering has completed the construction of a

monopile manufacturing plant, where operations commenced in April 2024*4.

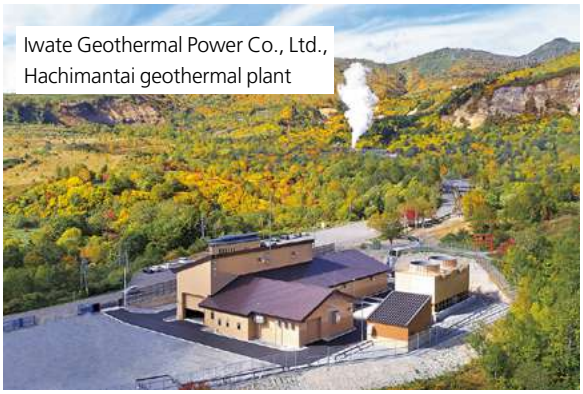
JFE Steel will contribute by increasing the supply of large and heavy steel plates, and JFE Shoji will assist by establishing SCM, which includes information sharing with Taiwan, a leader in offshore wind power generation, and East and Southeast Asian countries, where demand is expected to expand. We will also focus on O&M*5 to fully deploy Group resources.

Furthermore, from the perspectives of the effective use and recycling of resources, we are taking action to increase power output at waste processing facilities. JFE Engineering is developing a fully automated operation*6 to facilitate higher power output at waste incinerators (introduced to 12 facilities by FY2023, and will be gradually expanded to 16 facilities).

Moreover, we are utilizing renewable energy as the main power source for our retail electricity business*7, and in helping to establish and operate regional electricity retail companies*8, we focus on local production and consumption of electricity based on renewable energy. By FY2023, we have helped 8 locations establish and operate their regional electricity companies. In FY2024, we plan to do the same for 1 location, and in FY2030 for around 15 locations.

(Contribution to CO_2 reduction resulting from renewable energy power generation/recycling/etc.: FY2020: 9.65 million tonnes per year → FY2024: 12 million tonnes per year → FY2030: 20 million tonnes per year)

Waste-to-energy power generation plant



Geothermal power generation plant

➤ *1 The JFE Engineering Corporation's biomass power generation (Japanese only) (https://www.jfe-eng.co.jp/products/power/ele07.html)
➤ *2 The JFE Engineering Corporation's geothermal power generation plant (https://www.jfe-eng.co.jp/en/products/power/gene01.html)
➤ *3 The JFE Engineering's solar power generation (Japanese only) (https://www.jfe-eng.co.jp/products/power/ele05.html)
The JFE Technos Corporation's solar power generation (Japanese only) (https://www.jfe-technos.co.jp/products/solar/)
➤ *4 Completion of Japan's first manufacturing base of fixed-bottom foundation (monopile) for offshore wind turbines (https://www.jfe-eng.co.jp/en/news/2024/20240401.html)

*5 Operation and maintenance business

➤ *6 JFE Engineering's BRA-ING Pre-release (Japanese only) (https://www.jfe-eng.co.jp/news/2020/20200727.html)
➤ *7 Urban Energy Corporation's electricity retail business (Japanese only) (https://u-energy.jp/service/retail.html)
➤ *8 Urban Energy Corporation's regional electric power support business, targeting local governments (Japanese only) (https://u-energy.jp/service/municipality.html)
Establishing regional electricity retail companies in partnership with local municipal governments (CSR Report 2022, P. 116) (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/data/2022/csr2022e.pdf)

Multisite Energy Total Service

Short term (2024) Medium term (2030) Long term (2050)

In addition to the conventional service of optimizing energy use for single sites, JFE Engineering offers the Multisite Energy Total Service (JFE-METS)*, which optimizes energy use for multiple sites through centralized management. We realize overall energy savings and CO_2 reduction by analyzing energy consumption at multiple sites and achieving total optimization by installing and operating energy-related equipment at each site to circulate energy throughout the network, including remote locations.

➤ *The JFE Engineering Corporation's JFE-METS (Japanese only) (https://www.jfe-eng.co.jp/news/2019/PDF/20200130.pdf)

Recycling Business

Short term (2024) Medium term (2030) Long term (2050)

We are striving to reduce the use of new fossil fuel-derived materials by recycling waste plastic and food waste. In waste plastic recycling, in addition to the conventional recycling of plastic containers and packaging, we are actively engaged in the so-called bottle-to-bottle business, in which used PET bottles are recycled into new ones. We have completed the construction of the PET bottle recycling raw material manufacturing plant (West Japan PET Bottle MR center), and full-scale commercial operations have begun. The plant recycles approximately 10% of the total number of PET bottles shipped nationwide, demonstrating a complete resource recycling model for reducing CO_2 emissions. In food recycling, we generate methane gas from disposed food wastes to create renewable energy (fuel gas and electricity). JFE Engineering manages the engineering, procurement, and construction of recycling plants, while J&T Recycling Corporation manages the operation and business development of the plants*.

Industry-wide decarbonization cannot be achieved through technical developments in manufacturing alone. We therefore believe that demand for CCU and CCS facilities will increase as they facilitate the efficient use and storage of CO_2. JFE Engineering is able to undertake the entire process of building CCU and CCS facilities from design and procurement to construction.

➤ *JFE Engineering and J&T Recycling Corporation's Recycling (Japanese only) (https://www.jt-kankyo.co.jp/business/)

Solution Business for Low-Carbon Steelmaking Technologies

Short term (2024) Medium term (2030) Long term (2050)

From the perspective of the steel industry, there is room for disseminating eco solutions (energy-saving steel technologies) in nations such as China, where close to 50% of the world's crude steel is produced, and India and ASEAN countries, where further growth in production is expected. The potential CO_2 reduction achieved by internationally transferring and disseminating advanced energy-saving technologies widely used in Japan will exceed 400 million t-CO_2 worldwide (Japan is estimated to contribute to the reduction of approximately 80 million t-CO_2 in FY2030 through these technologies). JFE Steel launched a solutions-business brand, JFE Resolus™ , to provide solutions to a wide range of customers, including those outside the steel industry, based on manufacturing and operation technologies that JFE Steel has cultivated over many years in its steelmaking operations. Going forward, as the business environment and markets continue to undergo drastic change, JFE Steel will steadily enhance its proprietary technologies and, now under the JFE Resolus™ brand, offer customers the JFE Group's advanced technologies and know-how as solutions for mutual growth and development.

➤ JFE Steel's Solution Business (https://www.jfe-steel.co.jp/en/products/solution/)

FOCUS Key Factor (5) Unstable Raw Material Procurement due to Increased Occurrence of Climatic Hazards

Unstable material procurement

Short term (2024) Medium term (2030) Long term (2050)

In Australia, our major source country for raw materials, the frequency of typhoons is predicted to double. If production and shipments are disrupted in Australia for too long, there is no avoiding the impact on production, and depending on the situation, there is a risk that sales of steel materials will be impacted by a depletion of raw material stocks. To address this, we are promoting alternative procurement and dispersed supplier bases, stockpiling, and acquisition of raw material rights.

Alternative procurement, dispersed supplier bases, and stockpiling

Respond to disaster by carrying out spot procurement from China's port stocks, increasing procurement from closer source countries such as Indonesia and front-loading the purchase and/or increasing the purchase contract of different brands from outposts in unaffected regions of Australia. Also, use the stock and external yard of the Group company Philippine Sinter Corporation.

The decarbonization in the steelmaking process is expected to lead to a diversification of the required raw materials. We will take into account the risk of climate change for these materials as well and work to establish diversified procurement sources.

FOCUS Key Factor (6) Damage to Production Bases and Offices Caused by Climatic Hazards

Damage to manufacturing bases from typhoons, heavy rain, and drought

Short term (2024) Medium term (2030) Long term (2050)

We are taking action to minimize damage under the assumption that typhoons and heavy rains will become stronger and that the occurrence of disasters comparable to the torrential rain in western Japan in 2018 will rise. We have currently invested approximately 6.5 billion yen for disaster prevention at steelworks and strengthened drainage facilities and other assets. About 3.5 billion yen of separate investment has already been made to prepare for water shortages at steelworks by installing desalination facilities at some of them. Although no severe drought disaster has struck since 1994, we are preparing to minimize any damage, even if the frequency of occurrence should increase.

All steelworks are exposed to the risk of floods associated with rising sea levels because of their location in coastal areas. The estimated sea level rise by 2050 is 20 to 30 cm (70 cm by 2100 if the impact of climate change manifests itself at the highest level). We believe that current measures against storm surge, which generates more sea level rise, are sufficient to address the risk. However, we will continue analyzing climatic hazards going forward to prepare for the changing circumstances.

FOCUS Key Factor (7) National Resilience

Strengthened infrastructure and disaster measures

Short term (2024) Medium term (2030) Long term (2050)

The JFE Group takes seriously the increased frequency and severity of recent climatic hazards in Japan and overseas. Having one's daily life put in danger is a huge risk. It is our mission to promote disaster prevention and mitigation as well as national resilience to maintain vital infrastructure that is essential to daily life and economic activities.

Drawing upon its collective strengths, the JFE Group is able to contribute in many ways, such as by protecting key structures from earthquakes using structural steel such as high-strength H-shaped steel and steel pipe piles as well as steel sheet piles, reinforcing embankments that are prone to bursting, and providing disaster prevention products such as hybrid tide embankments and permeable steel slit dams. JFE Engineering is also able to handle a wide range of infrastructure construction projects, including bridges, gas, water and sewage, and pipelines.

➤ Hybrid Tide Embankments (P.81)
➤ Permeable Steel Slit Dams (P.82)
➤ Terre Armée Method (P.82)

Links to information about the JFE Group Environmental Vision for 2050 and Climate Change Scenario Analysis
Commitment to a Low Carbon Society: Policy Engagement (P. 90)
Targets and Results Related to Climate Change: Material Issues of Corporate Management and KPIs (P. 18)
Initiatives on Climate Change: Initiatives to Address Climate Change Issues (P. 52)
Technologies and Products Related to Reducing: Development and Provision of Eco-friendly Processes and Products (P. 135)

Realizing a Recycling-Oriented Society

Basic Policy

Economic growth in emerging countries is intensifying the need to conserve non-renewable resources. Iron can easily be separated and is thus highly recyclable. It can be recycled and reused to make other steel products infinite times (closed-loop recycling). The JFE Group is leveraging each Group company's strengths to enhance resource recycling through recycling co-products from iron and steelmaking, reducing waste at construction sites, and promoting the global recycling of steel scrap. We continue to pursue efficient uses of resources in both the production and product/service phases of its businesses, through steel scrap recycling, biomass fuel production and waste-to-energy power generation.

The JFE Group uses large quantities of fresh water for cooling and cleansing products and facilities in its core business of steel manufacturing. For this reason, the efficient use of water resources with due consideration to the source of the water and stakeholders in the area is a key challenge. In response, we have established a system for reducing water intake by maximizing the use of recycled water at our steelworks.

System

The JFE Group Environmental Committee, chaired by the president of JFE Holdings and operating under the JFE Group Sustainability Council, sets goals for environmental protection, monitors the progress of these initiatives and works to improve the Group's overall environmental performance. Key issues for corporate management such as climate change are deliberated at the Group Management Strategy Committee as well and reported to the Board of Directors. The board oversees environmental challenges by discussing the reported material. Additionally, specialized committees set up by JFE Group operating companies and affiliates implement specific activities.

➤ Framework for Environmental Management (P.46)

Targets and Results

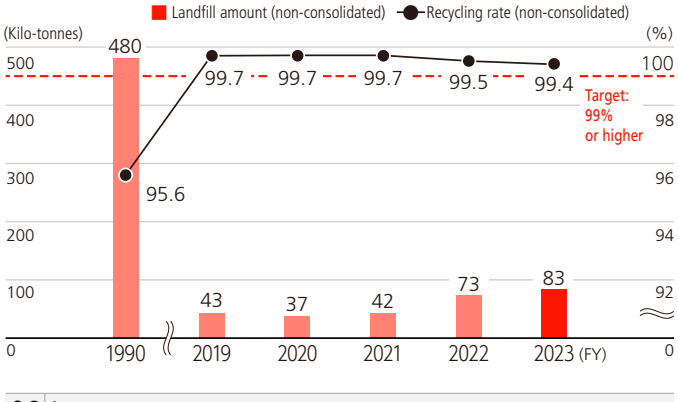
As we acknowledge that the efficient use of resources is a key environmental issue for manufacturers, we set high-level targets corresponding to the business of our Group companies and monitor the results. The Group companies have consistently fulfilled KPIs for material CSR issues every year up to FY2020 and established environmental practices. We continue to work on efficiently using resources toward the following high-level targets.

We also acknowledge the use of water resources as a key environmental issue for manufacturers. Because the JFE Group uses large quantities of water in its core business of steel manufacturing, the Group sets high goals for water resource recycling. We defined KPIs for material CSR issues and consistently met them every year up to FY2020. This effort helped us to establish environmental practices. We will maintain our efforts to reduce water consumption toward the following high-level targets.

■ Target and Result for FY2023 and Target for FY2024

Operating Company	FY2023 Targets	FY2023 Results and Initiatives	FY2024 Targets
JFE Steel	Recycling rate of co-products: 99% or higher	Recycling rate: 99.4%	Continue efforts to prevent and reduce the generation of dust and sludge in the recycling of co-products, to maintain the recycling rate of co-products at 90% or higher
	Maintain efficient use of water Recirculated water usage rate: 90% or higher	Recirculated usage rate: 93.1%	Continue the water resource recycling effort to maintain the recirculated usage rate at 90% or higher
JFE Engineering	Recycling rate at construction sites • Recycling rate of rubble: 99.5% or higher • Recycling rate of sludge: 95.0% or higher • Recycling rate of industrial waste: 85.0% or higher	Recycling rate at construction sites • Recycling rate of rubble: 97.8% • Recycling rate of sludge: 99.3% • Recycling rate of industrial waste: 87.1%	Recycling rate at construction sites • Recycling rate of rubble: 99.5% or higher • Recycling rate of sludge: 95.0% or higher • Recycling rate of industrial waste: 85.0% or higher
	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher	Recycling rate of office recyclable waste (Yokohama head office): 97.7%	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher
JFE Shoji	Global recycling of steel scrap • Exceed FY2020 scrap trade volume (FY2024 target: +5% from FY2020)	–5% from FY2020 While domestic trade volume increased, overseas sales decreased as a result of an overall decline in the export of scrap from Japan.	Global recycling of steel scrap: +5% from FY2020 Enhance domestic and overseas distribution network for scrap and increase the sales thereof to JFE Group companies and others that need it and outside the country toward achieving the target

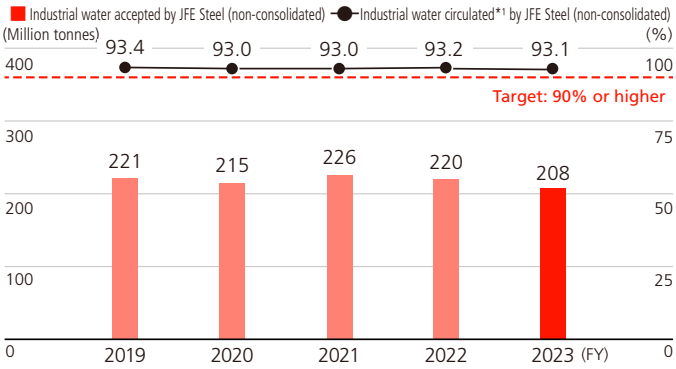
■ Landfill of Co-Products and Recycling Rates



		1990	2019	2020	2021	2022	2023	
Group companies*	Amount released	—	546	513	504	593	583	(Kilo-tonnes)
	Landfill amount	—	31	23	52	94	97	(Kilo-tonnes)

*22 JFE Steel consolidated subsidiaries in Japan.

■ Industrial Water Accepted/Circulated



JFE Steel

Total amount	3,323	3,066	3,207	3,242	3,053	(Million tonnes)
Industrial water accepted	221	215	226	220	208	(Million tonnes)

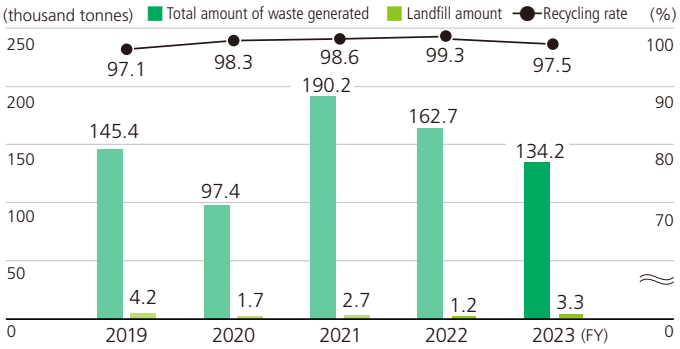
Group companies*2

Total amount	293	265	235	233	207	(Million tonnes)
Industrial water accepted	20	21	19	18	16	(Million tonnes)

*1 Industrial water circulated (%) = (Total amount used – industrial water accepted)/total amount used ×100

*2 22 JFE Steel consolidated subsidiaries in Japan.

■ Waste Generated at Construction Sites



For more on waste generated at the steelworks, please refer to the following information.

➤ Environmental Data (P.235)

Initiatives

Resource Recycling Solutions

The JFE Group is involved in establishing a recycling-oriented society through a variety of initiatives. Steelworks promote the efficient use of raw materials, water, and other resources in the process of iron and steelmaking in addition to encouraging the application of recycled resources such as used plastics for blast furnaces. Moreover, we are striving to more efficiently use

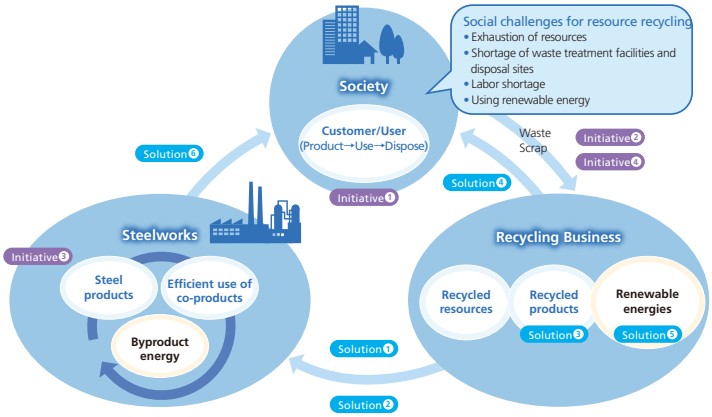
co-products generated in the iron and steelmaking process through initiatives such as the international recycling of steel scrap. By leveraging the highly recyclable quality of steel, we are also developing product that contribute to addressing the issue of plastic waste.

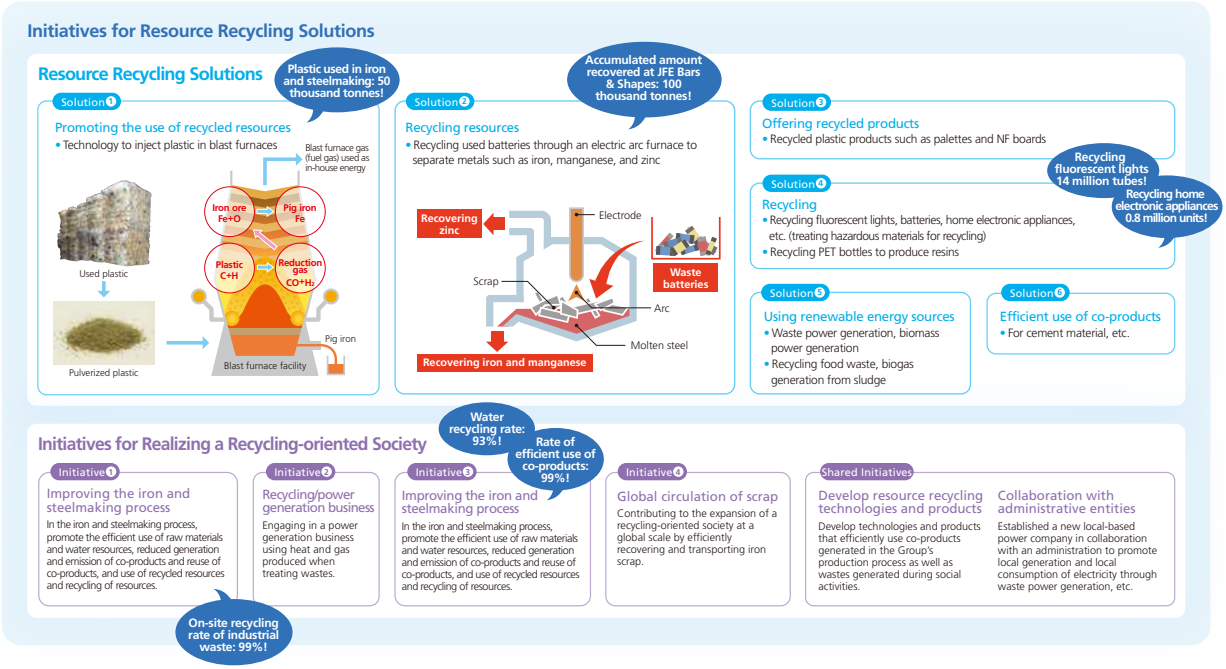
In the engineering field, we produce biomass fuel from food waste and sewage sludge, constructing plants, and other infrastructures for Waste-to-energy power generation and offer resource recycling solutions by operating these facilities directly or under contract. In addition, we are pursuing a circular economy by developing PET bottles and a plastics recycling business as well as an energy supplying business.

For JFE Steel and JFE Engineering's recycling businesses, please refer to the following information.

➤ **List of JFE Group's recycling businesses**
(https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/environment/resource/resource01.pdf)

For more on this, please refer to the following information.
➤ **Development and Provision of Eco-Friendly Processes and Products** (P.38)
➤ **Stakeholder Engagement** (P.135)





JFE Steel Reducing Generation and Emission of Co-Products and Reusing Co-Products

JFE Steel carefully controls the generation and emission of iron and steelmaking slag (a co-product), iron dust from blast furnaces and converters, sludge from water treatment facilities, and other co-products by setting targets to improve recycling rates. Dust and sludge with high iron content are recycled as raw materials for steelmaking. Iron and steelmaking slag is effectively recycled for reuse in cement and other construction materials. The company is also promoting its use as environment recovery material such as Marine Stone™, which works effectively as a base for the adhesion of organisms and for improving the marine environment. As a result of these efforts, the company accomplished a 99.4% recycling rate for slag, dust, and sludge in FY2023, fulfilling the target of 90% or higher, and it is committed to consistently achieving the target.

For more quantitative data related to co-products, please refer to the following information.
➤ Environmental Data (P.235)

JFE Engineering Promoting Recycling

Most of JFE Engineering's waste is either rubble and sludge discharged from construction sites or industrial waste discharged by the Tsurumi and Tsu works and the Kasaoka monopile manufacturing plant. The company is seeking to reduce industrial waste while also resource recycling through various measures, such as setting environmental goals for recycling rates and properly separating waste on-site before sending it to disposal companies known for achieving high recycling rates. It also complies with the Plastics Resource Circulation Act, enforced in Japan in April 2022, by including initiatives for plastics recycling in its environmental target.

The Yokohama head office sets target recycling rates for office recyclable waste and maintains its efforts to reduce waste (encouraging double-sided copying), reuse (setting up collection boxes for plastic folders and plastic business card cases and recovering label printer cartridges), and recycle (thoroughly separating waste). The JFE Engineering Group is also helping to realize a recycling-oriented society through its PET bottle and food waste recycling initiatives.

For more on waste generated at the steelworks, please refer to the following information.
➤ Environmental Data (P.235)

Efficient Use of Water Resources

JFE Steel Goal-Setting for Recycling Use of Water

All of JFE Steel's seven production sites in Japan developed a water management plan and monitored water usage in seeking to increase the recirculation rate of water in order to reduce the volume of water intake and drainage and efficiently use water resources. The target water recycling rate at JFE Steel, which uses a large volume of water for cooling and other processes, is 90% or more, which is extremely high considering the amount evaporated when water is used. We are striving to improve the recycling rate by adopting purification processes such as biological and chemical wastewater treatments, and we have been successfully achieving the target. Our recycling rate of industrial water in FY2023 maintained a high level of 93.1%.

JFE Engineering Efficient Use of Water Resources

JFE Engineering and each Group company strive to use water efficiently at their business sites.

For more on quantitative data related to water, please refer to the following information.
➤ Environmental Data (P.235)

Key Initiatives in FY2023

JFE Steel

Reducing Plastic Waste by Manufacturing Cups from Highly Recyclable Steel

Under the logo Steelish™, a combination of "steel" and "stylish," JFE Steel is engaged in an initiative to expand the use of stylish, recyclable steel products that would introduce a change in daily lifestyles and help propel the global effort to tackle plastic pollution. For instance, JFE Steel proposes single-use steel cups as an alternative to disposable plastic cups. Steel cups are light and sturdy, with a thin rim that feels smooth against the lips, and they are able to keep drinks hot or cold for a long time, as well as being infinitely recyclable into other steel items and easier to recycle than plastic.

To this end, JFE Steel in 2021 launched the project BETTER RECYCLE Shonan and has since been involving customers in the development of disposable steel cups, the first time the company has adopted this approach. The project team, made up of members from IBLC Co., Ltd. and Shonan Style (a magazine published by EDITORS, Inc.) as well as JFE Steel, sought advice and cooperation from local governments and plastic disposable suppliers in the Shonan area and created a prototype for an eco-friendly disposable steel cup. The prototype and the Steelish™ initiative were presented at Carnival Shonan 2022, an event held at the Kanagawa Municipal Tsujido Kaihin Park in November 2022 to explore turning the Shonan beaches into the first zero-waste beaches in Japan.

In March 2023, steel cups were used at Nakame Challenge Cup 2023, an event hosted by Asahi YOU. US, Ltd. and the Nakame Area Management Association to eliminate disposable plastic bottles discarded by people viewing cherry blossoms in Nakameguro and raise awareness of plastic pollution, food loss, and other sustainability issues.

JFE Steel is committed to playing its part in fostering public awareness about climate change and plastic pollution issues and to achieving the SDGs by developing steel solutions that meet the needs of customers and society as a whole.

The Steelish™ logo

The recyclable steel cup

➤ Website on recyclable steel cups (Japanese Only) (https://www.jfe-steel.co.jp/products/can/use/scene09.html)
➤ BETTER RECYCLE Shonan (Japanese Only) (https://www.jfe-steel.co.jp/products/can/pr/better_recycle_shonan.html)

Products and Technologies (Realizing a Recycling-Oriented Society)

The JFE Group is determined to both efficiently use resources in its business activities and deliver products and technologies that will help realize a recycling-oriented society.

Apart from eco-friendly products and processes designed to reduce environmental impact, the steel business is developing technologies and products for the efficient use of co-products from manufacturing processes and waste from social activities. The engineering business is conducting research and development for new technologies and eagerly advancing its Waste-to-energy power generation and plastic recycling projects.

For more on products and technologies aimed at realizing a recycle-oriented society, please refer to the following information.
➤ **Development and Provision of Eco-Friendly Processes and Products** (P.135)

Preserving Biodiversity

Basic Policy

Recognizing that natural capital and biodiversity are foundational for realizing a sustainable society, the JFE Group has endorsed the Declaration of Biodiversity by Keidanren and Action Policy and conducts business in harmony with nature across the world. We particularly recognize the preservation of biodiversity as a key challenge and conduct assessments to minimize the ecological impact associated with our business activities. Our initiatives include cooperating with the community to monitor biodiversity and carry out preservation activities around the steelworks, the key facilities for our business, and in surrounding areas. We are also involved in developing iron and steelmaking slag products that can help restore the marine environment. Furthermore, beyond our business operations, we launched a joint research program with a local government and conduct environmental education for local communities.

Our core business of steel manufacturing uses large quantities of fresh water for cooling and cleansing products and facilities. For this reason, the efficient use of water resources with due consideration to the source of the water and stakeholders in the area is a key challenge.

And while we have always taken measures against meteorological disasters such as droughts and floods at our manufacturing sites in Japan, we are further reinforcing them in anticipation of the increased frequency and severity of weather events associated with climate change by securing alternative means and raising the height of embankments. We also seek to identify water-related risks throughout our business sites and supply chain in Japan and overseas, such as the risk of drought at the source of water intake and pollution at the point of discharge. In areas under water stress, we will respond appropriately through dialogue with stakeholders.

➤ Declaration of Biodiversity by Keidanren and Action Policy (Revised Edition)
(https://www.keidanren.or.jp/en/policy/2018/084.html)

System

The JFE Group recognizes the issue of water resources as a risk that may significantly impact operations, and we have taken action against meteorological disasters such as droughts and floods. In recent years, we have been seeking to adequately identify and manage water risks based on the assumption that disasters due to climate change will increase in frequency and severity.

With regard to Group risk management, the Group Sustainability Committee, under the leadership of the CEO, who heads the JFE Group CSR Council, discusses, supervises, and guides Group-wide environmental initiatives, including the proper use of water resources.

There were no violations of environmental laws or regulations related to water quality in FY2023, and no fines or penalties were imposed.

➤ Framework for Environmental Management (P.46)

Initiatives

Assessing Impacts on Natural Capital

Evaluating Dependencies and Impacts in Line with the LEAP Approach

The JFE Group began pilot testing the LEAP approach in line with the recommendations of the Taskforce on Nature-Related Financial Decisions (TNFD), starting with the steel business and focusing on JFE Steel's leading manufacturing sites and key raw materials such as iron ore and coking coal. We will increase our understanding of relationships between nature and the Group's other businesses toward the disclosure of material risks and opportunities in accordance with the TNFD framework.

■ Progress in pilot LEAP assessment

Locate

Locating the interface with nature
We used TNFD-recommended tools such as IBAT and Resource Watch to identify locations of major manufacturing sites of our steel business and the mining sites used by our major suppliers of raw materials such as iron ore and coking coal, and assessed natural capital in the areas surrounding them.

Evaluate

Evaluating dependencies and impacts
We applied ENCORE and other TNFD-recommended tools to identify and evaluate the dependencies and impacts of our steel business on important natural capital.

Assess

Assessing nature-related risks and opportunities
Based on the findings from the evaluation of the dependencies and impacts, we identified and as-sessed nature-related risks and opportunities for our steel business.

Prepare

Preparing to respond and report
We have been preparing to respond to the assessed risks and opportunities.

Reviewing Specific Categories of Findings on the Dependencies and Impacts of the Steel Business on Nature (General Findings Related to the Steel Business)

Regarding the dependencies and impacts of our steel business on nature, we reviewed the findings under the categories of manufacturing at our production sites, procurement from our upstream supply chain at iron ore and coking coal mining sites, and product disposal at our downstream supply chain. Our procurement and manufacturing operations depend on natural resources, particularly related to water supply, the control of water volume, and climate adjustments. Meanwhile, our manufacturing operations have an adverse impact on nature through the use of water resources and by contributing to air pollution. The iron core and coking coal mining conducted at the upstream of our supply chain also impact nature through the use of terrestrial land and water resources, the emission of greenhouse gases, and pollution.

	Dependencies on nature						Impacts on nature										
	Supply service	Adjustment service					Climate change	Use of terrestrial and aquatic land			Use or resources		Pollution				
	Water resources	Air purification	Water volume control	Climate adjustment	Disaster mitigation	Erosion control	GHG emissions	Land areas	Freshwater areas	Sea areas	Water resources	Other	Air	Water quality	Soil	Waste	Disturbance
Procurement	■		■	■		■	■	■	■		■		■	■	■	■	■
Manufacturing	■	■	■		■		■	■			■		■	■	■	■	■
Product disposal																■	

■ Very high ■ High ■ Moderate □ Low

Assessment of Leading Manufacturing Sites

Our assessment of leading manufacturing sites found that the East Japan Works and the West Japan Works are located in proximity to areas of high conservation significance such as Key Biodiversity Areas (KBAs). As a result, those sites have been identified priorities for evaluation and responses.

Manufacturing site	Criteria for priority locations				
	Conservation significance	Ecosystem integrity	Degradation in ecosystem integrity	Water-related physical risks	Importance of ecosystem services
East Japan Works, Chiba	Located in proximity				Not located in proximity
East Japan Works, Keihin	Not located in proximity				Not located in proximity
West Japan Works, Kurashiki	Located in proximity				Not located in proximity
West Japan Works, Fukuyama	Located in proximity				Not located in proximity
Chita Works	Located in proximity				Not located in proximity
Sendai Works	Located in proximity				Not located in proximity

■Very high ■High ■Moderate □Low

* Assessment based on the five criteria was performed by using the following indicators and tools.
- Conservation significance: Assessed with IBAT the proximity (within a 3-km radius) to areas of conservation significance, for example, protected areas and KBAs.
- Ecosystem integrity: Assessed based on the Biodiversity Intactness Index provided by Natural History Museum
- Rapid degradation in ecosystem integrity: Assessed based on the Pressure on Biodiversity indicator provided by WWF Biodiversity Risk Filter to measure at degree of influence on nature
- Water-related physical risks: Assessed based on the Baseline Water Stress indicator through the use of Aqueduct
- Importance of ecosystem services: Assessed with the Global Forest Watch tool the proximity (within a 3-km radius) to areas under the control of Indigenous Peoples and Local Communities (IPLCs)

Raw Material Suppliers

We located the interfaces of our major iron ore and coking coal suppliers in natural settings and assessed the state of nature at those sites (6 iron ore mines and 14 coking coal). The iron ore mines are in Australia and Brazil, and our assessment found that some of those in Brazil are located near areas of conservation significance and that those in Australia are exposed to high water stress and require responses to handle water-related risks. Our coking coal suppliers are mining in Australia, Canada and Indonesia. We learned from our assessment that their mines in Canada and Indonesia are located in areas with high ecosystem integrity and that some of their mines in Australia are in areas with degrading ecosystem integrity.

Raw material	Major supplier countries	Findings from the Assessment of the Areas in Proximity to the Mines*
Iron ore	Australia	Some of the mines are located in areas exposed to high water stress.
	Brazil	Some are located in areas of high conservation significance or areas with high ecosystem integrity.
Coking coal	Australia	Some are located in areas whose ecosystem integrity is degrading.
	Indonesia	Some are located in areas with high ecosystem integrity or in areas whose ecosystem integrity is degrading.
	Canada	Some are located in areas with high ecosystem integrity.

*Assessed using the same indicators and tools as those used for the assessment of our leading manufacturing sites

Assessment of Risks and Opportunities and JFE's Responses

We sorted out nature-related risks and opportunities currently deemed potential based on the aforementioned findings. The risks, some of which are recognized in our climate change scenario analysis, include physical risks that could be materialized due to a water shortage or natural disaster and potentially trigger a decrease in production at our manufacturing sites or a lack of procurement from suppliers, apart from transition risks that might occur if regulations concerning protected areas and pollution are tightened. The potential opportunities include an increase in demand for our eco-friendly products, processes and technologies as well as related developments and an increase in new orders for our engineering business.

Meanwhile, we ensured that JFE Steel's major iron ore and coking coal suppliers had performed their assessment concerning water resources and ecosystem and had publicly announced how to respond to their detected risks. We will keep monitoring the status of their response efforts as part of our supply chain management. We will also encourage more of our suppliers to adopt and observe the JFE Steel Procurement Guidelines.

As for our own material risks and opportunities, we will maintain the current measures taken for them and, while enhancing our assessment, we will keep a close watch on whether additional measures are necessary.

Category	Risks and Opportunities
Physical risks	Destabilization in raw material procurement due to a water shortage or natural disaster
	Decrease in production capabilities due to a water shortage or natural disaster
Transition risks	Destabilization in raw material procurement due to a protected area expansion, tighter regulation, or another issue
	Increase in operational costs due to a protected area expansion, tighter regulation, or another issue
Opportunities	Increase in demand for eco-friendly products, processes and technologies, and increase in development opportunities
	Increase in demand for recycled steel products
	Increase in new demand related to natural capital considerations in the engineering business

➤ Initiatives to Address Climate Change Issues (P.52)
➤ Realizing a Recycling-Oriented Society (P.115)
➤ Initiatives for Blue Carbon Using Steel Slag Products and Acquisition of J Blue Credit™ (P.154)
➤ Restoring Marine Ecosystems Using Steel Slag Products (P.162)

Analyzing and Responding to Water Risks

As part of overall risk management, we identify, analyze and evaluate water risks based on past incidents of droughts and floods in the JFE Group's businesses, forecast data from the Meteorological Agency and results of our scenario analysis. In particular, we consider as key risks the damages to business sites and disruption of the supply chain caused by restrictions on water intake due to droughts or increasing severity of meteorological disasters. In response, we are further reinforcing measures such as using recycled water, securing alternative means, and strengthening drainage facilities.

JFE Steel Water Risk Assessment and Measures

JFE Steel identifies and evaluates water-related risks based on past incidents of damage caused by droughts and floods, forecast data from the Meteorological Agency and results of scenario analysis. We conduct a further evaluation of water risks around each manufacturing site from different perspectives by also using the World Resource Institute (WRI)'s Aqueduct, a mapping tool for evaluating overall water risks from droughts and floods in each region around the world. According to the WRI's assessment in June 2024, water risks for all of Japan are not designated at a high level or above, but there will be risks of water shortages and flooding due to weather conditions in the future (2030s and 2040s). JFE Steel identifies steelworks under such weather risks and takes measures such as business continuity planning.

JFE Steel Raised Effluent Standards to Reduce Water Resource Pollution Risks in Iron and Steelmaking Processes

JFE Steel strives to reduce its environmental impact on waterways by thoroughly purifying water used in iron and steelmaking processes before releasing it into public waterways or sewers. The company has concluded agreements with the administrative entity in each area that set out more rigorous effluent standards, compared to those stipulated under the Water Pollution Prevention Act. It also established a strict voluntary control standard to improve water quality. For FY2023, COD*, the water-quality index for wastewater, was 2.3 tonnes per day.

*COD stands for chemical oxygen demand, an indicator for water pollution in seas, oceans, lakes, and ponds. It represents the amount of oxygen (mg/l) consumed when pollutants present in water, such as organic matter, are oxidized.

JFE Engineering Proper Management in Accordance with the Water Pollution Prevention Act and Sewerage Act

Wastewater from the JFE Engineering Yokohama head office, Tsurumi works, Tsu works, and the Kasaoka Monopile Factory is released into public waterways or sewer systems. Nitric oxide, phosphorus, and COD in the wastewater are measured on a regular basis and effectively managed in accordance with the Water Pollution Prevention Act and Sewerage Act.

For more on quantitative data related to water, please refer to the following information.
➤ Environmental Data (P.235)

Environmental Impact Assessment

To minimize the ecological impact of our business activities on surrounding areas, we are monitoring biodiversity around all of our business sites and planting trees while also preserving rare species in the compound. An environmental impact assessment is conducted in accordance with laws and regulations before launching construction of a new manufacturing site or business. We assess the biodiversity of the surrounding areas as well as our premises to fully understand the situation and to implement the necessary measures for preserving the ecosystem.

Key Initiatives in FY2023

JFE Steel

Replanted a Rare Species of Orchid Found at a Planned Construction Site

Plant No. 1 in the JFE Ohgishima Thermal Power Plant, an aging facility, was renovated and resumed operations in 2019. Before this construction, we conducted an environmental prediction and evaluation for the renovation, in accordance with the Environmental Impact Assessment Act and Electricity Business Act. As a result, the Kugenuma orchid, a plant listed in Japan's Ministry of Environment's fourth version of the Red List as an endangered species (Threatened II-Vulnerable, VU), was discovered at the planned construction site for power generation facilities. To preserve the orchids, we replanted them in a different location of the site that had a similar environment.

A Kugenuma orchid discovered at the planned construction site for the JFE Ohgishima Thermal Power Plant

JFE Steel

Contributing to Biodiversity and the Creation of an Attractive Seaside Town by Utilizing Steel Slag Products (Partnership Agreement with Yokohama City)

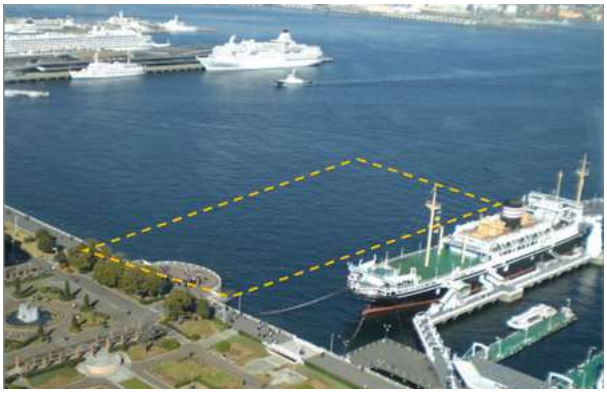
Silty sediment (sludge containing large amounts of organic matter) piles up at the ocean bed along the seaside frontage of Yamashita Park in Yokohama City, Kanagawa Prefecture, and significantly deteriorates water quality in summer. As a result, the ocean's ability to function as a spawning ground or environment for nurturing organisms has been lost.

In a joint research project with Yokohama City, JFE Steel is restoring the intrinsic ability of the waters to purify seawater with the help of marine organisms by using carbonated steel slag products such as Marine Block™ to form shorelines as a base for the adhesion of organisms and assist in improving the marine environment. Immediately after an experiment, we observed an increase in the presence of marine organisms such as starfish and sea cucumbers around the area, and the populations continuing to grow. Moreover, we estimated that 8,400 kl of seawater (equivalent to seventeen 25-meter swimming pools) is filtered per day by filter-feeding marine creatures such as bivalves and sea squirt. We also estimated their impact on the removal of COD and the reduction of CO_2 in comparison to results obtained through water purification at sewage treatment plants.

The findings from the research project were presented at many exhibits and other events, helping to raise local awareness of environmental protection. This public-private research project for improving the marine environment has earned public recognition, with Yokohama City and JFE Steel jointly receiving the FY2021 Environmental Award (Group-2) of the Japan Society of Civil Engineering*1. In September 2022, JFE Steel won the Minister of Land, Infrastructure, Transport and Tourism Award of the 5th Eco Pro Awards*2, sponsored by the Sustainable Management Promotion Organization, a general incorporated association. A signboard commemorating these awards was installed next to the sea-facing balcony in Yamashita Koen Park, displaying research findings to visitors.

*1 The Japan Society of Civil Engineering Award is a prestigious award with a history of over 90 years. The Environmental Award (Group-2) is given to an innovative project that has contributed to any combination of environmental preservation, improvement, and creation activities by developing or operating civil engineering technology or systems.
*2 The award is given to goods, services, technology, solutions, or business models with specific and outstanding eco-friendly attributes that are widely recognized by businesses, consumers, investors, and market players in the Japanese market.

- FY2021 Environmental Award of the Japan Society of Civil Engineering (https://www.jsce-int.org/node/780)
- The 5th Eco Pro Award (Japanese only) (https://sumpo.or.jp/seminar/awards/5th_eco-pro_award_results.html)



The dotted line indicates the area in which slag products are being used at Yokohama Bay (photo taken by Yokohama City)

Colony of sea squirts on Frontier Rock™

Marine Block™ covered by marine bivalves (Yokohama Bay area)

Signboard commemorating the partnership project (installed in September 2023)

JFE Steel

Advancing Biodiversity Verification of Steel Slag Products in Collaboration with Venture Businesses

JFE Steel keeps a water tank containing the coral-covered steel slag product Marine Block™ at the exhibition area at the reception of the head office, offering visitors the opportunity to enjoy watching coral and tropical fish while learning about our initiative to preserve the ecosystem using steel slag products. We also intend to conduct experiments inside the tank. Innoqua Inc.* is providing technical support for the exhibition, which has been featured by several newspapers and TV programs as an example of business collaboration in the field of the environment.

*A venture company engaged in the development of systems for managing and nurturing corals and fish by combining its aquarist know-how with IoT and AI.

Healthy coral growth on Marine Block™ inside the water tank

JFE Steel

Firefly Festival

JFE Steel has opened its Environment Pond at the Chita Works to the community for a firefly viewing festival every year since 2014. Children at the event have the opportunity to release fireflies. The Company is nurturing an environment that preserves the ecosystem together with the local community by maintaining the watering holes and surrounding environment within the steel-works site and these firefly viewing events.

Releasing firefly larvae

Stream within the Chita Works site where fireflies are released

Firefly viewing party

JFE Steel

The Chita Works Certified as an Aichi Biodiversity Company

In November 2022, our Chita Works was recognized as a certified enterprise under the Aichi Biodiversity Company Certification Program in its first term launched by Aichi Prefecture based on the Aichi Biodiversity Strategy 2030. The program is intended to encourage more businesses in the prefecture to play a pivotal role in preserving local biodiversity by certifying those that have implemented outstanding initiatives to do so.

The Chita Works is using its Biotope Chita to release firefly larvae and hold firefly viewing festivals in collaboration with the local community and nursery schools/kindergartens. Since FY2022, the Chita Works has also exchanged information about the migration of the chestnut tiger butterfly, a species that travels more than 2,000 kilometers across Japan, with municipalities on the Chita Peninsula in Aichi Prefecture. Moreover, the Chita Works is protecting the Japanese rice fish (Oryzias latipes) and Japanese honeybee (Apis cerana japonica), both domestic species.

Certified
Aichi Biodiversity Company

Chestnut tiger butterfly

Japanese rice fish

JFE Steel The "Biotope Chita" Initiative to Reproduce the Local Ecosystem

With the "Biotope Chita" built on the property, the Chita Works is working on reproducing and protecting the ecosystem of plants and animals living on the Chita Peninsula, where the Chita Works is located. Fireflies have been released in the biotope by participant children since 2014, when the Chita Works started holding a firefly viewing festival for local residents.

In 2024, the Chita Works started growing rice in the biotope in collaboration with Aichi Prefectural Handa Agricultural High School. The management of the rice paddy is left in the hands of the high school students who learn the skills in the classroom. The iron-coating powder KONABIJIN™ (iron powder products suitable for direct seeded rice), developed and marketed by JFE Steel, is used to grow rice in the paddy.

Moreover, the Chita Works is using its biotope to protect the Japanese honeybee. The bees of this domestic species build their hives there and work as pollinators for plants in the biotope, supporting its biodiversity.

The biotope in full view

Rice planting

Rice paddy

JFE Engineering Initiatives in Relation to Construction Works

For large-scale construction or construction work carried out near watersheds or mountainsides, customers and/or the relevant authorities may conduct preliminary investigations depending on the importance of preserving the surrounding environment. Various preservation conditions may then be required, including the protection of living creatures.

JFE Engineering respect the proposed conditions and thoughtfully consider biodiversity preservation by keeping the impact of construction works at a minimum. For example, the company may propose a construction method that minimizes the impact of noise or drainage pollution. For its steelworks, the status of biodiversity on its premises and in surrounding areas are checked, and necessary measures are taken to ensure preservation.

JFE Engineering: Biotope for Children's Learning Experience

JFE Engineering has conducted some renovation work at the JFE Dragonfly Path in the Tsurumi Works, and since 2009 it has been inviting children in the community to learn about the ecosystem at a biotope, Dragonfly Pond, located along this path.

The JFE Dragonfly Path Fan Club, a group mainly composed of neighborhood residents, has organized a research event that involved capturing dragonflies in order to learn about their ecology and the local environment.

Furthermore, JFE Engineering has been a cosponsor of the How Far Do Dragonflies Fly since FY2020, with the aim of improving the quality of green spaces in the Keihin coastal areas and contributing to biodiversity. The forum brings together companies, residents, governments, and experts and conducts research activities such as capturing dragonflies that fly in 15 green spaces and biotopes scattered throughout the Keihin Coastal Area and inland areas, tagging them, releasing them, and tracking their movements. The JFE Dragonfly Path also serves as one of the research sites.

Dragonfly Pond serving as biotope

JFE Engineering Participation in Kanagawa Prefecture's Reforestation Partner Program

In March 2023, the JFE Engineering Group's J&T Recycling Corporation expressed its support for the Kanagawa Reforestation 50 Year Plan and signed a memorandum of understanding with Kanagawa Prefecture on the Reforestation Partner Program*, an initiative launched by the prefecture.

The company's intent is to use the program as part of its environmental protection and harmony activities while supporting the prefecture's vision. Under the partnership, the company's employees volunteer to help thin trees and take part in other efforts for conserving forests, a valuable source of water for future generations.

The Reforestation Partner Program grants naming rights to participants for parts of the prefecture-owned forests, one of which is now called the J&T Kankyo Miracle Forest (with the word "miracle" expressed in kanji, meaning the "future is coming"). J&T Recycling Corporation is constantly enhancing its ESG initiatives to improve the environment.

New employees pruned trees in a volunteer activity

J&T Kankyo Miracle Forest

Valuation report on CO_2 absorption by the forest

*For details about the Reforestation Partner Program, please refer to:

➤ **Website for Kanagawa Prefecture (Japanese Only)** (https://www.pref.kanagawa.jp/docs/pb5/partner.html)

Endorsing and Participating in External Initiatives

As a member of the Keidanren Committee on Nature Conservation, the JFE Group endorses the Declaration of Biodiversity by Keidanren and Action Policy and actively engages in the conservation of nature and biodiversity. In addition, the Group took part in the Business for GBF Project, launched by the Ministry of the Environment and Keidanren Committee on Nature Conservation. JFE Steel's steel slag product was selected by the Ministry and Keidanren and introduced as an example of an initiative that contributes to the conservation of biodiversity. Going forward, we will deepen our understanding of and contribute to the Post-2020 Global Biodiversity Framework and other global initiatives committed to preserving nature and biodiversity.

JFE Holdings has joined the 30by30 Alliance for Biodiversity, a platform launched by the Ministry of the Environment, business associations, nature conservation groups, and other organizations. The alliance is committed to effectively protecting at least 30% of Japan's land and sea as healthy ecosystems toward the Nature Positive goal of halting and reversing biodiversity loss by 2030. JFE is going to contribute to the protection of biodiversity by carrying out various activities, including the conservation of its biotope at the Chita Works.

For further details on external initiatives, please refer to:

- Business for GBF Project, Ministry of the Environment (https://www.biodic.go.jp/biodiversity/private_participation/business/en/
- Ministry of the Environment's 30by30 Alliance (https://policies.env.go.jp/nature/biodiversity/30by30alliance/)

Products and Technologies (Preserving Biodiversity)

The JFE Group endorses and participates in the Challenge Zero initiative that is being jointly sponsored by Keidanren and the Japanese government. And we are collaborating with Yokohama City on a project that uses steel slag to improve the marine environment while also developing various products aimed at conserving biodiversity.

For more on products and technologies related to environmental protection, please refer to the following information.

- Development and Provision of Eco-friendly Processes and Products (P. 135)
- Challenge Zero (https://www.challenge-zero.jp/en/member/37)

Development and Provision of Eco-Friendly Processes and Products

Basic Policy

In accordance with its corporate philosophy of contributing to society with the world's most innovative technology, the JFE Group develops and provides processes and products for addressing climate change and reducing environmental impact. In the JFE Group Environmental Vision for 2050, we announced our initiatives for reducing the CO_2 emissions of the Group and expanding our contribution to reducing CO_2 emissions in society as a whole. Apart from these initiatives, we also strive to enhance our corporate value and play our part in realizing a sustainable society through **the development and provision of various processes and products related to preserving the global environment.**

In the steel business, the Steel Research Laboratory is engaged in research and development under the Environmental Management System (environmental strategies) to create a recycling-oriented society capable of sustainable development by providing the world's best technologies and sparking innovation. In the engineering business, the Research Center of Engineering Innovation conducts research and development of new technologies to support the society of the future, including the creation of next-generation energy and solutions to environmental problems.

➤ JFE Steel: Research and Technological Development (https://www.jfe-steel.co.jp/en/research/index.html)
➤ JFE Engineering: Technological Development (https://www.jfe-eng.co.jp/en/rd/)

For further details on the JFE Group Environmental Vision for 2050, refer to the following resources.

➤ The JFE Group Environmental Vision for 2050 (P.52)
➤ The JFE Group Environmental Vision for 2050, presentation material on May 25, 2021 (https://www.jfe-holdings.co.jp/en/investor/climate/presentation/index.html)

Initiatives

Each operating company of the JFE Group leverages its respective strengths to develop and provide a variety of eco-friendly products and technologies.

Eco-Friendly Processes, Products, and Technologies in FY2023

JFE Steel

Development of High-Efficiency Autonomous Cleaning Robot "GAZMASTER™-S"—Reduced Work Burden and Improved Safety and Productivity

Environmental Benefit: Environmental conservation
Status: Development stage

Steelmaking uses facilities for handling iron ore, coal, and other raw materials, and they are usually cleaned by workers. To meet the strong demand automation, JFE Steel developed "GAZMASTER™-S"*, a high-efficiency, autonomous cleaning robot that can clean the floors of these facilities containing piles of raw materials in lumps and powder forms. The robot is now being used by the West Japan Works (Fukuyama District) (Photo 1).

GAZMASTER™-S gets the job done even in narrow spaces and on stepped surfaces, requiring only a simple replacement of accessories depending on the space to be cleaned (Photo 2). This robot estimates its progress in cleaning a room by comparing its learned occupancy map with real-time information it obtains from its laser range scanner (Figure 1). It is capable of preventing its wheels from getting stuck and coping with low battery levels, and these functions and status conditions can be monitored and controlled using a tablet. Durability has already been assured through tests conducted at the steel

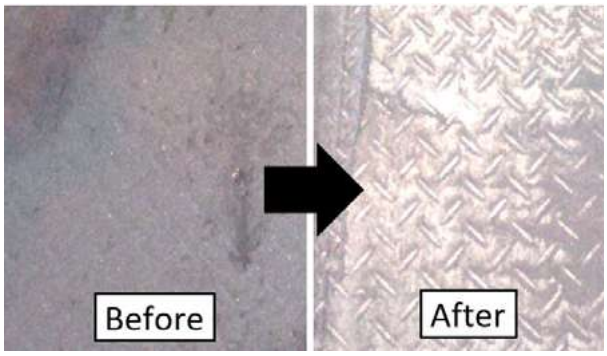
manufacturing plant in Fukuyama. JFE Steel plans to deploy GAZMASTER™-S at its other steelworks across the country to ease the burden of labor, improve safety and performance, and keep the workplaces cleaner and more pleasant.

With the launch of the JFE Digital Transformation Center (JDXC™), JFE Steel is promoting DX, including the implementation of a cyber-physical system (CPS) for manufacturing as an innovation in productivity and a means for addressing resolve safety and related issues associated with manufacturing operations, ultimately contributing to a sustainable future.

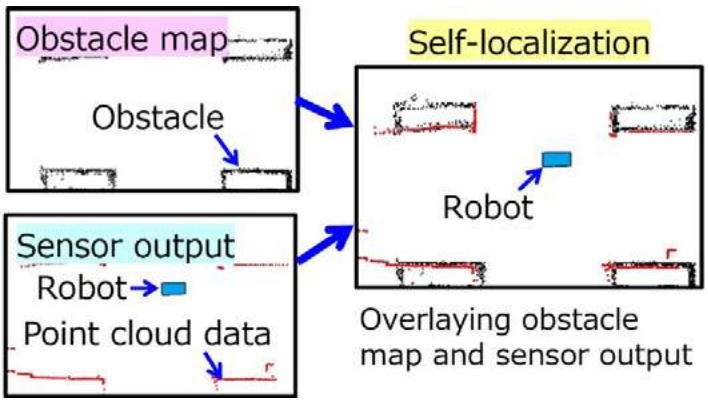
*GAZMASTAR: Coined from "Gather (dust)" and "Master".

■ Photo 1：High-efficiency, autonomous GAZMASTAR-S™ robot

■ Photo 2：Before and after cleaning



■ Figure 1: How robot calculates its position



JFE Steel

Receiving the 70th (FY2023) Okochi Memorial Technology Award for the Automation of Blast Furnace Operations through the Use of a Cyber-Physical System

Environmental Benefit: Reduce CO_2 emissions
Status: Development stage

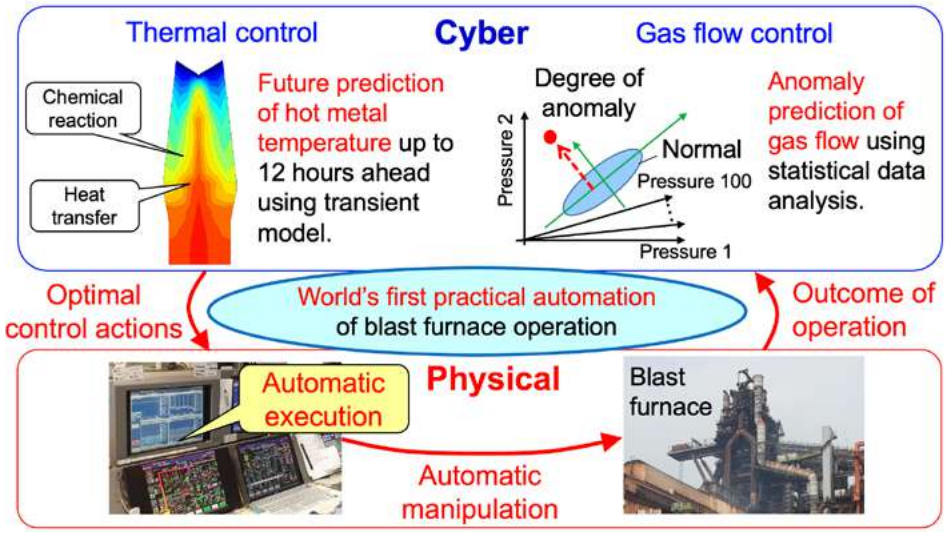
JFE Steel's data science technology progress toward establishing a cyber-physical system in furnace operations was awarded the 70th (FY2023) Okochi Memorial Technology Award, a prize granted for a unique accomplishment in the fields of industrial engineering and production engineering that significantly contributes to academic progress and industrial advancement.

Reducing CO_2 emissions from steelmaking requires increasing the efficiency and stability of blast furnace operations. While blast furnaces have high thermal efficiency, they must be handled by highly skilled operators with special knowledge and experience due to the difficulty of estimating internal conditions that are vulnerable to significant variances in the properties of raw materials and other factors. Furthermore, recently rising demand to reduce CO_2 emissions is increasing the urgency of realizing furnace operations that can be controlled more precisely and reliably than conventional ones.

JFE Steel developed a cyber-physical system that controls and optimizes hot metal temperatures and ventilation inside a blast furnace in real time. The system uses a unique model based on real-time sensor data collected from a blast furnace and estimates hot metal temperatures up to 12 hours in advance while also controlling ventilation using an anomaly detection technology. The system is already in use at JFE Steel's furnace operations, helping the company to boost labor productivity and reduce CO_2 emissions. JFE Steel plans to implement the system across its entire steelmaking operations as a productivity innovation and to increase operational safety.

Award ceremony (Mr. Kawamura, Mr. Yamazaki, Mr. Hashimoto, Mr. Hasegawa and Mr. Yamamoto, from left to right)

■ **Cyber Physical System of Blast Furnace**



JFE Steel

Verification of the Feasibility of Making Motors 48% Thinner Using Insulated Pure-Iron Powder Denjiro™

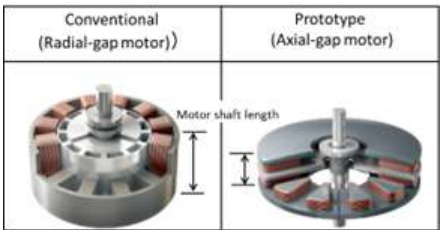
Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Commercialized

In a project with JFE Techno-Research Corporation and a venture company launched by Shizuoka University and named ARMIS CORPORATION, JFE Steel designed and prototyped a motor using Denjiro™, the company's insulated pure-iron powder. The demonstration, also conducted by the three, established the feasibility of making motors 48% thinner and 40% lighter than existing ones while maintaining the same level of horsepower by using this powder.

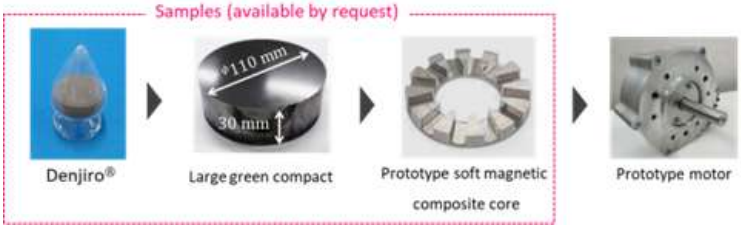
Demand continues to rise for smaller but higher-performing electric motors for industrial equipment and vehicles. Axial-gap motors, which are thinner than general radial-gap motors, can deliver high power (Figure 1). Unlike radial-gap motors, however, axial-gap motors pose a significant manufacturing challenge by requiring a three-dimensional magnetic core that cannot be made by laminating electrical steel sheets. Meanwhile, a powder magnetic core made by pressure-forming insulated magnetic powder exhibits a magnetic property that is three-dimensionally uniform and can withstand complex shapes. Denjiro™ is an insulated pure-iron powder product developed and marketed by JFE Steel. The aforementioned three parties designed and prototyped an axial-gap motor using a powder magnetic core made from Denjiro™ and tested the motor's performance (Figure 2). The test results showed that motors can be 48% thinner in height and 40% lighter compared to existing units while maintaining the same or higher level of performance (table and Figure 3). In response to these test results, JFE Steel and JFE Techno-Research Corporation launched a new service to support customers with the design of motor parts with a powder magnetic core. At the same time, the companies are now shipping samples of large green compacts for cutting and machining soft magnetic composite cores, as well as prototype soft magnetic composite cores that conform to specific designs.

In addition to developing products to meet customer demand, JFE Steel is going to increase its eco-friendly product lines to assist customers with reducing CO_2 emissions while also promoting technological exchanges with customers, including consultation on the use of technologies and support for prototype production and testing, under the goal of contributing to a sustainable future.

■ **Figure 1: Types of motors**



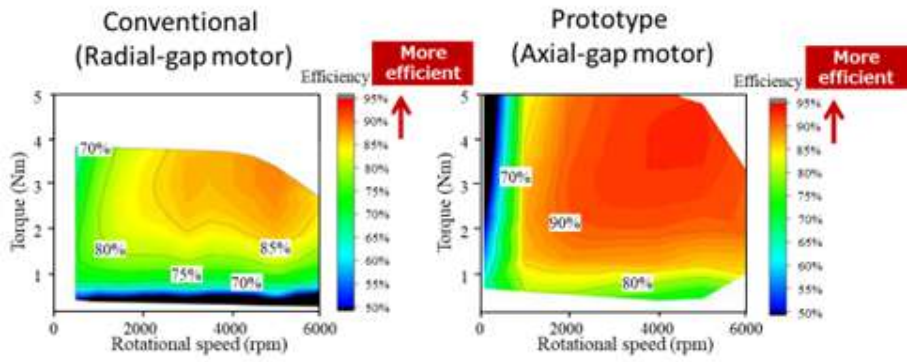
■ **Figure 2: From powder to prototypes**



■ **Conventional vs. prototype motor (test results)**

	Conventional (Radial-gap motor)		Prototype (Axial-gap motor)
Motor shaft length (mm)	90		110
Core weight (g)	1270	Thinner, Lighter	760
Core diameter (mm)	62		32
Max. efficiency (%)	89		93
Max. torque (Nm)	3.7		5.4

■ **Figure 3: Efficiency of conventional vs. prototype motor**



JFE Steel's New Insulated Pure-iron Powder for Soft Magnetic Composites Enables Prototype Axial-gap Motor to be Slimmed Down by 48% (https://www.jfe-steel.co.jp/en/release/2024/01/240116.html)

JFE Steel

Introduction of a Test Facility to Develop a Steel Product for Liquid Ammonia Tank Containers

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Development stage

JFE Steel started operating a test facility at the Steel Research Laboratory (Kurashiki District) at the end of October 2023, to evaluate the risk of stress corrosion cracking in steel products that can occur when exposed to liquid ammonia.

Amid growing worldwide initiatives for a decarbonized society, ammonia is expected to serve as an alternative fuel for thermal power generation and shipping, further increasing the importance of establishing supply chains for liquid ammonia, and the demand is rising for high strength steel required for the manufacture of larger liquid ammonia storage tanks.

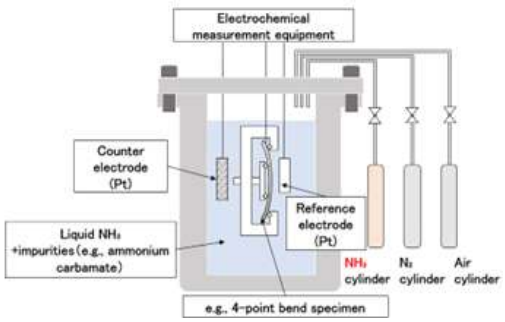
Liquid ammonia carries the risk of causing stress corrosion cracking (SCC*) in steel. Generally, higher strength carbon steel is more vulnerable to SCC when exposed to liquid ammonia. Therefore, the risk needs to be properly evaluated during the development of a high-strength steel sheet product. Since liquid ammonia is a toxic and combustible liquefied gas, JFE Steel constructed a new building (Photo 1) for housing the test facility (Figure 1) in accordance with the High Pressure Gas Safety Act, enabling the Steel Research Laboratory to perform electrical and chemical measurements in the building, in addition to evaluating the durability of raw materials against SCC through the use of test pieces soaked in the gas (Figure 2).

JFE Steel plans to make good use of this test facility to both propel the development of steel for ammonia tanks and proactively respond to other social needs, including the standardization of test methods and raw materials. The company will thereby support efforts for increasing green energy sources for a decarbonized society.

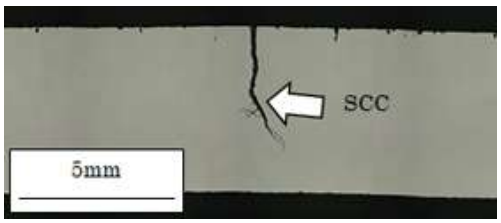
*Stress Corrosion Cracking: Occurs when metal materials are under tensile pressure and exposed to a corrosive environment.

■ **Photo 1：Example of stress corrosion cracking that occurred during test.**

■ **Figure 1: Building for testing stress corrosion cracking that occurs in liquid ammonia.**



■ **Figure 2:Overview of test equipment**



JFE Steel

Receiving the National Commendation for Invention for an Anti-Weatherability Steel Product that Does Not Require a Paint Finish Even Under Coastal Environmental Conditions

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Development stage

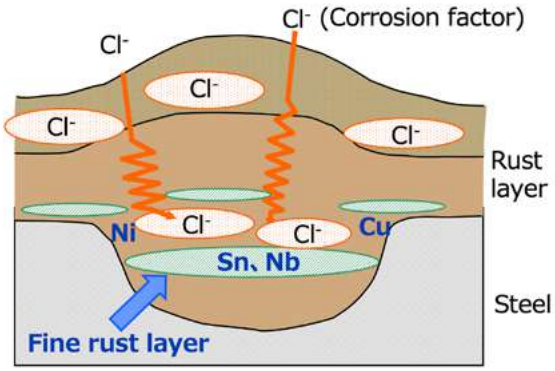
JFE Steel received the FY2024 National Commendation for Invention*1 for developing an anti-weatherability steel product that does not require a paint finish even for use in coastal settings. In addition to outstanding cost-performance, this product has weatherability nearly as high as the company's anti-weatherability nickel steel, which is popular as a material for bridges in high-salinity environments. The newly developed steel technology was applied to LALAC™-HS*2, an all-weather steel sheet product designed for use in high-salinity environments. LALAC™-HS already boasts a record of being selected as a material for five bridges in and outside Japan.

The company's anti-weatherability nickel steel is made with 1–3% additional nickel to achieve the prominent all-weather property, which has however made the product rather expensive. Instead of nickel, this award-winning invention adds a combination of tin and niobium. These elements thicken locally in the bottom layer of rust and form fine rust just as the anti-weatherability nickel steel would do, thereby controlling the permeation of chloride ions, which accelerates corrosion, into the steel (Figure 1). The anti-weather property of tin and niobium performs well even in small amounts thanks to their local thickening and allows a significantly reduced use of nickel, making this invention more affordable than anti-weatherability nickel steel, while exhibiting nearly the same level of weatherability (Figure 2). This newly-developed steel product with high weatherability and outstanding cost performance is expected to significantly reduce life cycle costs for structures by eliminating the need for painting or repainting.

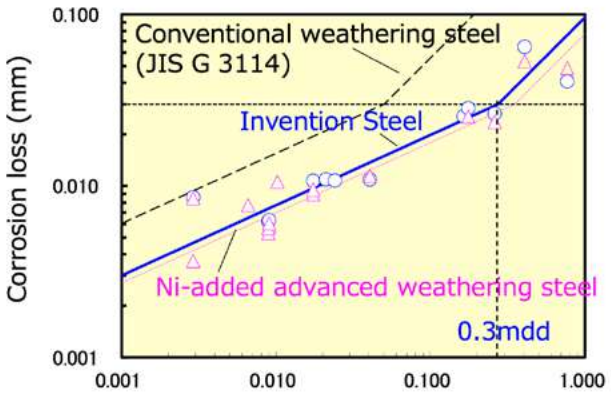
JFE Steel intends to further expand the applications for this new product and develop other steel products with high functionality and quality, thereby increasing the safety and durability of steel bridges and contributing to a sustainable future.

*1 Sponsored by the Japan Institute of Invention and Innovation (Chairman: Takeshi Uchiyamada). This commendation, which is intended to encourage the advance of science and technology in Japan and support the nation's industrial development, is given to an invention, idea, or design that has delivered or is expected to deliver significant benefits due to its excellence.
*2 LALAC™-HS: Abbreviation for Low Alloyed & Low Atmospheric Corrosion Steel – High Salinity.

■ Figure 1: Pattern Diagram Showing the Distribution of Elements in Rust Layers



■ Figure 2: Exposure Test in Real-Life Environments



JFE Steel

Receiving the FY2023 Ministry of the Environment Commendation for Action for Climate Change for the Development of an Ultra-Hydraulic Hydrogen Accumulator Using Steel and Carbon Fiber-Reinforced Resin Layers in Combination

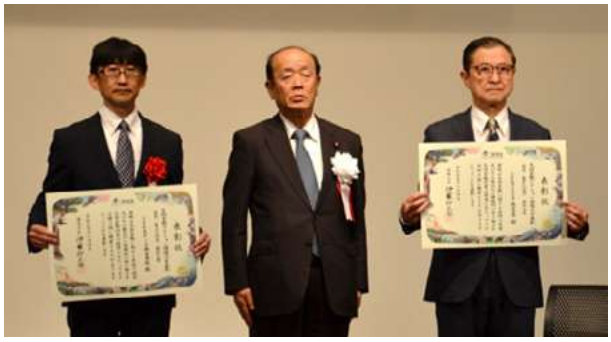
Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Development stage

JFE Steel's and JFE Container's joint "Development of Ultra-Hydraulic Hydrogen Accumulator Using Steel and Carbon Fiber-reinforced Resin Layers in Combination" received the FY2023 Ministry of the Environment Commendation for Action for Climate Change in the Development and Productization (the Mitigation domain) category.

Hydrogen is being studied as a source of energy in a number of fields worldwide because it does not emit CO_2 during combustion. For example, hydrogen stations represent a key component for popularizing its use as a green fuel for vehicles. The incorporation of a hydrogen accumulator for high-pressure storage enables these stations to essentially serve as stationary, large-capacity reservoirs that can quickly fill hydrogen into a vehicle.

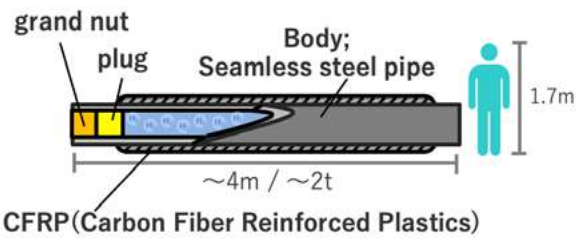
This award-winning hydrogen accumulator was designed and is now manufactured by JFE Container using JFE Steel's ultra-thick seamless steel pipe with high resistance to hydrogen embrittlement. The Carbon Fiber Reinforced Plastic (CFRP) of Mitsubishi Chemical Group Corporation is also used for the body of the accumulator to support a wide pressure range up to the highest levels in the industry. The accumulator was developed under a project of NEDO (New Energy and Industrial Technology Development Organization) and has been marketed by JFE Steel since FY2019, after having been authorized by the High Pressure Gas Institute of Japan and specially approved by the Minister of Economy, Trade and Industry in FY2018. The product is in use by multiple hydrogen stations around the country and has been recognized for its outstanding performance. It is also used for medium-pressure hydrogen accumulators, high-pressure hydrogen accumulators, and mock containers of the Fukushima Hydrogen Filling Research Center. The research facility was built under another NEDO project and mainly uses hydrogen produced by the adjacent processing facility, Fukushima Hydrogen Energy Research Field (FH2R). It facilitates the development and verification of filling and measurement technologies for large-flow-rate hydrogen for heavy-duty fuel-cell vehicles.

To further popularize the Ultra-Hydraulic Hydrogen Accumulator, JFE Steel is seeking to increase its manufacturing capacity and further developing the product to increase its internal volume, pressure range, and amplitude cycles to meet specifications likely to be requested as hydrogen stations become more popular for filling up fuel cell buses and trucks.



Award Ceremony (Dr. Takagi, JFE Steel Co., Mr. Yagi, State Minister of Environment, Mr. Takano, JFE Container Co.)

■ **High-pressure hydrogen accumulator**



JFE Steel

The Company's Proprietary Wall Bending and Restrike Method Selected for Production of Parts Supplied to a Major Japanese Automaker—Development of a Forming Method to Suppress the Springback of Ultra-High Tensile Steel Sheets

Environmental Benefit: Reduce CO_2 emissions
Status: Development stage

JFE Steel's Wall Bending and Restrike Method has been adopted and used to produce inner rockers, a body frame component, for use in vehicles manufactured and sold by a major Japanese automaker. The Wall Bending and Restrike Method, a press-forming method, is applied to suppress the springback of 1,180 MPa class, ultra-high tensile steel sheets. JFE Steel has provided customers with these steel sheets to meet increasing demand due to the need for lighter-weight vehicles to reduce CO_2 emissions and boosting fuel efficiency. Since pressed steel sheets are subject to springback—that is, returning to their original shape when removed from a mold—springback conditions must be corrected. Press-formed ultra-high tensile steel sheets generate greater stress than ordinary steel sheets and are therefore more susceptible to higher levels of springback. The resulting challenge of controlling deformation from the intended shape and the increased difficulty of bonding with other component parts has been a bottleneck to the wider application of ultra-high tensile steel sheets.

The Wall Bending and Restrike Method provides a solution for reducing springback by applying an offsetting force to springback-induced stress, particularly through the optimization of sheet shape prior to press-forming. The inner rockers, a structural component at the bottom of a vehicle door, for which the Wall Bending and Restrike Method is used, are manufactured by Kyoho Machine Works, Ltd., and the application of this method to mass-production molds was achieved through a joint development by this company and JFE Steel.

JFE Steel is actively working on what it calls Early Vendor Involvement (EVI), an activity beyond the supply of raw materials, to provide customers with solutions to help them develop new products and increase the performance of existing ones. JFE Steel is developing various steel application technologies to offer comprehensive solutions, including a systematized solution called JESOLVA™, which is short for JFE Excellent Solution for Vehicle Application. JFE Steel strives to broaden the application of its ultra-high tensile steel sheets and help customers boost the performance and trim the weight of their vehicles to contribute to a sustainable future.

■ Inner rocker made with the Wall Bending and Restrike Method

JFE Steel

The Company's Proprietary Forming Technologies for Ultra-High Tensile Steel Sheets Adopted and Used for the Production of Parts for Suzuki Swift— An Inflow Control Method for Reducing Wrinkles around Pressed Areas and the Stress Reverse Forming™ Method for Reducing Variation in Dimensional Accuracies

Environmental Benefit: Reduce CO_2 emissions
Status: Development stage

JFE Steel's inflow control method and the Stress Reverse Forming™ Method were adopted and have been used for the production of three front bumper parts for Suzuki Swift to reduce the formation of wrinkles at pressed areas of 980–1,180 MPa class, ultra-high tensile steel sheets and reduce variation in dimensional accuracies.

JFE Steel has provided customers with ultra-high tensile steel sheets to meet rising demand due to the need for lighter weight vehicles to reduce CO_2 emissions and raise fuel efficiency. When press-formed into a curvature shape, press wrinkles form on the steel sheets and the sheets tend to springback to their original shape; both conditions need to be corrected.

While contributing to vehicle weight reduction, ultra-high tensile steel sheets are susceptible to press wrinkles, mold damage, and shape variation, and all these issues are more likely to occur with thicker, stronger steel sheets, a factor that has inhibited the wider application of ultra-high tensile steel sheets. JFE Steel's inflow control method is capable of reducing the

formation of press wrinkles, particularly those around the flanges of pressed areas, by optimizing the inflow of materials at multiple press-forming processes.

The Stress Reverse Forming™ Method is designed to reduce variation in the scale of springback (or variation in dimensional accuracies), which increases as ultra-high tensile steel sheets have higher levels of strength. When press-formed, ultra-high tensile steel sheets are more susceptible to springback and to large variation in strength intensities than regular steel sheets. The Stress Reverse Forming™ Method uses the Bauschinger Effect, or the mechanical phenomenon in which deformation stress in steel sheets decreases immediately after the direction of the deformation is reversed. This method enables customers to stabilize their production of press parts even if there are changes in the intensities of steel sheets.

The front bumper parts for which these two methods are used are manufactured by Okamoto Press Industry, Co., Ltd. In fact, both the inflow control method and the Stress Reverse Forming™ Method were jointly developed by Okamoto and JFE Steel.

JFE Steel is actively working on what it calls Early Vendor Involvement (EVI), an activity beyond the supply of raw materials, to provide customers with solutions to help them develop new products and increase the performance of existing ones. JFE Steel is developing various steel application technologies to offer comprehensive solutions, including a systematized solution called JESOLVA™, which is short for JFE Excellent Solution for Vehicle Application. JFE Steel strives to broaden the application of its ultra-high tensile steel sheets and help customers boost the performance and trim the weight of their vehicles to contribute to a sustainable future.

JFE Steel

Ultra-High Tensile Steel Sheet Product Adopted for the First time as a Material for a Hybrid EV Battery Module Component

Environmental Benefit: Reduce CO_2 emissions
Status: Development stage

The 980 MPa class galvanized steel sheet was the first of JFE Steel's ultra-high tensile steel sheet products to be selected and used as a material for a lithium-ion battery module frame used in hybrid EVs.

A vehicle battery pack is comprised of multiple battery cells and bound with a steel frame to achieve a high power output. The frame must have a high bonding force to prevent the battery from swelling and from losing performance due to heat during use, and thus there has been demand for a high strength steel sheet. However, high-strength steel sheets are known to be susceptible to fracture when formed by bending. This process is required to minimize the curvature of the folding area of the frame to almost a 90-degree angle and thereby shrink the size of the battery module.

This issue can now be resolved with the use of a press-forming method using CAE* and product specs developed by J-MAX Co., Ltd., both of which have enabled the use of JFE Steel's 980 MPa class, galvanized steel sheet that has the high processability suitable for a battery module frame on hybrid EVs. This galvanized steel sheet is a product of the JEFORMA™ series, a lineup of steel sheets with high strength and high bending formability, properties achieved by optimizing the metallographic structure of the steel sheet through intricate temperature control at the continuous galvanizing facility of the West Japan Works (Fukuyama District). JFE Steel is seeking to expand the application of this galvanized steel sheet and will develop products and methods that will also satisfy customer needs. JFE Steel will contribute to a sustainable future by supporting customers in their development of safe, eco-friendly vehicles with lower CO_2 emissions and higher performance.

*Computer-Aided Engineering. A design tool using computer simulation.

■ Ultra-High Tensile Steel Sheet Product Adopted for a Hybrid EV Battery Module Component

JFE Engineering JFE Engineering's Commitment through Its Business

With the corporate purpose "Foundation of Life—Just For the Earth" in mind, JFE Engineering is committed to achieving the SDGs in five areas: waste to resources, carbon neutrality, combined utility services, infrastructure, and digital transformation (DX).

Waste to resources businesses include food recycling, plastic recycling, and waste incineration/power generation. Businesses related to carbon neutrality focus on renewable energies, such as offshore wind, solar, biomass, geothermal, and hydroelectric power generation. Combined utility services offered by the company include utility services (e.g., water, electricity, gas) that address regional concerns by launching new local electric power companies and offering heat supply services. The company's infrastructure business constructs bridges, gas plants, waterworks plants, pipelines, and other infrastructure by identifying needs such as robustness and longer service life. The DX project involves improving the efficiency of daily work as well as providing products and services that leverage digital technologies such as AI and IoT.

- JFE GROUP REPORT 2021 (PP. 43–44) (https://www.jfe-holdings.co.jp/en/common/pdf/investor/library/group-report/2021/all.pdf)
- JFE Engineering's Five Fields in the Medium- to Long-term Strategy (https://www.jfe-eng.co.jp/en/information/vision.html)
- JFE Engineering DX Strategy (https://www.jfe-eng.co.jp/dx/en/index.html)

JFE Engineering Offshore Wind Power: Launch of Operation at the Kasaoka Monopile Factory

Environmental Benefit: Renewable energy and reduce CO_2 emissions
Status: Business expansion
Feature: Production of monopile foundations for offshore wind turbines

Amid growing expectations for offshore wind power as a source of green power production, an increasing number of projects are being introduced, as is seen in the public tender launched by the Japanese government in 2020 to select offshore wind power generation operators under the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities. Foundation structures supporting offshore wind turbines are roughly categorized as seabed-fixed and floating. Seabed-fixed generators that can be installed in shallow sea areas are called monopile foundations. These are also the most economical option.

JFE Engineering built Japan's first factory for monopiles on the premises of JFE Steel's West Japan Works (Fukuyama District) Kasaoka City, Okayama Prefecture, and started operating the factory in April 2024. The Kasaoka Monopile Factory uses large, heavy steel plates supplied by JFE Steel's West Japan Works (Kurashiki District) and is therefore reducing the amount of welding and streamlining assembly. The factory has an annual manufacturing capacity of around 100,000 tonnes of monopiles, with each unit having a diameter of up to 12 m, a plate thickness of 130 mm, a length of around 100 m, and weighing around 2,500 tonnes. The factory is also capable of manufacturing transition pieces for joining monopiles with wind turbine towers as well as large-scale steel pipes for building the columns of floating foundation structures.

Ceremony inaugurating the Kasaoka Monopile Factory

- Offshore Wind Turbine Foundations (Efforts for the Offshore Wind-Power Business) (Japanese only) (https://www.jfe-eng.co.jp/products/life/owp02.html)
- Completion of Japan's first manufacturing base of fixed-bottom foundation (monopile) for offshore wind turbines -Kasaoka Monopile Factory begins operations on April 1st!- (https://www.jfe-eng.co.jp/en/news/2024/20240401.html)

JFE Engineering

Offshore Wind Power, a Foray into O&M through a Remote Integrated Management System

Environmental Benefit: Renewable energy and reduce CO_2 emissions
Status: Business expansion
Feature: Remote management of offshore wind power plants through the use of digital technology

For more than 25 years since 1996, JFE Engineering has been involved in EPC for onshore wind-power stations (131 generators at 25 sites) in addition to equipment supply and associated maintenance services. JFE Engineering will fully leverage its deep, extensive expertise in onshore wind power generation as well as technologies owned by other JFE Group companies to grow and advance its O&M services for offshore wind power plants.

In October 2023, JFE Engineering launched a 20-year O&M contract for offshore wind power facilities (three generators with the max output of 7,495 kW) off the coast of Nyuzen in Toyama Prefecture. These facilities were built under Japan's first offshore wind energy project in a general sea area. JFE Engineering adopted a remote integrated management system for this project, the first of its kind in the nation for an offshore wind power project. The use of the system is allowing the company to provide systematic and preventive maintenance services and facilitate sensor management and data analysis for failure detection and diagnosis.

Nyuzen offshore wind power station (Photo by VENTI JAPAN, Inc.)

JFE Engineering

Contributing the Company's Horizontal Directional Drilling Method to Japan's First Installation of Telecommunication Optical Fiber Cables across Tokyo Bay

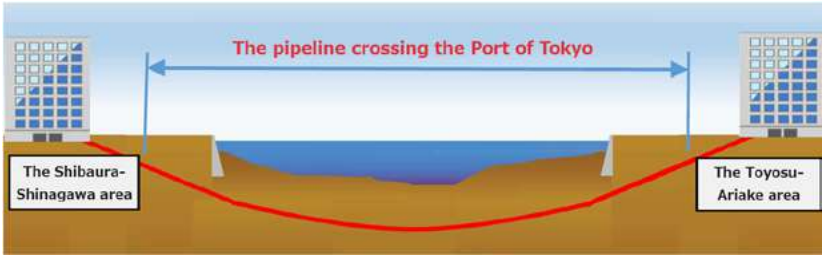
Environmental Benefit: Reduce environmental impact
Status: Commercialized
Feature: Telecommunication cable installation with the company's Horizontal Directional Drilling Method

JFE Engineering has completed the construction of a transmission channel across Tokyo Bay as a project ordered from Nippon COMSYS Corporation. The ongoing advance of information and telecommunication technologies have made telecommunication networks indispensable in daily life, and the growing volume of telecommunication traffic requires an increasing number of optical communications facilities.

Construction involved laying a pipeline for installing telecommunication optical fiber cables between Tokyo's Shibaura and Shinagawa areas, where many tech companies are located, and between the city's Toyosu and Ariake areas, thereby establishing a network with the shortest route. The challenging work required laying the pipeline deep undersea to prevent damaging seawalls and other protection structures around Tokyo Bay as well as handling nearly 2,000 meters of pipeline, one of the longest in Japan. The construction was completed successfully without accident within just two months, thanks to the use of the JFE-RAPID™ method, a pipeline technology developed by JFE Engineering to facilitate quick, low-cost construction.

The JFE-RAPID™ method makes it possible to bring down construction cost and shorten the work period by drilling at the sea bottom and moving the pipeline forward through a circular boring method instead of installing vertical shafts. This is an effective method for installing telecommunication cable and a promising technique for laying power cable pipelines for offshore wind-power stations.

■ **The pipeline (for illustrative purpose only)**



Propulsion machine

➤ JFE Engineering Completes the Construction of a Pipeline Crossing Tokyo Bay—Contributing with the Company's Horizonal Directional Drilling Method to Japan's First Installation of Telecommunication Optical Fiber Cables across the Bay (Japanese only)
(https://www.jfe-eng.co.jp/news/2024/20240523.html)

JFE Engineering

Aqua Connect Namie Corporation Launches Hydroelectric Power Generation Business at the Ukedogawa Hydro Power Plant

Environmental Benefit: Recycle resources and reduce CO_2 Emissions
Status: Commercialized
Feature: Matching local social needs and JFE Engineering Group's technologies

Aqua Connect Namie Corporation, a company established through the joint investment of JFE Engineering with The Tokyo Electric Generation Co., Ltd. and the Ukedogawa Land Improvement District (the town of Namie in the district of Futaba, Fukushima Prefecture), launched its power generation business at the Ukedogawa Hydro Power Station, becoming the first hydrogen power generation business for JFE Engineering. The business was established to take advantage of the agricultural water supplied from the Ogaki Dam to the ward of Odaka in the city of Minamisoma and to the towns of Namie and Futaba in the district of Futaba.

The Ukedogawa Hydro Power Station, with its waterwheel and power generator located at the foot of the Ogaki Dam, generates power by using the energy produced from the difference in water levels. All the power generated at this station is sold through the Feed-in Tariff System. Aqua Connect Namie Corporation is committed to operating the station safely and stably while supporting farmers in the Ukedogawa area. The company will thereby contribute to carbon neutrality and a sustainable future.

Celebrating the completed construction of the Ukedogawa Hydro Power Station

➤ Aqua Connect Namie Corporation Launches Power Generation Business at the Ukedogawa Hydro Power Station (Japanese only)
(https://www.jfe-eng.co.jp/news/2024/20240521.html)

JFE Engineering | Provision of Combined Utility Services

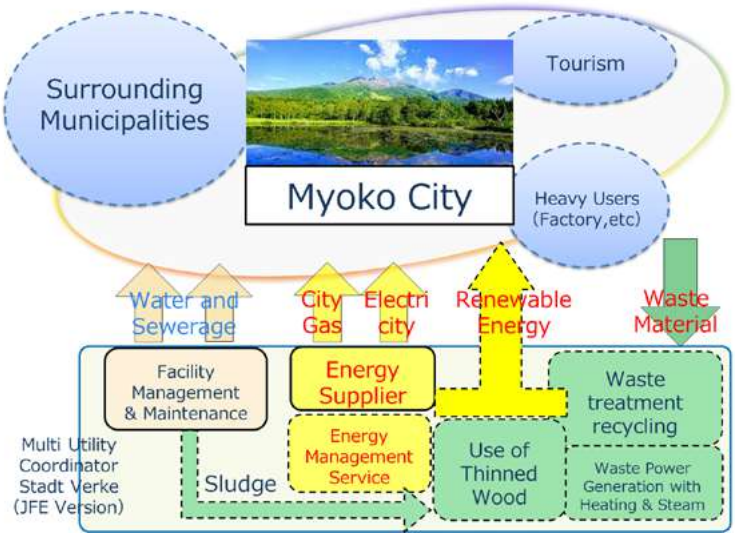
Environmental Benefit: Electric renewable energy and reduce CO_2 emissions
Status: Commercialized
Feature: Matching local social needs and JFE Engineering Group technologies

Myoko Green Energy Co., Ltd. was established through co-funding by JFE Engineering, Hokuriku Gas Co., Ltd., and INPEX Corporation under a basic agreement with the city of Myoko concerning the transfer of the municipal gas business and the delegation of the water and sewage services from the city to the private sector. The company has been providing utility gas, supplying water, and managing sewage for Myoko City, Niigata Prefecture, since April 1, 2022, to establish an urban infrastructure that ensures stable utility services for the citizens.

Myoko City, where the company is located, announced the Myoko Zero-carbon City Declaration in June 2020 and enacted an ordinance promoting it in April 2021. Because of the project's focus on carbon neutrality, Myoko was selected by the central government as a SDGs Future City in May 2021 and has been working on the project plan. To contribute to this initiative, Myoko Green Energy entered into a partnership for realizing a zero-carbon society with Myoko on March 14, 2022. One of the goals of the partnership focuses on the local production and consumption of electricity. To that end, the company started a local effort to collect and recycle renewable energy sources and has since distributed approximately 3,000 kW of zero-carbon electricity to 20 establishments belonging to the city.

Myoko Green Energy aspires to serve as a utility coordinator for local communities and is acquiring the required capabilities for handling infrastructure projects and services like those conducted and provided by Stadtwerke in Germany (See the diagram below).

■ **Myoko Green Energy's vision for itself in the future—Serving as an infrastructure company**



➤ Myoko Green Energy Receives the Award of Excellence in the "1st Commendation of Outstanding PPP/PFI Business Practices" from the Cabinet Office (Japanese only)
(https://www.myoko-green-e.co.jp/information/内閣府 第1回ppp-pfi事業優良事例表彰「優秀賞」を受/)

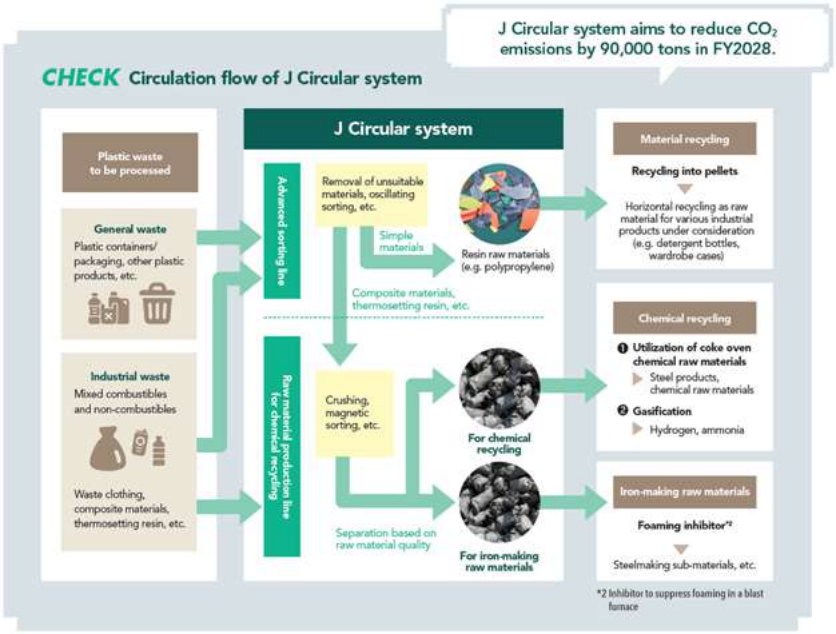
JFE Engineering | Promoting Plastic Recycling

Environmental Benefit: Recycle resources
Status: Commercialized
Feature: Matching local social needs and JFE Engineering Group technologies

J&T Recycling Corporation joined Sendai City's plastic recycling project, the first of its kind authorized by the Minister of the Environment and the Minister of Economy, Trade and Industry. The project was launched under the renewed Act on Promotion of Resource Circulation in September 2022 and subsequently started a service in April 2023 to recover waste plastic products and containers in the city. Waste plastic products previously had been disposed of by incineration, and the service launched by J&T Recycling to recover waste plastic products and containers has boosted the efficiency of the city's plastic recycling efforts.

Moreover, J&T Recycling partnered with the JR East Japan Group and established J Circular System Co., Ltd., in Kawasaki, Kanagawa Prefecture in July 2023 to promote the recycling of plastic items across the country. The company's facilities are capable of processing 200 tons of waste plastic a day as one of the largest recycling operations in the Tokyo metropolitan area. J Circular System is expected to launch full-scale operations in April 2025, to include segregating waste plastic items by type beyond simply recovering them, and recycling the goods into raw materials for other plastic items or converting them into chemicals.

In cooperation with the city of Kawasaki and its neighboring municipalities, J Circular System is developing a plastic recycling plant based on the aforementioned renewed act and seeking to obtain a national license to operate its integrated plastic-recycling business. This will help make the conventional intermediate treatment process for waste plastic simpler and more rational.



➤ J&T Recycling Corporation Joins the Municipal Waste Plastic Recycling Project of Sendai as Japan's First Private-Sector Recycling Operator

➤ J&T Recycling Corporation Establishes J Circular System Co., Ltd.—Its Plastic Recycling Facilities on the Kawasaki Waterfront Have the Largest Scale in the Tokyo Metropolitan Area

JFE Engineering

Renewal of the Chugoku Expressway, the Company's Largest-Scale Project

Environmental Benefit: Reduce environmental impact
Status: Commercialized
Feature: Proprietary technology for streamlining bridge construction

Large-scale construction to renew aging express highways are either underway or about to be launched around Japan. The Chugoku Expressway, western Japan's traffic aorta opened in 1970 to coincide with the Japan World Exposition Osaka 1970, is one of these aging highways, with the renewal under way between Suita JCT and Chugoku-Ikeda IC toward completion in October 2024. This project involves replacing a total length of 10.8 km of bridges and using about 17,300 tonnes of steel. JFE Engineering represents a joint venture established for this project at the largest scale JFE Engineering has ever undertaken.

In March 2023, the work requiring all-day closures, one of the larger construction components of this project, was completed. The work was carried out in six separate 90-day sessions to ease public impact, because the bridges stand along the Osaka Central Loop Motorway and intersect with railways. During periods of heavy traffic, however, the closures had to be suspended, limiting the available time for this work. Several new methods and technologies proposed by JFE Engineering, including the company's jack-up method, were adopted to facilitate these all-day closures.

The JFE Engineering's jack-up method allows for construction preparation regardless of weather conditions while maintaining a constant workload. This method, in which new beams are built below older ones, also reduces the costs of scaffolding and the need to transport new beams while streamlining construction.

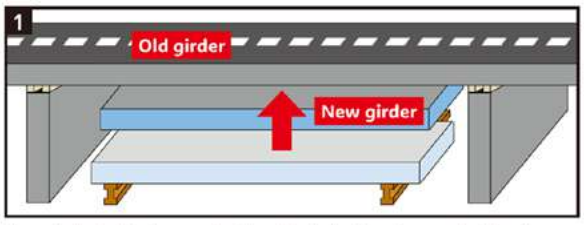
JFE Engineering will deploy its latest technologies and rich expertise to minimize the disruptive impact of bridge renewal work on traffic and society.

Installing a beam with the Jack-up Method

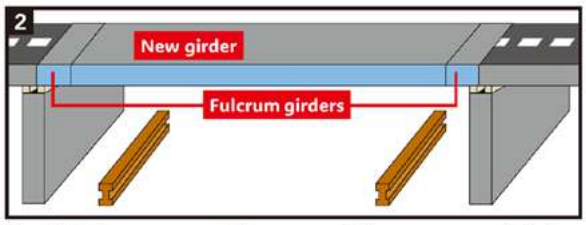
Replacing an old beam with a new one

JFE Engineering's Jack-up Method

This is a method for assembling new bridge beams in advance and thereby enabling them to immediately replace old ones after a highway has been closed off. New beams are used as the scaffolding for removing old ones. The method allows operators to arrange workers and machines in advance while maintaining a constant workload during a highway closure.



New girder jacked up under the old girder (used as scaffolding for new girder)



The old girders are removed by crane, and the new ones are jacked up to the same level. The fulcrum girders are also installed by crane

JFE Dayori (April 1–September 30, 2023) (P. 6) (Japanese only)
(https://www.jfe-holdings.co.jp/common/pdf/investor/stock/for_investors/2023/2023cyu-jigyou.pdf)

JFE Engineering

Development of a Waste Chemical Recycling Technology (C-PhoeniX Process™) through the Use of the Green Innovation Fund

Environmental Benefit: Recycle resources
Status: Development and verification stage
Feature: Participating in a national technology development project

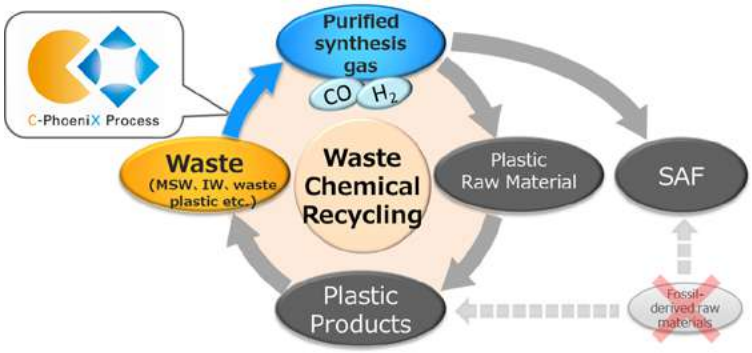
JFE Engineering responded to a public invitation to participate in a Green Innovation Fund Project issued by NEDO (New Energy and Industrial Technology Development Organization) in February 2024 and was selected*1. Following more than two decades of trial and error, JFE Engineering established a technology to convert domestic and other kinds of waste into processable gases. The company's unique gasification furnace has the longest running record in the world. The company is currently developing a new gasification technology, C-PhoeniX Process™ (or CX Process™), to improve and ultimately replace the current technology for carbon neutrality.

The C-PhoeniX Process™, based on the company's accumulated technological expertise, exhibits an advanced capability to constantly produce high-quality, purified synthesis gases, consisting primarily of hydrogen and carbon monoxide, from a wide range of waste materials. Once established, this technology will be applicable to the waste-to-chemical (WtC) process, enabling many types of waste to be recycled for different purposes, including the production of plastic, sustainable aviation fuel (SAF), and hydrogen.

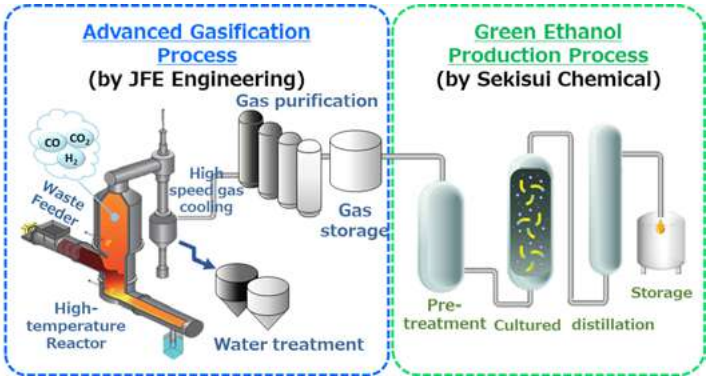
Through the use of the national Green Innovation Fund, JFE Engineering is set to develop a waste chemical recycling technology in cooperation with SEKISUI CHEMICAL Co., Ltd., which owns a technology for converting waste-originated purified synthesis gases into ethanol. In the meantime, JFE Engineering will accelerate the development of its C-PhoeniX Process™ for the advancement and social implementation of WtC. Development under the Green Innovation Projects is scheduled to be completed by the end of FY2030. JFE Engineering will deploy these two technologies, once established, overseas as well as in Japan, and will thereby contribute to the achievement of carbon neutrality by 2050.

*1 NEDO launches its Green Innovation Fund Projects to Achieve Carbon Neutrality in Waste and Resource Circulation

■ Overview of Waste Chemical Recycling



■ Entire Process and Development Domains



- Developing the Advanced Waste-to-Chemical Gasification Process, the "C-PhoeniX Process™" Toward Practical Use in Society
(https://www.jfe-eng.co.jp/en/news/2024/20240207.html)
- "Waste-to-Chemical Technology Development for Green Ethanol Production by Integrating Advanced Gasification and Biochemical Conversion Technologies" adopted for the NEDO Green Innovation Fund project
(https://www.jfe-eng.co.jp/en/news/2024/20240215.html)

JFE Engineering

The Energy Forest Project (Demonstration Project for Creating Stable and Effective Supply Systems of Woody Biomass Fuel)

Environmental Benefit: Renewable energy and reduce CO_2 emissions
Status: Development and verification stage
Feature: Participating in a national technology development project

The town of Yuni, located in Hokkaido, and JFE Engineering are jointly carrying out an Energy Forest Project, which will continue until the end of FY2028. This project, named JFE Forest NEXTAGE Project and drawn up by JFE Engineering, was selected by NEDO (New Energy and Industrial Technology Development Organization), a national research and development agency, for inclusion in the FY2023 Demonstration Project on Development of New Fuel Sources Such as Fast-growing Trees on August 3, 2023. JFE Engineering is specifically engaged in pioneering research for creating a large "energy forest," involving the silviculture of trees that grow well and fast in a subarctic climate (clean larch and Sakhalin willow) on land owned by the town of Yuni.

The town of Yuni is seeking to nullify CO_2 emissions by 2050 under the Unicho Zero Carbon City declaration. JFE Engineering is working with the town of Yuni to contribute to carbon neutrality and prevent global warming, thereby fulfilling its corporate purpose, "Foundation of Life—Just For the Earth."

Signing the Agreement Concerning the Energy Forest Demonstration Project with the town of Uni

- The Town of Uni and JFE Engineering Enter into an Agreement Concerning the Energy Forest Demonstration Project

Eco-friendly Processes, Products, and Technologies that Were Upgraded

JFE Steel Certification by SuMPO's EcoLeaf Environmental Labeling Program

Environmental Benefit: Reduce environmental impact
Status: Commercialized

JFE Steel has acquired certification for EcoLeaf, a Japanese environmental product declaration (EPD) program managed by the Sustainable Management Promotion Organization (SuMPO) in Japan for three types of steel sheets for cans: tinplate, JFE Universal Brite (laminated steel sheet), and tin-free steel; five types of building materials: H-beams, JFE Super HISLEND-H beams, extra- thick H beams, construction steel plates, and construction steel columns; and three types of steel plate products: for offshore structures and wind power generating equipment, ship building, and UOE steel pipes; and three types of steel pipes: welded steel pipes, seamless steel pipes, and Kakuhot™ construction seamless square steel pipes.

EcoLeaf is a Type III EPD program managed by SuMPO for quantitatively disclosing the environmental impact of products and services throughout their life cycle, from raw material procurement to disposal and recycling in accordance with ISO 14025:2006 (environmental labels and declarations, Type III Environmental Declarations, Principles and Procedures). The environmental impact of our products is presented as graphic representations of data to increase transparency. The disclosure of environmental impact data with fairness and reliability assured by third-party review and verification enables customers to quantitatively and objectively evaluate the environmental impact of the products they use.

EcoLeaf was renamed SuMPO EPD in April 2024. Going forward, JFE Steel will actively promote the acquisition and publication of SuMPO EPD for its products.

➤ SuMPO Environmental Labeling Program (https://ecoleaf-label.jp/en/)

JFE Steel Ferro-Coke

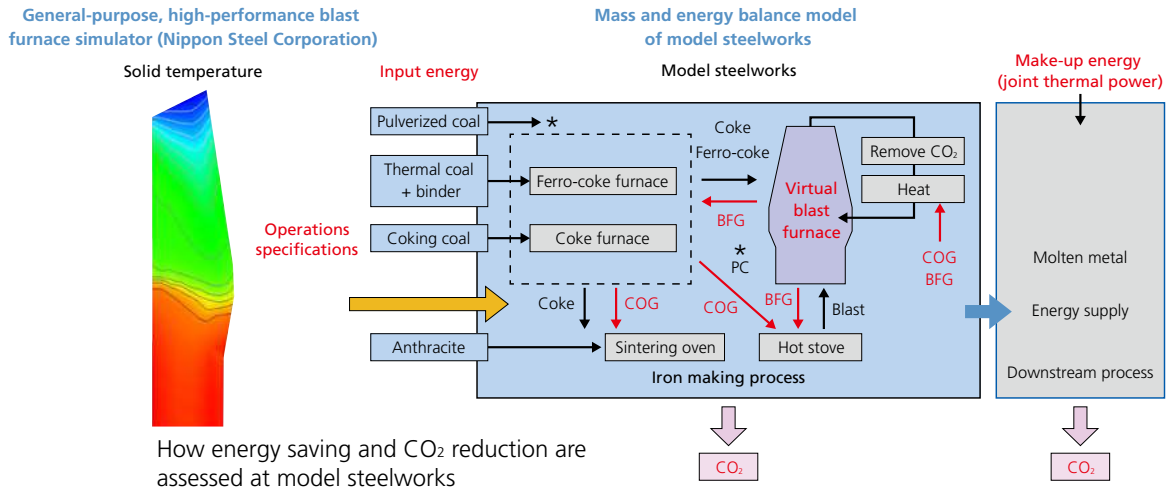
Environmental Benefit: Save energy and reduce CO_2 emissions
Status: Experimental operation

Ferro-coke is an innovative raw material for blast furnaces made by mixing low-grade coke and iron ore. In this energy-saving technology, metallic iron contained acts as a catalyst, reducing the amount of coke required in the furnace and thus significantly reducing CO_2 emissions in the iron making process.

In the six years from FY2017 to FY2022, JFE Steel engaged in a project to develop environmental technology for the steelmaking process, and technological development of the iron making process using ferro-coke, a project by the New Energy and Industrial Technology Development Organization. In 2022, the company conducted a test using ferro-coke made from affordable iron core at a facility with a daily capacity of 300 tonnes. In the test, the company used 30 kg/t of the ferro-coke at a furnace of the West Japan Works (Fukuyama District) and observed a 10 kg/t reduction in the reducing agent ratio. In 2023, the company produced ferro-coke from a mixture of even more economical iron core with fuel coal for use in pulverized coal injection and tested the ferro-coke at a furnace.

JFE Steel plans to conduct a laboratory test to clarify the materials for ferro-coke production that can reduce both material cost and the agency ratio before moving on to a pilot experiment.

■ How energy saving and CO_2 reduction are assessed at model steelworks



How energy saving and CO_2 reduction are assessed at model steelworks

JFE Steel

R&D into Line Pipe for Transporting High-Pressure Hydrogen Gas (Selected for Inclusion in the Nippon Foundation), and DeepStar Joint Research & Development Program Phase II

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Development stage

JFE Steel conducted research and development into the property evaluation of line pipe for transporting high-pressure hydrogen gas in a hydrogen-related technical development Phase-I under The Nippon Foundation*1—DeepStar*2 Joint Research & Development Program on Offshore Oil and Natural Gas*3 ("the Project"), which is being conducted in cooperation with major oil companies. Recognition of Phase-I results led to the selection of the R&D project for inclusion in the program's Phase II. In this phase, JFE Steel will expand the scope of the research to include thick, high-strength UOE steel pipes*4 intended for seabed pipelines, and it will continue to work with DeepStar consortium members ExxonMobil and Chevron of the U.S.A. and TotalEnergies of France to establish evaluation criteria and methods using the company's Mighty Seam™ electric-resistance-welded steel pipe*5 to transport high-pressure hydrogen for realizing the world's first commercial high-pressure hydrogen pipeline.

Since hydrogen does not emit CO_2 during combustion, the large-scale use of hydrogen for various purposes, such as fuel for power generation, is being widely considered for achieving carbon neutrality by 2050. The use of a pipeline similar to the current supply chain for natural gas is being explored for transporting hydrogen in bulk from its production plant and receiving terminal to where it is needed. Meanwhile, hydrogen causes steel materials to become brittle (reducing ductility). Consequently, methods for evaluating the performance of materials are being established in countries other than Japan to support safety standards and quality inspections. As in Phase I, JFE Steel's Steel Research Laboratory in Chiba, Japan, will research properties required for high-pressure hydrogen pipelines, particularly through the application of the Engineering Critical Assessment*6 . The company will also evaluate performance under high-pressure hydrogen environments using a steel pipe specimen as well as welded area samples to verify safety.

The JFE Group will continue to promote research and development that will contribute to the realization of a hydrogen society. By meeting the needs of customers who are working on the supply and wider application of hydrogen, the JFE Group will help realize carbon neutrality.

*1 A public interest incorporated association designated as a ship promotion organization by the Ministry of Land, Infrastructure, Transport and Tourism of Japan. Funding for its activities is drawn from the proceeds of motorboat racing held by local governments throughout Japan, to primarily support maritime shipping-related business, engage in public services/welfare business, and international cooperation.

*2 An offshore technology development consortium consisting of businesses that engage in globally exploring, developing, and producing offshore oil and natural gas, such as Chevron, Shell, and Equinor, as companies that carry out offshore oil field development and production, and other businesses, universities, and research institutions that offer products and services to those businesses.

➤ *3 A joint grant program of the Nippon Foundation and DeepStar for research and development projects for advancing decarbonization in offshore oil and natural gas areas.(Japanese only)
(https://www.nippon-foundation.or.jp/who/news/information/2023/20230113-83742.html)

➤ *4 Made by forming a steel plate through cold-pressing in two steps, first into a U shape and then an O shape, and then, after arc-welding the joint, expanding the tube while adjusting the shape. (https://www.jfe-steel.co.jp/en/products/pipes/linepipe.php)

*5 An electric-resistance-welded steel pipe for line pipe, with excellent weld quality.

*6 A technology for evaluating safety from a mechanical standpoint, by comparing the forces acting on a structure with material toughness obtained from material testing.

JFE Steel

Steel Slag Hydrated Matrix

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Commercialized

Steel slag hydrated matrix is a steel slag product that can be used as a substitute for concrete but uses ground granulated blast furnace slag instead of cement, and steel slag instead of natural gravel and sand aggregate, as its ingredients. It effectively uses steel slag and does not rely on natural aggregate, thereby reducing environmental impact, and uses less cement, in turn reducing CO_2 emissions.

There are many examples of blocks and artificial stones made from steel slag hydrated matrix being used as a substitute for concrete blocks and natural stones in harbor works, apart from the expected application for scour-prevention at the growing number of offshore wind-power stations to be constructed in the near future. In addition, we are conducting on-site monitoring in the Katsunan Central Zone of Chiba Port with the help of a local fishing association to assess the impact of these blocks on marine biodiversity.

Wave-dissipating and foot protection block

Artificial stones made from steel slag hydrated matrix

JFE Steel

Initiatives for Blue Carbon Using Steel Slag Products and Acquisition of J Blue Credit™

Environmental Benefit: Recycle resources, preserve biodiversity, and absorb and secure CO_2
Status: Commercialized

In recent years, research on blue carbon (carbon absorbed and stored by living organisms in the ocean) has been advancing. JFE Steel has been participating in the research by creating a seaweed bed using steel slag products and measuring the amount of carbon captured by the entire bed.

The company has been collaborating with Koujiro Fisheries Cooperative (Iwakuni City, Yamaguchi) and the National Institute of Technology, Ube College (Ube City, Yamaguchi) on a project to create a seaweed bed and ecosystem using recycled materials at areas around Shinto, Iwakuni City, since FY2012. The initiative involves creating a seaweed bed with rich biodiversity using Marine Stone™, a grain-size-adjusted steel slag, and other steel slag products, and measuring CO_2 absorption of the created beds. The cumulative amount of CO_2 absorbed and stored from 2018 to 2022, which totaled 80.7 tonnes, received J Blue Credit™ certification by the Japan Blue Economy Association. This was the first certification ever given to a three-party joint project by the Fisheries Cooperative, academia, and private business. The seaweed bed created through the project had the co-benefits of offering a gathering place for diverse fish. The sea area is also useful for education and research.

This initiative was highly regarded, and its members and JFE Steel received the Ministry of Agriculture, Forestry and Fisheries Prize for the 32nd Global Environment Award*, sponsored by the Fujisankei Communications Group in 2024.

*The Global Environment Award recognizes environmental preservation and related efforts that will help establish a circular society for a "harmonic coexistence between industrial development and the environment of the Earth."

➤ The 32nd Global Environment Award (Japanese only) (https://www.sankei-award.jp/eco/jusyou/)

School of rockfish gathered around the steel slag seaweed bed

Excellent place for education and research (photo from the National Institute of Technology, Ube College)

JFE Shoji Building a Supply Chain for the Offshore Wind Power Generation Industry

Environmental Benefit: Renewable energy
Status: Sales expansion

Initiatives toward carbon neutrality are expanding around the world to tackle the shared issue of climate change. Japan has set its goal to achieve carbon neutrality by 2050 and formulated the Sixth Strategic Energy Plan in 2021 to lay out strategies to that end. These ambitious strategies include reducing greenhouse gas emissions by 46% in FY2030, boosting renewable energy in its electricity mix to 36–38%, and increasing the ratio of wind in the renewable energy mix to 5% (generating capacity of 23.6 GW) compared to the 0.9% (generating capacity of 4.5 GW) in FY2019.

As for offshore wind power generation, the industry is expected to expand, as targets were set to accept proposals to build 10 GW capacity by 2030 and 30–45 GW by 2040, and the commercialization of those proposals is in progress. Moreover, as is seen in the selection of a demonstration project for floating offshore wind-power generation as a Green Innovation Fund Project, efforts are underway to adopt many internationally competitive technologies.

JFE Shoji is collaborating with a local enterprise that manufactures the wind turbine foundations in Taiwan, which is leading in the offshore wind power generation market, and have been achieving progress regarding supply chain of steel materials for foundation structures. Looking ahead, the company will capitalize on the knowledge acquired and contribute to the realization of carbon neutrality by establishing a supply chain that supports the domestic production of goods and the local economy while also meeting customer demand in the offshore wind power generation industry in Japan.

Major Eco-Friendly Processes, Products, and Technologies in the Past

JFE Steel

Technology for Optimized Combustion of a Coke Furnace

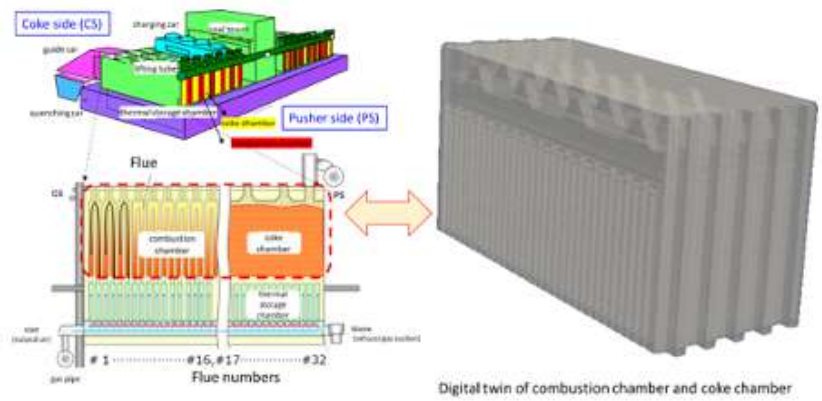
Environmental Benefit: Save energy and reduce CO_2 Emissions
Status: Operation in production process

JFE Steel has completed technological development of a new facility at the coke furnace in the West Japan Works (Fukuyama District), which is capable of saving energy and cutting CO_2 emissions, by using digital-twin technology, and has started the operation of the process.

We intend to transform into an intelligent steel works through the deployment of cyber physical systems (CPSs) as part of our digital transformation (DX) strategy. Digital twins are a core CPS technology in which physical systems and processes in the real world are replicated with equivalent properties in a digital model ("twin") in a virtual space, allowing for an accurate simulation of the real world. These digital models make it possible to visualize highly inaccessible internal areas of facilities to optimize the design and operation of manufacturing processes for which internal conditions have conventionally been difficult to confirm via sensors or direct observation. The use of the digital twin also makes it possible to predict the effects of major changes to facilities or operations.

The technology was applied to process improvements for the operation of the Number 5, D Group coke furnace in the Fukuyama District of the West Japan Works. The information obtained from the digital twin of coke furnace constructed in virtual space confirmed that a mechanism for partially controlling air supply will achieve greater operational efficiency, information that the company can use for calculating the amount of supplemental air needed to optimize combustion. JFE Steel then applied these learnings in developing the new facility, which is now in commercial operation. The company has achieved an approximately 5% reduction in the amount of fuel used and has reduced its CO_2 emissions by 6,600 tonnes a year, compared to the level with the furnace's previous design. This project was chosen for the Japanese government's Sustainable Open Innovation Initiative funding.

■ **Architecture of the coke furnace and the digital twin model**



JFE Steel

Fuel and Power Operation Guidance System for Steelworks

Environmental Benefit: Save energy and reduce CO_2 emissions
Status: Development stage

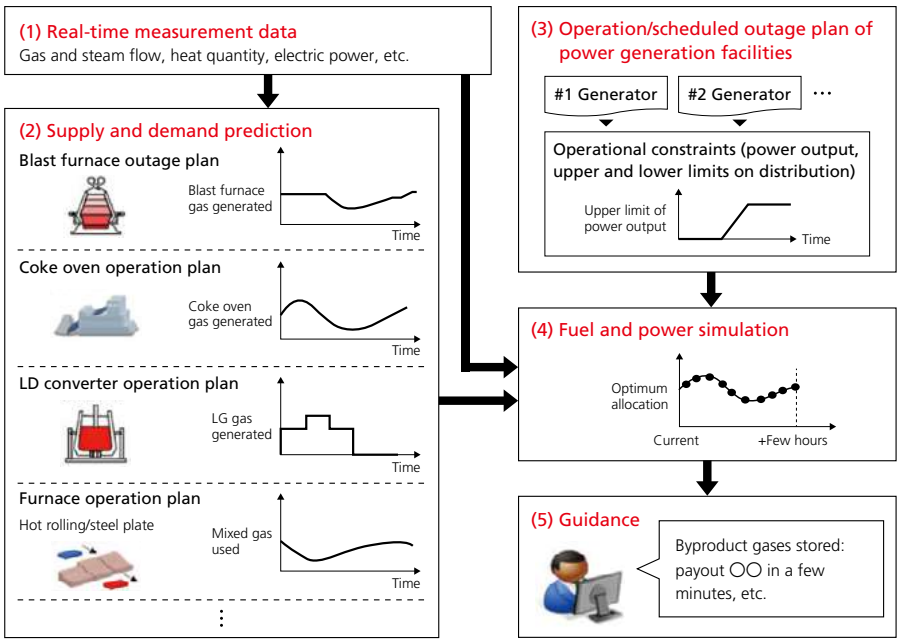
JFE Steel developed a fuel and power operation guidance system for steelworks and succeeded in saving energy and reducing CO_2 as well as fuel and power by optimizing the fuel, steam, and electric power used in the steelmaking process.

Previously, operators determined various factors such as the distribution of byproduct gas to each process, amount of fuel (heavy oil, city gas, etc.) and electricity to purchase, and the amount of byproduct gas stored, taking into account energy demand and supply (amount generated and used) as well as the operating conditions of power generation facilities, to minimize cost and energy loss. However, it was difficult to use this method to accurately estimate the change in energy demand and supply. The guidance system (diagram 1) developed by JFE Steel uses voluminous real-time measurement data (1) obtained through a cyber physical system (CPS)* and the precise production plans of each factory to predict future demand and supply with high accuracy (2), and by taking into account information such as in-house power generation capacity (3), fuel and power simulation allows for the calculation of the optimal operating conditions with the lowest possible purchase from external sources (4), and the results are fed back to guide the operator (5).

The system's development was awarded the Academic Award (Technical Division) of the 2022 Japan Institute of Energy Award. JFE Steel established the JFE Digital Transformation Center (JDXC™) to promote CPS within the manufacturing process and other digital transformation initiatives to achieve innovative production improvements as well as stable operations. We remain committed to realizing a sustainable society by adopting digital transformation to address the various issues identified at production sites.

*A system that brings together a vast amount of sensor information about physical space as big data in cyberspace and generates value by feeding back in real time the results analyzed by various measures for application in the physical space.

■ **Guidance System Overview**



➤ JFE Steel receives Academic Award (Technical Division) of the 2022 Japan Institute of Energy Award (Japanese only)
(https://www.jfe-steel.co.jp/release/2023/03/230301.html)

JFE Steel

Resource Saving Silicon-Gradient Steel Sheet

Environmental Benefit: Save energy and reduce CO_2 emissions
Status: Commercialized

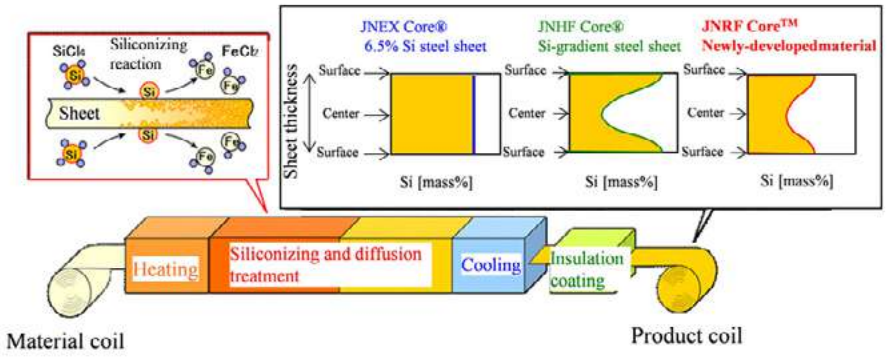
The recent trend toward increasing driving frequency due to the downsizing of electrical equipment has intensified the need to reduce iron loss*1 in the high-frequency range for electrical steel sheets*2, widely used as iron core material for electrical equipment such as motors and transformers. Meeting this demand depends upon increasing the concentration of silicon (Si), an element that strengthens electrical resistance. However, increasing concentration also causes magnetic flux density to decrease at the same time.

To overcome this, JFE Steel developed JNHF™, JNSF™, and JNRF™ using its proprietary chemical vapor deposition (CVD) continuous siliconizing process technology for controlling Si concentration distribution. These products exhibit low iron loss at high frequencies and high magnetic flux density, significantly contributing to greater efficiency while downsizing electrical equipment, and they are used as an iron core material for reactors for solar power generation and high-speed motors.

In recognition of the positive social impact of this development, we received the 2022 Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology under the development category of the science and technology field. JFE Steel will continue to contribute to improving electrical equipment by raising efficiency, reducing size, and saving energy by providing high-performance, high-grade electrical steel sheets.

*1 The loss of energy, primarily as heat, that occurs when the iron core is excited by an alternating current. The less iron lost, the higher the efficiency of electrical equipment.
*2 Electrical steel sheets are obtained by adding silicon to iron and are widely used as iron core materials in equipment such as motors and transformers.

■ CVD Continuous Siliconizing Process and Si Concentration Distribution Control



➤ Received the 2022 Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology under the science and technology field (development category). (Japanese only)
(https://www.jfe-steel.co.jp/release/2022/04/220408.html)

➤ External Awards (P.269)

JFE Steel

Anti-Fatigue-Damage Steel for Increased Bridge Safety (AFD™ Steel)

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Development stage

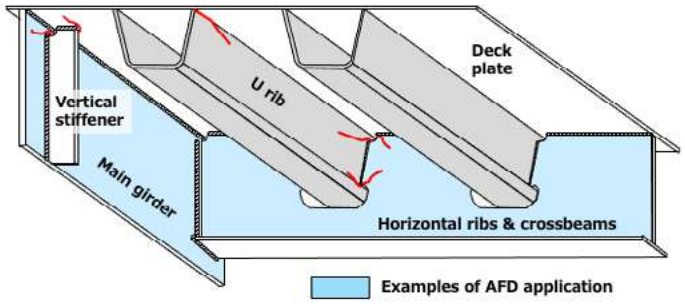
JFE Steel has developed a thin version of its anti-fatigue-damage steel (AFD™ steel) with improved fatigue resistance. The steel plate, produced by a plate mill at the East Japan Works (Keihin District) using the Super-RQ system with advanced cooling control, has a minimum thickness of 9 mm and retains the mechanical properties of conventional plates while offering improved fatigue resistance. Compared to AFD™ steel, the thin-walled version is expected to be deployed in a wider range of applications, including bridge structural members that are prone to cracking over time.

Ensuring low maintenance and renewal costs associated with aging is crucial for steel structures purposed for long-duration use. Thin-walled members of bridges are susceptible to fatigue cracking over time, and the cracks may increase in size between inspections and maintenance. The newly developed AFD™ steel increases the durability of steel structures because it can be used in places prone to fatigue cracking. Compared to ordinary steel, AFD™ steel reduces the fatigue-crack growth rate*1 to half or less of the upper limit of ordinary steel and roughly doubles product life, thereby reducing life cycle costs associated with long service life.

Looking ahead, JFE Steel will continue to improve the performance and quality of steel to achieve superior durability, safety, and economy in steel structures, including bridges, ships, construction machinery, and industrial machinery, thereby contributing to a more sustainable world.

Note: AFD is the abbreviation for Anti-Fatigue Damage.
*1 Fatigue damage is caused by small, repeated forces that create cracks that gradually grow until the material fails. Since these cracks propagate incrementally with the repeated application of force, the length over which the cracks propagate per repetition is called the fatigue crack growth rate.

■ **Examples of Thin AFD Steel Application**



➤ Developed thin, fatigue-resistant steel for steel structures (https://www.jfe-steel.co.jp/en/release/2023/230330.html)

JFE Steel Extra-Thick, High-Strength Steel Plate for the Materialization of Large Container Ships

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Commercialized

The world's thickest crack arrest steel plate*1, developed by JFE Steel, is applicable to large container ships, with its 460 MPa class yield strength and a thickness of 100 mm. The technology is the first in the world to satisfy two different properties in the extra-thick steel plate: weldability and crack arrestability. Container ships are designed with wide open areas at the top of the deck. Since the hull is exposed to heavy wave force throughout the voyage, the top of the deck and the side of the hull (hatch side coaming) must be built with steel that is thick with high strength. In response to the recent trend of upsizing container ships for more efficient transportation, the thickness of steel plates has increased from 50 mm to 100 mm, with an expected yield strength of 460 MPa. At the same time, an excellent crack-arrest property is required to prevent the propagation of brittle crack. To ensure the safety of hulls that are rapidly becoming larger, the International Association of Classification Societies mandated that all 80 mm to 100 mm class thickness steel used in hatch side coaming must have at least 8,000 $N/mm^{3/2}$ arrest toughness (Kca). Using TMCP technology*2, JFE Steel precisely controlled the heating and rolling temperatures and established a proprietary technology that increases the crystallization ratio in the central part of the steel plate's thickness, helping ensure high brittle crack arrestability in the world's thickest, 100 mm, high-strength steel plate.

The development of this technology received the 2023 Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology under the development category of the science and technology field for significantly contributing to the materialization of ultra-large container ships. It has been awarded many other prizes including the 2018 Invention Prize of National Commendation for Invention and the 2019 Okochi Memorial Prize. We will continue to improve the economic efficiency, safety, and reliability of vessels by providing high-performance, high-quality steel material while meeting the diversified needs of customers and also addressing global environmental concerns, and contributing to the realization of a sustainable society.

*1 A steel plate with excellent performance in minimizing vessel damage by stopping brittle crack propagation in the event of weld cracking.
*2 A thermo-mechanical control process technology that improves the strength and toughness of steel material in an online process using controlled rolling and accelerated cooling systems.

➤ Received the Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology under the science and technology field (development category)(Japanese only) (https://www.jfe-steel.co.jp/release/2023/04/230407.html)

JFE Steel Calcia Improvement Material

Environmental Benefit: Recycle resources and preserve biodiversity
Status: Commercialized

Calcia improvement material is a slag product that uses converter-type steelmaking slag as raw material and is manufactured by controlling the composition and adjusting particle size. Dredged soil mixed with calcia improvement material is called calcia improvement soil, which is stronger than the original weak dredged soil and is therefore able to prevent dredged soil from dissipating into the surrounding area and having a negative environmental impact placed in water.

This enables the effective use of weak dredged soil in land reclamation, shoal and tideland construction, and refilling former dredging sites. Calcia improvement soil has been used to construct a mid-section submerged breakwater* (Shin Honmoku Pier, Port of Yokohama), the main embankment material for creating a shallow area (incidental facilities at the sediment disposal site, Tokuyama-Kudamatsu Port) and backfilling material for an earthquake-resistant quay wall in the Mino offshore area, Fukuyama Port.

*An embankment built under the water surface on the inside of a perimeter wall to divide the land into sections for reclamation.

■ Calcia Improvement Material and Calcia Improvement Soil

Example of calcia improvement soil application (shoal and tideland construction material)

JFE Steel Precast Concrete Products Mixed with Finely Ground Blast Furnace Slag

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Commercialized

Finely ground blast furnace slag can be used as a cementing material in concrete. This type of concrete exhibits significantly higher durability under harsh conditions such as applications in sewers and exposure to anti-freeze agents. Its effectiveness in reducing environmental impact is widely understood, although there has recently been growing interest in its practical applications for concrete constructions that require higher durability.

As one of the deliverables for the Japanese government's Strategic Innovation Promotion Program, the Japan Society of Civil Engineers published a draft guideline in March 2019 on the application of finely ground blast furnace slag to precast concrete product, and its application now includes precast concrete slabs installed in highways and piers. With the application of finely ground blast furnace slag in concrete, the durability of precast products is expected to be greater and more consistent, allowing them to contribute to building national resilience.

Precast concrete slabs mixed with finely ground blast furnace slag installed in piers

JFE Steel Use of Granulated Blast Furnace Slag to Reduce CO_2 Emissions

Environmental Benefit: Recycle resources, preserve biodiversity, and reduce CO_2 emissions
Status: Commercialized

Granulated blast furnace slag in crushed and powdered form can be mixed with cement and used as a substitute for cement for making concrete. This leads to reducing the production of cement, thus lowering CO_2 emissions. For example, producing 1 tonne of blast furnace slag cement with 45% of its content substituted with granulated blast furnace slag emits 42% less CO_2 than conventional cement. In FY2023, JFE Steel supplied approximately 5.94 million tonnes of granulated blast furnace slag to cement production, equivalent to a reduction of approximately 4.21 million tonnes of CO_2 emissions.

■ CO_2 Emissions for Producing 1 Tonne of Cement (Unit: kg-CO_2/ton)

CO_2 Emissions Source	Regular Cement	Blast Furnace Slag Cement
Limestone	478	270
Electricity/energy	278	168
Total	756	437

Source: Data published by the Japan Cement Association (compiled from the actual FY2022 data)

JFE Steel

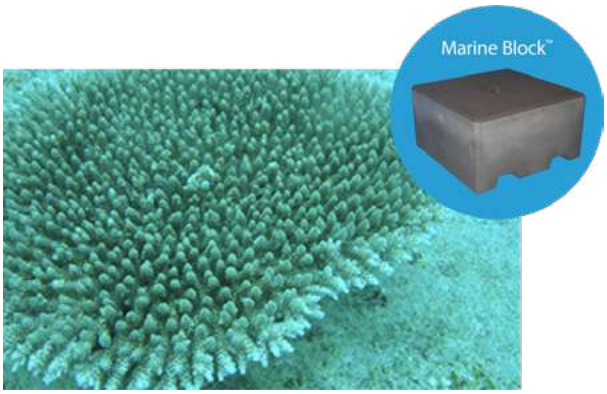
Restoring Marine Ecosystems Using Steel Slag Products

Environmental Benefit: Recycle resources, preserve biodiversity, and absorb and secure CO_2
Status: Commercialized

Marine Stone™ is a grain-size-adjusted steel slag that controls the generation of hydrogen sulfide from the silty sediment in enclosed coastal seas and improves the environment in which organisms can live. Its effectiveness in improving marine environments is widely recognized, and the joint project with Hiroshima University has received external commendations.

Frontier Rock™ is another steel slag product that consists of artificial stones made from steel slag hydrated matrix and provides an excellent base for seaweed beds and fishing reefs. A submerged bank built on the seabed off the coast of Minami - Izu Town, Shizuoka Prefecture, has become a gathering place for large perennial seaweeds as well as useful fishery resources such as lobsters, turban shells, and a wide variety of fish. We are also testing the effects of Marine Block™ as beds for corals.

School of fish attracted to the submerged bank made of Frontier Rock™



Coral growing on Marine Block™

JFE Steel

JFE Steel and Tohoku University's Collaborative Research Laboratory for Green Steel

Environmental Benefit: Reduce CO_2 emissions
Status: Development stage

In February 2022, JFE Steel and Tohoku University jointly established the Collaborative Research Laboratory for Green Steel within the university's Graduate School of Engineering to research eco-friendly steel materials and production methods for the carbon-neutral era. The Collaborative Research Laboratory is managed under a cross-divisional system and develops collaborations across a wide range of fields, including the development of steelmaking processes and materials. This will facilitate a multifaceted approach to resolving issues related to low-carbon steelmaking processes and to discover innovative development themes from new perspectives. Furthermore, we will dispatch young researchers to nurture highly specialized human resources who will lead the next generation of the steelmaking industry.

Collaborative Research Wing, Materials Development, Graduate School of Engineering, Tohoku University

➤ JFE Steel and Tohoku Univ. Establish Collaborative Research Lab for Green Steel (https://www.jfe-steel.co.jp/en/release/2022/220203.html)

JFE Engineering Carbon Neutrality Collaborative Research Center Established with the Tokyo Institute of Technology

JFE Engineering and the Tokyo Institute of Technology opened the JFE Engineering Carbon Neutrality Collaborative Research Center (CRC) at the Institute's Laboratory for Zero-Carbon Energy under the Institute of Innovative Research on July 1, 2022. The purpose of the CRC is to promote new technologies for realizing a carbon-neutral society. The two parties are comprehensively and jointly working on technical developments in carbon neutrality, transcending the boundaries of a typical individual joint research framework to pursue a multilayered approach and generate innovation across the wide range of fields required for realizing a carbon-neutral society.

The CRC will promote the development of new technologies to help realize a carbon-neutral society by combining JFE Engineering's engineering technologies related to plant and infrastructure construction in the fields of energy and the environment with the Tokyo Institute of Technology's advanced academic knowledge in a wide range of areas. The CRC will also continue collaborating with a variety of organizations through the Tokyo Tech GXI*, an industry-academia partnership project run by Tokyo Institute of Technology.

*Intended to promote research activities that will initiate a GX (green transformation) society, strengthen startups, and substantiate industry-society collaboration.

Laboratory for Zero-Carbon Energy, Institute of Innovative Research (Ookayama North No. 1 Campus)

➤ JFE Engineering and Tokyo Institute of Technology establishes JFE Engineering Carbon Neutrality Collaborative Research Center (Japanese only) (https://www.jfe-eng.co.jp/news/2022/20220629.html)

JFE Shoji

Expanding Business in Biomass Fuels

Environmental Benefit: Renewable energy and reduce CO_2 emissions
Status: Sales expansion

JFE Shoji imports fuels such as palm kernel shells (PKS) to Japan from Malaysia and Indonesia and wood pellets from Southeast Asian countries as fuel supplies for domestic biomass power plants.

PKS and wood pellets serve as carbon neutral fuel sources by absorbing CO_2 as they grow. JFE Shoji is working to procure biomass fuel through a process that is environmentally and socially sound, thereby maintaining a sustainable business model. Additionally, the company launched alternative fuel initiatives for exiting the use of coal as it strives to become an environmentally sound company.

PKS

Wood pellets

JFE Shoji

Expansion of Scrap Trading to Support the Development of a Recycling-Oriented Society

Environmental Benefit: Recycle resources and reduce CO_2 emissions
Status: Sales expansion

JFE Shoji engages in a recycling business for steel and aluminum scrap. Demand for steel scrap is particularly expected to grow in Japan and overseas as the global community advances toward carbon neutrality. JFE Shoji will contribute to building a recycling-oriented society by increasing scrap recycling across the globe.

Social: Executive Summary

The mission of the JFE Group is to establish its position as a company that is essential for the sustainable development of society and to create safe, comfortable lives for people everywhere. Through our efforts to address social issues, such as investing in human capital by ensuring occupational safety and health and recruiting and nurturing diverse human resources, and by respecting human rights across the supply chain, we intend to achieve the sustainable growth of the Group and become an entity that continues to develop and provide safe, high-quality products and services based on our leading technologies.

The key measures of our Seventh Medium-Term Business Plan include safety and health management, the active participation of human resources, respect for human rights throughout the supply chain, and contribution to local communities.

Ensuring the well-being and safety of our employees is the foundation of our continued existence as a company, and we are committed to creating a safe work environment by adhering to the philosophy of safety first. To achieve our top-priority goal of zero major accidents, we are bolstering our capital investments and safety education programs while utilizing multifaceted occupational employee health and safety services, including monitoring and detection, that incorporate advanced IT solutions.

In recruiting and nurturing diverse human resources, we hire diverse human resources, fostering those who serve as the backbone of our business, create workplace environments and systems for employees to fully demonstrate their abilities with a sense of fulfillment, and realize new workstyles not restricted by time or location.

With the belief that respect for human rights is foundational for business as well as a corporate social responsibility, we have been taking action to realize a society in which human rights are respected and protected. We have been conducting human rights due diligence since FY2021 in accordance with the United Nations Guiding Principles on Business and Human Rights. In April 2023, we revised the JFE Group Human Rights Basic Policy in light of recent changes in awareness and issues related to human rights. We will continue to promote Group-wide efforts as well as seeking cooperation from all stakeholders including our supply chain to respect and protect human rights.

Regarding contribution to local communities, it is important to cooperate and collaborate with society as we carry out our corporate activities globally. By actively contributing to those communities, we hope to achieve sustainable growth for both our businesses and society at large.

Targets and Results for Material Issues of Corporate Management Concerning Society (Materiality)

➤ **Material Issues of Corporate Management and KPIs** (P.18)

Key Initiatives

- To achieve our goal of zero major accidents, particularly in terms of **prioritizing safety investments** (P.186) (around 10 billion yen per year Group-wide) to reduce risks by making workplaces inherently safe and also promote **multifaceted occupational employee health and safety services, including monitoring and detection, by harnessing advanced IT solutions** (P.186)
- Proactively promote **mental healthcare** (P.189) in addition to **maintaining and improving the mental and physical health of employees and their families** (P.189), by, for example, creating an environment that supports employee physical health and medical checkups for their spouses.
- Promote a **new workstyle** (P.199) by promoting teleworking and a flexible working hour program.
- Implement a broad range of initiatives to promote diversity, **such as active recruitment and development of female employees** (P.194), enhanced childcare-support programs that significantly exceed statutory requirements, and training and education.
- Roll out **human rights due diligence** (P.169) and consider initiatives to identify and address human rights risks for the JFE Holdings and major Group companies during FY2021. In FY2022, we revised the JFE Group Human Rights Basic Policy, advanced preliminary studies for the risk identification surveys of suppliers, and expanded risk identification surveys at Group companies in Japan. In FY2023, we completed a survey on human rights risks in Japan for major Group companies and distributed a questionnaire to approximately 400 high-priority suppliers to instill respect for human rights throughout the supply chain. In FY2024, we will provide feedback on the results to suppliers surveyed in FY2023, provide support for improvement to those who were determined to require a follow up, and conduct surveys at high-priority overseas Group companies.
- **Actively promote DX** (P.177), including the active introduction of IoT, AI, and data science, and the application of data assets.

Human Rights

Basic Policy

The JFE Group views respect for human rights as both a corporate social responsibility and a foundation of its business. Our determination to prevent discrimination in our business operations is clearly expressed in our Standards of Business Conduct, which we have consistently upheld. In FY2018, the JFE Group Human Rights Basic Policy was established as a standard to which Group companies and their officers and employees must comply in order to further clarify the approach to our initiatives. Under the policy, we also seek cooperation from all stakeholders including our supply chain to respect and protect human rights.

We have been conducting human rights due diligence since FY2021 in accordance with the United Nations Guiding Principles on Business and Human Rights, while organizing seminars by external experts on human rights. Given recent changes in human rights awareness and concerns, the JFE Group Human Rights Basic Policy was revised in April 2023 to further strengthen the JFE Group's efforts to respect human rights. Under the new version of the policy, every operating company inspected and revised its procurement guidelines and related materials, thereby strengthening the Group's efforts throughout the supply chain.

We will continue to promote initiatives for realizing a society in which human rights are respected and protected.

JFE Group Basic Policy on Human Rights

JFE hereby establishes the JFE Group's Basic Policy on Human Rights based on the United Nations Guiding Principles on Business and Human Rights in order to promote Group-wide efforts to respect human rights and to fulfill its responsibilities to all stakeholders that it influences in the course of its business activities.

1. Basic approach to respect for human rights

We, the JFE group, support and respects the International Bill of Human Rights, which consists of the Universal Declaration of Human Rights and the International Covenants on Human Rights, as well as the International Labor Organization (ILO) Declaration on Fundamental Principles and Rights at Work.

We believe that respect for human rights is a corporate social responsibility and a foundational aspect of our operations. In addition to clearly stating and implementing our policy for respecting all members of the company and the general public and refraining from any form of discrimination in our corporate activities, we implement initiatives to ensure that we are not complicit in human rights abuses.

This policy represents our commitment to respect human rights based on the JFE Group Standards of Conduct.

2. Scope of application

This policy applies to all officers and employees of the JFE group. We also encourage all stakeholders, including members of our supply chain, to understand and support this policy.

3. Compliance with applicable laws

We comply with the laws and regulations of Japan and all other countries and regions where we operate, but if there is any conflict with internationally recognized human rights and regulations, we seek ways to respect internationally recognized human rights as much as possible.

4. Human rights due diligence

We identify negative impacts on human rights and utilize our internal mechanisms for human rights due diligence to prevent or mitigate such impacts.

5. Corrections and remedies

We maintain reporting contact points for receiving reports from both internal and external sources regarding negative impacts on human rights caused by any of our business activities. If we are made aware that we have caused or been involved in a negative impact on human rights, we will follow the necessary procedures to correct and remedy the problem.

6. Education
We provide education on respecting human rights to ensure that all of our officers and employees understand and implement the company's basic policy.

7. Oversight
The JFE Group Sustainability Council, chaired by the President of JFE Holdings, Inc., oversees compliance with this policy and the implementation status of initiatives referred to herein.

8. Dialogue and consultations with stakeholders
Among the initiatives taken under this policy, we utilize outside experts as well as engage in discussion and consultation with internal and external stakeholders.

9. Information disclosure
We appropriately disclose all relevant information about our initiatives concerning respect for human rights and the progress of such initiatives via JFE group websites and other means.

10. Business-related human rights issues
(1) Non-discrimination and equality under the law

We respect every individual connected with our corporate and business activities and do not discriminate on the basis of race, nationality, ethnicity, creed, religion, social status, lineage, age, gender, sexual orientation, gender identity, disability, or any other such factor.

(2) Engaging with business partners

We seek the cooperation of all of our business partners in initiatives to respect and protect human rights in order to contribute toward creating a society in which the rights of all humans are respected and protected.

(3) Harassment

We do not engage in any kind of harassment based on gender, status, or any other factors, including through language or behavior that offends or violates the dignity of others.

(4) Forced labor and child labor

We never use forced labor or child labor in any country or region. We also do not tolerate or sanction any form of modern slavery, including bonded labor and human trafficking.

(5) Occupational health & safety and appropriate working environments

In accordance with the fundamental idea that safety is our top priority above all else, we pursue health and safety in all of our activities and strive to create safe, healthy workplaces where all employees feel assured that their physical and mental health is protected.

(6) Working hours and livable wages

We comply with all laws and regulations concerning working hours and wages applicable in the countries and regions where we operate. We work to ensure wages that allow employees to enjoy an adequate standard of living.

(7) Right to freedom of association and collective bargaining

We respect employee rights to freely associate and collectively bargain in accordance with the laws and collective bargaining agreements in each country. In addition to taking into account each country's laws and labor practices, we work to build sound labor-management relations and resolve problems by engaging in sincere and constructive dialogue with employees in accordance with international norms.

(8) Rights of local and indigenous peoples

We respect and give due consideration to local people's land rights, access to water, safety and health as well as the rights of indigenous peoples in regions where we operate.

Established: April 2018
Revised: April 2023
JFE Holdings, Inc.

This policy revision was formulated with the assistance of human rights experts and approved at the JFE Group Sustainability Council chaired by the President of JFE Holdings, Inc. Amendments to the policy have also been reported to the Board of Directors.

Structure

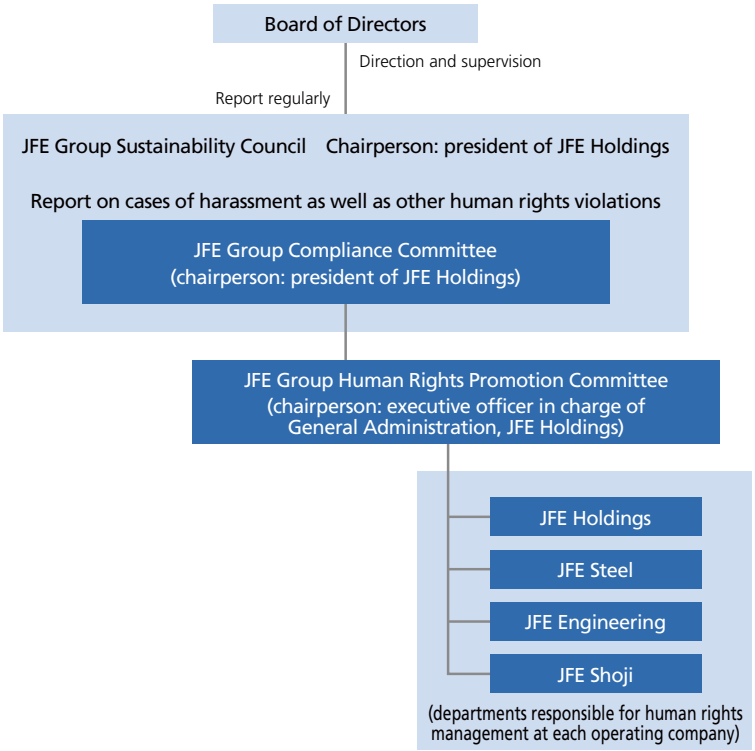
Promoting Human Rights

In order to steadfastly focus on human rights initiatives, we formulated Group-wide policies at the JFE Group Sustainability Council, chaired by the president of JFE Holdings and reports periodically to the Board of Directors for guidance and supervision. In addition, we established the JFE Group Human Rights Promotion Council, chaired by the corporate officer of JFE Holdings under the JFE Group Compliance Committee, chaired by the president of JFE Holdings, which allows us to regularly share information with departments responsible for human rights issues that have been set up at each operating company.

In addressing all human rights risks, we emphasize communicating with stakeholders through such initiatives as setting up a Corporate Ethics Hotline at each operating company and an independent law firm as an external contact point, as well as dedicated consultation desks on harassment issues at major offices, all of which accept anonymous reporting and consultation on human rights and related issues. Furthermore, we receive inquiries, including anonymous requests concerning human rights issues and compliance from external stakeholders via the contact form on our corporate website. The operational status of these help desks and reports of harassment as well as other human rights violations are regularly reported to the JFE Group Sustainability Council and Board of Directors for their direction and supervision.

➤ Development of the Whistleblowing System (P. 228)

■ Governance Structure for Human Rights Awareness Promotion



Targets and Results

Recognizing that contributing to the realization of a society in which the human rights of each and every individual are respected and protected is not only a corporate social responsibility but also a foundational principle of management, the JFE Group upholds respect for human rights across the supply chain as a key management issue and promotes its efforts by setting KPIs.

➤ Material Issues of Corporate Management and KPIs (P.18)

Human Rights Due Diligence

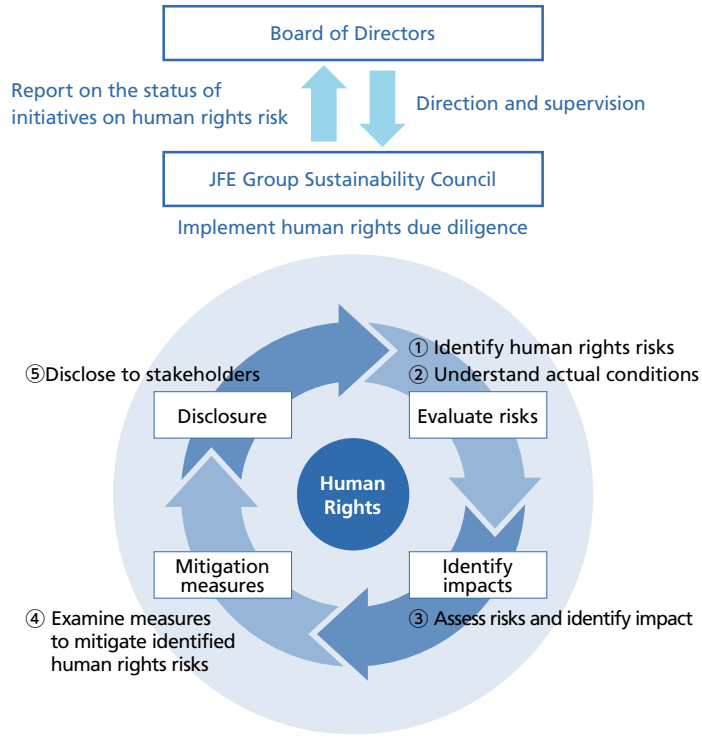
The JFE Group has been committed to human rights due diligence based on the United Nations Guiding Principles on Business and Human Rights since FY2021.

■ Group's Past Initiatives and Future Plans

	Overview
FY2021	• Identified human rights risks and examined corrective measures to be taken at the JFE Holdings and other Group companies, including operating companies
FY2022	• Revised the JFE Group Human Rights Basic Policy (established in 2018) to further strengthen our efforts to respect human rights throughout the JFE Group • Every operating company inspected and revised their procurement guidelines in line with the revised policy
	Expanding Human Rights Due Diligence to Group Companies • Group companies implemented the following initiatives to identify, assess, reduce, and prevent human rights risks (1) Held briefings on human rights for Group companies (2) Conducted a survey on human rights risks for major domestic Group companies that are significantly affected by human rights risks in terms of sales size, and other aspects.
	Establishing a Human Rights Risk Management System for Suppliers • Discussed the method, scope, and priorities for conducting a survey on human rights risks throughout the supply chain • Selected suppliers that are a high priority for a survey, such as those based in countries with high human rights risks
FY2023	**Expanding Human Rights Due Diligence to Group Companies** • Further expanded the survey to include all major domestic Group companies (about 100 companies)
	Establishing a Human Rights Risk Management System for Suppliers • Conducted a survey on human rights risks for about 400 high-priority suppliers
FY2024 (plan)	**Expanding Human Rights Due Diligence to Group Companies** • Conduct a survey on human rights risks for about 50 high priority overseas Group companies, including those based in countries that particularly exposed to human rights risks • Continue to support major domestic Group companies that have already been surveyed to correct and improve their ability to manage human rights risks, consider conducting periodic surveys, and monitor the status of corrective action.
	Establishing a Human Rights Risk Management System for Suppliers • Provide feedback on survey results to suppliers surveyed in FY2023 and request improvements as necessary

Human Rights Due Diligence Process

■ **Human Rights Due Diligence Process**



❶ Identify human rights risks

We created a long list of human rights risks by referring to international norms and guidelines. Then, taking into account human rights risks specific to the industry, regional characteristics, and other relevant factors, we identified human rights risks related to the Group and its supply chain by stakeholder, such as employees and suppliers, including women, children, and local residents.

International norms and guidelines referenced:

United Nations Guiding Principles on Business and Human Rights, International Bill of Human Rights, ILO's Core Labor Standards, OECD Guidelines for Multinational Enterprises, Ten Principles of the UN Global Compact, GRI Standards, FLA Workplace Code of Conduct, and CHRB Key Industry Risks

15 human rights issues to consider:

Compliance with standards and guidelines for respect for human rights demanded by international norms	Avoiding complicity in human rights abuses, compliance, social security, and fair competition	Prohibition of discrimination and equality before the law
Access to remedy	Thorough supplier management	Harassment and abuse
Women's rights	Child labor	Forced labor
Occupational health and safety	Working hours	Appropriate working environment
Wages that guarantee a decent standard of living	Freedom of association and the right to collective bargaining	Rights of indigenous and local people

❷ Investigate current status

We ascertained the current status of the risk management system and activities by examining our disclosure of policies on child labor, forced labor and various other human rights risks, such as the JFE Group Human Rights Basic Policy and the Basic Procurement Policy of each company, our whistleblowing system for ensuring access to remedial action, our initiatives on compliance including prevention of corruption, and other initiatives, systems and rules concerning internal and external human rights issues.

❸ Assess risks and determine impacts

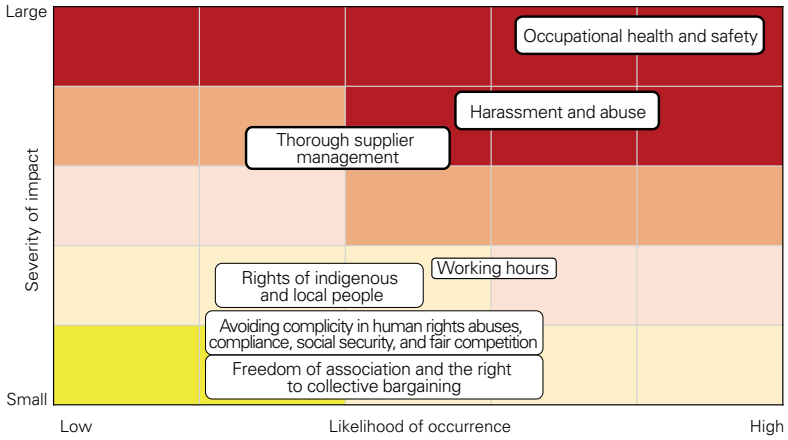
We assessed the risks of the identified human rights issues to be considered, based on the severity of impact and likelihood of occurrence, and determined the status of our initiatives on respecting human rights through written surveys and interviews in order to better identify that status in our future endeavors. During the risk assessment, we also determined the adverse impacts of human rights risks on the JFE Group and its stakeholders.

➤ Stakeholder Engagement (P.38)

Human rights risks identified as particularly high risk and requiring action:

- Occupational health and safety
- Harassment and abuse
- Thorough supplier management (establishment of a human rights risk management system for the entire supply chain)

■ **Map of Key Human Rights Risks**



❹ Consider mitigation measures for identified human rights risks

We implement mitigation measures for the identified human rights risks, including response as well as preventive and corrective measures and promotion systems. For occupational health and safety and harassment, we continue to strengthen our efforts to eliminate accidents and harassment using KPIs.

To create a sustainable and resilient supply chain, we are establishing a human rights risk management system encompassing the entire supply chain. We will also conduct surveys on the human rights risks of suppliers by determining the priority of the surveys based on the severity of the impact of such risks and the likelihood of their occurrence.

➤ Material Issues of Corporate Management and KPIs (P.18)
➤ Occupational Health and Safety (P.186)
➤ Social Data: Lost-Work Injuries and Accidents (P.253)
➤ Governance Data: Whistleblowing (P.263)

❺ Information disclosure to stakeholders

We disclose the JFE Group Human Rights Basic Policy, guidelines for procurement at each operating company, and other related information on our website to communicate our initiatives to respect human rights, including human rights due diligence, and their status to our stakeholders.

FY2023 Initiatives

Expanding Human Rights Due Diligence to Group Companies

We conducted a series of surveys on human rights risks for about 100 major Group companies in Japan that are significantly affected by such risks in terms of sales volume and other factors . The surveys were completed in FY2023. We are working on measures to reduce and prevent human rights risks based on survey results.

Establishing a Human Rights Risk Management System for Suppliers

We conducted surveys on human rights risks using the Global Compact Network Japan's CSR Procurement Self-Assessment Tool for about 400 high-priority suppliers, such as those based in countries with particular high exposure to human rights risks.

Future Initiatives

We will promote initiatives to correct and mitigate identified human rights risks and take the following actions to expand our human rights due diligence. To steadily advance our initiatives, we will conduct appropriate evaluations and make improvements under the supervision of the JFE Group Sustainability Council and Board of Directors, thereby enhancing effectiveness.

Expanding Human Rights Due Diligence to Group Companies

In FY2024, we will conduct surveys on human rights risks for high priority overseas Group companies, such as those based in countries that have particularly high exposure to human rights risks. We will also continue to support major domestic Group companies that have already been surveyed to correct and improve their ability to manage human rights risks, consider conducting periodic risk surveys and monitor the status of corrective action.

Establishing Human Rights Risk Management System for Suppliers

In FY2024, we will provide feedback on the results of the survey of suppliers in FY2023 and provide support for improvement to those who were determined to require a follow up. We will also consider the scope and priority of the survey in order to expand the survey in the future.

Human Rights Promoting Activities

To consistently maintain our activities to respect human rights and raise employee awareness, we conduct human rights training courses, offer guaranteed equal employment opportunities, promote fair human-resource management, and actively prevent workplace harassment. Our training courses encourage employees to develop a thorough understanding of the JFE Group Human Rights Basic Policy and the respect for human rights expected of a company in the international community. To this end, we continuously monitor and following up on seminars against a KPI focused on attendance rate (attendance rate in FY2023: 100%).

We seek to prevent sexual harassment, power harassment, and other forms of harassment by addressing these issues in company regulations, displaying posters in workplaces, and organizing training by position (including management), individual offices, and executives. In addition, we invited an outside attorney to conduct a seminar on corporate ethics hotlines and harassment consultation desk staff (those who receive reports, including management) within the JFE Group. We regularly organize these training sessions for hotline and consultation desk personnel. (participants: approx. 200 in FY2020 and approx. 300 in FY2022).

Furthermore, we actively support and take part in initiatives undertaken by public organizations and groups promoting human rights as well as groups in which private enterprises participate, such as the Industrial Federation for Human Rights, Tokyo and the Corporate Federation for Dowa and Human Rights Issue, Osaka. By attending seminars and workshops sponsored or supported by such organizations and groups, we have become increasingly aware of human rights trends and challenges as well as issues specific to Japanese business. We then apply this knowledge in JFE human-rights awareness training programs and related initiatives.

Respecting the Rights of Workers

The JFE Group adheres to the laws and regulations of various countries as well as collective agreements. It also respects the rights to freedom of association as well as their right to collective bargaining.

Upper management, including the president and the representative of the union, meets regularly to discuss matters such as management issues, work life-balance, working environments, and working conditions. By conducting earnest labor-management consultations, we strive to create a vigorous workplace while working to maintain healthy and sound labor-management relations.

The JFE Group complies with laws and regulations related to salary payments and sets salaries above the minimum wage designated by country, region and industry sector. In addition to meeting legal requirements concerning the upper limits for overtime and other mandates, the JFE Group establishes challenging and satisfying working environments by providing our employees with one of the top levels of employment conditions in the industry as well as performance-based bonuses linked to company profits.

We regularly review the wage situation in each region and business sector and engage in honest discussions with the labor union to ensure a fair return to our employees while also paying due consideration to management and business performance.

Respect for Freedom of Expression

The JFE Group upholds basic human rights in its Human Rights Basic Policy and is committed to respecting and protecting the human rights of each individual throughout its corporate activities. We pay due care to prevent violations of the freedom of expression, as recognized by the International Covenant on Human Rights and other international conventions, and to fully protect the right to privacy.

Respect for Children's Rights

The JFE Group supports the Convention on the Rights of the Child and Children's Rights and Business Principles and will seek to eliminate child labor and respect every child's right to survival, right to development, right to protection and the right to participation, the four pillars of the Convention on the Rights of the Child.

The JFE Group Human Rights Basic Policy upholds recognizing the diverse values held by each individual in all aspects of corporate activity as well as respecting and protecting the human rights of each person in compliance with international conventions. It also explicitly prohibits child labor and forced labor. To promote concrete initiatives, the JFE Group has focused on nurturing the next generation as a key area of its public service and is engaged in activities that support the sound development of younger generations.

Endorsing and Participating in External Initiatives

We are a member of the Global Compact Network Japan, an organization that promotes Global Compact activities in Japan, in support of the Ten Principles of the United Nations Global Compact, related to the protection of human rights, the elimination of unfair labor practices, environmental protection, and the prevention of corruption. We also participate in subcommittee activities of the Global Compact Network Japan and promote our own initiatives based on exchanging information with participating companies and organizations.

Respecting Human Rights across the Supply Chain

JFE Steel Compliance with the JFE Steel Procurement Guidelines and Responsible Procurement of Raw Materials

In accordance with the JFE Group Human Rights Basic Policy, JFE Steel established the JFE Steel Procurement Guidelines in 2023, which incorporate more extensive and specific information on sustainability in general, in addition to respect for human rights. To promote sustainability initiatives throughout the supply chain, we disclose the guidelines on our website and request compliance from our suppliers.

In terms of raw material procurement in particular, there is concern that tin, tantalum, tungsten, gold, and cobalt provide a funding source for militias causing human rights violations and environmental destruction. Therefore, JFE Steel purchases them only after confirming that they have not been mined in conflict-affected or high-risk areas, in accordance with Japanese and overseas regulations governing the responsible procurement of minerals as well as international rules.

For JFE Steel Procurement Guidelines, please refer to the following.

➤ **JFE Steel Procurement Guidelines** (https://www.jfe-steel.co.jp/en/company/purchase_policy.html#to-our-business-partners)

JFE Engineering Promoting Initiatives to Respect Human Rights in Cooperation with Suppliers

JFE Engineering is promoting sustainable procurement in accordance with its Purchasing and Procurement Policies to promote initiatives related to respect for human rights in cooperation with suppliers. In addition, JFE Engineering asks suppliers to respect basic human rights, eliminate all forms of discrimination, and strive to create a safe and comfortable working environment by establishing procurement guidelines while observing laws, regulations, and social norms in their business activities. JFE Engineering ensures that these policies are clearly communicated throughout the supply chain by publicizing them on the company's website.

For JFE Engineering's Procurement Policy and Procurement Guidelines, please refer to the following.

➤ **Procurement Policy** (https://www.jfe-eng.co.jp/en/information/procurement_policy.html)

➤ **Procurement Guidelines** (https://www.jfe-eng.co.jp/en/information/procurement_policy.html)

JFE Shoji Promoting Respect for Human Rights in the Supply Chain

JFE Shoji established the Basic Policy on Sustainability in the Supply Chain, which consists of eight items, including respect for human rights, prohibition of discrimination, prohibition of forced labor and child labor. It requests the understanding and cooperation of its suppliers in complying with this policy and also discloses related information on its website.

In 2021, it signed the Ten Principles of the UN Global Compact, recognized by the international community as advocating universal values in areas such as human rights and labor, and has been promoting respect for human rights across its supply chain.

For JFE Shoji's Basic Policy on Sustainability in the Supply Chain, please refer to the following.

➤ **Basic Policy on Sustainability in the Supply Chain** (https://www.jfe-shoji.co.jp/en/sustainability/promote/)

Providing Quality Products and Enhancing Customer Satisfaction

Basic Policy

Under its corporate philosophy of contributing to society with the world's most innovative technology, the JFE Group will continue to be a company that provides world-class products and services for a prosperous global future.

JFE Group Standards of Business Conduct

1 Provide quality products and services

Earn the trust and acclaim of customers by endeavoring to provide safe, high-quality products and services based on superior technologies, and by fully respecting and protecting the privacy of personal and customer information. Also, leverage our superior technologies for the sustainable growth of our Group and society.

Targets and Results

Under its Standards of Business Conduct to provide quality products and services, the JFE Group has identified increasing efficiency and enhancing cost competitiveness in production and engineering and raising quality of products and services and ensuring reliable supply as two key management concerns and sets KPIs to manage progress and promote relevant initiatives.

➤ Material Issues of Corporate Management and KPIs for FY2023 (P.18)

Initiatives

JFE Group's Quality Initiatives

The JFE Group manages quality by ensuring compliance with quality standards set by each operating company. All manufacturing sites that require ISO 9001 certification for their quality management have been duly certified.

Strengthening Quality Assurance System

JFE Steel **Initiatives to Improve Product Quality**

To serve customers by meeting their quality requirements and delivering products that boast the world's highest quality, JFE Steel has established a quality assurance system with advanced sensors for process monitoring, in addition to its ongoing efforts to develop new products and advanced manufacturing technologies.

The company's quality assurance system is continually improved based on the Guidelines for Enhancing Quality Assurance Systems, issued by the Japan Iron and Steel Foundation (JISF). In an effort to enhance the reliability of product testing, the company uses high-precision equipment and is working to thoroughly prevent errors in identification work and data tampering by automating every process, from conducting tests that include instructions on testing and collating specimens to delivering test results.

Moreover, JFE Steel intends to provide customers with innovative value by operating its quality management system based on ISO 9001 and by maintaining the assurance certifications required for steel products, including the JIS mark and approvals

from ship classification bodies as well as certification under the national standards of relevant foreign countries. It is also actively promoting the formation and standardization of international rules in conjunction with future DX promotion and the social implementation of technologies obtained through research and development.

JFE Engineering Promoting Quality Activities Based on the Company-wide Quality Policy

Products and services that JFE Engineering designs, procures, manufactures or constructs must comply with all required rules, regulations, and standards, and quality must satisfy the needs of our customers. Under this corporate policy, it continually strives to improve the quality of its products and services.

Specifically, our certified inspectors conduct on-site inspections at each phase of a plant construction project, including procurement, manufacturing, construction, and pilot operations. We also conduct witness inspections by customers during critical processes and at the time of equipment delivery to ensure quality.

In addition, JFE Engineering has published quality-assurance manuals based on the specific characteristics of each product and obtained ISO 9001 certification for each product category.

To further strengthen its quality assurance system, JFE Engineering uses an electronic document processing system in its quality inspections to prevent omissions in inspection data and data tampering, and all inspection data is electronically stored to further ensure traceability.

JFE Shoji Maintaining and Improving Quality Assurance Level Based on Quality Philosophy

Guided by its quality philosophy of maintaining customer trust by consistently delivering products that satisfy quality requirements, JFE Shoji is constantly striving to enhance the level of its quality assurance for customer confidence and satisfaction. Its processing centers in Japan and abroad are systematizing and automating operations to eliminate human errors. Raising employee awareness is essential for preventing human error at every stage, from receiving orders to processing, inspecting and shipping. The company provides quality education for employees by introducing case studies of nonconformance at other companies as well as at Group companies in Japan and abroad. JFE Shoji also conducts a quality audit at all relevant Group companies in and outside of Japan to confirm the quality of each processing center and provide advice. Moreover, it follows up as necessary by continuously monitoring the progress of improvements to maintain and enhance the level of quality assurance.

Ensuring Stable Supply of Products

JFE Steel Initiatives to Supply High-Quality Products

JFE Steel is working to improve its manufacturing capabilities by actively utilizing digital technologies in its manufacturing processes. While strengthening its manufacturing base by introducing a cyber-physical system (CPS) for all manufacturing processes, JFE Steel is also striving to improve quality and yield through the full-scale introduction of quality prediction technology that uses integrated data from steelmaking to final processing, and to enhance reliability by increasing the frequency of automated testing and inspections.

These activities will stabilize facility operations as well as production and quality to safeguard the consistent delivery of high-quality products to customers.

JFE Engineering Securing Construction Business Operators

JFE Engineering have been designated as a special construction business operator under the Construction Business Act to undertake mechanical, civil engineering, and building construction work, and assign dedicated managing engineers at construction sites to oversee the technical aspects of construction work. The smooth implementation of plant construction projects depends on licensed specialists. The company is always striving to secure the necessary human resources by encouraging employees to acquire qualifications by granting allowances and through mid-career hiring of licensed personnel.

JFE Shoji

Strengthening the Supply Chain and Periodically Conducting Quality Audits

JFE Shoji is strengthening its entire supply chain, from materials procurement to processing and distribution, to consistently meet customer demands. In the raw materials field, it has established a system and network for procuring iron ore, coal, and other raw materials for steel from Brazil, Australia, and other countries around the world. In the area of processing and distributing steel products, it is making capital investments for the Group and raising efficiency to realize an optimal system for sales and processing to meet customer demand while strengthening its quality assurance system by periodically conducting quality audits at Group companies.

Proper Export Procedures

Each JFE operating company promotes international peace and security by working against the spread of weapons of mass destruction and excess accumulation of conventional weapons. Specifically, the company carries out internal inspections to confirm the final destinations, customers and applications of its exported products, and then ensures that export procedures are carried out properly. In addition, the Legal Affairs Department conducts internal briefings to disseminate knowledge of export-related laws and regulations, such as the Foreign Exchange and Foreign Trade Act. Also, education on export security controls and related measures is implemented for the employees of Group companies involved in trading.

Improving Customer Satisfaction

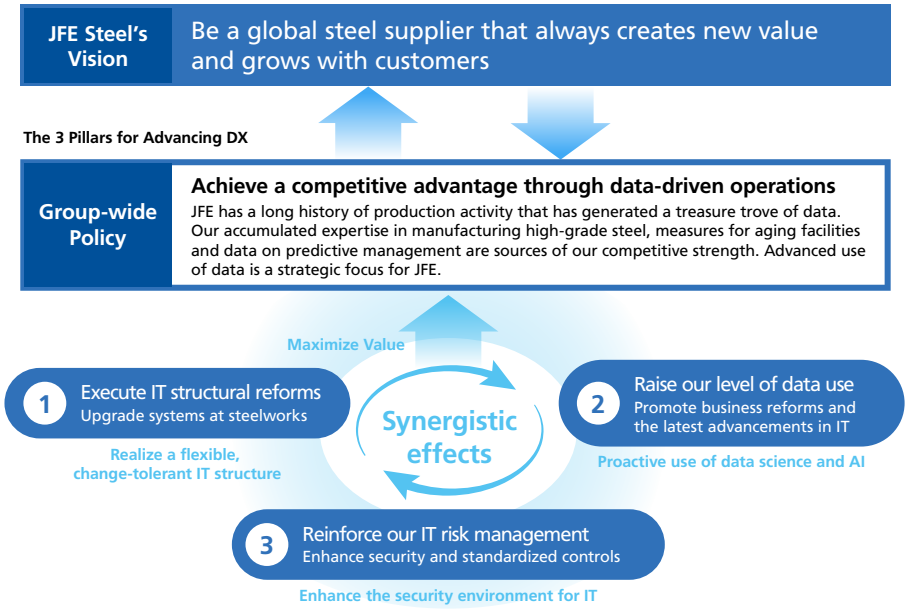
JFE Steel

Aggressive Advancement of DX

JFE Steel's Digital Transformation (DX) strategy revolves around technological innovation based on the active introduction of IoT, AI and data science (DS) and the application of data assets. Compared to mills in other countries, we possess an enormous amount of know-how and data accumulated through many years of production operations. Our abundant data assets are the source of our value creation.

We will harness the latest DS and AI technologies to make versatile use of such data in achieving innovative improvements in productivity, enhancing quality and ensuring stable operations to raise our competitiveness.

■ **Advancement of Digital Transformation (DX)**



Please see the DX REPORT.

➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)

JFE Steel Testing and Research Centers for Collaboration with Customers on Product Development

JFE Steel collaborates with customers in research and development. The Customers' Solutions Lab (CSL) for auto industry customers and the JFE Welding Institute -Center for Integrity against Fatigue and Fracture (JWI-CIF2) are located in eastern Japan, while the Customer Center Fukuyama (CCF), which develops materials and conducts applied technology research, is in western Japan. Using these facilities to strengthen early vendor involvement (EVI)*enables the company to quickly identify customer needs and develop products based on cutting-edge evaluation techniques and innovative production processes.

*Customer participation in product development is from an early stage to facilitate innovative new methods, functions, processes and evaluations for new steel materials.

Customers' Solutions Lab (CSL)

JFE Steel Enhancing Our Response to Customer Needs

In an effort to strengthen the company's total capabilities for better responding to customer needs, its sales department emphasizes sales education for sales personnel, from the headquarters and branch offices according to position. Specifically, it develops abilities in areas such as engaging in technical conversations, picking up clues from customer relations and using them in product development, offering suggestions to improve logistics and distribution, and analyzing financial indicators and costs. We also constantly strive to improve our ordering system to ensure that customer product specifications are accurately reflected in manufacturing.

JFE Steel Unified Customer Care

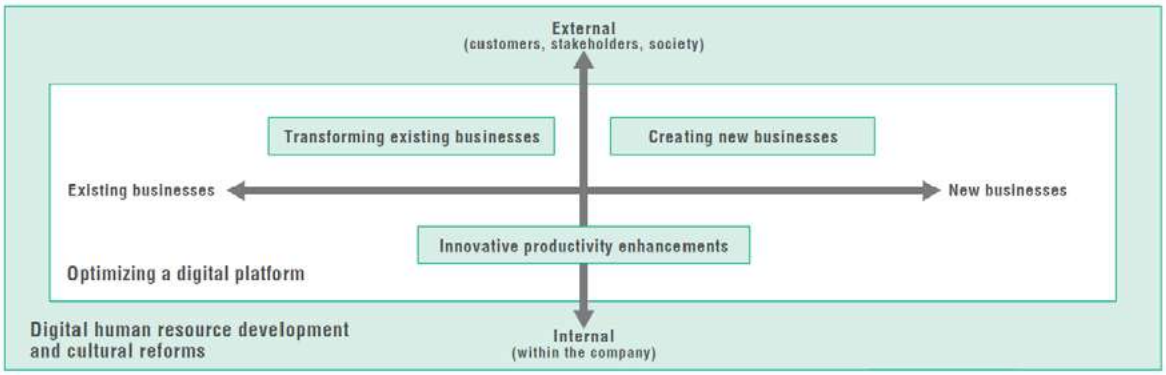
JFE Steel regularly conducts customer questionnaires and interviews to draft strategies for greater customer satisfaction. Business strategies are shared among the sales divisions, the business planning functions and steelworks to facilitate unified customer care and proposals that leverage the collective strengths of the JFE Group.

JFE Engineering Create and Continue to care for the Foundation of Life by Maximizing DX

JFE Engineering plans, designs, builds and operates the infrastructure that supports people's lives and industry. Digital transformation (DX) is crucial for accelerating the pace of its work and for maintaining its position at the forefront of the engineering industry.

JFE Engineering will aggressively pursue DX beyond simply raising operational efficiency to fundamentally reform its operational processes, add new functions to its products and services, and take on the challenge of developing new businesses that utilize data, to realize a green society and enhance corporate value.

■ JFE Engineering's DX strategy



Please see the DX REPORT.

➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)

JFE Engineering Company Assessments Based on Customer Evaluations

JFE Engineering uses customer surveys, interviews, and contractor performance evaluation forms to collect and assess data on the company's construction management, quality, advanced technologies and innovation. Each division analyzes and applies the data for quality improvement, new product development and the overall strengthening of aftersales service, to ultimately enhance customer satisfaction.

JFE Shoji

Establishing a System to Meet Customer Needs

To meet the needs of diversifying markets and the increasingly sophisticated requests from customers, JFE Shoji is planning to introduce DX solutions that leverage the strengths of the JFE Shoji Group.

JFE Shoji Electronics Corporation, a subsidiary of JFE Shoji, launched a logistics tracking solution service using GPS terminals in the spring of 2024. By visualizing information on location, temperature, and impact using GPS terminals, we will contribute to improving the efficiency of trailer operations and work times to help solve the "2024 problem" in logistics.

■ System features

- Efficient management of trailer arrival and delivery using GPS location information
- Reduction of labor and time for drivers searching for a trailer by grasping location information
- Contribution to reduction of CO_2 emission by visualizing emission caused by users in transit
- Confirmation of collected data on personal computers or smartphones via a web-based application

Please see the DX REPORT.

➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)

Promotion of Research and Development

JFE Steel

Promoting Technological Developments to Meet the Needs of Customers and Society at Large

Under the Seventh Medium-Term Business Plan, JFE Steel is researching and developing innovative technologies for the steel manufacturing process for achieving carbon neutrality, such as CO_2 reduction technology, carbon-recycling blast furnaces and CCU, and hydrogen-based ironmaking (direct reduction). These technological developments leverage data science and robotics to closely align with the needs of customers and society at large.

In addition, JFE Steel is accelerating the introduction of new products and solutions for each field, with automobiles including EVs and new energy as key areas of R&D.

For main results for FY2023, please refer to the following.

➤ Development and Provision of Eco-friendly Processes and Products (P.135)

JFE Engineering

Promoting Research and Development in Five Key Areas

JFE Engineering is promoting research and development with a focus on five key areas: waste to resource, carbon neutrality, composite utility services, core infrastructure, and DX as the technological foundation that supports these four business areas. The company is particularly focused on carbon neutrality, which includes manufacturing technology for monopile foundations for offshore wind turbines, low-energy CO_2 separation and capture technology using a hybrid of membrane separation and physical adsorption methods, and waste-to-chemical recycling technology to produce chemical raw materials from waste.

For main results for FY2023, please refer to the following.

➤ Development and Provision of Eco-friendly Processes and Products (P.135)

Internal Awards

The following technical and product developments were awarded in FY2023.

■ Internal Awards (FY2023)

	Prize/Award	Project	Recipient
JFE Steel	Grand Prize/ Excellence Award, JFE Steel President's Awards	Establishing a sustainable business structure for high-grade electrical steel sheets	Electrical Steel Sales Dept., Electromagnetic Dept., West Japan Works (Kurashiki Area)
		Establishing a robust business structure at Chita Works through a shift focus from quantity to quality	Planning Dept., Chita Works, etc.
		Promoting a company-wide strategy to rationalize capital investment costs	Capital Investment Strategy Dept. (the current Plant Construction Strategy Office, Plant Construction Dept.), etc.
		Improving the quality of automotive steel sheets by deepening and transforming the quality control system that integrates manufacturing, sales, and technology	Product Engineering Dept., East Japan Works (Chiba Area)
		Completing the refurbishment of a single unit of the Chiba 6 Blast Furnace	Iron Making Dept., East Japan Works (Chiba Area)
		Improving UOE profitability through a fundamental review of business strategies	Welded Pipe Dept., West Japan Works (Fukuyama Area), etc.
JFE Engineering	Grand Prize, JFE Engineering President's Awards	Contributing to the operation of Japan's first offshore wind monopile (MP) plant with the world's leading welding technology	Offshore Wind Project Team

For more on the external awards, please refer to the following.

➤ External Awards (P. 269)

Supply Chain Management

Basic Policy

Through the adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement, the international community has called on companies to actively engage in actions to resolve global issues toward realizing a sustainable society. Existing harmoniously with the global environment, respecting human rights, and providing challenging work environments are some of the JFE Group's commitments in the JFE Standards of Business Conduct and the Group promotes initiatives under these standards. In order to realize a sustainable society, we believe it is important to address these challenges within the Group itself as well as across the entire supply chain. We will continue to push forward with our initiatives supported by the understanding of our suppliers and other business partners.

Promoting Green Procurement

The JFE Group's procurement policies help to conserve resources and protect the environment by ensuring adherence not only to all laws and regulations but also to procurement principles stated in the Charter of Corporate Behavior developed by the Japan Business Federation. Going forward, the JFE Group expects to accelerate such efforts in its supply chains.

Procurement Policy and Initiatives by Each Business

JFE Steel JFE Steel Procurement Guidelines and Requests to Suppliers to Promote Sustainability

To guide its procurement of raw materials, JFE Steel established the JFE Steel Procurement Guidelines, in accordance with the JFE Group Standards of Conduct and the JFE Group Basic Policy on Human Rights, to promote activities for realizing sustainability across its entire supply chain. Under the guidelines, JFE Steel pays due consideration to human rights, including the prohibition of child labor and forced labor, as well as legal compliance and environmental protection. In addition, the company purchases raw materials such as tin, tantalum, tungsten, gold, and cobalt only after confirming that they have not been mined in conflict-affected or high-risk areas. We share these guidelines with our business partners and promote sustainability initiatives throughout our supply chain.

For the JFE Steel Procurement Guidelines, please refer to the following.

➤ JFE Steel Procurement Guidelines (https://www.jfe-steel.co.jp/en/company/pdf/procurement-guidelines.pdf)

JFE Engineering Basic Procurement Policy, and Requests to Suppliers to Promote CSR

Viewing its suppliers as key partners in achieving mutual growth, JFE Engineering strives to nurture mutual trust and reinforce partnership relationships.

JFE Engineering established its Basic Procurement Policy to implement fair and transparent procurement activities. Under its Procurement Guidelines, it also makes specific requests to its business partners and asks for their compliance. To ascertain the status of suppliers' efforts based on the request for compliance, the company started a questionnaire survey in FY2023. The results are compiled and shared with suppliers so that they can apply the results for their own initiatives.

Through these efforts, JFE Engineering will develop CSR activities with its suppliers to promote sustainable procurement.

For JFE Engineering's Basic Policy on Sustainability in the Supply Chain, please refer to the following.

➤ Basic Procurement Policy (https://www.jfe-eng.co.jp/en/information/procurement_policy.html)

➤ Procurement Guidelines (https://www.jfe-eng.co.jp/en/information/procurement_policy.html)

JFE Shoji Ensuring a Safe, Fair Supply Chain

The JFE Shoji Group engages in activities toward becoming a company with a strong presence that can achieve sustainable development and growth together with its customers, the JFE Group, and all other stakeholders. JFE Shoji believes that ensuring sustainability across the supply chain is a key issue for achieving this goal and established the Basic Policy on Sustainability in the Supply Chain to guide its efforts on human rights, labor issues, the global environment, and other matters. The JFE Shoji Group seeks the understanding and cooperation of its suppliers and other business partners in complying with the policy and will work with them to establish a more sustainable supply chain.

For JFE Shoji's Basic Policy on Sustainability in the Supply Chain, please refer to the following.

➤ Basic Policy on Sustainability in the Supply Chain (https://www.jfe-shoji.co.jp/en/sustainability/promote/)

Human Capital

Basic Policy

The JFE Group intends to establish its position as a company that is essential to the sustainable development of society while also creating safe, comfortable lives for people everywhere. So that it can continue to enhance corporate value under an increasingly complex and rapidly changing business environment, each and every employee must be able to provide support. We established the JFE Group's Basic Policy on Human Resource Management and the JFE Group Health Declaration and are working on measures to maximize the abilities and vitality of our employees by investing in human capital. Additionally, we view "ensuring occupational safety and health" and "recruiting and nurturing diverse human resources" as areas of challenge in our business activities, and we have identified each as a key management issue (materiality).

Occupational safety and health depends upon ensuring employee well-being and safety as a basic corporate requirement, particularly for manufacturers, and is fundamental to the continued existence of any company. The JFE Group adheres to the philosophy of safety first, and, together with its Group companies and partner companies (including contractors), is promoting safety and health activities and effectively operating an occupational health and safety management system to promote a safe and healthy workplace. Furthermore, the Group seeks to create safe, attractive environments where everyone can enjoy working and aggressively promotes the establishment of settings in which personnel with diverse backgrounds can demonstrate their full potential. To that end, it collaborates with its health insurance union and industrial health staff to maintain and strengthen employee health so that everyone can work with vigor.

To recruit and nurture diverse human resources, we are working to secure diverse human resources and foster human resources who serve as the backbone of our business, create workplace environments and systems for employees to fully demonstrate their abilities with a sense of fulfillment, and realize new workstyles that are not restricted by time or location.

JFE Group's Basic Policy on Human Resource Management

1 Respect Human Rights and Facilitate Fair Management of Human Resources

The Group manages human resources fairly by respecting the human rights of all employees and nurturing employees who embrace the Group's corporate values and standards of business conduct.

2 Foster a Corporate Culture that Nurtures People and Promotes Satisfying Workplaces

The Group facilitates interactive communication among employees to cultivate a corporate culture that nurtures human resources and creates safe, attractive environments where everyone can enjoy working.

3 Diversify Human Resources

The Group ensures that diverse all people, including women, non-Japanese, the elderly and the disabled, can demonstrate their full potential.

4 Recruit and Steadily Nurture Excellent Human Resources

To survive in an increasingly complicated and diversified business environment, the Group steadily recruits diverse, high-quality skilled human resources, ensures that they receive the skills and knowledge necessary to continue strengthening the Group's technological capabilities, and nurtures their global capabilities.

Poster displayed at each workplace

JFE Group Health Declaration

1. JFE, recognizing that safety and health are fundamental for fulfilling its mission, creates workplaces in which every employee can work with vigor.
2. JFE and its health insurance union work together to advance initiatives for maintaining and upgrading the physical and mental health of employees and their families.
3. JFE gives top priority to safety and health and to creating a health culture in which each employee takes personal responsibility.

Targets and Results

Having identified the prevention of workplace accidents and ensuring of the health of employees and their families as material issues related to occupational safety and health, the JFE Group has set KPIs to manage progress and promote relevant initiatives.

To prevent occupational accidents, it is committed to creating a safe work environment by adhering to the philosophy of safety first. To achieve our top-priority goal of zero major accidents, as set forth in the Seventh Medium-Term Business Plan, we will bolster safety education and require stringent compliance with related rules while further striving to reduce occupational health and safety risks by actively making each facility inherently safe. To ensure the health of our employees and their families, we are implementing health and productivity management by setting targets for the provision rate of health guidance and smoking rates.

Moreover, as defined in the JFE Group's Basic Policy on Human Resource Management, we are committed to fostering a nurturing corporate culture, creating satisfying workplaces, diversifying human resources, and recruiting and steadily nurturing excellent human resources. We have set KPIs for diversity and inclusion, the strengthening of human resource development, and the creation of work environments that motivate employees as key management issues related to recruiting and nurturing diverse human resources, to manage progress and promote relevant initiatives.

Data related to Lost-Work Injuries, see:

➤ Social Data: Lost-Work Injuries and Accidents (P.253)
➤ Material Issues of Corporate Management and KPIs (P.18)

Occupational Health and Safety

Initiatives

To ensure safety at its operating companies, the JFE Group regularly reports to the Board of Directors, which provides direction and supervision. It also holds discussions on health and safety with the labor union through the Occupational Health and Safety Committee.

To achieve our goal of zero workplace fatalities under the Seventh Medium-Term Business Plan, the JFE Group particularly prioritizes safety investments (around 10 billion yen per year Group-wide) to reduce risks by making workplaces inherently safe. We will also promote multifaceted occupational employee health and safety activities, including detection and monitoring, by harnessing advanced IT solutions.

The JFE Group also organizes seminars for newly appointed managers and supervisors to provide information on the Industrial Safety and Health Act and risk assessment regulations and on formulating work plans and policies for health and safety management. In the construction operations department, we offer programs for local superintendents in charge of construction work (Overall Safety and Health Controller) centered on the Industrial Safety and Health Act as well as related regulations for subcontractors and the Construction Business Act (400 participants in 2023). We also conduct new employee training and position-specific training on mental health (1,600 participants in 2023).

JFE Steel Occupational Health and Safety Initiatives Based on Two Strategies

In 2024, we are following two basic strategies: practicing autonomous safety activities while strengthening communication between employees and business associates and taking action based on the Group's Health Declaration. In accordance with our goal of achieving zero accidents Group-wide and zero accidents at each workplace, management supervisors make a point to visit work sites every day, while workers are striving to handle their tasks with discipline. We are also proactively applying IT, such as by introducing safety monitoring systems* for safety management.

In order to more independently and systematically promote occupational health and safety management throughout the organization, we established an occupational health and safety management system in accordance with the ISO 45001 international standard and obtained ISO 45001 certification (JIS Q 45001) for all our construction and operating sites. We will continue making workplaces safer and healthier through an ongoing and effective operation of the occupational health and safety management system.

Certified Sites

- Chita Works (September 9, 2021)
- Fukuyama Area (December 16, 2021)
- Chiba Area (May 26, 2022)
- Kurashiki Area (May 26, 2022)
- Sendai Works (December 15, 2022)
- Keihin Area (January 19, 2023)

To mitigate or prevent disaster risks, JFE Steel conducts risk assessments at the planning stage for new facilities as well as prior to periodic and as-needed repairs. We also constantly strive to make each facility inherently safe so as to lower the risk level for our workers.

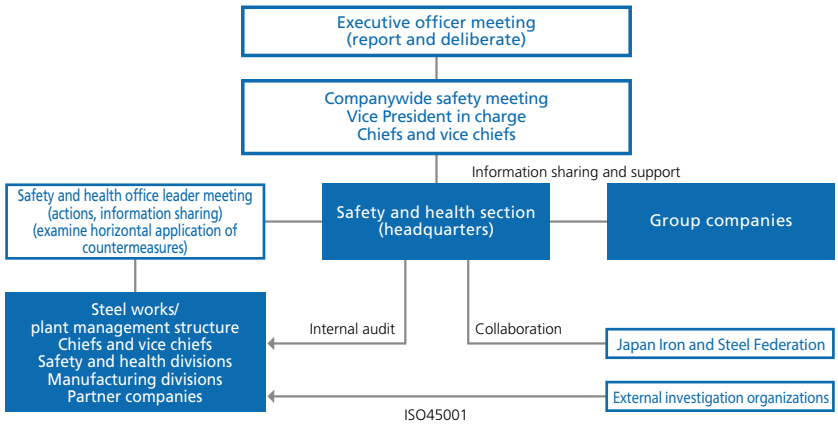
In the event of an industrial accident, the department in which the incident occurred investigates the cause and formulates and implements actions to prevent recurrence. At the same time, we inform the relevant departments and labor union through the Occupational Safety and Health Committee. We will also set up a disaster investigation committee as necessary and forward recommendations to the department where the accident occurred as well as related departments so that they can develop appropriate measures to prevent recurrence. In the event of severe accidents, a response is deployed across the company, and a standard progress report is submitted to Corporate Officer Council until countermeasures have been completed. In the event of other incidents and near-misses, the health and safety departments discuss and determine the need to deploy a company-wide response and follow up on progress until the company-wide deployment is completed. This practice has been standardized across the entire company.

We immediately report industrial accidents to the Japan Iron and Steel Federation (JISF) under the required guidelines. We file an update once we have determined the cause and decide on countermeasures. In the event of severe accidents,

we promptly submit a report on safety, disaster prevention and environmental issues to the Ministry of Economy, Trade and Industry, the Ministry of Health, Labor and Welfare, and the JISF.

*A system that provides managers with real-time information about, for example, carbon monoxide concentration and oxygen concentration along with worker locations.

■ **Management Structure for Health and Safety**

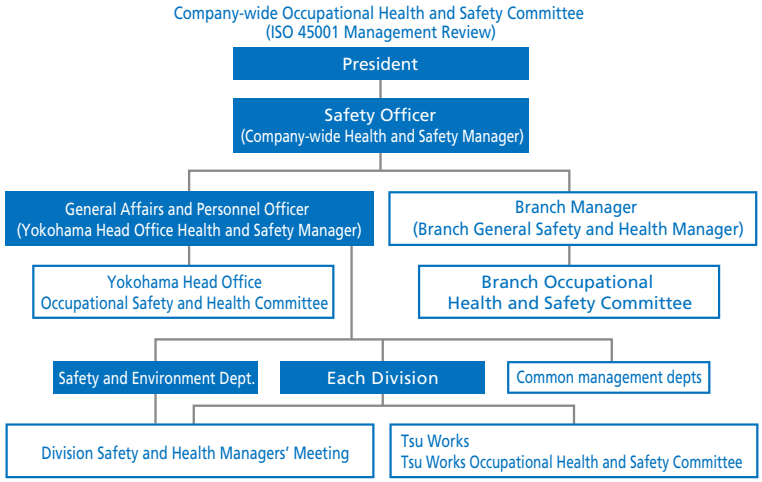


JFE Engineering Ensuring Employee Health and Improving Occupational Health Level

In addition to setting up governance organizations for health and safety at each operating site to comply with the Industrial Safety and Health Act and in line with the type of work and number of employees, JFE Engineering has established a governance structure for health and safety at each operational headquarters to facilitate and effectively implement company-wide management at its construction and operating sites and manufacturing plants. JFE Engineering strives to eliminate disasters at all suppliers and Group companies by establishing priority items to be shared across the company and to which all employees and all staff at suppliers adhere. It also endeavors to identify sources of danger as well as safety measures through risk assessments aligned with the particular characteristics of each individual operational headquarters. Meanwhile, it promotes physical and mental health and the creation of comfortable working environments as a means of ensuring the health of employees and bringing occupational health to an overall higher level.

In the event that an industrial accident occurs, occupational health and safety managers will meet to determine the cause and consider countermeasures that will be deployed across the company. Since 2016, the company has been operating an occupational health and safety management system (ISO 45001 certified) for its construction activities in Japan and overseas as well as its manufacturing operations at the Tsu Works. As a new initiative, JFE Engineering applies IT solutions promoting occupational health and safety, including monitoring and detection by multiple approaches.

■ **Management Structure for Health and Safety**



JFE Shoji

Enhanced Health and Safety Activities and Establishing a Safe and Secure Working Environment

JFE Shoji is implementing the following activities to eliminate unsafe operations that could lead to severe accidents for achieving zero severe accidents at its coil centers and other processing sites.

(1) Risk assessment by supervisors patrolling the site and identifying unsafe operations using the recording functions of safety cameras, or by ensuring that each worker is engaged in hazard prediction.
(2) Comparative study of similar disaster cases and hazard experience training for improving the ability to recognize and avoid unsafe operations
(3) Facility improvement for reducing risks, including installation of safety sensors
(4) Operation training (slinging for cranes and other skills) and review of operational standards

Furthermore, for each of its Group companies, JFE Shoji assigns a safety manager to spearhead these efforts to raise the level of health and safety activities. To ensure that all JFE Shoji Group companies operate under the same values, safety managers meet every other month to share knowledge and information on occupational health and safety.

All lost-work injuries must be reported to the top management from the president of each Group company as part of the JFE Shoji Group-wide effort to address safety management. Annual safety awards are also presented to encourage employees to actively engage in health and safety activities. Through these initiatives, the company will raise the level of safety management within the JFE Shoji Group and continue to maintain safe working environments.

Health and Productivity Management

Company-wide Targets for Each Operating Company

We are working on health and productivity management by setting Company-wide goals for each of our operating companies, in addition to KPIs common to the JFE Group.

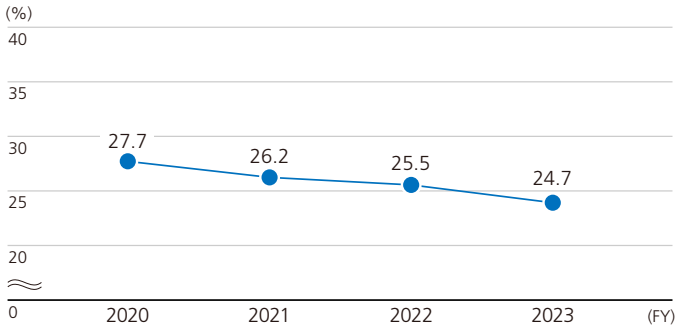
	Items	Indicators	FY2023 Results	FY2024 Targets
JFE Steel	Thorough implementation of physical examinations Preventive health measures	Rate of complete exams for dependents	55.2%	Rate of complete exams for dependents: 60%
		Rate of providing specific health guidance	—*2	Rate of providing specific health guidance: at least 60%
	Preventive health measures Promotion of non-smoking and segregates smoking	Rate of obesity (BMI: 25 or higher)	30.7%	Rate of obesity (BMI: 25 or higher): 30% or less
		Smoking rate	25.8%	Smoking rate: 24.3% (1.5% annual reduction)
	Measures related to sleep	Sleep-related risk (based on responses in health checkup questionnaire)	36.7%	Sleep-related risk (based on responses in health checkup questionnaire): 35% or lower
JFE Engineering	Measures related to sleep	Sleep-related risk (based on responses in health checkup questionnaire)	36.7%	35% or lower
	Measures related to passive smoking	Smoking rate	21.8%	20.8% or lower (1% annual reduction)
	Measures related to obesity	Obesity rate (BMI: at least 25 or abdominal circumference ≧85/≧90 for male/female)	41.7%	38.3% or lower
	Collaborated health promotion	Rate of providing specific health guidance	—*2	At least 50.0%
		Rate of complete exams for dependents	54.4%*1	60%
JFE Shoji	Preventive health measures	Rate of providing specific health guidance	—*2	60%
	Measures for non-smoking and passive smoking	Smoking rate	20.6%	20.0%

*1 Preliminary figures
*2 Actual rates of providing specific health guidance will be added as soon as they are confirmed.
*JFE Steel manages the obesity rate and smoking rate on a calendar year basis.

Physical Health Initiatives

- Ensure the implementation of regular physical examinations and strengthen cancer screenings.
- Prevent aggravation of lifestyle diseases by conducting metabolic syndrome checkups and offering health guidance.
- Utilize the health insurance union's health promotion app, PepUp, to educate employees on physical exercise and other healthy habits.
- Promote non-smoking areas and maintain separate areas for smokers and non-smokers in buildings. Provide guidance to help employees quit smoking through industrial physicians and public health nurses.

■ Changes in Smoking Rates (All Operating Companies)



Maintaining and Promoting the Health of Employees' Families

The JFE Group works with the health insurance union to maintain and improve the health of employees and their families by, for example, encouraging spouses to undergo health examinations. The rate of health examinations for dependents (age 40 or older) has been steadily increasing to 53.8% in FY2023, up 16.2 points from 37.6% in FY2014.

For employee health data, please refer to the following.
➤ Social Data: Health (P.255)

Mental Healthcare

The JFE Group conducts four basic initiatives to maintain the mental health of employees: "self-care" for workers who strive to remain aware of stress and take preventive measures; "care by management supervisors" who provide advice to subordinates; "care by industrial health staff" who support employees, managers and supervisors; and "care by human resources outside workplaces," including specialist clinics and individuals.

JFE's health insurance union also provides mental health counseling, including a 24-hour hotline for employees and their families (spouse and dependents).

Initiatives on Health Issues

We operate a health management system for continuously and effectively managing the health of all employees, including those on overseas assignments and business trips and those studying abroad.

We particularly seek to ensure that employees working abroad, under healthcare systems that differ from those in Japan, can maintain a healthy lifestyle, along with their accompanying family members, by conducting health checkups and vaccinations before they move overseas, in accordance with Company-wide regulations. In a proactive effort to prevent infections, we also provide information on global health issues such as COVID-19, HIV, tuberculosis, and malaria during assignment briefings. We will continue to monitor and appropriately respond to global health issues.

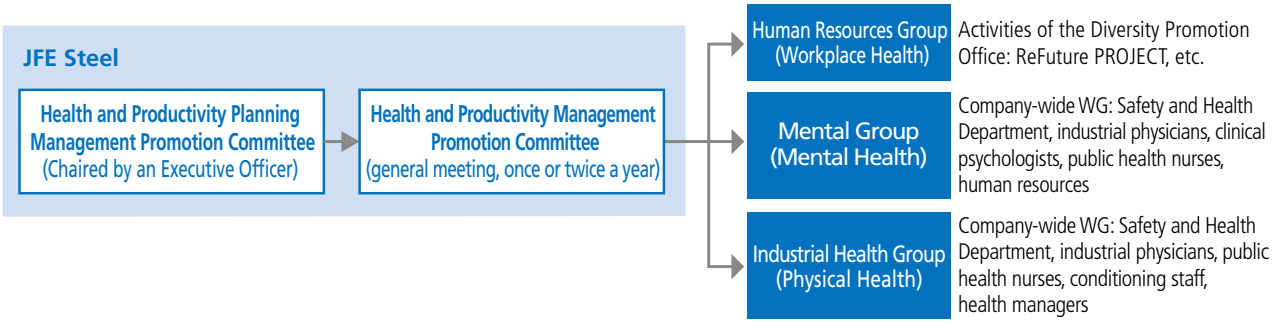
JFE Steel

Promoting Health and Productivity Management to Maintain and Improve Health

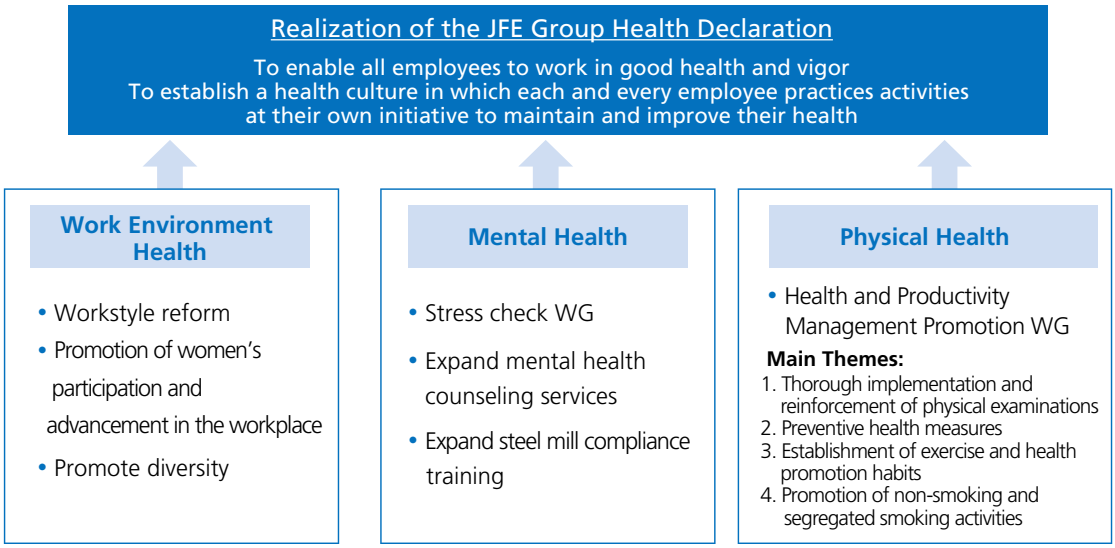
To drive key initiatives for maintaining and improving the health of employees and their families, JFE Steel launched the Health and Productivity Management Promotion WG upon the establishment of its Group Health Declaration in 2016 and is monitoring the achievement of medium- to long-term goals. Through these ongoing activities, we want all employees to work healthily and vigorously and to establish a health culture in which every employee practices activities on their own initiative to maintain and improve their health.

In 2016, the Health and Productivity Management Promotion WG first focused on physical health established key initiatives regarding: (1) thorough implementation and reinforcement of physical examinations, (2) preventive health measures, (3) establishment of sound exercise and health habits, and (4) non-smoking and segregated smoking activities. Since 2024, we have been implementing activities with all of our operating sites.

■ Structure of Health and Productivity Management Promotion WG



■ Objective of the Health and Productivity Management Promotion WG



■ Health and Productivity Management Promotion WG

Members	•Each region, works, main office	•Industrial physicians and public health nurses •Manager of Labor Management Office, Labor Management HR Department, Organizational HR Department •Office of Safety and Health (health staff), Safety and Health Department
	•Health Insurance Union	•Directing Manager, Manager of Health Development Office
Discussion topics	•Evaluation of Health and Productivity Management (physical and mental health, and working environment) Evaluation of indices and activities: •Company-wide promotion activities •Reporting health and productivity management plans and results to the management team	
Frequency	•Twice a year	

JFE Steel

Active Exercise™ Health

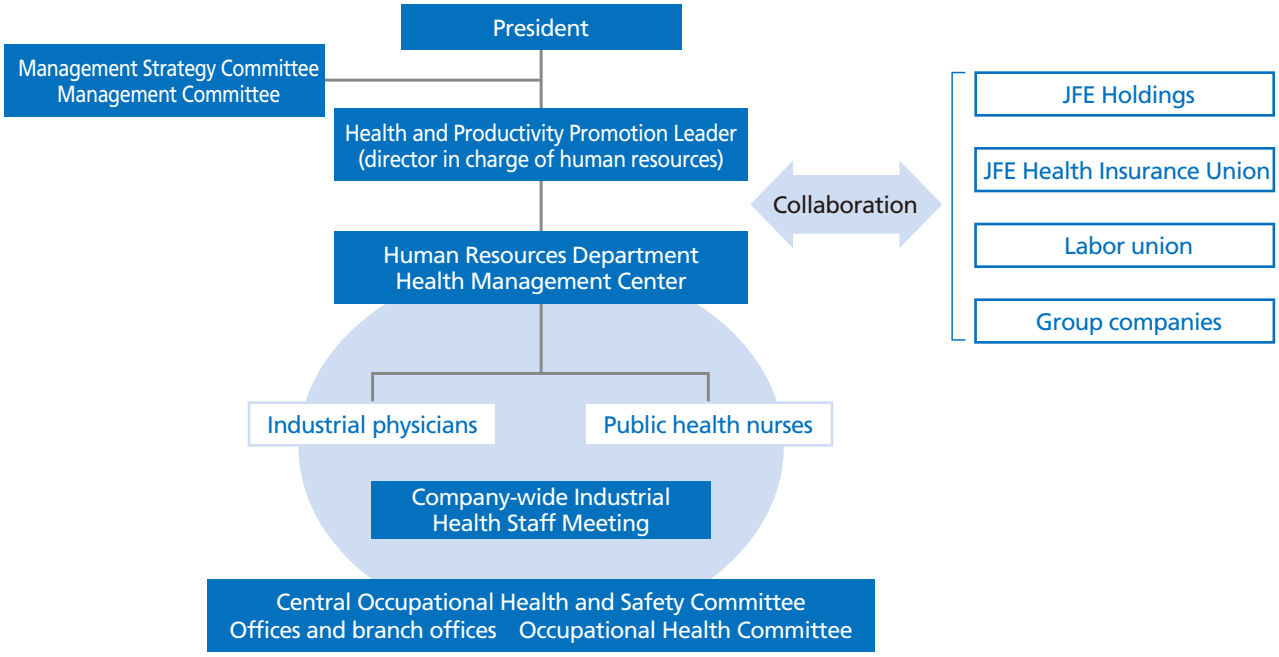
JFE Steel business sites offer the Active Exercise™ program, designed by West Japan Works to help people increase their physical strength and prevent injuries from falling. The program's effectiveness in preventing occupational accidents and improving health has even attracted attention outside the company, so it is being actively shared not only among Group companies but also with on-site suppliers and companies across a broad range of industries. To prevent accidents such as falls and back injury, we participate in the Ministry of Health, Labor and Welfare and the SAFE Consortium as well as activities such as Active Exercise™ and Safe Physical Fitness™ Functional Tests.

JFE Engineering

Engineering Activities for Boosting Health Based on Health Checkup Data

JFE Engineering maintains a system centered on the Health Management Center of the Human Resources Department, under which industrial health staff at each office and branch office cooperate to promote activities. The company is pursuing initiatives for improving health focused on five domains, including sleep, smoking and obesity issues extracted from past health checkup data, along with cancer and mental health. Every year, the Health Management Center compiles basic health checkup data and prepares the Data Book, which shows changes over time at a glance for the entire Company and major business sites. The center follows the PDCA cycle while reviewing the results of its initiatives.

■ Health and Productivity Management Promotion System



■ Initiatives Based on Past Health Checkup Data

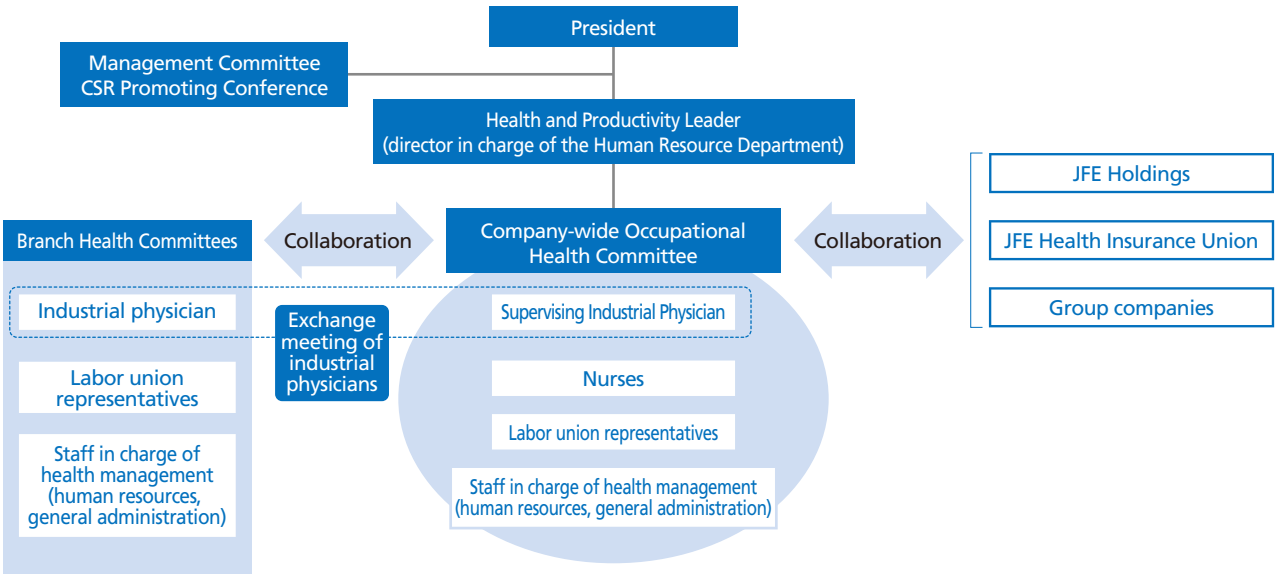
Fiscal Year Launched	Purpose	Initiatives
2018	Preventing cancer	Stomach endoscopy during regular health checkups
2019	Improving sleep habits	Company-wide self-care seminars to practice napping and breathing exercises
2020	Addressing obesity	Labor and management co-sponsored RIZAP seminars and workplace exercises at home
2021	Ending exposure to passive smoking	Complete ban on indoor smoking
	Improving sleep habits	Company-wide self-care seminars to practice sleeping and breathing exercises
2022	Providing more personalized guidance	Provision of more individualized guidance on sleep, obesity, smoking, etc.
2023	Preventing cancer	Colonoscopy subsidy system introduced, charity walk held

JFE Shoji

Detecting Illnesses at an Early Stage, Maintaining and Promoting Health for Employees and their Families

JFE Shoji believes that the health of employees and their families holds the key to the further development of the company and is therefore creating workplace environments in which employees can work with vigor.

■ **Health and Productivity Management Promotion System**



■ **Past Initiatives**

Fiscal Year Launched	Purpose	Initiatives
2018	Prevent cancer	Helicobacter pylori tests conducted during regular health checkups
		New program for subsidizing examination fees for breast cancer and uterine cancer
	Raise employee health awareness	e-learning program based on the importance of regular health checkups, and reducing heart and brain disease
2019	Prevent lung cancer and stroke	New program for subsidizing smoking cessation clinic fees
	Measures related to passive smoke (reduction in smoking rate)	
2020	Encouraging employees to exercise as a habit	Encourage participation in the Powering Up Health Care program
2022	Providing more individualized guidance	Encourage individual consultation to those eligible for specific health guidance
2023	Early detection of stomach cancer	Gastrointestinal endoscopy tests conducted during regular health checkups

Response to the COVID-19 Pandemic

The JFE Group recognizes the importance of social infrastructure that manufactures and supplies the necessary goods for society. It has therefore been formulating a BCP that includes setting response policies for the phase of a new influenza epidemic. In response to the COVID-19 pandemic since 2020, it fully understands the purpose and content of the government's basic policy to respond to COVID-19. We place the highest priority on employee health and have taken action from the perspective of the basic approach to preventing infection and specific measures to be taken as outlined in the guidelines issued by the Japan Business Federation. While taking into account the conditions of factories and other factors, we have worked to prevent the transmission of COVID-19 and have continued to fulfill our role as a social infrastructure, including providing vaccinations at workplaces.

Since COVID-19 was reclassified as Class 5 in May 2023, we have been responding in accordance with government guidelines, and every Group company has returned to normal working rules. Nevertheless, all employees are encouraged to take basic infection prevention measures, such as washing hands and gargling. As mutant strains or new infections occur in the future, we will use all of our experience in responding to COVID-19 while acting in accordance with prevailing government policy.

Diversity and Inclusion

Initiatives

In a rapidly changing business environment, the JFE Group believes that the fusion of various values and ways of thinking will lead to the creation of unprecedented ideas and solutions, which ultimately results in sustainably enhancing corporate value. For this reason, the Group has positioned diversity and inclusion as a key management concern. It has established a diversity promotion department in each of its operating companies to steadfastly advance initiatives such as creating an environment where employees with diverse backgrounds, including gender, nationality, values, and different lifestyles, can demonstrate their abilities. In addition, management and the promotion organization are working together to formulate and implement company-wide policies, including the establishment of a diversity promotion committee headed by the president.

We developed even more ambitious KPIs particularly to support the advancement of women, such as number and ratio of women appointed to management positions and the ratio of female hires, starting in FY2022. Every operating company formulates a company-wide policy through discussions with management. These efforts include recruitment measures to increase the number of candidates for female management positions, and retention measures through the enhancement of internal and external networking and the presentation of role models, as well as placement and development measures through the creation of individual training plans for female employees.

JFE Steel Accelerating and Strengthening Diversity Promotion

JFE Steel fosters a workplace culture in which diverse human resources can play an active role across a variety of fields, through such initiatives as management and supervisor training and activities for raising awareness through Diversity Month. Furthermore, directors and general managers strive to accelerate and strengthen the promotion of diversity by setting diversity targets and exercising leadership in their own divisions.

To promote women's advancement, the company provides career training for female employees and their supervisors, actively sends them to external training, and has started to hold online career networking events to connect the entire company and women's health seminars based on the voices of female employees. For female employees engaged in shift work, it has established a flow of work-life balance support interviews during which employee discusses their future career with their supervisor, as well as the human resources department when they experience life events such as pregnancy or childbirth, and a detailed support system has been established for employees to continue to play an active long-term role while balancing work and childcare. As part of helping employees balance work with childcare and nursing care, the company disseminates joint labor-management messages that encourage male employees to take childcare leave. It also holds seminars to assist employees with balancing work and nursing care. Through these initiatives, it has supported employees through various stages of life while establishing a workplace where they feel motivated to work.

Additionally, the company changed the name of the promotion department to the DEI Promotion Office in FY2024, and it has bolstered its activities as a means of confirming its commitment to diversity from the perspective of equity while also raising the level of understanding of its activities.

JFE Engineering Promoting Awareness-Raising Activities Within the Company

JFE Engineering engages in activities for reforming its corporate mindset, including diversity seminars for managers, e-learning programs for all employees and the annual Diversity Month. In FY2022, as part of the CSR promotion system*, the Diversity Committee, comprising the management team, was established to deploy company-wide policies and formulate and implement plans for each organization. For female employees, the company supports career development by providing opportunities for external training and networking events. It also accepts around 60 locally hired employees of overseas Group companies at any given time to provide on-the-job training. The company also strives to create an environment in which workers can spend their time in Japan with a sense of security, by offering information through a portal site and providing Japanese language classes. Every year in Japan, JFE Engineering actively hires around 70 mid-career recruits possessing diverse characteristics and values, such as those with experience in other industries.

*The name was changed to the Sustainability System in FY2023.

JFE Shoji

Initiatives to Raise Awareness within the Company

JFE Shoji promotes company-wide awareness by periodically conducting diversity seminars for the management team, diversity management seminars targeting managers including those at Group companies, and e-learning for all employees, as well as Diversity Month (every November). In addition, the Diversity Promotion Committee, comprising the management team, was established to share overall policies and develop and implement departmental plans. It also supports the career development of female employees by providing a career training program for mid-career female employees together with their supervisors while holding roundtable discussions with senior employees and actively dispatching female employees to external training programs and activities.

The company organizes information exchange meetings for employees on maternity leave and follow-up seminars after they return to work to ensure that women can continue working after childbirth or periods of childcare or nursing care. As part of efforts to encourage male employees to participate in childcare, we hold seminars on male childcare leave and provide explanations to department heads and to the employees.

Promoting Women's Professional Development

The JFE Group is implementing a broad range of initiatives to promote women's advancement, including active recruitment, enhanced childcare-support programs that significantly exceed statutory requirements, and development of training and awareness-raising activities. The initiatives and issues faced by each company are shared among operating companies. They are also discussed at the Board of Directors' and other meetings in an ongoing effort to promote the initiatives. In recognition of its efforts to encourage the empowerment of women, JFE Holdings has been selected three times as a Nadeshiko Brand* since FY2013.

*A joint project of the Ministry of Economy, Trade and Industry and the Tokyo Stock Exchange. One company per industry is selected from among those listed on the First Section of the Tokyo Stock Exchange and announced as a company that is actively promoting the careers of female employees, including improvements to environments where women can continue to work.

Formulation of an Action plan for Promoting Women's Professional Development

The Act on Promotion of Women's Participation and Advancement in the Workplace went into effect on April 1, 2016. The JFE Group has designated the promotion of workforce diversity as a key management strategy for maximizing the potential of every employee and has been actively hiring and supporting the advancement of female employees.

We formulated the following action plan in accordance with the Act to establish a working environment that encourages female employees to demonstrate their abilities and create satisfying workplaces for all employees.

- **Action Plan Period**
  Period of five years starting on April 1, 2021 and ending on March 31, 2026

- **Target of the Action Plan**
  We have set a common goal for the JFE Group to increase the ratio of women in managerial positions above the section manager level to at least 10% by 2030 (of which at least 20% are in administration and the sales divisions). Under this goal, we will actively promote the appointment of women to managerial positions.

- **Action Plan for Each Operation Company**

➤ JFE Steel (Japanese Only) (https://www.jfe-holdings.co.jp/csr/pdf/female_plan_st.pdf)
➤ JFE Engineering (Japanese Only) (https://www.jfe-holdings.co.jp/csr/pdf/female_plan_eng.pdf)
➤ JFE Shoji (Japanese Only) (https://www.jfe-holdings.co.jp/csr/pdf/female_plan_shoji.pdf)

Company Policy Explained by the President

The president of JFE Holdings has endorsed the Declaration on Action that was introduced by a group of male leaders in Japan who intend to create "A Society in which Women Shine" with the support of the government's Gender Equality Bureau Cabinet Office. He also announced additional measures to support the professional development of female personnel, thereby communicating both inside and outside the company that women can play active roles at JFE.

For more information, see:
➤ Declaration on Action by a Group of Male Leaders Who Will Create a Society in Which Women Shine
(https://www.gender.go.jp/policy/sokushin/male_leaders/pdf/declaration_body_en.pdf)

Employment of People with Disabilities

The JFE Group has three special subsidiaries, JFE Apple East Corporation, JFE Apple West Corporation and Mie Data Craft Co., Ltd., to employ people with disabilities and create enjoyable workplace environments for them.

For more on the employment of people with disabilities, see:
➤ Social Data: Employment of People with Disabilities (P. 257)

Programs for Employees Over 60 Years Old

To ensure that the skills and experience of veteran employees are handed down, JFE Group companies have either raised the mandatory retirement age to 65 or introduced a system that enables all employees to work until the age of 65.

As of the end of March 2024, 938 veteran employees (about 4.9% of the total) are working at JFE Steel, JFE Engineering, and JFE Shoji.

JFE Steel Passing on Techniques and Skills and Promoting Human Resource Development

JFE Steel raised its mandatory retirement age to 65 in April 2021 to increase the motivation of veteran employees in their work, pass on their techniques and skills, and steadily promote human resource development. While we used to rehire anyone who wished to continue working after reaching the age of 60, we recently established a personnel and wage system to cover all employees up to the age of 65.

JFE Engineering Maintaining and Strengthening Competitiveness and Passing on Skills

JFE Engineering regards veteran employees as highly specialized experts in business and technical fields and expects them to play roles in maintaining and strengthening competitiveness while passing on their skills to the next generation of workers. To encourage their further success, we raised the retirement age to 65 in fiscal 2023.

JFE Shoji Realizing Flexible Workstyles

JFE Shoji is mindful of creating an environment that allows veteran employees over 60 to continue working with high motivation, while also seeking to realize flexible workstyles and develop a healthy working environment. Employees may choose from a variety of working arrangements, including full-time employment, shortened workweeks, and shortened daily work hours in accordance with their lifestyles.

JFE Group Creating an Inclusive Workplace

The JFE Group is creating a workplace that does not discriminate on the basis of gender, sexual orientation or gender identity by conducting internal human rights seminars and position-specific curriculums. LGBTQ concerns have also been incorporated into the Group's compliance guidebook, which is distributed to all employees and used as a common reference during the annual Compliance Month of October toward nurturing greater understanding. JFE Steel has revised its benefit program to extend coverage to same-sex or de facto partners from FY2022 and holds program briefings and educational training sessions. At JFE Engineering, e-learning programs are offered to all employees, and seminars are held mainly for personnel in human resources.

Securing Diverse Human Resources

Recruitment Results for University Graduates (FY2024) and Mid-career Recruits (FY2023)
683 employees (total of three operating companies)

- Women in positions with prospects for promotion: 23.2% (104 out of 448)
  Women in white-collar positions: 37.8% (71 out of 188)
- Mid-career and year-round recruits: 32.4% (221 out of 683)

Recruits in positions with prospects for promotion: 33.0% (148 out of 448)
Recruits in on-site positions at steelworks: 31.1% (73 out of 235)

To ensure sustainable growth, the JFE Group steadfastly recruits from a diverse pool of applicants and actively hires women, foreign nationals and mid-career personnel, and recruits year-round.
The Group also operates overseas businesses across a broad range, and its overseas sites hire employees locally, thereby contributing to communities with employment opportunities.

■ Recruitment Results (Three Operating Companies) for University Graduates (FY2024) and Mid-career Recruits (FY2023)

Category	Career-track Positions			On-site and Clerical Positions	Total
	White-collar	Technical	Total		
Male	117	227	344	219	563
Female	71	33	104	16	120
Total	188	260	448	235	683
Ratio of women (%)	37.8	12.7	23.2	6.8	17.6

For more on employees, refer to the following data.
➤ Social Data (P. 253)

Strengthening Human Resource Development

Initiatives

Human Resource Development

The JFE Group is enhancing training and education with an emphasis on nurturing the capacities of each employee and cultivating global human resources to support the expansion of our overseas business. We are also committed to securing and developing the necessary human resources to promote the DX strategy, one of the JFE Group's management strategies. In FY2023, we added a new KPI for DX human resource development to the KPI for training hours per employee, to further accelerate our efforts.

For more on training results, refer to the following data.
➤ Social Data (P. 253)

JFE Steel Passing on Skills and Promoting DX Human Resource Development

The generational replacement of employees has peaked, raising the urgency of boosting the skills of younger employees. Accordingly, the company applies an evaluation system at manufacturing sites to quantitatively grasp and analyze the skill level of each employee and then uses the results in its training system.

It also promotes the use of IT such as a mixed reality technology-based training simulator for enhancing the quality of training.

Furthermore, the Group is taking steps to respond to DX technologies, which are rapidly being introduced and applied in industry, for such tasks as improving internal training programs for data scientist personnel. Starting in FY2023, we will provide DX literacy training to all employees to instill our vision and inform their thinking. We will also provide training that challenges the mindsets of executives and managers to guide them into specific goals that further promote human resource development.

JFE Engineering Engineering Training Programs to Support Independent Learning

To enhance the knowledge of underlying technologies that represent a technological foundation for an engineering enterprise, the company's leading expert lectures over 30 different courses on basic technology for younger employees and mid-career hires.

A web-based learning curriculum launched in FY2018 offers employees opportunities to acquire business skills that cater to each job responsibility, including accounting and marketing.

Through these training programs, JFE Engineering provides younger employees with opportunities to grow through independent and continuous learning and strengthens the leadership capabilities of managers to transform corporate management.

JFE Shoji Training and Measures to Maximize Employee Potential

To expand the trading business in Japan and overseas, JFE Shoji has organized a training program that enables personnel with diverse backgrounds to achieve growth in their respective work sites and business situations. The program includes a course for developing the basic skills required of trading company personnel, such as negotiation, finance and strategic thinking, and the trading business along with another course for newly hired mid-career employees. Furthermore, employees in rank-based training learn the roles and skills required for their new qualifications before being promoted, which enables them to advance their careers more quickly. Other programs include the early dispatch of young employees to overseas Group companies and conducting national staff training in which locally hired talented overseas employees are invited to the head office to further boost their abilities and motivation. These opportunities for a wide range of employees are intended to raise the performance of the entire Group.

Developing Global Personnel

In addition to hiring and developing non-Japanese for career-track positions in Japan and local personnel overseas, the JFE Group is enhancing programs for Japanese employees to gain overseas study and training. The Company is also developing younger employees through practical experience by dispatching them on overseas assignments.

■ Global Personnel Development Programs

	JFE Steel	JFE Engineering	JFE Shoji
Study abroad	○	○	○
Short-term overseas language training	○	—	○
Overseas assignments for younger employees	○	○	○
Dispatching engineers to international conferences	○	—	—
Training for local personnel at overseas sites	○	○	○
Practical training in Japan for non-Japanese personnel at overseas sites	—	○	○
Internship for international students	○	○	—

Creating Work Environments that Motivate Employees

Initiatives

To ensure the sustainable development of the JFE Group, it is essential to fundamentally review past customs and develop workstyles that enable each employee to be highly productive in creating new value with pride and satisfaction in their work. Under the Seventh Medium-term Business Plan, we intend to continue building workplace environments and internal systems that enable employees to fully demonstrate their abilities with a sense of security and safety.

Promoting Motivating Work Environments

The JFE Group complies with laws and regulations related to salary payments and sets salaries above the minimum wage designated by country, region and industry sector to meet living wage requirements. In addition, the Group establishes challenging and fulfilling working environments by providing employees with one of the top levels of employment conditions in the industry as well as performance-based bonuses linked to company profits, besides complying with regulations such as on overtime limits.

Furthermore, the Group offers generous welfare benefits, including dormitories and company housing in order to provide a stable environment for our employees and encourage them to remain with the company for many years.

The company and each operating company conduct an annual engagement survey to maintain a sense of current employee awareness and uses the results to identify issues related to job satisfaction while considering remedial measures. In addition, they have been focusing on establishing a comfortable working environment by referring to the results of the periodic corporate ethics awareness surveys.

JFE Steel Initiatives to Enhance Job Satisfaction

In April 2024, JFE Steel established the Human Resources Strategy Division to promote multifaceted measures, including personnel and corporate culture reforms, based on management's understanding that enhancing job satisfaction is a key management concern for the company's sustainable development. It launched the ReFuture PROJECT*, with the president as the project owner, as a corporate reform for enhancing employee job satisfaction so that both the company and its employees grow together. The project's aim is to enable the company to provide a variety of support and initiatives to enhance employee job satisfaction, and for employees to contribute to the company by maximizing their abilities, so that both the organization and its employees grow together by meeting their respective expectations while fostering a strong relationship of mutual trust. The Culture Reform Office, recently established within the Human Resources Strategy Division, will lead the entire project and develop action plans in cooperation with related departments.

For example, the environment surrounding the company is changing drastically, including carbon neutrality, a declining population, and falling domestic demand. Under these circumstances, the company must redefine what it wants to be in the future, the reason for its existence in society, and how it currently defines its long-term vision, so that employees can work with their own dreams and expectations for the future. With this in mind, we are currently formulating our corporate purpose, vision, and values. Furthermore, in October 2024, in order to enhance the job satisfaction of every employee, we plan to revise our personnel and wage systems, including a reorganization of employee classifications, a framework for employees to choose a range of work locations to which they could be transferred, more transparent evaluations, and stronger feedback.

JFE Steel is also promoting its new workstyle so that employees can work with a sense of job satisfaction and fulfillment, which in turn will lead to improving productivity across the company. In concrete terms, the company will promote teleworking by expanding its work-at-home systems; introduce a coreless flexible working hour program; adopt a shared-desk policy at and around the head office; introduce chat and web conferencing tools and robotic process automation (RPA), a software program that facilitates the automation of work done on terminal devices; promote paperless offices by introducing electronic contracts and workflows; and eliminate the use of seals.

In addition, JFE Steel introduced a cafeteria plan as an employee benefit in FY2022 to meet the diversifying needs of employees following a rise in the number of mid-career hires and other changes. The company seeks to enhance the work-

life balance by encouraging employees to take paid leave by designating annual planned leave days and enhancing a work-life-balance vacation program to support employees in taking vacations for childcare, nursing care, infertility treatment, self-enlightenment, or participation in volunteer activities. Furthermore, the company has increased the number of days off for general employees by 2 days per year to 121 days per year, starting in FY2024, to establish a more secure working environment for them and their families while balancing health and work.

■ Key Initiatives for the ReFuture PROJECT in FY2024

Item	Outline
Developing the vision for the future	Determining corporate purpose, vision, and values
Operational reform/organizational culture reform	Reviewing the way work is done, promoting IT, improving management to enhance job satisfaction
Communication reform	Strengthening management-employee dialogue through town hall meetings.
Investing in working environments	Realizing more comfortable working environments through focused investment in offices, mainly at steelworks and manufacturing plants
Review of personnel and wage systems	Revision for improving the job satisfaction of each employee (scheduled for October 2024)

*The name "ReFuture PROJECT" embodies the company's desire to create a new future that the world needs, by focusing on what the company wants to be in the future, especially now that the organization, founded in 2003 with the vision of becoming "Japan's leading future-oriented corporate group," is in a period of dramatic change.

JFE Engineering Initiatives to Enhance Productivity and Job Satisfaction through New Workstyles

JFE Engineering is promoting "vacation-style reform" across the company. Employees are encouraged to take Fridays off during the summer and consecutive days of paid leave following the completion of construction work. Out of 22 paid leaves granted, 19.4 paid leave days on average (over 88% of the total) were taken by employees in FY2023. The company intends to raise the average taken to at least 20 in FY2024.

As part of its workstyle reform, JFE Engineering has introduced a flexible working hour program for offices, in which employees determine their own core work hours. Under the program, the company designates "no overtime days" on which employees must leave the office on time and in principle prohibits overtime work after 8 pm to encourage employees to work more efficiently. Teleworking, which was introduced as a preventive measure against COVID-19 infections, has been adopted as a permanent system since FY2021. Employees can work at home or at any of the roughly 400 shared offices nationwide, thereby supporting flexible workstyles.

In the area of construction, JFE Engineering has set the reduction of working hours as a major issue and has been steadfastly working on this. Since FY2023, it has been monitoring the progress of reduction efforts and the status of overtime work, site by site, within the countermeasure working group established across the company. Annual plans for overtime work are formulated, and the head office manager works with site staff to address any discrepancies between actual monthly results and the annual plan. In addition, the working group promotes measures such as reducing internal documentation, utilizing the head office's back-office for creating documents, and introducing IT tools to maintain timely communication with the head office and subcontractors. In terms of job satisfaction, the company believes that the success of its employees is a source of competitiveness and sustainable growth, and it has been taking action to enable employees to fully demonstrate their abilities, knowledge, skills, and experience as a management concern.

KPIs have been set for health and safety, development, diversity, and employee engagement, and the following concrete steps are being taken.

- **Personnel and Wage Systems Review**
  Given the changing composition of its workforce, such as an increase in mid-career hires, the company has revamped its personnel system to improve the acceptability of evaluations and support employee growth.
- **Training System Review**
  As part of the personnel system reform, we have redefined the type of personnel we expect at each level as the basis for reviewing our training system, starting this fiscal year. As a result of the review, a variety of training programs have been set in place so that we can be voluntarily selected to meet the growth aspirations of each employee.

JFE Shoji Initiatives to Support Various Workstyles to Realize a Work-Life Balance

As a measure to realize a work-life balance, initiatives have been implemented to reduce work hours and improve work-life balance, such as designating Wednesdays as the day to encourage everyone to leave on time, prohibit all work after 10 pm, and also designating annual days off. To support more diverse workstyles, JFE Shoji has introduced work-at-home and flexible working hour systems. We also hold annual, company-wide Challenge Days that last about a month, to help all employees become aware of and practice a healthier work-life balance. For example, some employees commit to and follow through on leaving the office at the regularly scheduled time while others re-examine the way they work to improve organizational and individual productivity.

We are also striving to improve engagement (job satisfaction) by establishing a workplace where employees feel motivated and grow. We periodically monitor the scores of the annual engagement survey, digging deeper into the background of each department and setting action plans for improvement, leading to increased engagement.

In addition, we revised our personnel system so that individual evaluations can be more clearly reflected in salaries. In addition, interviews provide opportunities for feedback to individuals during which supervisors can share the details of evaluation results to subordinates and provide advice for improvement, allowing employees to feel a sense of growth. And supervisors and subordinates can discuss future career steps, designing the way they work from the perspective of the future, to bolster the perception of doing rewarding work.

Operational Reforms

JFE Steel Promoting Operational Reforms that Leverage the Newest ICT

To reduce employee time spent on simple for repetitive tasks and free up more time for creative work, JFE Steel implemented RPA, a software to facilitate the automation of human work done on terminal devices. As of FY2023, RPA was deployed in over 900 types of operation, releasing over 110 thousand hours to be spent on other productive work.

JFE Steel is also expanding its RPA in-house development program, which began in the latter half of FY2020, across the company, with more than 410 people having completed the academy for development tools. Also, more than 260 employees generated over 6,800 hours through in-house development using low-code development tools, which began in FY2021. In addition to the low-code development tools, the company is promoting in-house development using workflow systems, to improve operational efficiency as well as promote workstyle reforms, such as eliminating the use of stamps and shifting to a paperless system. The time saved from these operational reforms will be used toward enhancing customer service.

To promote data-driven operational reform, the company will also rollout a new BI tool company-wide to speed up decision-making by visualizing and sharing data, thereby enhancing corporate competitiveness.

JFE Engineering Promoting Operational Reforms Using Generative AI

In September 2023, with the goal of innovating business operations through the use of generative AI, JFE Engineering released Pla'cello xChat, the Company's AI text generator that helps minimize the risk of information leaks through unique security measures, for internal use. More than 1,000 employees are already using Pla'cello xChat to boost work efficiency in creating documents and organizing information, and for other tasks. Moreover, we are continuously promoting the automation of business operations through RPA. As of June 2024, approximately 300 business operations were automated, raising efficiency by automatically creating employee vacation attendance/leave management sheets, various reports, and notifications.

By introducing various systems, measures and tools to boost efficiency, JFE Engineering intends to achieve both work-life-balance and improved productivity while maximizing overall output.

JFE Shoji J-MUSCLUE Activities

Since 2008, JFE Shoji has continued to promote operational reform activities aimed at increasing work efficiency and performance. In 2023, it changed the name of its activities from J-SLIM to J-MUSCLE to shift from efficiency to increased value. We will further revitalize these activities based on the concept of J-MUSCLE, which is intended to make the company much stronger by building up the added value of the muscles in the body, which has become slimmer by cutting away the waste.

At the 2023 J-MUSCLE presentation, 22 teams from JFE Shoji and domestic and overseas group companies presented their J-MUSCLE activities online, which was viewed by a total of 2,900 people across the group. These activities included reviewing how to share information, reducing work hours using cloud systems, improving the accuracy and efficiency of office work by utilizing data and EXCEL functions, holding joint study sessions with customers and other level-up activities, and revitalizing communication by improving the office environment. JFE Shoji is promoting the sharing and horizontal deployment of these activities that lead to improved productivity throughout the Group. Furthermore, the company will continue to foster a corporate culture that can flexibly adapt to the changing times and constantly seek change free of preconceived notions.

Invigorating Workplaces through Small Group Activities

JFE Steel J1 Activities

In JFE Steel, approximately 1,200 small groups carry out J1 Activities* that have yielded various results in the key areas of quality and work improvement. In addition, the JFE Family Result Reporting Conference, which includes participation from Group companies, is held twice a year, and groups that excelled in the competition are dispatched to QC Conventions and affiliated companies in Japan and overseas to strengthen the J1 Activities.

*Designed to turn JFE into an excellent company and propel it to the number one position in its industry (called JE1 Activities at JFE Engineering and J1 Activities at JFE Steel and JFE Shoji).

JFE Engineering Initiatives of JE1 Activities

JFE Engineering has about 250 teams and 2,000 employees, including those of group companies worldwide, involved in JE1 Activities. The results of these activities are showcased at a company-wide competition held at the end of the fiscal year. Activities focused on topics such as quality, efficiency, safety or costs contribute significantly to workplace vitality and corporate performance.

JFE Shoji Further Revitalizing J1 Activities

JFE Shoji has been conducting J1 Activities in production divisions of its group companies in Japan as a means of improving their problem-solving skills in areas such as safety, quality, cost, operations and delivery target. The company holds annual competitions in which about 20 teams report their activity results and awards are given to the highest achieving teams. The company will continue to promote J1 Activities to improve workplace vitality and improve problem-solving skills.

Toward Sound Labor-Management Relations

The JFE Group engages in active discussions with the labor union regarding working conditions and various systems in order to foster a vibrant workplace. We take the union's opinions as representing the true perspectives of our frontlines employees, and we also identify issues and explore measures to create motivating work environments.

JFE Steel Sincere Labor-Management Consultations

Recognizing that labor-management cooperation is essential for the company to fully tackle its business challenges, JFE Steel has established a strong relationship with its labor union based on understanding and trust. The company convenes its Labor-Management Business Discussion Committee four times a year to bring the president and other executives together with labor representatives for the purpose of exchanging ideas on business challenges. The two sides also share views on working conditions and workplaces and hold joint consultations whenever the labor system is revised.

JFE Engineering Working Toward Sound Labor-Management Relations

JFE Engineering strives to ensure sound labor-management relations. In addition to Central Labor-management Committees, which are regularly convened for the company's president and other executives to share views with representatives of its labor union, a labor-management committee on work-life-balance helps to maintain friendly working environments.

JFE Shoji Maintaining Sound Labor-Management Relations

JFE Shoji management and labor have jointly declared they will achieve continuous growth for the company, enhancing the lives of employees and realizing an affluent society based on mutual trust and understanding. The company maintains a sound relationship between management and labor. Semiannual Management Committee meetings are held as opportunities for the company president and other executives to regularly exchange opinions and share management information with representatives of the labor union.

Community

Basic Policy

We are engaged in corporate activities across the globe. Continuing to do business requires that we forge relationships of trust with local communities and realize sustainable growth together by contributing to the development of each region in which we operate as well as by pursuing development at manufacturing sites where our steelworks are located. To this end, the JFE Group is committed to working with communities as stated in the JFE Standards of Business Conduct and is promoting activities that contribute to local communities.

The operation of our steelworks involves massive production facilities and significantly impact the region's employment and economy as well as environmental air and water quality. Our steel business seeks to revitalize local communities as an important means for deepening understanding of the JFE Group among local residents and mutually promoting regional development.

JFE Group Standards of Business Conduct

3 Work with communities

Actively contribute to host communities as a good corporate citizen by emphasizing harmony and cooperation.

Initiatives

Local Activities

In addition to consistently taking action to ensure safety and reduce the environmental impact of our corporate operations, we also conduct initiatives that serve the public with a focus on protecting the environment, nurturing the next generation, promoting sports and culture, and revitalizing regional communities.

Furthermore, we provide paid leave programs that can be used to promote volunteer work to encourage the active participation of employees.

Opening Manufacturing Sites to the Public

Every year, the JFE Group opens its manufacturing facilities, inviting residents in local host communities to participate in demonstrations, tours, and other events.

■ On-site Events in FY2023

	Location	Event	Date	Attendance
JFE Steel	East Japan Works, Keihin	Keihin Community Festival	May 26	35,000
	East Japan Works, Chiba	JFE Chiba Festival	October 22	30,000
	West Japan Works, Fukuyama	JFE West Japan Festival in Fukuyama	June 4	60,000
	West Japan Works, Kurashiki	JFE West Japan Festival in Kurashiki	November 3	20,000
	Chita Works	Handa Community Industrial Festival	November 11	20,000
	Sendai Works	JFE Steel Sendai Festival	October 14	1,000
JFE Engineering	Tsu Works	Autumn Festival	October 21	4,000

JFE West Japan Festival in Fukuyama

In addition, on-site recreational facilities are made available for community sports such as soccer, baseball, volleyball and basketball as well as other events sponsored by Group companies. Coaching sessions are offered by company baseball and track teams, which compete in Japan's top-level corporate leagues. Such activities promote sports and health as well as stronger relationships with host communities.

JFE Steel Tour of Steelworks

Every year, JFE Steel invites approximately 100,000 guests, mostly elementary and junior high school students from host communities to tour steel production sites at each steelwork, in conjunction with festivals and other events.

JFE Steel Education at Elementary Schools

JFE Steel conducts plant tours for students at nearby elementary and junior high schools. In addition, company employees visit schools to give lectures on iron and steelmaking processes, the features of steelworks, environmental initiatives, and other topics to deepen understanding of the steel industry and career opportunities. In FY2023, these lectures have been given to 400 students in 16 classes, bringing the total to approximately 325 classes since these began in FY2012.

Kawasaki Middle School in Kawasaki City, Kanagawa Prefecture

JFE Engineering Establishment of a System for Promoting Social Co-existence Activities

In FY2022, JFE Engineering established the Social Co-existence Committee, chaired by the president, to bolster social initiatives and enhance its contribution to realizing a sustainable society in accordance with the JFE Group Standards of Business Conduct. Under the policies set by JFE Engineering, the scope of committee activities encompasses initiatives implemented through its businesses as well as those for resolving social issues not covered by business activities, while the four themes of the environment, disaster prevention, local communities, and nurturing the next generation are designated as the key areas. Collaborating with local communities is essential for the company, which operates businesses in various locations. Nurturing the next generation is in line with JFE Engineering's stated purpose of strongly supporting people's daily lives and passing community strengths on to future generations. Under the system, leaders have been assigned in each organization to promote activities across the company. Also, the company laid out guidelines for its system in order to create an environment conducive to its activities. In addition, it designed an original logo and selected a catchphrase from entries submitted by employees to spread awareness and promote employee participation.

JFE Engineering emphasizes employee participation in its activities. In FY2024, the company exhibited programs for children on topics such as the future and STEAM education at the YOXO FESTIVAL 2024, organized by the Yokohama Future Organization (YOXO). Approximately 30 staff members recruited from across the company were in charge of running these programs.

We have also been focusing on education and public relations related to these initiatives. In FY2024, for example, we held a lecture for management on these activities and set up a special website page to publicize them outside the company. Looking ahead, we will continue to engage in social co-existence activities to contribute to a sustainable society.

みんなと創る
みんなで生きる

For more information, please refer to the following.

➤ JFE Engineering's Social Contribution Activities (https://www.jfe-eng.co.jp/information/en/social_coexistence/)

JFE Engineering Forest Management in the JFE Forest

JFE Engineering has concluded a forest maintenance agreement with the town of Yuni in Hokkaido, under the Hokkaido Government's Corporate Forest Development in Hokkaido program, and has been managing approximately 7 hectares of town-owned forest there. The purpose of this initiative is to conserve forests and revitalize the community through the proper maintenance and management of local forests. We named the forest where we carry out this initiative the JFE Forest, and as the first step in FY2024, we cut down 50-year-old trees that no longer effectively absorbed CO_2 and also planted clean larch seedlings, a tree species with high CO_2 absorption efficiency. In addition, an expert presented a lecture to employees who participated in the tree-planting activities, providing them with an opportunity to deepen their understanding of forests.

We intend to continue our tree-planting activities through open recruitment of employees and undergrowth cutting through and beyond fiscal 2024.

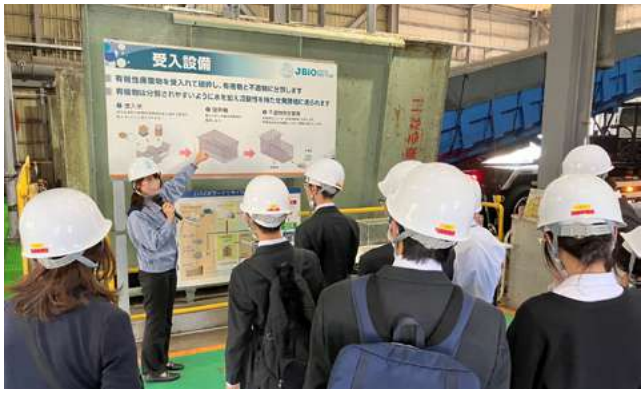
JFE Engineering Environmental Protection Activities in the Kumozu River Basin in Mie Prefecture

JFE Engineering is the founding member of a committee set up in 2008 for protecting the environment in the Kumozu River basin in Mie Prefecture, including Tsu City, where the company's Tsu Works is located. Together with the local forestry and fisheries cooperatives, which are also members, and with support from Tsu City, the committee conducts river cleanups and tree planting activities in the river basin, as well as beach cleanups at the mouth of the river and public environmental education, in which employees and their families participate.

JFE Engineering Facility Tours and School Lectures

JFE Engineering accepts visitors, mainly children from neighboring communities, and gives them tours of the works, construction sites, and incineration plants it manages under contract. The company also dispatches its employees to schools to provide lectures on the environment and other topics.

For example, a lecture on the environment and recycling was given to around 80 second-year students at the Junior High School Attached to Yokohama Science Frontier High School near JFE Engineering's Yokohama Head Office, followed by a visit to the Yokohama Head Office. Students learn through both classroom lectures and on-site experience by touring a food recycling plant operated by a Group company and the Global Remote Center, which remotely monitors over 80 incineration plants and other facilities in Japan and overseas. This initiative has been implemented for six consecutive years since its launch in 2018.



Food recycling plant tour

Support for External Organizations

Contributing to the realization of a sustainable society is a key management concern for the JFE Group, which actively seeks to address issues in collaboration with external groups and NGOs in pursuing solutions for the 17 SDGs.

UN World Food Programme

The JFE Group seeks to resolve the global hunger issue by supporting the cause and activities of the Japan Association for the World Food Programme*.

*An NPO-accredited supporter of the UN World Food Programme (WFP), which works to eliminate hunger and poverty.

Supporting Training for Foreign Medical Professionals

The JFE Group supports the Japanese Council for Medical Training, spearheaded by the Toranomon Hospital in Tokyo. The council offers a training program in which doctors from developing countries, primarily in Southeast Asia, are invited to study in Japan. The program aims to make an international contribution by training participants in Japan's advanced medical practices so trainees can apply their results to raise the medical standards of their home countries and to foster stronger relationships between those nations and Japan. The program also contributes to resolving health issues in local communities by enhancing the medical standards of those countries.

For more information, please refer to the following.

➤ JCMT (https://www.jcmt.jp/english/)

Japanese Foundation for Cancer Research

Since its establishment in 1908, the Japanese Foundation for Cancer Research has upheld its basic philosophy of aiming to improve the well-being of people everywhere by achieving better cancer control. The JFE Group supports this foundation, which has played a leading role in research and treatment as well as human resource development in Japan.

Fund to Support Children's Future

The JFE Group endorses the Japanese government's national campaign for creating a society in which every child can grow with dreams and hopes. The Group supports the Fund to Support Children's Future, which provides assistance to NPOs and other groups engaged in activities to eliminate poverty throughout Japan.

Support for Youth Development

Japanese Language Speech Contest

The JFE Group supports the All-China Japanese Speech Contest for university students in China as a way to promote stronger international exchange. The contest has been held since 2006 to further Japan-China relations through language and communication, and JFE has provided support from its launch. The 17th contest was held in FY2023, and the finals were held in Japan for the first time in five years since 2019 due to the COVID-19 pandemic. Through this activity, the JFE Group contributes to the development of Japanese language education in China and the promotion of friendly exchanges between the two countries.

Career Education for Students

JFE Steel and JFE Engineering provide plant tours for female junior high school, high school and university students to encourage them to pursue careers in science and technology.

Since 2006, JFE Steel has participated in the Keizai Koho Center's "Business Training for Japanese School Teachers." Teachers from primary, junior high and high schools learn about business operations, human resource development, safety and environment-protection-related initiatives, among other topics, with the intention of sharing that knowledge with their students and leveraging it for better school management. In addition, some facilities invite local junior high students and host work-experience sessions.

As part of career education for high school and junior high school students, Kawasho Foods Corporation, a member of the JFE Shoji group, cooperates with the School Support Center, a specified Nonprofit Corporation, to invite students for training. The participants learn how society is supported by specific kinds of work as well as the products and services related to such work.

Business training for schoolteachers

FY2023 Internships

The JFE Group annually hosts many trainees and interns from overseas to help them gain practical experience at plants as well as design and construction sites. They also participate in group work.

■ Number of Interns Accepted by Each Operating Company (FY2023)

JFE Steel	JFE Engineering	JFE Shoji
659 (desk work: 378, technical: 281)	688 (desk work: 239, technical: 449)	360

JFE Steel

High School Science and Engineering Contest

The Japan Science & Engineering Challenge is a national science-paper contest for high school and technical college students. Under the sponsorship of the Asahi Shimbun Company and TV Asahi Corporation, the contest has been supported by JFE Steel since 2006 to nurture future scientists and engineers.

JFE Steel Award presented to a student from Ibaraki Prefectural Namiki Secondary School

JFE Shoji

Supporting Elementary Schools in Ghana and Nigeria

The JFE Shoji Group has been conducting annual donation campaigns in Ghana and Nigeria since 2011. The donations take into account requests from the local Ministry of Education and schools, and FE Shoji mainly selects products to contribute to the economic activities of the two countries. This year for the 13th donation campaign, the JFE Shoji Group donated 12,500 cans of GEISHA brand canned mackerel with tomato sauce, 435 sets of desks and chairs, and 17,000 notebooks to 15 schools in the two countries. School officials and local government agencies expressed many words of gratitude for the donations.

The JFE Shoji Group will continue to provide support for food and education into the future, as a project that symbolizes the Group's commitment.

Students at an elementary school in Ghana

Students at an elementary school in Nigeria

JFE Shoji

Providing Off-Campus Training Opportunities for Special-Needs Schools

The JFE Shoji Group has been providing off-campus training opportunities for students at schools for special needs since FY2017. Training mainly consists of accepting interns to experience working in such jobs as cleaning, maintaining the tea dispenser, and sorting forms. In addition, students are regularly invited to a Group company to practice selling bread.

As a company that values open relationships with society, JFE Shoji will continue to support self-reliance and social participation so that people with disabilities can lead vibrant lives in their own way.

JFE 21st Century Foundation

The JFE 21st Century Foundation was founded in 1990 through a donation from the JFE Group (the former Kawasaki Steel) to operate as a public-service corporation that contributes to society. It engages in various public services, such as supporting research at universities and cultural development.

- **Issued technical research grants (steel-related technology, global environment, technology for preventing global warming)**
- **Issued grants for Asian historical research**
- **Published and donated textbooks for universities and publications related to steel**
- **Sponsored cultural activities in communities hosting steel facilities**
- **Held Overseas Literary Contest and donated literary works**

For more on the JFE 21st Century Foundation, refer to the following information.

- JFE 21st Century Foundation (http://www.jfe-21st-cf.or.jp/eng/)
- Social Data: JFE 21st Century Foundation (P. 258)

Support for Technology Research

The foundation has been highly acclaimed by many universities for its support of technology research since FY1991.

In FY2023, it fielded 137 grant requests and provided a total of 56 million yen in the form of grants valued at 2 million yen each for 13 projects involving iron and steel technologies and 15 projects related to environmental technologies, including those designed to prevent global warming.

Support for Asian History Studies

The foundation began awarding grants in support of Asian history studies at Japanese universities in FY2005. In FY2023, 73 applications were received and 12 grants worth 1.5 million yen each were awarded, bringing the total to 18 million yen.

Support Activities in Communities Hosting Steel Facilities

The foundation financially sponsors community cultural activities including music, art, traditional events, community revitalization, community activities and the conservation of cultural property.

In FY2023, it sponsored nine events in regions across Japan where the Group operates its steel business, including Chiba, Kawasaki and Fukuyama cities.

Supporting the Japan Overseas Educational Services Writing Contest and Anthology Donation

The Japan Overseas Educational Services organizes contests in the areas of essays, poems, tanka and haiku for Japanese students attending elementary and middle schools overseas. The JFE Group has been cosponsoring the contest by offering JFE 21st Century Foundation prizes since FY1991. The foundation also donated 2,200 copies of Chikyu ni Manabu (Learn from the Earth), a collection of the winning entries, again in FY2023, to approximately 700 organizations, including elementary and middle schools and public libraries located in the regions where the Group operates its steel business.

List of Social-Contribution Activities

Local Communities and Society

- **Supported World Food Programme**
- **Supported Japanese Foundation for Cancer Research**
- Gave plant tours
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-01)
- Held festivals and events
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-02)
- Donated to Japan National Council of Social Welfare
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-03)
- Donated emergency food supplies to a food bank (Japanese Only)
  (https://www.jfe-steel.co.jp/company/csr.html#anc01-04)
- Lectured at elementary schools
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-04)
- Joined local cleanup activities
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-05)
- Conducted disaster response and prevention activities with local governments
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-06)
- Implemented and promoted Active Exercise™
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-07)
- Launched on-site daycare centers for local residents
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-08)
- Organized on-premise blood donation campaigns (Japanese Only)
  (https://www.jfe-steel.co.jp/company/csr.html#anc01-10)
- Cooperated with traditional events
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-09)
- Joined Nishinomiya tourism event
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-10)
- Held Manufacturing Class for children
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc01-11)
- Donation for Fukuyama Castle 400th Anniversary Project
  https://www.jfe-steel.co.jp/en/company/csr.html)
- **Sponsored children's eco activities under World Food Programme**
- **Supported local festivals**
- **Organized public viewing of "Dragonfly Street" and Station Square**
- **Joined Where Do Dragonflies Fly Forum**
- **Supported Tsurumi Line stamp rally**
- **Volunteered for Kasumigaura Marathon**
- **Volunteered for disaster reconstruction**
- **Organized in-house fairs for supporting post-disaster reconstruction in Fukushima (providing meals at a cafeteria using local ingredients)**
- **Participated in tree-planting to invigorate a rainforest in the Philippines**
- **Organized environmental events at a contracted incineration plant**
- **Signed an agreement with the local government on opening up the contracted incineration plant as an evacuation site in the event of a disaster and providing emergency supplies**
- **Comprehensive collaboration agreement between Chiba City and East Japan Works**
- **Co-sponsorship of Kawasaki City's 100th anniversary in 2024**

Nurturing the Next Generation

- Supported Chinese students' Japanese speech contest
- Supported Japanese Council for Medical Training
- Supported Welfare and Medical Service Agency's Children's Future Support Fund
- Supporting technician education at universities in Vietnam and Myanmar
  (https://www.jfe-steel.co.jp/en/company/csr.html)
- Organized internships
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc03-02)
- Supported Japan Science & Engineering Challenge
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc03-03)
- Supported career education
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc03-05)
- Accepted teachers for private-sector training
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc03-06)
- Supported Females in choosing Science or Engineering careers
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc03-07)
- Certified as company supporting child rearing (Kanagawa Prefecture and Nagoya City)
- Accepted foreign technical interns (welding training)
- Supported elementary schools in Ghana and Nigeria
- Supported off-campus training by special-needs schools
- Supported robotics competitions for high schools in Mie Prefecture
- Provided welding training for technical high school teachers
- Support for Hilltop Children's Cafeteria in Komaoka

Environmental Protection

- Organized firefly larvae release and viewing party
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc04-01)
- Held environmental exhibitions
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc04-02)
- Eco-purposed steel slag
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc04-04)
- Addressing the plastic waste problem through the development of a steel drinking container (Japanese Only)
  (https://www.jfe-steel.co.jp/company/csr.html#anc04-04)
- Forest maintenance in the JFE Forest
  (https://www.jfe-eng.co.jp/information/social_coexistence/topics_forest/)
- Donated PET bottle caps
- Cooperated with nonprofit Green Bird in volunteer garbage collection

Sports and Cultural Promotion

- Held local sporting events
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc02-01)
- Baseball and racing clubs held instructional classes
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc02-02)
- Sponsored Cho Chikun Go Cup
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc02-03)
- Promoted parasports
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc02-04)
- Keihin Symphonic Band gave performances
  (https://www.jfe-steel.co.jp/en/company/csr.html#anc02-05)

Contribution to Local Communities through the Engineering Business

We contribute to realizing a circular economy in local communities by providing utility services, such as electricity, gas, and water, as well as combining our businesses in plastics and food recycling, renewable energy power generation, and waste-to-energy power generation.

Development and Provision of Eco-friendly Processes and Products (P.135)

Governance: Executive Summary

With its many companies and partners, the JFE Group is engaged in a broad and diverse range of businesses, centered on the steel, engineering, and trading businesses.

Establishing a proper governance system is essential for increasing the autonomy and efficiency of each operating company and for appropriately managing various business risks, including those related to the environment, safety, and disaster prevention. It is also important for ensuring the Group's sustainable growth and improving corporate value over the medium to long term.

We have been enhancing corporate governance through such initiatives as formulating the Basic Policy on Corporate Governance, establishing the Nomination Committee and Remuneration Committee, introducing a stock remuneration system for Directors, and evaluating the effectiveness of the Board of Directors. We have also introduced indicators for employee safety and climate change to determine performance-linked remuneration for Directors. We will continue to improve our remuneration system for Directors to provide stronger incentives with a higher level of integrity and drive sustainable growth.

Thorough compliance is the foundation of our relationship of trust with stakeholders and the basis of our business activities. While we strive to ensure adherence to corporate ethics and compliance as a material issue of management, the JFE Group Sustainability Council, chaired by the president of JFE Holdings, supervises and provides guidance on compliance efforts, and important measures are reported to and deliberated by the Board of Directors for direction and supervision.

With regard to risk management, JFE Holdings as the holding company is responsible for the comprehensive risk management of the Group and has established a system under which its Board of Directors supervises risk management and confirms its effectiveness. JFE Holdings is continuously improving risk management for the entire Group based on discussions by its Board of Directors.

Objectives and results related to material issues of corporate management concerning governance

➤ Material Issues of Corporate Management and KPIs (P.18)

Key Initiatives

- Introduction of non-financial metrics (related to employee safety and climate change) as indicators for performance-based remuneration for Directors (P.220)
- Third-party analysis and evaluation of the Board of Directors' effectiveness (P.218)
- Disclosure of skills matrix for Directors and Audit & Supervisory Board Members (P.217)
- Corporate Ethics Awareness Survey implemented periodically for officers and employees of JFE Holdings and operating companies (P.230)
- Ongoing oversight and confirmation of the effectiveness of Group-wide risk assessment by the Board of Directors (P.231)

Corporate Governance

Basic Policy

With the steel business, engineering business and trading business at its core, the JFE Group develops a broad range of businesses in a wide range of areas together with many group companies and partners. Establishing a proper governance system is essential toward improving independence and raising efficiency in each operating company, along with the optimal management of risks, which include those related to the environment, safety, and disaster prevention in the Group. It is also necessary for the sustainable growth of the Group and the medium- to long-term improvement of its corporate value.

We have also established the JFE Holdings, Inc. Basic Policy on Corporate Governance to express concretely the JFE Group's Corporate Vision of pursuing best practices in corporate governance and achieving further development in this area.

➤ JFE Holdings, Inc. Basic Policy on Corporate Governance (https://www.jfe-holdings.co.jp/en/common/pdf/company/info/basic-policy.pdf)
➤ Corporate Governance Report (https://www.jfe-holdings.co.jp/en/common/pdf/company/info/corporate-governance.pdf)

Results

Major topics discussed during FY2023 Board of Directors meetings included the following.

- Progress of the Seventh Medium-term Business Plan
- Large-scale capital expenditures (expansion in production facility for grain-oriented electromagnetic steel sheets, other)
- Overseas business development (grain-oriented electrical steel sheet joint venture with JSW Steel Limited, India)
- ESG initiatives (e.g., efforts to achieve carbon neutrality, assessment and review of KPIs for material issues of corporate management)

Selected governance data can be accessed from the following link.

➤ Governance Data (P.259)

Systems and Initiatives

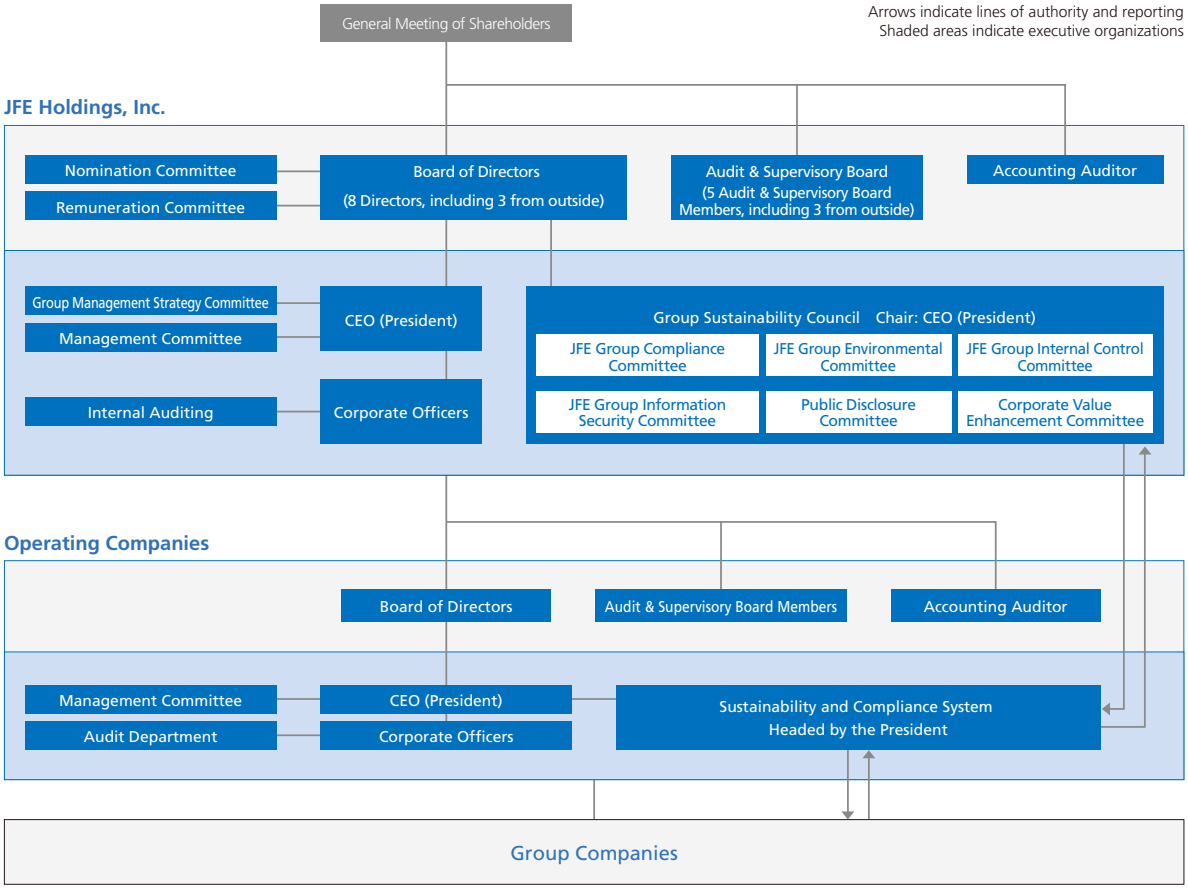
Corporate Governance System

Group Governance System

The JFE Group comprises a holding company and three operating companies, JFE Steel, JFE Engineering, and JFE Shoji.

JFE Holdings, a pure holding company at the core of the Group's integrated governance system, guides Group-wide strategy, risk management, and public accountability.

Each operating company has developed its own system suited to its respective industry, ensuring the best course of action for competitiveness and profitability.



Governance Data (P.259)

Governance System

JFE Holdings and each operating company have their respective Audit & Supervisory Board Members. The companies are crosschecked by the Directors, who supervise operational execution, and the Audit & Supervisory Board Members, who conduct audits. Also, a Corporate Officer system separates decision-making and execution to clarify authority and responsibility as well as to accelerate execution. JFE Holdings' Board of Directors is responsible for maintaining and enhancing management efficiency and passing resolutions as legally required, laying down key management policies and strategies and supervising operational execution. The Audit & Supervisory Board oversees management for the purpose of strengthening its soundness.

■ Major Initiatives to Strengthen the Governance System

September 2002	Established JFE Holdings
June 2007	Added two Outside Directors and shortened the term of Directors from two years to one year
October 2015	Established JFE Holdings, Inc. Basic Stance on Corporate Governance, Nomination Committee, and Remuneration Committee
FY2015	Initiated analysis and evaluation of board of directors' effectiveness
June 2017	Reorganized the Board of Directors and the Audit & Supervisory Board based on results of their effectiveness analysis and evaluation • Added the presidents of JFE Engineering and JFE Shoji to the Board of Directors, along with an increase of two outside members (Director and Audit & Supervisory Board Member)

Duties of the Board of Directors and other Bodies

Selection of Independent Outside Directors and Independent Outside Audit & Supervisory Board Members

Independent Outside Directors comprise at least one-third of the total number of Directors. Independent Outside Directors are elected from nominees who can be expected to bear responsibility for strengthening governance, including those with proven experience in managing a global enterprise or who possess expertise and deep knowledge and satisfy our independence standards. Currently, three of the eight Directors are Independent Outside Directors.

Meanwhile, more than half of the Audit & Supervisory Board Members are from outside. Independent Audit & Supervisor Board Members are elected from nominees who can be expected to enhance the auditing function, including those with proven experience in managing a global enterprise or who possess expertise and deep knowledge and satisfy our independence standards. Currently, of the five Audit & Supervisory Board Members, three are Independent Outside Audit & Supervisory Board Members.

➤ Standards for Independence of Outside Directors/Audit & Supervisory Board Members of JFE Holdings, Inc.
(https://www.jfe-holdings.co.jp/en/common/pdf/company/info/independence.pdf)

➤ Governance Data: Directors and Audit & Supervisory Board Members (P.260)

Approach to Diversity in the Board of Directors

With regard to the composition of the Board of Directors, the Company elects officers following deliberations by the Nomination Committee by focusing on the enhancement of diversity of the Board members, such as their expertise, knowledge and experience in various fields, while balancing with the appropriate size of the Board. One female Director and one Audit & Supervisory Board Member are currently in office. The Company also elects Directors and Audit & Supervisory Board Members who possess a wealth of knowledge and experience as management in global enterprises. In this way, the Company is working to enhance gender and global diversity. The company will continue to systematically engage in initiatives to foster such human resources suitable for candidates for Directors and Audit & Supervisory Board Members by setting specific targets.

Skill Matrix of Directors and Audit & Supervisory Board Members

We have established the JFE Holdings, Inc. Basic Policy on Corporate Governance for promoting sustainable growth of JFE Holdings, Inc. and the JFE Group, the medium- to long-term improvement of corporate value, and expressing concretely the JFE Group's Corporate Vision of pursuing best practices in corporate governance and achieving further development in this area. With regard to the composition of the Board of Directors, we strive to enhance the diversity of the Board members, such as their expertise, knowledge, and experience in various fields, and identify necessary skills of corporate management in light of our business and corporate management issues. The Company elects officers following deliberations by the Nomination Committee while balancing with the appropriate size of the Board.

The skill matrix of each Director and Auditor against identified skills in light of their knowledge, experience, and expertise are summarized below.

	Corporate Management, Management Strategy	Sustainability, Environment	Technology, DX	Finance and Accounting	Internal Control, Governance	Legal Affairs, Compliance	Human Affairs, Labor, Human Resource Development	Sales, Marketing	Business that Requires Knowledge
Representative Director Yoshihisa Kitano	●	●	●		●				Steel
Representative Director Masayuki Hirose	●	●			●			●	Steel
Representative Director Masashi Terahata	●	●		●	●	●	●		Steel, Trading
Director Toshinori Kobayashi	●	●	●		●			●	Steel, Trading
Director Kazuyoshi Fukuda	●	●	●		●			●	Engineering
Outside Director Masami Yamamoto	●	●	●		●				—
Outside Director Yoshiko Ando		●			●	●	●		—
Outside Director Keiichi Kobayashi	●	●	●		●			●	—
Audit & Supervisory Board Member Nobuya Hara	●			●	●				Steel
Audit & Supervisory Board Member Nakaba Akimoto					●	●			Steel, Engineering, Trading
Outside Audit & Supervisory Board Member Isao Saiki					●	●	●		—
Outside Audit & Supervisory Board Member Tsuyoshi Numagami	●			●	●			●	—
Outside Audit & Supervisory Board Member Takuya Shimamura	●	●			●			●	—

Nomination Committee and Remuneration Committee

JFE Holdings has maintained the Nomination Committee and the Remuneration Committee since October 2015 as advisory bodies to the Board of Directors to secure fairness, objectivity, and transparency in the appointment of and remuneration for Directors and Audit & Supervisory Board Members. For both committees, the majority of committee members are Outside Directors/Audit & Supervisory Board Members and the chairs are chosen from among these people.

The Nomination Committee deliberates and reports to the Board of Directors on matters pertaining to the basic policies related to the President of the Company, including election and dismissal, selection of candidates, and succession plans in addition to the nomination of candidates for Outside Directors and Outside Audit & Supervisory Board Members. (Six meetings were held in FY2023, all with 100% attendance.) The Remuneration Committee deliberates on matters pertaining to the basic policy on the remuneration of Directors, etc., of the Company and each operating company and reports to the Board of Directors. (Three meetings were held in FY2023, all with 100% attendance.)

➤ Governance Data: Nomination Committee and Remuneration Committee (P.261)

Support for Directors and Audit & Supervisory Board Members

Directors and Audit & Supervisory Board Members are provided with opportunities and funding to receive training in legal matters, corporate governance, risk management, and other subjects that help them fulfill their roles and duties.

In addition, a briefing is held for Outside Directors and Outside Audit & Supervisory Board Members prior to Board of Directors meetings.

Furthermore, Outside Directors and Outside Audit & Supervisory Board Members are provided with relevant information and opportunities to exchange opinions with the president and other top managers, attend key hearings on the operational status of individual departments, and inspect business sites and Group companies inside and outside Japan.

Analysis and Evaluation of the Effectiveness of the Board of Directors

Since FY2015, JFE Holdings has been evaluating the overall effectiveness of its Board of Directors based on its Basic Policy on Corporate Governance. Since FY2018, a third party has been conducting the analysis and evaluation to ensure objectivity. In FY2023, we conducted a questionnaire with all Directors and Audit & Supervisory Board Members.
Furthermore, we examined the results of our efforts in FY2023 to reflect the opinions and recommendations of the FY2022 evaluation.

Based on the discussions by the Board of Directors in light of the survey results and evaluation by the third-party organization, it was determined that the overall effectiveness of the Board has been ensured through vigorous discussions among members supported by sufficient preliminary briefings at the meeting for Outside Directors/Audit & Supervisory Board Members as well as by appropriate management and leadership by the chairperson.

The FY2023 initiatives reflecting the results of the effectiveness of evaluations up to FY2022 include the following.

- Apart from revising KPIs on diversity and inclusion and human resource development, we also discussed the awareness surveys on corporate ethics that have been conducted until recently. In addition, we reported the results of the engagement survey and our response to the Board of Directors in an effort to deepen our discussion on human capital management.
- We reported on the status of our initiatives on carbon neutrality and human rights due diligence at the Board of Directors meetings to confirm progress and encourage discussion on the challenges ahead. We also reported on issues related to sustainability and risk management, including the Group's approach to BCP as well as its approach to and policies on biodiversity, to enhance Board discussions.
- We improved reporting on risk information and management initiatives at the operating companies and Group companies. We also revised the frequency of our surveys on awareness of corporate ethics and related issues to more thoroughly instill awareness about corporate compliance and prevent risks from materializing. We continue to improve Group-wide risk management in accordance with discussions at Board of Directors meetings.

In addition to accurate and fair audits performed by the Audit & Supervisory Board Members, the members also express opinions and actively ask questions at Board of Directors meetings on management decisions and reports to further invigorate deliberations. Such outcomes supported the conclusion that JFE functions efficiently as a company with an Audit & Supervisory Board.

Furthermore, the following main issues were extracted from this survey for further improvement of effectiveness.

- Sustainable corporate growth depends upon considering the ideal state of the Group and its long-term strategies while at the same time further deepening discussions on human capital management and respect for human rights as well as other material management issues.
- From the perspective of enhancing corporate value, we must organize the agenda items for Board of Directors meetings to establish a balance between speedy decision-making with supervisory functions. We must also continue to consider the governance structure, including ways to further enhance diversity.
- To further strengthen risk management across the entire Group, we must continuously consider ways to develop our reporting of risk information, including that of subsidiaries and affiliates, to the Board of Directors.

In FY2024, we will continue to enhance the sharing of opinions between the Board of Directors and the executive members of operating companies. These efforts will include holding Board of Directors meetings at domestic operating companies and field visits by the Board members to domestic and overseas operating companies.

Given these issues, we will proactively implement initiatives to increase the effectiveness of the Board of Directors and enhance the Group's corporate value.

Operating System

Key Decision-Making

JFE companies are responsible for business decisions in accordance with their respective rules and procedures, whereas JFE Holdings makes decisions about Group-wide matters. Each operating company determines key matters through a deliberative process by its own Management Committee and Board of Directors. In April 2017, JFE Holdings changed the operating structure of key committees. Management strategies involving the entire group are now deliberated by the Group Management Strategy Committee and core issues of JFE holdings, the operating companies and the Group are deliberated by the Management Committee before they are submitted to the Board of Directors for resolution.

➤ Governance Data: Operating System (P.261)

Executive Remuneration

Executive remuneration is based on the Basic Policy on Remuneration for Directors and Corporate Officers and the Policy for Deciding the Individual Remuneration for Directors and Corporate Officers founded on discussions and reports by the Remuneration Committee, and it is decided through either a resolution of the Board of Directors or deliberations by the Audit & Supervisory Board Members, for an amount within the total limit approved at the General Meeting of Shareholders.

Outline of Policy for Deciding the Individual Remuneration for Directors and Corporate Officers

- The Board of Directors shall determine remuneration system for Directors and Corporate Officers based on deliberations regarding its appropriateness by the Remuneration Committee to ensure fairness, objectiveness, and transparency.
- The remuneration level for Directors and Corporate Officers shall be determined to secure excellent human resources who are able to put the Group's corporate vision into practice, taking into consideration the business environment of the Group and remuneration levels at other companies in the same industry or of the same scale.
- The ratio between basic remuneration and performance-linked remuneration (annual bonus and stock remuneration) shall be properly established according to the roles and responsibilities, etc., of each Director and Corporate Officer so as to function as sound incentives toward the sustainable growth of the Group.

Outline of Policy for Deciding the Individual Remuneration for Directors and Corporate Officers

- Remuneration for Directors and Corporate Officers shall be determined by a resolution of the Board of Directors in accordance with the Basic Policy and the Decision Policy, based on reports from the Remuneration Committee.
- Remuneration for the Directors and Corporate Officers is comprised of basic remuneration and performance-linked remuneration (annual bonus and stock remuneration).
- Basic remuneration is paid as a fixed amount, in cash, each month according to position.
- An annual bonus is linked to the Company's single-year performance (calculated based on financial and non- financial indicators) and is paid in cash once a year.
- Stock remuneration is granted as the Company's shares and cash equivalent to the amount of the Company's shares converted to market value through the trust upon retirement.
- The ratios of remuneration by type are structured so that the higher the position, the greater the weight of performance-linked remuneration, and the ratio for the company's President when performance target goals have been attained is set so that the ratio of basic remuneration, annual bonus and stock remuneration stands at 6:2:2.

The Company pays only basic remuneration to Outside Directors and Audit & Supervisory Board Members, given their roles of supervising and auditing management from an independent and objective standpoint. Directors who concurrently serve as Executive Directors of operating companies shall not be paid the Stock Remuneration from the Company.

Performance-linked remuneration is calculated as follows.

- Annual bonus

Annual bonuses are calculated by taking the total segment profit for a single fiscal year and indicators related to employee safety and climate change as the performance-linked indicators and multiplying the level of achievement of these indicators by a given coefficient for each position.

We introduced one non-financial indicator related to employee safety in FY2022 and one related to climate change in FY2023. The employee safety indicator depends on the level of achievement of KPIs set for the operating company concerned, such as zero work fatalities and target lost-work injuries rate. The climate change indicator depends on the level of achievement of KPIs selected for the operating company concerned from "Contribute to resolving climate change issues (initiatives for achieving carbon neutrality by 2050)." (See the following diagram.) Directors and Corporate Officers who have been dismissed or have committed any misconduct may lose the right to receive benefits based on a resolution of the Board of Directors. Directors and Corporate Officers who have already received benefits may be asked to return the amount based on a resolution of the Board of Directors if they engage in any misconduct.

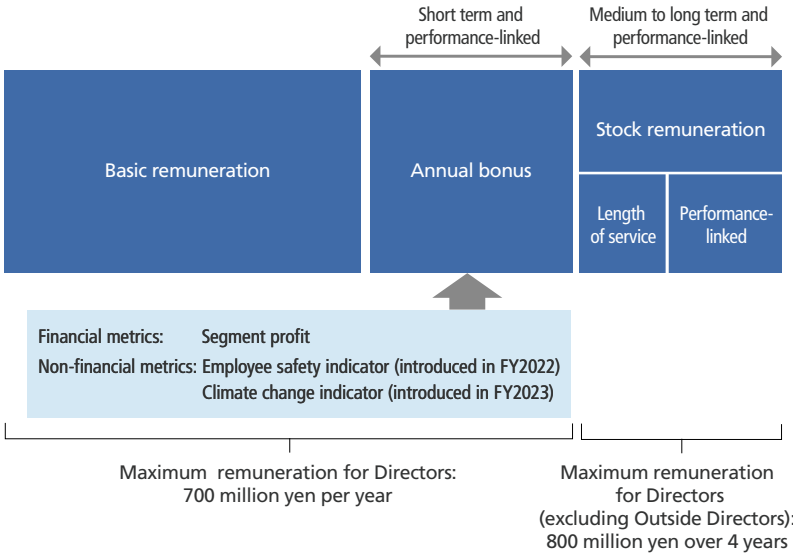
• Stock remuneration

Under the stock remuneration plan, a payment level is determined based on performance targets set in the Seventh Medium-term Business Plan of the Group. From FY2021 to FY2024, the payment level is determined according to the level of achievement of the target profit attributable to owners of the parent company of 220 billion yen per year, set under the Seventh Medium-term Business Plan. Furthermore, 5% or more return on equity attributable to owners of parent (ROE) is the minimal requirement for the payment.

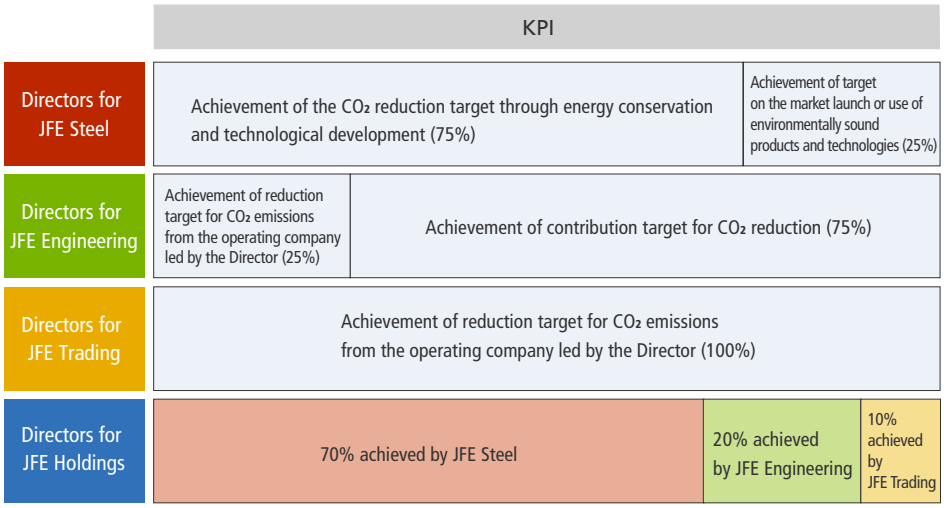
Directors and Corporate Officers who have been dismissed or have committed any misconduct may lose the right to receive benefits based on a resolution of the Board of Directors. Directors and Corporate Officers who have already received benefits may be asked to return the economic value equivalent to the Company's shares already received, based on a resolution of the Board of Directors if they engage in any misconduct.

To achieve sustainable corporate growth for the Group, the Remuneration Committee and the Board of Directors continue to improve the remuneration system for Directors to serve as an incentive with a higher level of integrity.

■ **Design of the Remuneration Plan for Directors**



■ **Conversion Rates (Achievement of Climate Change Indicators)**



*1 Excluding Outside Directors *2 Weighted-average level of achievement among operating companies

➤ Executive Remuneration (P.262)

Internal Control

The JFE Group's internal control system, in accordance with the Basic Policy for Building an Internal Control System, is maintained through various committee regulations including the Rules of the Board of Directors, Regulations for Group Management Strategy Committee, Regulations for Management Committee, Regulations for the JFE Group Sustainability Council, Regulations for Organization and Operations, Regulations for Document Management, Regulations for Addressing Violence Directed at Companies, and a Corporate Ethics Hotline. We revise and improve the Basic Policy from time to time to boost sustainable corporate value.

➤ Basic Policy for Building an Internal Control System (Japanese only)
(https://www.jfe-holdings.co.jp/company/info/pdf/naibutousei.pdf)

Strengthening Internal Control

Internal Audits

JFE Holdings, its major operating companies, and key Group companies have internal audit organizations comprising 168 people as of April 1, 2024. These organizations share information to enhance overall auditing within the Group. They also report internal audit findings to the Board of Directors as well as to the Audit & Supervisory Board to maintain the effectiveness of internal audits.

To ensure the proper implementation of sustainability activities, the JFE Group assesses environmental management, Antimonopoly Law compliance, measures taken to prevent the bribery of public officials, expense management, overseas office management, tax law compliance, safety management, and disaster prevention by systematically including these areas in business operation audits conducted by the internal auditing department. If an audit finds an issue or problem, the internal audit departments of JFE Holdings and the operating company work together to share the information across the Group and incorporate lessons learned in sustainability activities conducted by the Group's companies.

Audits by Audit & Supervisory Board Members

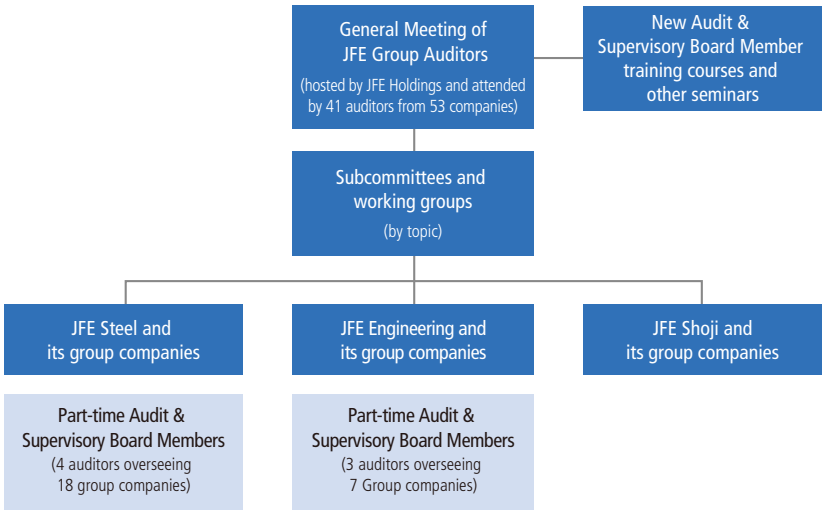
JFE has an Audit & Supervisory Board composed of five Members including three Outside Audit & Supervisory Board Members. Apart from attending the meetings of the Board of Directors, duties are shared between full-time and part-time Audit & Supervisory Board Members to attend meetings of the Group Sustainability Management Strategy Committee, Management Committee, and Group Sustainability Council, among other important meetings, and express opinions as appropriate. To audit the execution of Directors responsibilities, they engage in activities such as conducting hearings with Directors and Corporate Officers regarding operational status and receiving operational reports from operating companies and Group companies.
In addition to undergoing statutory audits, JFE companies take the following initiatives to strengthen coordination among Audit & Supervisory Board Members by sharing information and ensuring the effectiveness of internal auditing by the Audit & Supervisory Board Members.

A total of 34 full-time Audit & Supervisory Board Members have been appointed to 29 companies, including JFE Holdings. Operating company personnel are dispatched to Group companies as part-time Outside Audit & Supervisory Board Members. Each dispatched Audit & Supervisory Board Member serves one to five subsidiaries to perform audit and enhance Group governance. Seven Audit & Supervisory Board Members served 25 companies in total.

The JFE Group Board of Auditors includes both full-time Audit & Supervisory Board Members of each Group company and part-time Audit & Supervisory Board Members. Subcommittees and working groups created to address specific issues meet autonomously to share information, investigate issues and enhance understanding. The findings of the year's activities are presented at the general meeting of JFE Group Auditors and used for audits.

➤ Governance Data: Operating System (P.261)

■ **Structure of JFE Group Board of Auditors**



Cooperation between Audit & Supervisory Board Members and Accounting Auditor

In FY2023, the Audit & Supervisory Board Members held eight scheduled or unscheduled meetings with Ernst & Young ShinNihon, JFE's outside accounting auditor, in which the latter presented its audit plan, completed work and detailed results. The firm also presented a detailed explanation of its quality management system to confirm its validity. In turn, the Audit & Supervisory Board Members explained their own audit plans and other matters to the firm. The two sides also shared opinions on related matters.

Cooperation between Audit & Supervisory Board Members and Internal Auditing Department

In FY2023, the Audit & Supervisory Board Members held ten scheduled or unscheduled meetings with the internal auditing department, in which the latter presented its internal audit plan, work status and detailed results. During the meetings, the Audit & Supervisory Board Members also shared opinions with the department.

Operating Company Governance

Some Directors, Corporate Officers, and Audit & Supervisory Board Members of JFE Holdings serve concurrently as the Directors or Audit & Supervisory Board Members of operating companies to strengthen governance and information sharing across the Group. To strengthen governance, JFE Holdings' managers attend each operating company's General Meeting of Shareholders and Management Planning Briefing, receive reports on their activities, and discuss the managerial policies of subsidiaries.

Policy on Listed Subsidiaries and Listed Affiliates

(1) Significance of having listed subsidiaries and affiliates based on group management approach and policies

To put into practice the Group's corporate vision of contributing to society with the world's most innovative technology, and also to realize sustainable growth and enhancement of medium- to long-term corporate value, the JFE Group forms corporate groups comprising companies with high expertise, divides business functions within the Group, and conducts businesses development outside of the Group. Within these groups, JFE Steel Corporation, a subsidiary of the Company, owns one listed subsidiary and four listed affiliates described below.

For the listed subsidiary among them, the Company seeks an optimal structure based on the business relationship with JFE Steel Corporation, its parent company, and maintains its listing based on a comprehensive judgement that listing is necessary for the company's growth and increasing the value of the Group as a whole, from the perspective of market recognition and credibility in funding, sales and marketing, and hiring.

In addition, the four listed affiliates maintain their listing as a means to enhance their competitiveness from the perspectives of market recognition and credibility in funding, sales and marketing, and hiring. JFE Steel Corporation holds some shares in the four companies because of associated benefits such as the exchange of steel manufacturing-related technologies and human resources.

Listed Subsidiary

JFE Systems, Inc. (Tokyo Stock Exchange, Standard Market)

The main business of JFE Systems includes system integration consisting of planning, designing, development, operation, and maintenance of information system, system construction utilizing solutions, and the company's own products, and IT infrastructure solutions that support the business system. Computer systems are an important foundation in the steel business that support overall business activities, including order acceptance, production, shipment, and quality management, and in using a variety of data. Guaranteeing the accumulation of know-how and the continuation of personnel exchanges by holding JFE Systems as a subsidiary will also be indispensable for maintaining the competitiveness of JFE Steel in pressing ahead with digital transformation.

JFE Systems, Inc.'s predecessor, Kawasaki Steel Systems R&D Corporation, was listed on the 2nd Section of the Tokyo Stock Exchange in March 2001. As of March 31, 2024, the JFE Group holds 67.9% shares of JFE Systems, Inc.

Listed Affiliates

Gecoss Corporation (Tokyo Stock Exchange, Prime Market)

Gecoss Corporation is mainly engaged in the rental and sales of temporary construction materials, as well as in design and construction of temporary works, etc. Gecoss Corporation's predecessor, Kawasho Lease System Co., Ltd., was listed on the 2nd Section of the Tokyo Stock Exchange in August 1994 and was subsequently reassigned to the 1st Section of the Tokyo Stock Exchange in September 1996.

Furthermore, Gecoss Corporation used to be a subsidiary of JFE Steel Corporation, but it was determined that further enhancing Gecoss Corporation's independence as well as strengthening its existing business and creating new business opportunities through a capital and business alliance with Mizuho Leasing Company, Limited would contribute to increasing the corporate value of the company and the JFE Group. As such, some shares of Gecoss Corporation were sold to Mizuho Leasing Company, Limited in May 2024. The JFE Group as a whole currently holds 39.5% shares of the company.

Shinagawa Refractories Co., Ltd. (Tokyo Stock Exchange, Prime Market)

Shinagawa Refractories Co., Ltd. is mainly engaged in the manufacture and sale of refractories as well as engineering services such as furnace design and construction. Shinagawa Shirorenga, the predecessor of the company, was listed on the 1st Section of the Tokyo Stock Exchange in May 1949 and subsequently became an affiliate of JFE Steel Corporation. As of March 31, 2024, the JFE Group holds 34.9% shares of Shinagawa Refractories Co., Ltd.

Nippon Chuzo K.K. (Tokyo Stock Exchange, Standard Market)

Nippon Chuzo K.K. is mainly engaged in the formed and fabricated materials business to manufacture a variety of casting products and the engineering business to design and manufacture bridge components, etc. The company was listed on the 2nd Section of the Tokyo Stock Exchange in October 1961. As of March 31, 2024, the JFE Group holds 36.2% shares of Nippon Chuzo K.K.

NIPPON CHUTETSUKAN K.K. (Tokyo Stock Exchange, Standard Market)
NIPPON CHUTETSUKAN K.K. is mainly engaged in the manufacture and sale of ductile iron pipes and polyethylene pipes, as well as water pipe laying works. The company was listed on the 2nd Section of the Tokyo Stock Exchange in July 1962 and subsequently became an affiliate of JFE Steel Corporation. As of March 31, 2024, the JFE Group holds 30.0% shares of NIPPON CHUTETSUKAN K.K.

The aforementioned five companies are subject to rules different from those applicable to other consolidated subsidiaries and affiliates based on the guidelines of the Ministry of Economy, Trade and Industry and the Tokyo Stock Exchange regarding listed subsidiaries, and other measures are also taken so as to ensure that each of the companies conducts autonomous corporate activities exercising autonomy and flexibility. Each company also secures management independence as listed companies mainly by appointing outside directors who are independent from each company, JFE Steel Corporation and the Company and by establishing special committees composed of independent members such as independent outside directors, and makes sure that the interests of the said subsidiary or affiliate, as well as the interests of shareholders of the subsidiary or affiliate other than the Company, will not be unfairly impaired.

With regard to the adjustment and allocation of business opportunities and business areas for the listed subsidiary and affiliates, the Company respects autonomous management decisions made by each company, except in cases where such decisions have a significant impact on the Company's consolidated financial statements.

In addition, each company independently raises and manages funds based on its own financial strategy. Although the Company receives fund deposits from the listed subsidiary, the transaction terms are determined rationally in consideration of market interest rates, etc.

With respect to matters necessary for the Group's risk management, prior consultation and reporting are required from each company while securing their independent decision-making, so as to implement risk management as a member of the Group companies.

(2) Measures to ensure the effectiveness of governance systems at listed subsidiaries and affiliates
Each company independently formulates its own proposals regarding the nomination of officers. JFE Steel Corporation fully respects the independence of each company and the decisions made by each company's nomination committee, and exercises its voting rights with the aim of improving each company's corporate value in the medium to long term.

To maximize the benefits of technological and personnel exchanges with each company, the Company and JFE Steel Corporation may recommend director candidates in some cases.

Furthermore, we shall regularly verify the significance of maintaining the listing of the listed subsidiaries and take necessary measures upon confirmation at its Board of Directors. The above details were verified and discussed at a Board of Directors meeting in May 2024.

Basic Policies for Strategic Shareholdings and Exercise of Related Voting Rights

All shares held by the Company are the shares of subsidiaries or affiliates. In principle, the Company's wholly owned subsidiaries and operating companies, JFE Steel Corporation, JFE Engineering Corporation and JFE Shoji Corporation (hereinafter "Operating Companies"), do not hold domestic listed stocks as strategic shareholdings. Strategic shareholdings, however, are allowed as an exception when holding the stocks of the Company is determined to be necessary for maintaining and achieving growth for the Group.

The Board of Directors regularly confirms the relative value of the strategic shareholdings and whether the benefits and risks of such holdings are commensurate with their capital cost, and sell shareholdings that are not significant or if there is a risk of damage to shareholder interests. In FY2023, the Company sold all or part of 30 stocks for 21.6 billion yen (market value). Furthermore, the Board of Directors regularly examines the significance of strategic holdings and the return on investment.

The exercise of voting rights of strategic shareholdings is decided upon reviews by operating companies on the content of the proposal and is appropriately implemented in a way that will maximize shareholder interest. To be specific, the content of the proposal is to be checked by the investment application department and the investment control department, and approval will be given to proposals which are considered not to pose any threat to the maximization of interest of these operating companies as shareholders.

Of the shares for investment purposes held by JFE Steel, which has the largest balance sheet amount for investment purposes posted in the consolidated financial statements of the company, those shares of the company held for purposes other than pure investments are shown below.

■ Number of Issues and Amount Reported in the Balance Sheet

	FY2019 year-end	FY2020 year-end	FY2021 year-end	FY2022 year-end	FY2023 year-end
Number of issues	219	171	146	138	127
Total balance sheet amount (billion yen)	166.1	96.0	71.2	59.0	60.8

Compliance

Basic Policy

In expanding our businesses in Japan and abroad, it is important that JFE maintains relationships of trust with all stakeholders, including its customers, shareholders and local communities. Trust can only be built upon a strong foundation of ensuring thorough compliance. Misconduct and scandals resulting from compliance violations can instantly shatter the trust that has taken many years to establish. Therefore, JFE believes it is extremely important that all members of the organization deepen their knowledge and awareness of compliance and perform their jobs accordingly. It conducts training on various topics such as the Antimonopoly Act, the Subcontract Act and anti-corruption, including prevention of bribery of public officials, using e-learning and compliance guidebooks and through guidebook reading sessions as well as by other means.

Compliance System

The Compliance Committee chaired by the President of JFE Holdings generally convenes four times a year to deliberate basic policies and issues and then supervise their implementation. Each operating company has a similar in-house system for promoting and supervising compliance. In addition, the JFE Group has introduced a Corporate Ethics Hotline to ensure that crucial information regarding compliance can be communicated directly from the front lines to top management.

For more on the JFE Group Standards of Business Conduct, please refer to the following information.
➤ JFE Group Standards of Business Conduct (https://www.jfe-holdings.co.jp/en/company/philosophy/guideline.html)

Targets and Results

The JFE Group Standards of Business Conduct guide employees to conduct their business activities based on the Corporate Vision and Corporate Values. They also help to strengthen awareness among all JFE Group executives and employees and ensure adherence to corporate ethics. We promote the initiatives by upholding the Ensure Adherence to Corporate Ethical Standards and Compliance as material issues of corporate management and setting KPIs to achieve those targets.
➤ Performance Evaluation for FY2023 KPIs and Establishment of FY2024 KPIs (P.18)

Initiatives

Ensure Adherence to Corporate Ethical Standards and Compliance

Compliance Education

The JFE Group's Compliance Guidebook, created as part of our effort to foster corporate compliance culture across the Group, is distributed to all Directors and employees inside and outside Japan for individual and group review. In addition to information about laws and ordinances relevant to our business activities, it provides guidance on which actions comply with internal rules and which do not (such as cartels, collusive bidding, the bribing of public officials, insider trading, harassment, and other acts in violation of laws related to the environment, labor standards, and occupational health and safety). The guidebook also provides a simple explanation of concrete standards for complying with laws and internal rules and for acting in accordance with social mores with over a hundred case studies.

Questions that come up in the course of daily operations as well as situations and cases that test our judgment have been compiled in the guidebook with explanations by the relevant department. The content has been reviewed by legal counsel. The guidebook has been reviewed according to the revisions of relevant laws and rules, and some of the cases described have been added, revised, or omitted since the first edition in 2006 to improve its overall content.

The JFE Group also conducts training on compliance with the Antimonopoly Act, insider trading restrictions, security export controls, the Construction Business Act, anti-corruption laws including laws against bribery of public officials, and more.

Whistleblowing System

The JFE Group has established a Corporate Ethics Hotline, a contact point accessible to all officers and employees (including contract workers, part-time workers, and temporary staff, either active or retired) of the JFE Group as well as those of suppliers and other business partners. The purpose of the hotline is to ensure adherence to corporate ethics and compliance and to prevent corruption and human rights abuses. Reports and consultations are accepted via e-mail, a dedicated phone line and postal mail, anonymously if preferred, and an external hotline to an independent law firm is also provided.

To encourage the active sharing of information, the Corporate Ethics Hotline is operated under rules and regulations that ensure strict confidentiality and protect people who report information or seek advice against acts of retaliation. We investigate the facts of any incident that has been reported on and consulted about only after consulting with the whistleblower to protect their privacy, and feedback the investigation results to the whistleblower if requested.

We strive to prevent incidents of misconduct and ensure the early detection and correction of wrongdoing by accepting consultations and reports, ranging from compliance issues such as violation of the Antimonopoly Act, corruption, and bribery, to human rights abuses including misconduct and harassment in the workplace. In the event that violations of laws are confirmed, corrective and remedial measures are taken in the organization involved. Details of the reports and consultation received at the Corporate Ethics Hotline are regularly communicated to full-time Audit & Supervisory Board Members while the operational status of the system is reported to the Board of Directors for their supervision.

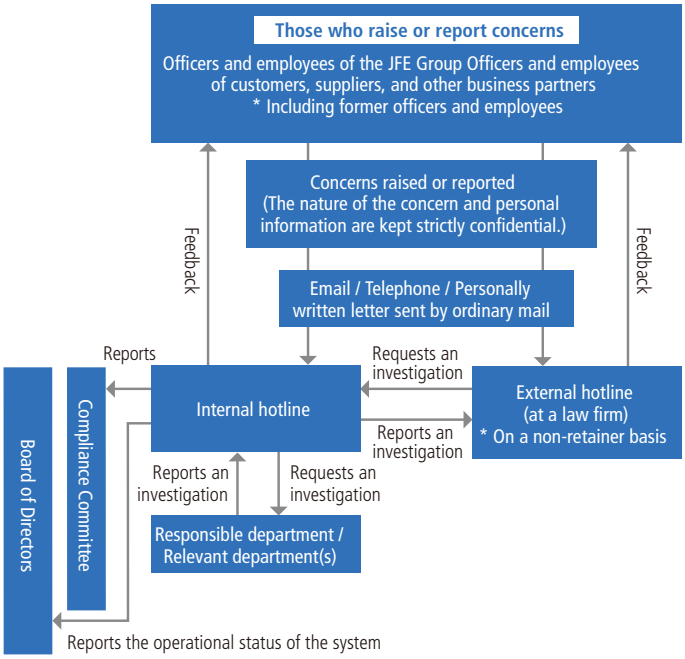
We also accept inquiries, anonymously if preferred, on compliance and other issues from external stakeholders via a form available on the corporate website. The content is handled as confidential and appropriately addressed.

Procedures for handling illegal acts or other violations:

- Departments responsible for compliance at JFE Holdings and each operating company carry out necessary responses, such as implementing the initial response, confirming facts, investigating the cause, and developing measures to prevent recurrence.
- Departments responsible for compliance at each company report on the facts, cause, and recurrence prevention measures to the Compliance Committee at each company to confirm the cause and assess the effectiveness of recurrence prevention measures and the responsibility of related parties.

- Matters such as major violations are reported to the Compliance Committee to be shared across the entire Group and to facilitate horizontal implementation of recurrence prevention measures to make sure that no similar violations occur anywhere in the Group.

■ **Whistleblowing System**



Preventing Corruption and Bribery

Under its Standards of Business Conduct, the JFE Group endeavors to comply with laws and ordinances, compete fairly and freely, refrain from illegal business activities, and build and maintain sound and proper relationships with governments and political authorities.

We explicitly prohibit bribery, such as the offering and receiving of illegal payoffs, excessive entertaining or favors, as well as corruption such as embezzlement from a position of advantage and promotion of conflicting interests. The Group strives to thoroughly prevent corruption by stating in its Company rules that these offenses will be penalized.

In addition, under its Standards of Business Conduct, the JFE Group endeavors to build and maintain sound and proper relationships with governments and political authorities. The bribing of public officials has become a major business risk in recent years due to growing global awareness of corruption and a stronger drive by authorities to expose such wrongdoing. The JFE Group does not tolerate any kind of illegal activity in Japan or any other country, including bribery, such as offering money or other benefits to public officials, and never resorts to these illegal activities to gain profit or resolve problems.

Considering this, the Group issued JFE Group's Basic Policy on Preventing Bribery of Public Officials and disseminate it throughout the Group including operating companies. The JFE Group also maintains various systems to prevent the bribery of public officials, such as by stipulating that efforts be made to use third-party appointment checklists or have an anti-bribery confirmation letter signed when using external parties including agents or consultants who may have connections with overseas public officials.

For more on our stance on preventing bribery, refer to the following information.

➤ **JFE Group's Basic Policy on Preventing Bribery of Public Officials**
(https://www.jfe-holdings.co.jp/en/company/philosophy/anti-bribery.html)

Tax Transparency

The JFE Group upholds the JFE Standards of Business Conduct and complies with both the letter and spirit of the tax laws of each country as well as international rules, including the taxation guidelines issued by the Organization for Economic Co-operation and Development and other international institutions. We will pay taxes in every country where we do business in a timely, appropriate, and fair manner.

Moreover, we seek to forge relationships of trust with the tax authorities in each country by raising transparency and without resorting to tax planning or the use of tax havens to evade taxation.

Resisting Organized Crime

The JFE Group declares in its standards of business conduct that it will firmly resist all antisocial forces and has established the JFE Group Policies for Addressing Antisocial Forces and Regulations for Addressing Violence Directed at Companies to clarify the measures to be taken against antisocial forces, including an initial response manual.

The JFE Group Policies for Addressing Antisocial Forces has been approved by the Board of Directors, and we will seek to establish sound corporate management based on an organized and unified response to the issue within the framework of our system of compliance. We have specifically set up a section responsible for handling antisocial forces in the General Administration and Legal Affairs departments of each Group company to completely discontinue any dealings with antisocial forces. We will also set up rules for reporting and responding to any related incidents and will resolutely stand against antisocial forces by cooperating with law enforcement.

In addition, we will seek to establish thorough awareness of the JFE Group Policies for Addressing Antisocial Forces and specific rules governing our response among all executives and employees by providing e-learning and distributing the Compliance Guide Book.

Compliance with the Antimonopoly Act

The JFE Group views past violations of the Antimonopoly Act seriously and continues to implement thorough measures to eliminate the possibility of future infringements. The internal audit departments of JFE Steel and JFE Engineering are auditing transactions with other companies to ensure compliance with the Antimonopoly Act by confirming that no activities are suspected of violating the law. The audits are being conducted regularly at each office, including branches and branch offices. Each Group company is implementing similar measures to prevent violations of the Antimonopoly Act.

We are increasing the effectiveness of these recurrence prevention measures by regularly reporting relevant activities to the Compliance Committee.

Confirmation and Improvement through the Employee Awareness Survey

The JFE Group regularly conducts a Corporate Ethics Awareness Survey (previously once every three years, but now once every two years since FY2024) for Directors and employees of the Company as well as the operating companies to confirm the penetration of and thorough compliance with the Group's Corporate Vision, Corporate Values, and Standards of Business Conduct, along with the identification of potential risks. The survey conducted in FY2022 confirmed that many employees acknowledged the vision and corporate policy and are aware of compliance in the course of their work. On the other hand, the survey also brought our attention to issues to address going forward. Issues identified are reflected in the specific initiatives of each company for improvement under the supervision of the JFE Group Sustainability Council and the Board of Directors.

Indictment of JFE Group Company Employees

Three employees of JFE Engineering Corporation were indicted for alleged involvement in obstructing bids concerning the construction contracted with Taketomi Town, Okinawa Prefecture. One of them, now a former employee of the company, was convicted in August 2022, while the other two were convicted in October 2023 by the Naha District Court.

We deeply regret this situation and sincerely apologize for the inconvenience and concern caused to many of the related parties.

We regard this matter very seriously and sincerely. We will strive to regain public trust as early as possible by preventing a recurrence through the implementation of measures addressing the identified causes of the incident.

Risk Management

Basic Policy

In order to enable the Group to achieve sustainable growth with ever-increasing corporate value through the pursuit of the JFE Group's vision of "contributing to society with the world's most innovative technology," we have properly identified risks across the Group. Our risk management system is subject to ongoing improvement, and effective measures are taken to eliminate as many foreseeable risks as possible.

Risk Management System

JFE Holdings is responsible for comprehensive risk management of the Group in accordance with its Basic Stance for Building an Internal Control System by establishing a system whereby the Board of Directors oversees risk management and confirms its effectiveness.

Specifically, corporate officers are responsible for recognizing risks, and those deemed material are then confirmed and assessed by the JFE Group Sustainability Council, chaired by the CEO (president) of JFE Holdings. Next, the CSR Council deliberates and decides on countermeasure policy and action plans for risk management. Such risks include business activities; compliance-related matters such as compliance with the Antimonopoly Act and laws related to anti-corruption including bribery of public officials, observance of company policy and regulations such as the Corporate Vision and JFE Group Standards of Business Conduct; and ESG risks such as those related to the environment, climate change, human affairs, labor, safety and disaster prevention; human rights abuses such as sexual harassment and power harassment, quality management, financial reporting, and information security.

The Board of Directors oversees risk management and confirms its effectiveness by regularly receiving reports on Group policy and action plans on risk management, and through deliberation and decision-making on important matters regarding risk management.

We will continue improving Group-wide risk management in accordance with the discussion by the Board of Directors.

For our risk management policies and systems, refer to the following information.

➤ Basic Policy for Building Internal Control Systems (Japanese only)
(https://www.jfe-holdings.co.jp/company/info/pdf/naibutousei.pdf)
➤ JFE Group Sustainability System (P.10)
➤ Development of the Whistleblowing System (P.228)

Initiatives

Response to Specific Risks

Response to Climate Change Risks

The JFE Group places initiatives on climate change as top-priority business concerns, and it formulated the JFE Group Environmental Vision for 2050 to achieve carbon neutrality by 2050. In the Seventh Medium-term Business Plan, the Group established managerial targets to reduce CO_2 emissions from the steel business by 18% from FY2013 levels by the end of FY2024 and by over 30% from FY2013 levels by the end of FY2030, and further achieve carbon neutrality by 2050 in multiple ways.

Risks are identified and evaluated based on a scenario analysis conducted under the framework recommended by the TCFD, and important factors that may affect management are selected for further analysis and used in formulating business strategies, including the Seventh Medium-term Business Plan.

For climate change risks and opportunities, refer to the following information.
➤ TCFD Recommended Scenario Analysis (P.104)

Intellectual Property Management

The JFE Group meticulously manages intellectual property across its diverse business activities. To prevent infringement on third-party intellectual property, it constantly monitors the latest information on intellectual property and implements all necessary measures.

Privacy Protection

JFE has established the JFE Group Privacy Statement for managing information including "My Numbers," which are personally identifiable numbers under Japan's social security and tax number systems.

To maintain the appropriate protection of personal information, employee trainings on the rules, which have been set in place in accordance with the privacy statement, have been conducted as stipulated in applicable laws of each country related to businesses and guidelines.

To reduce information security risks, including cyber-attacks and improper system use such as leaks of personal information, and to promote safe business activities, the JFE-Security Integration and Response Team (JFE-SIRT), comprising the IT division managers of each operating company, participates in the Nippon CSIRT Association, established by private sector volunteers and corporate Computer Security Incident Response Teams (CSIRTs) active in Japan. We seek to enhance the level of our initiatives by exchanging information and coordinating on security incidents.

For privacy protection policies, please refer to the following information.
➤ JFE Group Privacy Statement (https://www.jfe-holdings.co.jp/en/privacy.html)

Information Security

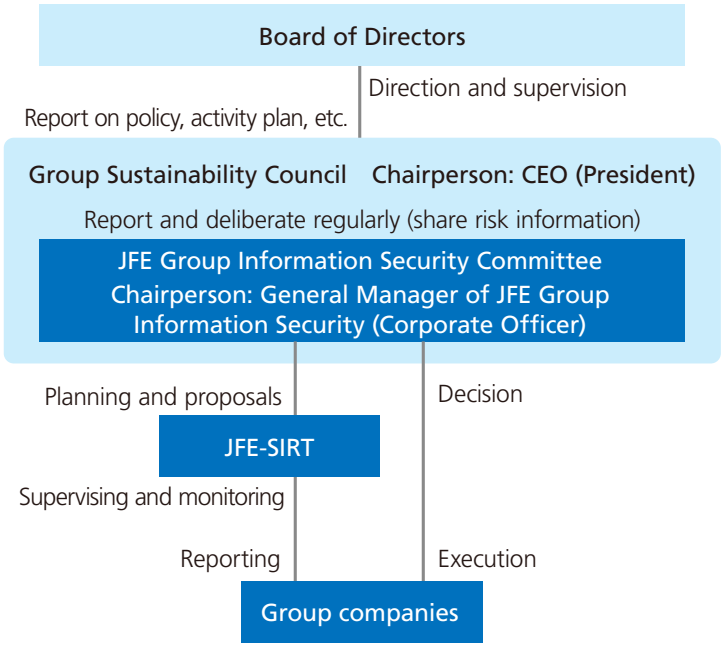
The JFE Group formulates various rules on information security management to prevent information leakage and system failures due to cyber-attacks and improper system use. Efforts are made to enhance information-security knowledge and awareness of rules among employees through training and education. Additionally, shared IT measures are applied in each Group company and regular information security audits are conducted to reinforce the overall information security management level in the Group.

Key issues related to IT, particularly information security, are deliberated by the JFE Group Information Security Committee to determine Group policy.

Applying the policies set by the committee, the JFE-SIRT formulates and implements information-security measures, performs information security audits, offers guidance on responding to incidents and generally enhances the level of Group-wide information security management. The JFE-SIRT reports on its activities to the Group CSR Council as appropriate. In addition, we established JFE Cyber Security & Solutions, Ltd. in April 2024 to acquire and train high-level security personnel and strengthen security monitoring and other systems.

For more details on JFE's information security, refer to the information in the management section of the DX REPORT.
➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)

■ **Digital Governance and Cyber Security Framework in the JFE Group**



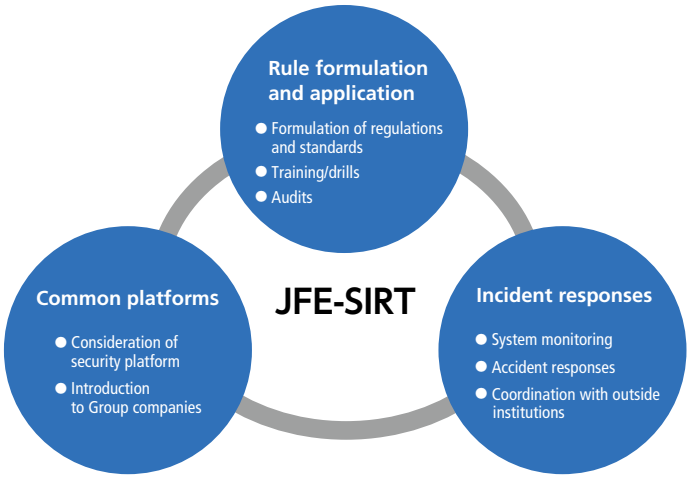
Cybersecurity

The JFE Group Declaration of Cybersecurity Management was revised in January 2023. Even as we consider cybersecurity as a vital investment for our digital transformation, we understand its continual enhancement is also a material management concern given the increasing frequency and sophistication of cyber threats. Cybersecurity measures are being accelerated under management leadership, mainly through the JFE-SIRT.

For more details about our cybersecurity measures, please see Security Management in the DX REPORT.

➤ DX REPORT (https://www.jfe-holdings.co.jp/en/investor/library/dxreport/index.html)

■ **Cybersecurity monitoring initiatives**



Responding to Human Rights Risks within the Supply Chain

The JFE Group procures raw materials, construction materials, and machinery from all over the world. In response to human rights risks associated with the supply chain, the Group established the JFE Group Human Rights Basic Policy in 2018 to take action in accordance with the United Nations Guiding Principles on Business and Human Rights. Each operating company has established raw material purchasing policies, purchasing and procurement policies, and a basic policy on sustainability in the supply chain, and they carry out purchasing in a way that respects human rights, legal compliance, and environmental preservation.

In addition, the Group has been conducting human rights due diligence since FY2021. In April 2023, we revised the JFE Group Human Rights Basic Policy to take account of recent changes in public awareness and issues surrounding human rights. Furthermore, we have endorsed the Ten Principles of the UN Global Compact, which cover protection of human rights, elimination of unfair labor practices, environmental protection, and prevention of corruption. We are a member of the Global Compact Network Japan, an organization that promotes Global Compact activities in Japan. We also participate in the subcommittee activities of the Global Compact Network Japan, and we have been promoting our own initiatives based on information shared with participating companies and organizations. All supply chain members and other stakeholders will continue to be called upon Group-wide to respect and support human rights.

For more details on our human rights due diligence initiatives, refer to Human Rights.
➤ Human Rights (P.166)

JFE Group's Business Continuity Plan

Anticipating the possibility of natural disasters caused by typhoons and major earthquakes as well as a rapid expansion of infectious diseases such as a new strain of influenza, the JFE Group has formulated a business continuity plan (BCP) to address contingencies. We conduct regular training based on the BCP while also pursuing other countermeasures.

In the event of a major earthquake, the Group Sustainability Council will promptly discuss and determine the policy on how to deal with the matter, based on predetermined response processes to minimize loss and other damages.

Response to Major Natural Disasters

We are preparing to respond in the event of a major earthquake through measures such as establishing tsunami shelters, maintaining a Company-wide line of command under restricted communications and power outages, and securing data backup. We have also strengthened the drainage system at our steelworks to address the impact of typhoons and torrential rains that are occurring with increasing severity in Japan.

Response to Infectious Diseases

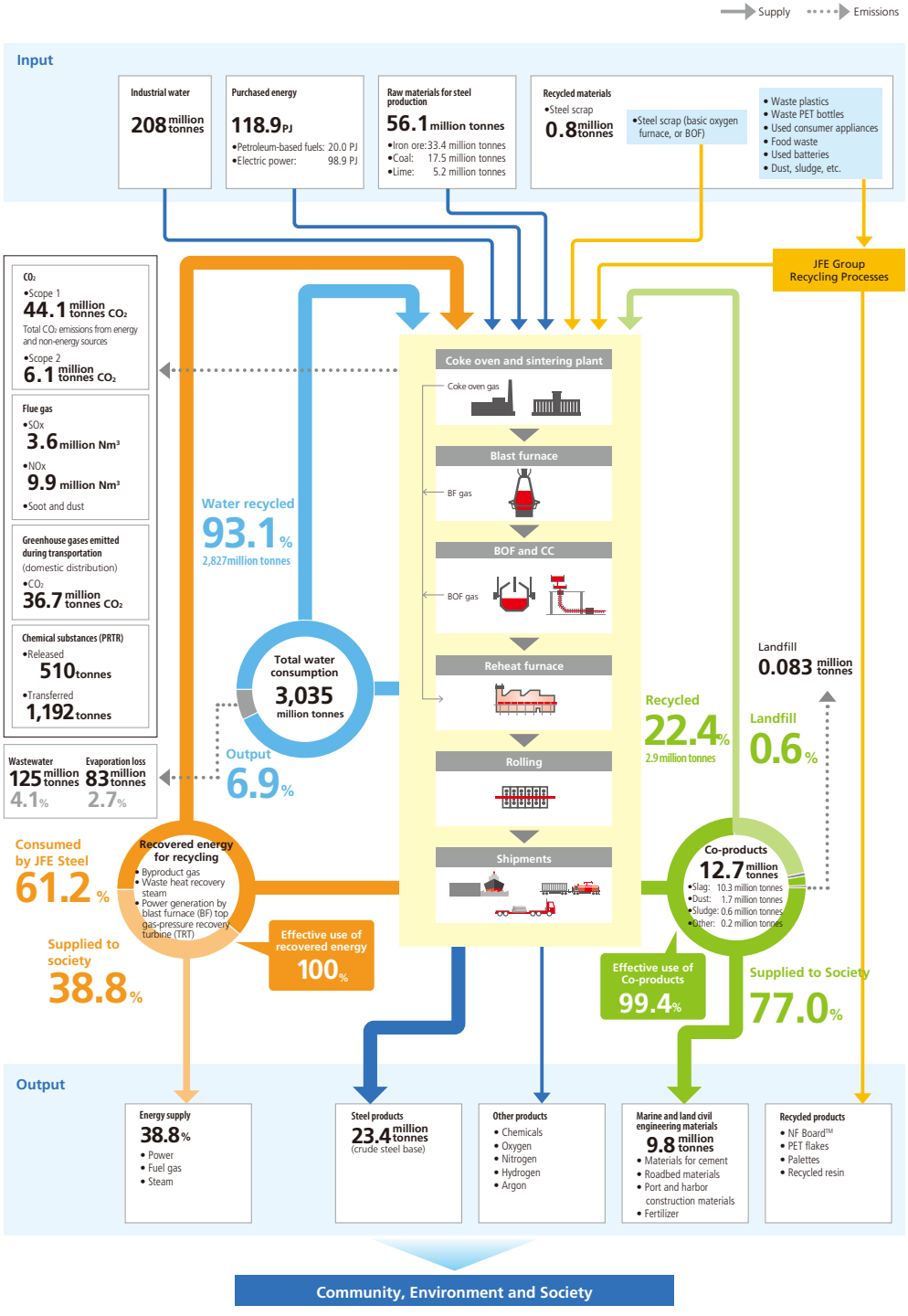
Apart from the development of policies against novel influenza virus infections, we have been taking simulation-proven measures for varying scenarios to maintain key operations and prevent stoppages, including those at steel production sites and steelworks, even if there is an increase in the absence rate due to the spread of a disease. The policies are periodically reviewed and improved by the JFE Group Sustainability Council and other relevant bodies. Moreover, as a measure to protect employees against the threat of infectious diseases, we provide vaccinations and health checkups for employees, as well as their families, who are assigned to countries outside Japan and for those who go abroad for work. In addition to safety information in the destination countries, we also provide information about local infectious diseases and prohibit employees from going abroad to protect their safety, depending on prevailing circumstances.

Environmental Data

Material Flow

JFE Steel works to reduce the environmental impact of its iron and steelmaking processes, including through the effective use of resources. The company recycles 93.1% of the water it uses for production and uses 99.4% of its co-products, such as iron and steelmaking slag. In addition, 100% of co-product gas generated during production is reused as fuel for reheating slabs, generating power for internal use and supplying power to the public.

■ JFE Steel's Material Flow (Non-Consolidated)



■ JFE Engineering's Material Flow (Head Office and Works)

Input

Steel	24,000 tonnes
Energy	
• Electric power purchased	23.4 GWh
• Class A heavy oil	177 kl
• Kerosene	3.4 kl
• Light oil	280 kl
• Gasoline	14.9 kl
• City gas	354,000 Nm^3
• LPG	69.2 tonnes
Water	72,900 tonnes

JFE Engineering

- **Tsurumi Works**
- **Tsu Works**

Output and Emissions

Products	23,000 tonnes
CO_2	5,300 tonnes CO_2
• Scope 1	2,500 tonnes CO_2
• Scope 2	2,800 tonnes CO_2
Waste discharged	925 tonnes
• Industrial wastes	706 tonnes
• General wastes	219 tonnes
Wastewater (ocean only)	122,000 tonnes
Others (PRTR)	83 tonnes

Abbreviations indicated under "scope" represent the following group or company:
JFE Group [All]; JFE Steel Group [ST Gr]; JFE Steel [ST]; JFE Engineering Group [EN Gr];
JFE Engineering [EN]; JFE Shoji Group [SH Gr]; JFE Shoji [SH]

Environmental Indicators

Area	Operating company	Target	FY2023 results and related pages
Greenhouse Gas and Energy	ST	• Reduce CO_2 emissions by 18% from FY2013 levels by the end of FY2024	PP.237-238
	EN	• Reduce CO_2 emissions in its own plants and offices FY2024: 40% reduction from FY2013 levels • Contribute to reduction in CO_2 emissions (FY2023): 11.5 million tons per year	PP.237-238,240
	SH	• Reduce CO_2 emissions through the procurement of electricity derived from renewable energy FY2022 domestic CO_2 emissions: Reduce by 10% from FY2019 levels (reduce by 5% per year from FY2019 levels from FY2021 to FY2024)	P.237-238
Chemical Substances	ST	• VOC emissions: –30% from FY2000 (1,078 t or less) • Benzene emissions: –80% from FY1999 (46 t or less) • Dichloromethane emissions: –40% from FY1999 (46 t or less)	P.244
Resource Use	ST	• Recycling rate of co-products: 99% or higher	P.246
	EN	Recycling rate at construction sites • Recycling rate of rubble: 99.5% or higher • Recycling rate of sludge: 95.0% or higher • Recycling rate of industrial waste: 85.0% or higher • Recycling rate of office recyclable waste • Yokohama head office: 98.0% or higher	PP.247-248
	SH	Global recycling of steel scrap • Exceed FY2020 scrap trade volume (FY2024 target: +5% from FY2020)	P.246
Water Use	ST	• Maintain efficient use of water Recirculated water usage rate: 90% or higher	P.249

Greenhouse Gas and Energy

■ CO_2 Emissions by Scope

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Scopes 1 and 2 total*1*2	All	million t-CO_2	60.4	53.1	59.0	56.1	54.7
	ST Gr	million t-CO_2	60.0	52.6	58.6	55.7	54.2
	ST	million t-CO_2	56.0	49.1	54.7	52.3	50.1
	ST subsidiaries	million t-CO_2	3.9	3.5	3.9	3.4	4.1
	EN Gr	million t-CO_2	0.403	0.484	0.387	0.422	0.482
	EN	million t-CO_2	0.0168	0.0141	0.0103	0.0081	0.0081
	EN subsidiaries	million t-CO_2	0.386	0.470	0.377	0.414	0.474
	SH Gr	million t-CO_2	0.0353	0.0296	0.0319	0.0316	0.0311
	SH	million t-CO_2	0.0005	0.0004	0.0004	0.0004	0.0004
	SH subsidiaries	million t-CO_2	0.0348	0.0292	0.0315	0.0311	0.0307
Scope1*3*4	All	million t-CO_2	52.9	46.6	51.9	49.0	47.4
	ST Gr	million t-CO_2	52.5	46.2	51.5	48.6	47.0
	ST	million t-CO_2	49.8	43.8	48.8	46.4	44.1
	ST subsidiaries	million t-CO_2	2.7	2.4	2.7	2.2	2.9
	EN Gr	million t-CO_2	0.361	0.442	0.345	0.395	0.459
	EN	million t-CO_2	0.0038	0.0024	0.0024	0.0029	0.0038
	EN subsidiaries	million t-CO_2	0.357	0.439	0.343	0.393	0.455

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Scope2*6	All	million t-CO_2	7.6	6.4	7.1	7.1	7.3
	ST Gr	million t-CO_2	7.5	6.4	7.0	7.1*5	7.3
	ST	million t-CO_2	6.3	5.3	5.8	5.9	6.1
	ST subsidiaries	million t-CO_2	1.2	1.1	1.2	1.1*5	1.2
	EN Gr	million t-CO_2	0.0422	0.0424	0.0418	0.0263	0.0232
	EN	million t-CO_2	0.0129	0.0116	0.0079	0.0052	0.0043
	EN subsidiaries	million t-CO_2	0.0293	0.0308	0.0339	0.0211	0.0189
	SH Gr	million t-CO_2	0.0353	0.0296	0.0319	0.0316	0.0311
	SH	million t-CO_2	0.0005	0.0004	0.0004	0.0004	0.0004
	SH subsidiaries	million t-CO_2	0.0348	0.0292	0.0315	0.0311	0.0307
Unit CO_2 emissions (numerator: Scopes 1 and 2 total; denominator: sales)	All	t-CO_2/ billion yen	1,619	1,644	1,352	1,057	1,057
Scope3*7*8	All	thousand t-CO_2e	16,382	14,369	20,778	23,184	22,701
Category 1 Purchased goods and services	All	thousand t-CO_2e	12,557	11,026	17,244	19,750	19,118
Category 2 Capital goods	All	thousand t-CO_2e	1,401	1,226	1,221	1,166	1,239
Category 3 Fuel and energy related activities not included in Scopes 1 or 2	All	thousand t-CO_2e	728	671	717	736	760
Category 4 Upstream transportation and delivery	All	thousand t-CO_2e	489	419	454	450	440
Category 5 Waste generated in operations	All	thousand t-CO_2e	57	45	58	62	133
Category 6 Business travel	All	thousand t-CO_2e	4	4	5	4	5
Category 7 Employee commuting	All	thousand t-CO_2e	49	51	59	49	14
Category 15 Investments	All	thousand t-CO_2e	1,097	927	1,022	967	993

*1 Data cover 75 companies
- JFE Steel and 26 major domestic and overseas subsidiaries
- JFE Engineering and 11 major domestic and overseas subsidiaries
- JFE Shoji and 35 major domestic and overseas subsidiaries.

*2 Starting with FY2021, figure includes data for an expanded list of JFE Steel, JFE Engineering, and JFE Shoji subsidiaries.
*3 Data for JFE Steel include CO_2 emissions from non-energy sources.
*4 Data for 3 JFE Steel major domestic subsidiary and a JFE Engineering major domestic subsidiary include CO_2 emissions from non-energy sources.

*5 Emission factors for overseas subsidiaries have been revised.
*6 CO_2 emission factors for purchased electricity in FY2023:
- JFE Steel uses the emission factors of the Carbon Neutrality Action Plan of the Japan Iron and Steel Federation for energy purchased in FY2022.
- JFE Steel's domestic consolidated subsidiaries, the JFE Engineering Group, and the JFE Shoji Group apply the adjusted emission factors of each electric power company for each fiscal year.
- Overseas: Latest IEA emission factors

*7 Coverage:
(Categories 1, 2, 3, 4, 5) JFE Steel, 21 JFE Steel major domestic subsidiaries, JFE Engineering, 1 JFE Engineering major domestic subsidiary, and JFE Shoji
(Category 6, 7) JFE Steel, 21 JFE Steel major domestic subsidiaries, JFE Engineering, 12 JFE Engineering major domestic and overseas subsidiaries, and JFE Shoji
(Category 15) Japan Marine United, and 10 JFE Steel equity-method affiliates (7 domestic and 3 overseas)
*8 Sources: Green Value Chain Platform (Ministry of the Environment) and others

■ Other Greenhouse Gas

Items			Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
CO_2 emissions from energy sources	CO_2 emissions (Scopes 1 and 2 total)		ST Gr	million t-CO_2	57.4	50.2	55.8	53.1	51.7
			ST	million t-CO_2	54.2	47.3	52.6	50.4	48.3
			ST subsidiaries	million t-CO_2	3.2	2.9	3.2	2.7	3.4
			EN Gr*1*2	thousand t-CO_2	67.5	62.5	61.4	45.2	36.3
		Scope1	ST	million t-CO_2	47.9	41.9	46.8	44.5	42.3
	Unit: CO_2 emissions (denominator: crude steel production)		ST	t-CO_2/t-steel	2.03	2.08	2.03	2.09	2.06
CO_2 emissions from non-energy sources			ST Gr*3	million t-CO_2	2.65	2.40	2.74	2.59	2.48
			ST	million t-CO_2	1.89	1.82	2.05	1.93	1.79
			ST subsidiaries	million t-CO_2	0.76	0.58	0.69	0.66	0.69
			EN subsidiaries*4	million t-CO_2	0.34	0.42	0.33	0.38	0.45

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
GHG emissions other than CO_2		All	thousand t-CO_2e	103.3	96.1	103.0	55.2	117.9
	Methane (CH_4)	ST Gr	thousand t-CO_2e	72.9	68.3	74.6	35.4	78.5
		ST	thousand t-CO_2e	72.9	68.3	74.6	35.4	78.5
		ST subsidiaries	thousand t-CO_2e	—	—	0.005	0.005	0.005
	N_2O	All	thousand t-CO_2e	30.4	27.9	28.5	19.8	39.4
		ST Gr	thousand t-CO_2e	20.0	15.5	17.7	7.8	37.1
		ST	thousand t-CO_2e	20.0	15.5	17.7	7.8	37.1
		ST subsidiaries	thousand t-CO_2e	—	—	0.004	0.004	0.004
		EN subsidiaries*4	thousand t-CO_2e	10.4	12.4	10.8	12.0	2.3
GHG emitted during transportation*5		ST Gr	million t-CO_2	0.65	0.57	0.63	0.61	0.59
		ST	million t-CO_2	0.40	0.34	0.38	0.37	0.37
		ST subsidiaries	million t-CO_2	0.25	0.23	0.25	0.24	0.22
Contribution to CO_2 emission reductions*6		EN Gr	million t-CO_2/year	4.13	9.65	10.57	11.14	11.53
	Biomass power generation	EN Gr	million t-CO_2/year	2.12	2,74	2.86	2.94	2.95
	Waste power generation	EN Gr	million t-CO_2/year	1.53	3.37	3.40	3.72	3.80
	Others*7	EN Gr	million t-CO_2/year	0.48	3.54	3.57	3.59	3.84
	Recycling (Includes fluorocarbon recovery and energy creation)	EN Gr	million t-CO_2/ year	—	—	0.74	0.89	0.94

*1 Data cover JFE Engineering and 11 major domestic and overseas subsidiaries.
*2 Starting with FY2021,expanded coverage of major subsidiaries for JFE Engineering.
*3 Data cover JFE Steel and 3 major domestic subsidiaries.
*4 J&T Recycling Co. is a domestic subsidiary of JFE Engineering.
*5 Data cover JFE Steel and 9 major domestic subsidiaries, which are specified consigners designated under the Japanese Energy Saving Act.
*6 Coverage:
- Up to FY2019, only JFE Engineering's domestic business is covered
- FY2020 data cover JFE Engineering's domestic and overseas businesses and its German subsidiary Standardkessel Baumgarte GmbH (SBG)
- From FY2021, JFE Engineering's domestic and overseas businesses, J&T Recycling Corporation, JFE Urban Recycle Corporation, and German subsidiary Standardkessel Baumgarte GmbH (SBG) are covered

*7 Coverage: Others (digestion gas, geothermal, solar power, wind, waste heat recovery, fuel conversion, energy services, logistics products)

■ Energy Consumption

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Energy consumption and unit energy consumption	Energy consumption	All	PJ	670	592	654	627	612
		ST Gr	PJ	669	591	652	625	611
		ST	PJ	620	545	602	581	557
		ST subsidiaries	PJ	48.8	45.2	49.6	43.9	53.9
		EN Gr	PJ	1.3	1.2	1.3	1.2	1.2
		SH Gr	PJ	0.6	0.6	0.7	0.7	0.7
	Unit energy consumption (crude steel production)	ST	GJ/t-steel	23.2	24.0	23.3	24.1	23.7
	Energy consumption (Crude petroleum equivalent)	EN	kl	8,788	8,000	7,636	7,772	7,756
	YOY ratio of unit energy consumption	EN	%	80.7	91.0	95.5	107.9	94.3
Recovered energy for recycling	Supplied to society	ST	%	39	38	38	37	39
	Consumed internally	ST	%	61	62	62	63	61

■ Modal Shift

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
All transportation	Ship and rail	ST	%	59.6	58.4	58.3	59.0	57.9
	Truck	ST	%	40.4	41.6	41.7	41.0	42.1
Transportation of a distance of 500 km or more	Ship and rail	ST	%	90.9	91.6	90.0	92.1	93.6
	Truck	ST	%	9.1	8.4	10.0	7.9	6.4

Scope of calculation: All products and half-finished products transported in Japan

Greenhouse Gas and Energy (Supplementary Data)

■ CO_2 Emissions and Energy Consumption of JFE Steel Group Subsidiaries (FY2023)

Company name	CO_2 emissions (unit: thousand t-CO_2)	Energy consumption (unit: PJ)
JFE Mineral & Alloy Company, Ltd.*	1,724.7	9.83
JFE Bars & Shapes Corporation	533.3	9.39
JFE Chemical Corp.	224.8	4.15
JFE LOGISTICS CORPORATION	151.3	2.26
JFE Galvanizing & Coating Co., Ltd.	48.3	1.01
JFE Plastic Resource Corporation	20.0	0.37
MIZUSHIMA RIVERMENT CORP.	8.1	0.11
JFE Container Co., Ltd.	9.6	0.19
J-Logitec Co., Ltd.	7.6	0.11
Galvatex Corporation	3.7	0.08
JFE Metal Products & Engineering Inc.	8.6	0.16
JFE Welded Pipe Manufacturing Co., Ltd.	8.3	0.15
JFE Techno-wire Corporation	3.7	0.08
JFE PRECISION CORPORATION	3.5	0.07
K-PLASHEET CORPORATION	4.7	0.07
JFE LIFE CORPORATION	5.6	0.10
CHIBA RIVERMENT AND CEMENT CORP.	6.0	0.12
JFE Steel Pipe Co., Ltd.	2.7	0.06
GECOSS CORPORATION	3.2	0.06
JFE Kozai Corporation	3.1	0.06
JFE Ferrite Corporation	3.6	0.05
5 overseas companies	1,288.0	16.38
Total	4,072.5	44.86

* Data for Mineral & Alloy Company, Ltd. since FY2021 has included CO_2 emissions from Mizushima Ferroalloy Co., Ltd. and JFE Material Co., Ltd., which merged into JFE Mineral & Alloy Company in April 2022.

■ CO_2 Emissions from Energy Sources and Energy Consumption of JFE Engineering Group Subsidiaries (FY2023)

Company name	CO_2 emissions (unit: thousand t-CO_2)	Energy consumption (unit: PJ)
J&T Recycling Corporation	38.5	0.8
Fujikako, Inc.	1.7	0.030
NORTHERN JAPAN MACHINERY Corporation	0.9	0.015
TOHOKU DOCK TEKKO CO., LTD.	0.8	0.014
Asuka Soken Co., Ltd.	0.8	0.012
JFE Pipeline Engineering Corporation	0.5	0.007
JFE Technos Corporation	0.1	0.002
JFE Project One Co., Ltd.	0.1	0.002
J&M Steel Solutions Company Limited	0.4	0.008
Total	43.9	0.893

* CO_2 emissions data of J Farm Corporation has been included in the data of JFE Engineering Corporation from the FY2023 results.
* CO_2 emissions data of JFE Environmental Service Corporation has been included in the data of J&T Recycling Corporation from the FY2023 results.

Chemical substances

■ Air Emissions

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
SOx emissions*1	ST Gr	million Nm^3	4.3	3.3	3.5	3.3	3.6
	ST	million Nm^3	4.3	3.3	3.5	3.3	3.6
	ST subsidiaries	million Nm^3	0.04	0.03	0.03	0.04	0.04
NOx emissions*2	ST Gr	million Nm^3	11.3	10.4	11.4	10.2	10.1
	ST	million Nm^3	11.1	10.3	11.2	10.1	9.9
	ST subsidiaries	million Nm^3	0.17	0.14	0.18	0.15	0.16

*1 11 JFE Steel consolidated subsidiaries in Japan.
*2 11 JFE Steel consolidated subsidiaries in Japan.

■ Release to Waterways

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
COD (chemical oxygen demand)	All*1	t/day	3.4	3.1	3.1	3.1	2.6
	ST	t/day	3.2	2.9	2.9	2.8	2.3
	ST subsidiaries	t/day	0.15	0.17	0.23	0.25	0.27
	EN*2	kg/day	8.4	8.7	8.4	6.6	4.8

*1 Coverage:
- JFE Steel and 10 consolidated subsidiaries in Japan.
- JFE Engineering

*2 This report uses the maximum value of each year.

■ PRTR-Registered Substances

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
PRTR-registered substances*1*2	Amount released	All*3	t	918	754	827	750	917
		ST Gr	t	766	596	672	609	790
		ST	t	481	341	380	366	510
		ST subsidiaries	t	285	255	292	243	280
		EN Gr	t	152	158	155	141	126
		EN	t	107	121	116	103	101
		EN subsidiaries	t	45.4	36.7	39.3	37.8	25.1
	Amount transferred	All*3	t	7,866	5,949	9,845	12,809	11,217
		ST Gr	t	7,832	5,910	9,811	12,779	11,193
		ST	t	1,865	1,694	1,378	1,278	1,192
		ST subsidiaries	t	5,967	4,216	8,433	11,501	10,001
		EN Gr	t	34	39	34	30	23
		EN	t	29	26	30	26	19
		EN subsidiaries	t	5.4	12.5	4.4	4.4	3.9

*1 Coverage:
- JFE Steel and 15 consolidated subsidiaries in Japan.
- JFE Engineering and 4 consolidated subsidiaries in Japan.

*2 Excluding dioxins

*3 JFE Shoji is not included in the scope of the report as the company is not subject to PRTR registration.

Chemical Substances (Supplementary Data)

■ SOx and NOx Emissions of JFE Steel Group Subsidiaries (FY2023)

Company name	SOx emissions (unit: Nm^3)	NOx emissions (unit: Nm^3)
JFE Mineral & Alloy Company, Ltd.	15,880	95,960
CHIBA RIVERMENT AND CEMENT CORP.	85	695
MIZUSHIMA RIVERMENT CORP.	0	647
JFE PRECISION CORPORATION	746	186
JFE Plastic Resource Corporation	24	14
JFE Bars & Shapes Corporation	9,534	11,324
JFE Metal Products & Engineering Inc.	29	2,062
JFE KENZAI FENCE CO., LTD.	0	0
JFE Galvanizing & Coating Co., Ltd.	1,354	12,890
JFE Container Co., Ltd.	93	0
JFE Welded Pipe Manufacturing Co., Ltd.	0	0
JFE Steel Pipe Co., Ltd.	0	0
Galvatex Corporation	0	454
JFE Techno-wire Corporation	0	0
JFE Kozai Corporation	0	0
GECOSS CORPORATION	0	0
JFE LOGISTICS CORPORATION	0	0
J-Logitec Co., Ltd.	0	0
JFE Chemical Corp.	9,471	31,113
K-PLASHEET CORPORATION	168	0
JFE LIFE CORPORATION	0	0
Total	37,383	155,345

Use of Natural Resources

■ Input and Products supplied

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Input	Raw materials for steel production*	ST	million t	64.3	56.2	63.4	60.4	56.1
	Iron ore*	ST	million t	38.7	32.9	37.6	35.7	33.4
	Coal	ST	million t	20.3	18.1	19.9	19.1	17.5
	Lime	ST	million t	5.3	5.2	5.9	5.6	5.2
	Recycled materials (steel scrap)	ST	million t	1.1	0.8	1.2	0.9	0.8
	Raw materials	EN	thousand t	39.4	36.9	38.6	27.9	24.0
Products supplied	Steel products	ST	million t	26.7	22.8	25.9	24.1	23.4
	Engineering products	EN	thousand t	36.6	34.7	37.4	27.0	23.0

*Data for FY2019 though FY2022 was revised to increase accuracy.

■ Co-Products and Wastes

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Co-products	Amount generated*1	ST Gr	million t	15.6	13.9	14.4	14.1	13.3
		ST*2	million t	15.1	13.4	13.9	13.5	12.7
		ST subsidiaries	million t	0.5	0.5	0.5	0.6	0.6
	Amount recycled internally	ST	million t	5.0	3.3	3.3	2.9	2.9
	Internal recycle rate	ST	%	32.9	24.9	24.0	21.7	22.4
	Emissions*1	ST Gr	million t	10.3	10.2	10.8	10.8	10.1
		ST	million t	10.2	10.1	10.6	10.6	9.9
		ST subsidiaries	million t	0.1	0.1	0.2	0.2	0.2
	Used by local communities	ST	million t	10.1	10.0	10.5	10.5	9.8
	Rate of local communities use	ST	%	66.8	74.8	75.7	77.8	77
	Landfill amount*1	ST Gr	million t	0.074	0.060	0.094	0.167	0.180
		ST	million t	0.043	0.037	0.042	0.073	0.083
		ST subsidiaries	million t	0.031	0.023	0.052	0.094	0.097
	Recycling rate	ST	%	99.7	99.7	99.7	99.5	99.4

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Wastes	Emissions*3*4	EN Gr	thousand t	211.0	159.1	249.2	223.7	193.1
	Offices	EN	t	367.1	329.2	235.3	259.4	219.4
		Yokohama HO	t	299.0	256.9	156.7	195.0	157.2
		Tsu works	t	68.2	72.3	78.6	64.4	62.2
	Productions	EN	t	1,340.5	1,072.3	803.0	821.4	705.8
		Tsurumi works	t	653.8	519.8	364.7	461.6	338.3
		Tsu works	t	686.7	552.5	438.3	359.8	367.5
	Constructions	EN	t	145,397.7	97,387.9	190,242.3	162,747.2	134,157.5
	Subsidiaries	EN subsidiaries	t	63,876.7	60,296.7	57,960.3	59,841.4	57,990.0
	Recycling rate (offices)	EN	%	97.3	96.8	96.1	96.4	92.1
		Yokohama HO	%	98.8	99.1	98.5	98.4	97.7
		Tsu works	%	85.2	87.2	88.4	85.7	87.1
	Recycling rate (production)	EN	%	68.0	48.8	46.8	54.0	50.4
		Tsurumi works	%	79.4	72.0	68.3	75.9	60.9
		Tsu works	%	60.9	33.8	28.0	25.0	42.3
	Recycling rate (construction)	EN	%	97.1	98.3	98.6	99.3	97.5
	Landfill	EN	t	4,489.3	2,011.6	3,035.6	1,456.7	3,497.5
	Offices	EN	t	8.5	9.1	7.4	7.7	7.4
		Yokohama HO	t	3.3	2.1	2.2	2.9	3.0
		Tsu works	t	5.2	7.0	5.2	4.8	4.4
	Productions	EN	t	312.6	351.2	322.6	287.7	235.2
		Tsurumi works	t	77.3	75.2	89.4	85.9	80.5
		Tsu works	t	235.3	276.0	233.2	201.8	154.7
	Constructions	EN	t	4,168.2	1,651.3	2,705.6	1,161.3	3,254.8
	Recycling rate	EN	%	95.8	95.9	96.5	97.4	96.1

*1 Data cover JFE Steel and 22 consolidated subsidiaries in Japan.
*2 Byproducts generated by JFE Steel are mostly reused as offshore, land, or construction materials.
*3 Data cover JFE Engineering and 9 consolidated subsidiaries in Japan.
*4 Data from FY2019 includes wastes generated at offices and productions of JFE Engineering.

■ Wastes at JFE Engineering Construction Sites

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Rubble	Amount generated	EN	t	113,637	78,100	159,309	141,888	119,708
	Recycle rate	EN	%	98.6	99.4	99.4	99.9	97.8
	Landfill amount	EN	t	1,533	484	940	173	2,632
Sludge	Amount generated	EN	t	17,225	12,399	24,350	14,806	9,679
	Recycle rate	EN	%	98.8	98.9	96.9	99.0	99.3
	Landfill amount	EN	t	205	135	683	130	56
Industrial waste excluding rubble and sludge	Amount generated	EN	t	13,788	6,678	6,583	6,054	4,771
	Recycle rate	EN	%	85.0	85.4	81.6	84.4	87.1
	Landfill amount	EN	t	1,923	868	1,083	858	566

■ Paper Consumption at JFE Shoji

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Consumption of copier papers	SH	boxes	4,675	3,021	3,033	2,860	2,934
	Tokyo	boxes	2,516	1,333	1,471	1,376	1,396
	Osaka	boxes	399	310	337	351	391
	Nagoya	boxes	293	157	154	177	162
	Branch	boxes	1,467	1,221	1,071	956	985

Water Use

■ Water Withdrawal and Discharge

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Amount of water accepted*1	All	million t	242	237	246	240	226
	ST Gr	million t	241	236	245	239	224
	ST	million t	221	215	226	220	208
	ST subsidiaries	million t	19.8	20.9	18.7	18.2	16.1
	EN Gr	million t	1.410	1.296	1.141	1.35	1.24
	EN	million t	0.106	0.072	0.063	0.064	0.073
	EN subsidiaries	million t	1.304	1.223	1.078	1.28	1.17
	SH Gr	million t	0.149	0.160	0.154	0.154	0.145
	SH	million t	—	—	—	—	—
	SH subsidiaries	million t	0.149	0.160	0.154	0.154	0.145
Amount of water released*2	ST Gr	million t	143	141	144	143	139
	ST	million t	126	123	128	128	125
	ST subsidiaries	million t	17.0	18.3	15.6	15.4	13.9
	EN	million t	0.126	0.157	0.132	0.122	0.122
Amount of water consumption*2	ST Gr	million t	3,616	3,331	3,442	3,475	3,242
	ST	million t	3,323	3,066	3,207	3,242	3,035
	ST subsidiaries	million t	293	265	235	233	207
Amount evaporated	ST	million t	95	92	98	92	83
Ratio of amount released and evaporated	ST	%	6.6	7.0	7.0	6.8	6.9
Amount recycled*2	ST Gr	million t	3,375	3,096	3,197	3,237*4	3,017
	ST	million t	3,102	2,851	2,981	3,022*4	2,826
	ST subsidiaries	million t	273	245	216	215	191
Recycling rate*2*3	ST	%	93.4	93.0	93.0	93.2	93.1
	ST subsidiaries	%	93	92	92	92	92

*1 Coverage:
- JFE Steel and 22 consolidated subsidiaries in Japan.
- JFE Engineering and 6 consolidated subsidiaries in Japan.
- 33 JFE Shoji domestic and overseas consolidated subsidiaries.

*2 Data cover JFE Steel and 22 JFE Steel consolidated subsidiaries in Japan.

*3 Industrial water circulated (%) = (Total amount – industrial water accepted)/total amount used × 100

*4 Revised the prior year data to increase accuracy.

■ Breakdown of Water Intake and Discharge Areas

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Total amount accepted	All*	million t	221.0	214.8	226.1	220.4	208.4
River/lake		million t	0	0	0	0	0
Groundwater		million t	0	0	0	0	0
Industrial water/waterworks		million t	221.0	214.8	226.1	220.4	208.4
Ocean		million t	0	0	0	0	0
Rainwater		million t	0	0	0	0	0
Other intake source		million t	0	0	0	0	0
Total amount released	All*	million t	126.8	123.6	128.8	128.5	125.8
Ocean		million t	126.3	123.1	128.3	128.1	125.4
Surface water		million t	0	0	0	0	0
Underground/well		million t	0	0	0	0	0
Off-site water processing		million t	0.4502	0.4796	0.4709	0.4300	0.4158
Beneficial use/other use		million t	0	0	0	0	0
Other discharge source		million t	0	0	0	0	0

* Data cover JFE Steel and JFE Engineering.

Water Use (Supplementary Data)

■ Amount of Water Accepted and Released at JFE Steel Group Subsidiaries (FY2023)

Company name	Amount accepted (unit: thousand tonnes)	Amount released (unit: thousand tonnes)
JFE Mineral & Alloy Company, Ltd.	5,566	5,530
CHIBA RIVERMENT AND CEMENT CORP.	12	12
MIZUSHIMA RIVERMENT CORP.	10	10
JFE PRECISION CORPORATION	140	140
JFE Plastic Resource Corporation	21	21
JFE Bars & Shapes Corporation	4,583	2,808
JFE Metal Products & Engineering Inc.	150	147
JFE KENZAI FENCE CO., LTD.	21	21
JFE Galvanizing & Coating Co., Ltd.	525	525
JFE Container Co., Ltd.	251	251
JFE Welded Pipe Manufacturing Co., Ltd.	38	38
JFE Steel Pipe Co., Ltd.	2	2
Galvatex Corporation	528	528
JFE Techno-wire Corporation	108	108

Company name	Amount accepted (unit: thousand tonnes)	Amount released (unit: thousand tonnes)
JFE Kozai Corporation	13	13
GECOSS CORPORATION	66	66
JFE LOGISTICS CORPORATION	106	106
J-Logitec Co., Ltd.	3	3
JFE Chemical Corp.	3,432	3,073
K-PLASHEET CORPORATION	34	29
JFE LIFE CORPORATION	502	489
Total	16,108	13,919

■ Amount of Water Accepted at JFE Engineering Group Subsidiaries (FY2023)

Company name	Amount accepted (unit: thousand tonnes)
J&T Recycling Corporation	1,170
NORTHERN JAPAN MACHINERY Corporation	0.006
TOHOKU DOCK TEKKO CO., LTD.	0.02
Fujikako, Inc.	0.02
Total	1,170

* Water intake data of J Farm Corporation has been included in the data of JFE Engineering Corporation from the FY2023 results.
* Water intake data of JFE Environmental Service Corporation has been included in the data of J&T Recycling Corporation from the FY2023 results.

Environmental Management

■ Environmental Management System

Items		Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
% covered by ISO 14001 certification	Base	All	%	58	58	54	52	52
		ST Gr	%	21	21	18	44	44
		EN Gr	%	9	9	8	44	43
		SH Gr	%	28	28	27	64	64
	Employee	All	%	74	70	68	67	72
		ST Gr	%	75	74	72	70	72
		EN Gr	%	60	51	50	50	47
		SH Gr	%	92	89	83	81	80
Environmental audit (number of sites)		ST Gr	sites	32	24	29	28	27
		EN Gr	sites	48	28	52	50	52
Environmental education conducted (total participants)		EN Gr	people	1,063	731	1,131	889	897

■ Environmental Accounting

Breakdown of environmental protection cost		FY2022		FY2023	
		Investment (billion yen)	Cost (billion yen)	Investment (billion yen)	Cost (billion yen)
Management	Impact monitoring and measurement, and EMS expenses and education	14	27	12	24
Global warming countermeasures	Saving and efficiently using energy	55	359	195	365
	Recycling industrial water	32	216	49	257
Conservation of natural resources	Recycling and waste management of internally generated materials, etc.	14	62	0	57
Environmental protection	Air pollution countermeasures	159	312	69	307
	Water pollution countermeasures	43	107	18	115
	Prevention of soil contamination, noise, vibration, and subsidence	0	5	0	5
Other	Charges, etc.	—	14	—	14
R&D	Technologies for protecting the environment, saving energy, and preventing global warming	10	105	10	94
Societal activities	Support for nature preservation and forestation, information disclosure, exhibitions, and public relations	—	7	—	7
Total		327	1,215	352	1,244

Note: Data cover all investment activities of JFE Steel Corporation and R&D activities of JFE Engineering Corporation.

■ Environmental Accounting (Accumulated)

Items	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Energy-saving investment (accumulated)	All	billion yen	5,321	5,465	5,654	5,708	5,903
Environmental protection investment (accumulated)	All	billion yen	7,276	7,421	7,709	7,971	8,119

Social Data

Provide Quality Products and Enhance Customer Satisfaction

■ Customer Training (FY2023)

Training type	Scope	Unit	Participants
Technical presentation by overseas Group companies (number of participating companies*1)	JFE Shoji	People (companies)	93(15)
National staff training (NS training*2)	JFE Shoji	People (companies)	23

*1 Participants from nine countries, with training conducted online (face-to-face session planned for 2024).
*2 Participants from 12 countries (Thailand, Vietnam, India, Malaysia, Mexico, Indonesia, Philippines, South Korea, Taiwan, Canada, U.S.A., Germany).

Human Capital

■ Lost-Work Injuries and Accidents

Items		Scope*1	Unit	2019	2020	2021	2022	2023
Lost-work Injuries and Severity (Rates)	Lost-work injuries*2	JFE Steel	—	0.28	0.23	0.10	0.18	0.06
	Severity*3		—	0.30	0.08	0.08	0.08	0.00
	Lost-work injuries*2	JFE Engineering	—	0.45	0.35	0.56	0.26	0.28
	Severity*3		—	0.62	0.01	0.40	0.01	0.42
	Lost-work injuries*2	JFE Shoji Group	—	1.00	0.76	0.60	0.25	0.12
	Severity*3		—	0.02	0.04	0.05	0.02	0.03
	Lost-work injuries*2	Manufacturing industry average	—	1.20	1.21	1.31	1.25	1.29
	Severity*3		—	0.10	0.07	0.06	0.08	0.08
Number of lost-work injuries	Lost-work injuries	JFE Group	Cases	49	36	26	25	12
	Fatal injuries		Cases	6	1	2	1	1
	Lost-work injuries	JFE Steel	Cases	30	23	10	18	6
	Fatal injuries		Cases	4	1	1	1	0
	Lost-work injuries	JFE Engineering	Cases	11	7	11	5	5
	Fatal injuries		Cases	2	0	1	0	1
	Lost-work injuries	JFE Shoji Group	Cases	8	6	5	2	1
	Fatal injuries		Cases	0	0	0	0	0

Items		Scope*1	Unit	2019	2020	2021	2022	2023
Lost-work injuries involving employees	Lost-work injuries	JFE Group	Cases	18	15	10	13	6
	Fatal injuries		Cases	1	0	0	1	0
	Lost-work injuries	JFE Steel	Cases	10	9	5	11	4
	Fatal injuries		Cases	1	0	0	1	0
	Lost-work injuries	JFE Engineering	Cases	2	2	1	0	1
	Fatal injuries		Cases	0	0	0	0	0
	Lost-work injuries	JFE Shoji Group	Cases	6	4	4	2	1
	Fatal injuries		Cases	0	0	0	0	0
Lost-work injuries involving employees of contractors	Lost-work injuries	JFE Group	Cases	31	21	16	12	6
	Fatal injuries		Cases	5	1	2	0	1
	Lost-work injuries	JFE Steel	Cases	20	14	5	7	2
	Fatal injuries		Cases	3	1	1	0	0
	Lost-work injuries	JFE Engineering	Cases	9	5	10	5	4
	Fatal injuries		Cases	2	0	1	0	1
	Lost-work injuries	JFE Shoji Group	Cases	2	2	1	0	0
	Fatal injuries		Cases	0	0	0	0	0

*1 Scope of data:
- JFE Steel and JFE Engineering: parent company, business associates and contractors in Japan
- JFE Shoji : parent and consolidated subsidiaries, business associates and contractors in Japan

*2 Lost-work injuries (rate) = number of employees with lost-work injuries/total working hours × 1,000,000

*3 Severity = number of lost working days/total working hours × 1,000

■ Health and Safety Training (FY2023)

Items	Unit	Participants*
Training for managers and supervisors	People	400
Mental healthcare education for new hires and at rank-based training	People	1,600

* Total of 3 operating companies.

■ Occupational Health and Safety

Item	Scope	Unit	FY2021	FY2022	FY2023
Ratio of ISO 45001-certified sites	JFE Steel	%	33	100	100

■ Health

Item	Scope	Unit	FY2019	FY2020	FY2021	FY2022	FY2023
Provision rate of health guidance*1	JFE Steel	%	64.2	53.0	72.2	71.1	—
	JFE Engineering	%	39.6	39.1	39.4*3	42.7	—
	JFE Shoji	%	36.0	41.6	52.1*3	35.0	—
Smoking rates	JFE Steel*2	%	31.8	29.0	27.3	26.6	25.8
	JFE Engineering	%	26.4	23.3	22.9	22.3	21.8
	JFE Shoji	%	24.9	24.9	21.5	21.9	20.6
Metabolic syndrome rates	Insured by the JFE Group's health insurance union (age 40 and above)	%	35.6	36.5	36.3	36.0	36.3
Rate of health examination for dependents	Age 40 and above	%	51.5	46.3	51.3	52.3*3	53.8

*1 Figures for FY2023 will be added once they are finalized.
*2 Smoking rate for JFE Steel is managed based on calendar year.
*3 Revised the prior year data to increase accuracy.

■ Health and Safety Training (FY2023*1)

Category	Consolidated/ non-Consolidated	Unit	JFE Steel	JFE Engineering	JFE Shoji
Employees	Consolidated*2	people	43,081	10,466	8,618
Male		people	37,419	9,019	4,970
Female		people	5,662	1,447	2,194
Management positions*3		people	11,596	3,616	1,712
Male		people	10,712	3,373	1,363
Female		people	884	243	216
Ratio of women in management positions		%	7.6	6.7	13.7
Employees	Non-consolidated	people	14,599	3,646	1,051
Male		people	13,351	3,094	618
Female		people	1,248	552	433
Management positions (manager or higher)*3		people	1,659	1,685	617
Male		people	1,625	1,627	555
Female		people	34	58	62
Ratio of women in management positions		%	2.0	3.4	10.0
Recruits		people	455	162	66
Male		people	392	131	40
Female		people	63	31	26
New graduates		people	328	91	43
Mid-career professionals		people	127	71	23
Years of continuous employment (average)		year	17.1	15.8	12.9
Male		year	16.8	15.8	12.8
Female		year	20.3	15.4	12.9
Job turnover rate*4 (total2.7%)		%	2.6	3.0	2.8
Elderly employees*5		people	862	50	26
Ratio of elderly employees*5		%	5.9	1.4	2.5
Average annual leave taken		day/year	18.4	19.4	16.1
Average overtime		hours/ month	24.9	26.0	30.2
Employees working shorter hours for childcare (aggregated)		people	82	70	67
Ratio of male employees taking childcare leave*6		%	91	94	93
Wage gap between men and women*7 (all workers)		%	79.5	65.1	66.2
Full-time employees		%	80.0	65.1	66.4
Part-time workers and fixed-term employees		%	71.1	57.8	58.1
Temporary staffs		people	146	670	27

*1 Personnel composition (excluding managers and temporary staff) is as of March 31, 2024. Number of managers and temporary staff is as of April 1, 2024, and other personnel as of FY2023.
*2 Scope of data: Operating companies and other consolidated subsidiaries, JFE Steel: 133, JFE Engineering: 81, and JFE Shoji: 88. JFE Shoji's America region is excluded from the gender breakdown since no survey has been conducted on the number of employees and managers by gender.
*3 Management positions at JFE Shoji include employees on loan.
*4 Percentage of employees who voluntarily choose to resign from the organization.
*5 Figures for JFE Steel and JFE Engineering include active employees who are age 60 and above (the companies' mandatory retirement age has been raised to 65).
*6 Rate of male employees taking childcare leave or time off related to child rearing = (Number of male employees who took childcare leave + Number of male employees who used the childcare leave program for pre-elementary school children) / Number of male employees whose spouses have given birth.
*7 Calculated in accordance with the provisions of the Act on the Promotion of Women's Active Engagement in Professional Life.

■ Recruiting for New Graduates (FY2024) and Mid-Career Professionals (FY2023) (Three Operating Companies, Excluding their Subsidiaries)

Items	Unit	Career-track Positions			On-site positions at steelworks	Total
		White-collar	Technical	Total		
Male	people	117	227	344	219	563
Female	people	71	33	104	16	120
Total	people	188	260	448	235	683
Ratio of women	%	37.8	12.7	23.2	6.8	17.6

■ Employment of People with Disabilities (as of June 1 of each year)

Items	Scope	Unit	2019	2020	2021	2022	2023
Employment of People with Disabilities	JFE Steel	%	2.48	2.51	2.51	2.57	2.52
	JFE Engineering	%	2.23	2.37	2.53	2.58	2.83
	JFE Shoji	%	2.50	2.39	2.39	2.66	2.74

■ Human Resource Development

Items	Scope	Unit	2022	2023
Training hours per employee	JFE Steel	Hours per year	45.2	44.9
	JFE Engineering	Hours per year	20.9	23.4
	JFE Shoji	Hours per year	20.1	22.1
DX human resource development (accumulated)	JFE Steel	Persons	—	610
	JFE Engineering	Persons	—	179

Community

■ Social Contributions (FY2023)

Activities		Scope		Unit	Achievements
Internships		JFE Group		People	1,707
			JFE Steel	People	659
			JFE Engineering	People	688
			JFE Shoji	People	360
Supporting elementary schools in Ghana and Nigeria	Desks and chairs	JFE Shoji		Sets	435
	Notebooks			Books	17,000
	Canned foods			Cans	12,500

■ JFE 21st Century Foundation (FY2023)

Grants		Projects	Value (million yen)
Technology research (accumulated)		738	148,380
Technology research for FY2023	Iron and steel technology research	13	2,600
	Global environment and global warming prevention technology research	15	3,000
Asian history studies (accumulated)		174	26,100
Asian history studies for FY2023		12	1,800

Activities	Sets donated
Supporting the Japan Overseas Educational Services Writing Contest and anthology donation (to elementary and middle schools and also public libraries in the regions related to steel*)	2,200

* Donated to 650 elementary schools and middle schools, 70 libraries, etc.

Governance Data

Corporate Governance

■ Corporate Governance System

As of July 1, 2024

Items		Overview of the system
Organizational design type		Company with an Audit and Supervisory Board
Number of Directors (members)		8
	The number of Independent Outside Directors (members)	3
	The number of female Directors (member)	1
Number of Audit & Supervisory Board Members (members)		5
	The number of Independent Outside Audit & Supervisory Board Members (members)	3
	The number of female Audit & Supervisory Board Members (members)	1
Term for Directors (years)		1
Term for Outside Directors (years)		1
Corporate Officer System		Adopted
Voluntary advisory committees of the Board of Directors		Nomination Committee and Remuneration Committee

■ Directors and Audit & Supervisory Board Members

As of July 1, 2024

Position		Name	Significant concurrent post	Independent executive	Number of meetings of the Board of Directors attended in FY2023	Number of meetings of the Audit & Supervisory Board attended in FY2023
Director	Inside	Yoshihisa Kitano	Chairman of the Board of Directors of JFE 21st Century Foundation (Public Interest Incorporated Foundation)	—	16/16 (100%)	—
		Masayuki Hirose	Representative Director, President and CEO of JFE Steel Corporation	—	—	—
		Masashi Terahata	Director of JFE Steel Corporation, Representative Director of JFE 21st Century Foundation (Public Interest Incorporated Foundation)	—	16/16 (100%)	—
		Toshinori Kobayashi	Representative Director, President and CEO of JFE Shoji Corporation	—	13/16 (81%)	—
		Kazuyoshi Fukuda	Representative Director, President and CEO of JFE Engineering Corporation	—	—	—
	Outside	Masami Yamamoto	—	○	16/16 (100%)	—
		Yoshiko Ando	Outside Director of Kirin Holding Company, Limited Outside Director of Sansei Technologies, Inc.	○	16/16 (100%)	—
		Keiichi Kobayashi	Chairman of the Board, Furukawa Electric Co., Ltd. Outside Director, NTT DATA Group Corporation	○	—	—
Audit & Supervisory Board Member	Inside	Nobuya Hara	Audit & Supervisory Board Member of JFE Steel Corporation	—	16/16 (100%)	19/19 (100%)
		Nakaba Akimoto	Audit & Supervisory Board Member of JFE Engineering Corporation Audit & Supervisory Board Member of JFE Shoji Corporation	—	16/16 (100%)	19/19 (100%)
	Outside	Isao Saiki	Partner Lawyer of Abe, Ikubo & Katayama Law Firm	○	16/16 (100%)	19/19 (100%)
		Tsuyoshi Numagami	Professor, Institute for Business and Finance, Waseda University Outside Director of Tokyo Century Corporation Outside Director of EBARA Corporation	○	16/16 (100%)	19/19 (100%)
		Takuya Shimamura	Director and Chairman of AGC Inc. Outside Director of EBARA Corporation	○	16/16 (100%)	19/19 (100%)

*Mr. Masayuki Hirose, Mr. Kazuyoshi Fukuda, and Mr. Keiichi Kobayashi were elected for the first time as Directors at the previous year's Ordinary General Meeting of Shareholders, on June 25, 2024.

■ Nomination Committee and Remuneration Committee

As of July 1, 2024

Items		Members	Chairperson	Number of meetings held during FY2023
Nomination Committee		6	Masami Yamamoto (Outside Director)	6
	Inside Director	2		
	Outside Director	2		
	Outside Audit & Supervisory Board Member	2		
Remuneration Committee		6	Keiichi Kobayashi (Outside Director)	3
	Inside Director	2		
	Outside Director	2		
	Outside Audit & Supervisory Board Member	2		

■ Operating System

Committee	Company	Chairperson	Attendees
Group Management Strategy Committee	JFE Holdings	President	Inside Directors (including 3 operating company Presidents), Corporate Officers and full-time Audit & Supervisory Board Members
Management Committee	JFE Holdings	President	Inside Directors (excluding 3 operating company Presidents), Corporate Officers and full-time Audit & Supervisory Board Members
	Each operating company	President	Directors, major Corporate Officers and Audit & Supervisory Board Members

■ Executive Remuneration

FY2023

Executive remuneration						
Position Type	Total remuneration, etc. (million yen)	Total amount by remuneration type (million yen)*1				Number of Executives (members)
		Basic remuneration	Bonus	Stock remuneration*2		
				Linked to performance	Linked to service length	
Directors (excluding Outside Directors)	320.247	217.415	61.840	27.328	13.664	5
Audit & Supervisory Board Members (excluding Outside Audit & Supervisory Board Members)*1	78.335	78.335	—	—	—	2
Outside Directors/ Audit & Supervisory Board Members	106.697	106.697	—	—	—	6

*1 Directors' (excluding outside directors) performance-linked remuneration is composed of bonus and stock remuneration. Total amount of performance-linked remuneration for the current fiscal year is 89.168 million yen.

*2 Only directors (excluding outside directors) are included in the scope of the above-mentioned stock remuneration, and the entire amount is non-monetary remuneration. Total amount of stock remuneration expensed for the current fiscal year as non-monetary remuneration is 40.992 million yen.

Officers whose consolidated remuneration exceeded 100 million yen								
Name	Position	Company	Total (consolidated basis) (million yen)	Per company (consolidated basis) (million yen)	Total amount by remuneration type (million yen)			
					Basic remuneration	Bonus	Stock remuneration	
							Linked to performance	Linked to service length
Yoshihisa Kitano	Director	JFE Holdings	185.813	12.000	12.000	—	—	—
	Director	JFE Steel		173.813	108.043	36.490	19.520	9.760
Masashi Terahata	Director	JFE Holdings	102.979	102.979	68.567	22.700	7.808	3.904
Koji Kakigi	Director	JFE Holdings	188.467	188.467	120.047	39.140	19.520	9.760
Hajime Oshita	Director	JFE Holdings	103.244	8.400	8.400	—	—	—
	Director	JFE Engineering		94.844	60.764	19.440	9.760	4.880
Toshinori Kobayashi	Director	JFE Holdings	106.750	8.400	8.400	—	—	—
	Director	JFE Shoji		98.350	55.800	27.910	9.760	4.880

Ratio of remuneration for each		
Basic remuneration: fixed (%)	Annual bonus: linked to short-term performance (%)	Stock remuneration: linked to medium- to long-term performance (%)
60	20	20

Note: The ratios above are applicable only when the company's president has attained the performance target goals.

■ Internal Control System

As of April 1, 2024

Internal control system			
Items		Number of companies (companies)	Number of people assigned (members)
Internal audit	Internal audit organization	60	168
Audit & Supervisory Board	Full-time Audit & Supervisory Board Members	29	34
	Dispatched Audit & Supervisory Board Members (part-time Audit & Supervisory Board member)	25	7
Cooperation of Audit & Supervisory Board members			
Items		Number of meeting held during FY2023	
Accounting auditor		10	
Internal Audit Department		8	

Compliance

■ Whistleblowing

Items	Scope	Unit	FY2021	FY2022	FY2023
Cases handled by the Corporate Ethics Hotline	JFE Holdings and operating companies	Cases	133	127	134

Independent Assurance Statement

SUSA
Sustainability Accounting Co.,Ltd.

Independent Assurance Statement

September 24, 2024

Mr. Yoshihisa Kitano
Representative Director, President and CEO of JFE Holdings, Inc.

1. Purpose

We, Sustainability Accounting Co., Ltd., have been engaged by JFE Holdings, Inc., ("the Company") to provide limited assurance on Company's following data during the fiscal year 2023, that were 47.4 million t-CO_2 of CO_2 emissions for Scope1, 7.3 million t-CO_2 of CO_2 emissions for Scope2 and 22.7 million t-CO_2e of CO_2 emissions for Scope3 (categories 1, 2, 3, 4, 5, 6, 7, 15), 612 PJ of energy consumption, 226 million tonnes of water accepted, 10.1 million tonnes of co-products emissions of JFE Steel Group, and 0.19 million tonnes of wastes emissions of JFE Engineering Corporation (collectively, "the Environmental performance indicators"). The purpose of this process is to express our conclusion on whether the Environmental performance indicators were calculated in accordance with the Company's standards. The Company's management is responsible for calculating the Environmental performance indicators. Our responsibility is to independently carry out a limited assurance engagement and to express our assurance conclusion.

2. Procedures Performed

We conducted our assurance engagement in accordance with International Standard on Assurance Engagement 3000 (ISAE 3000) and International Standard on Assurance Engagement 3410 (ISAE 3410). The key procedures we carried out included:

- Interviewing the Company's responsible personnel to understand the Company's standards and reviewing the Company's standards
- Performing cross-checks on a sample basis and performing a recalculation to determine whether the Environmental performance indicators were calculated in accordance with the Company's standards

3. Conclusion

Based on the procedures performed, nothing has come to our attention that causes us to believe that the Environmental performance indicators have not been calculated in all material respects in accordance with the Company's standards.

We have no conflict of interest relationships with the Company.

Takashi Fukushima
Representative Director
Sustainability Accounting Co., Ltd.
2-4, Kojimachi, Chiyoda-ku,
Tokyo, Japan

External ESG Evaluations

JFE Holdings is highly regarded by ESG evaluation organizations in Japan and overseas. Particularly notable, it is a constituent of all the Japanese equity ESG indexes selected by the Government Pension Investment Fund (GPIF), the world's largest pension fund.

FTSE Blossom Japan Index (Invested in by the GPIF)

JFE Holdings has been selected as a constituent of the FTSE Blossom Japan Sector Relative Index, an investment index provided by FTSE Russell. The index selects companies that demonstrate strong environmental, social, and governance (ESG) practices and is used in the creation or assessment of sustainable investment funds and other financial products.

FTSE Blossom Japan

FTSE Blossom Japan Sector Relative Index (Invested in by the GPIF)

JFE Holdings is a constituent of the FTSE Blossom Japan Sector Relative Index, an investment index provided by FTSE Russell. It refers to the ESG assessment made by FTSE Russell as a base and reflects management practices toward climate change risks and opportunities for some constituents that have high carbon intensity (GHG emissions per unit of revenue).

FTSE Blossom Japan Sector Relative Index

MSCI Nihonkabu ESG Select Leaders Index (Invested in by the GPIF)

JFE Holdings has been selected for two consecutive years as a constituent of the MSCI Nihonkabu ESG Select Leaders Index, an investment index provided by MSCI Inc. The index is based on MSCI's ESG research, which is used by over 1,000 companies around the world. This comprehensive ESG index reflects ESG risks to the market portfolio and is comprised of constituents with relatively high ESG evaluation within the industry.

2024 CONSTITUENT MSCI JAPAN EMPOWERING WOMEN INDEX (WIN)

* The inclusion of JFE Holdings, Inc. in any MSCI index, and the use of MSCI logos, trademarks, service marks or index names herein, do not constitute a sponsorship, endorsement or promotion of JFE Holdings, Inc. by MSCI or any of its affiliates. The MSCI indexes are the exclusive property of MSCI. MSCI and the MSCI index names and logos are trademarks or service marks of MSCI or its affiliates.

MSCI Japan Empowering Women Index (WIN) (Invested in by the GPIF)

JFE Holdings has been selected as a constituent of the MSCI Japan Empowering Women Index (WIN), an investment index provided by MSCI Inc. The index is constructed by multidimensionally calculating a gender diversity score of a constituent of the MSCI Japan IMI top 700 index and selecting companies from each industry that achieved high scores.

2024 CONSTITUENT MSCI NIHONKABU ESG SELECT LEADERS INDEX

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S&P/JPX Carbon Efficient Index (Invested in by the GPIF)

JFE Holdings has been selected as a constituent of the S&P/JPX Carbon Efficient Index, jointly developed by S&P Dow Jones Indices and the Japan Exchange Group. The weighting of constituents in the index is determined by the status of corporate disclosure for environmental information and the level of carbon efficiency, or carbon emissions per unit of revenue.

Morningstar Japan ex-REIT Gender Diversity Tilt Index (Invested in by the GPIF)

JFE Holdings is a constituent of the Morningstar Japan ex-REIT Gender Diversity Tilt Index provided by Morningstar, Inc. This index is based on the data and evaluation methods of Equileap and is designed to facilitate investment prioritizing companies that have established gender diversity policies embedded in their corporate culture and companies committed to providing equal opportunities for employees regardless of gender.

FTSE4Good Index Series

JFE Holdings has been selected as a constituent of the FTSE4Good Index Series, an investment index provided by FTSE Russell. This comprehensive ESG index in general applies the same ESG assessment scheme as that used for the FTSE Blossom Japan Index. Constituents have high absolute ESG ratings and are screened from major stocks around the world.

MSCI ESG Leaders Indexes

JFE Holdings has been selected as a constituent of the MSCI ESG Leaders Indexes, an investment index provided by MSCI Inc.. The index is formed of major stocks around the world with high ESG evaluations within their industry, selected based on MSCI's ESG research.

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Evaluation Based on CDP 2023

Established in Britain in 2000, the Carbon Disclosure Project (CDP) is a nongovernmental organization that conducts ESG evaluations. It calls on companies to disclose ESG-related information by responding to CDP questionnaires to facilitate the ESG investment decisions of institutional investors. Currently, the CDP covers three environmental areas: climate change, water security, and forests, and companies are rated on an eight-point scale (from A to D-) for each area. The volume of information collected by the CDP has become one of the largest in the world, with currently over 1,985 companies in Japan responding to the questionnaires, which are widely used in various indexes by institutional investors and for socially responsible investment.

The JFE Group actively participates in CDP initiatives as a member of the CDP Reporter Service and responds to climate change and water security questionnaires every year. Our high rating reflects our complete disclosure of appropriate information for the CDP 2023 questionnaire.

CDP 2023 score: climate change: A-, water security: A-, supplier engagement: A-

White 500 Organization under the 2024 Certified Health and Productivity Management Outstanding Organizations Recognition Program

JFE Holdings, JFE Steel, and JFE Engineering were each recognized as a White 500 organization, which constitutes the top 500 companies selected under the 2024 Certified Health and Productivity Management Outstanding Organizations Recognition Program. Sponsored by Japan's Ministry of Economy, Trade and Industry and Nippon Kenko Kaigi, the program recognizes organizations that practice excellent health management, including large enterprises and small and medium-sized companies.

The JFE Group seeks to create safe, attractive environments where everyone can enjoy working and aggressively promotes the establishment of settings in which personnel with diverse backgrounds can demonstrate their full potential. To that end, we established the JFE Group Health Declaration and collaborate with our health insurance union and industrial health staff to maintain and strengthen employee health. For example, the Group implements effective, ongoing efforts to improve employee lifestyle habits, such as instilling exercise routines, alleviating sleep-deprivation risks, and reducing smoking rates, based on an analysis of employee health risks. These efforts have been highly regarded and led to this certification.

This is the third time in two years that JFE Holdings and JFE Steel have been recognized as White 500 companies. Meanwhile, JFE Engineering has been recognized as a White 500 company for four consecutive years, making it six times overall.

SOMPO Sustainability Index

JFE Holdings has been selected for 13 consecutive years as a constituent of the SOMPO Sustainability Index (former: SNAM Sustainability Index), which was launched by Sompo Asset Management Co., Ltd. The index, which comprises companies with highly regarded ESG ratings, contributes to investor asset formation by evaluating corporate value from a long-term perspective.

DBJ Employees' Health Management Rated Loan Program

The DBJ Employees' Health Management Rated Loan Program is the world's first financing menu that bases loan conditions on DBJ's proprietary system for rating health management for the purpose of selecting and evaluating companies based on their performance in this area.

JFE Holdings' efforts in pursuing employee health management has been highly regarded, and it is rated as a top-ranking company under the program.

DBJ Environmentally Rated Loan Program

The Development Bank of Japan (DBJ) Environmentally Rated Loan Program uses a screening (rating) system developed by DBJ to evaluate environmental management and then assign a corresponding interest rate from three levels. This was the world's first loan program to incorporate environmental ratings in its financing menus. In March 2016, JFE Holdings was rated as a top-ranking company that pursues excellent and advanced environmental initiatives resulting in outstanding environmental-management performance, based on which the company secured a loan under the program.

External Evaluations of Non-ESG Areas

DX Stock 2024

JFE Holdings was selected as a DX Stock 2024 under the Digital Transformation Stock Selection (DX Stock) program, selected by Japan's Ministry of Economy, Trade and Industry, the Tokyo Stock Exchange, and the Information-technology Promotion Agency.

The JFE Group has accumulated through its businesses vast amounts of operational data, know-how, and technology over many years, representing valuable assets that are difficult for other companies to replicate. These assets drive value creation for the JFE Group, enabling it to support society with world-class technologies. In the latest selection, we have been recognized for our pursuit of advanced initiatives, including leveraging these assets for a solutions business, the scheduled migration of the entire core system of our steel mills to a cloud environment ahead of other manufacturers, and developing a plant operation support service in our engineering business that utilizes next-generation remote monitoring stations in Japan and overseas. Additionally, we are focused on nurturing DX personnel through organizational structure improvements and awareness-building initiatives.

The JFE Group positions DX as a key management strategy and will continue to provide new added value by taking on the challenges of innovating existing businesses and creating new ones, in addition to achieving groundbreaking improvements in productivity. At the same time, we will strive to realize sustainable growth and enhance corporate value over the medium to long term based on the Group's corporate vision of contributing to society with the world's most innovative technology.

External Awards

Bronze Award, Environmentally Sustainable Company Category, the 5th ESG Finance Awards Japan

JFE Holdings received the Bronze Award in the 5th ESG Finance Awards Japan's Environmentally Sustainable Companies Category, presented by the Japanese Ministry of Environment.

ESG Finance Awards Japan was founded to disseminate and expand ESG finance by commending and widely sharing the initiatives of institutional investors, financial institutions, intermediaries, and companies that have made an outstanding impact by proactively engaging in ESG finance as well as environmental and social projects. JFE Holdings received a special recognition at the second ESG Finance Awards Japan in FY2020 and was selected as an Environmentally Sustainable Company* at the third and fourth awards in FY2021 and FY2022. This is the first time the Company has received the Bronze Award while also being selected as an Environmentally Sustainable Company.

We believe the latest awards recognize JFE for its various initiatives and approach to dialogue, including its response to climate change. We will continue to deepen our initiatives and expand our information disclosure.

*The awards include the Environment Sustainable Category, which provides investors and companies with concrete examples of businesses that incorporate significant environmental opportunities and risks into their management strategies to enhance corporate value and develop positive environmental benefits while creating that value. Those selected under the category as Environmentally Sustainable Companies meet specific standards for information disclosure.

Please see the following for further details.

➤ JFE Group awarded the Bronze Award in the Environmentally Sustainable Company category in the 5th ESG Finance Awards Japan (Japanese only) (https://www.jfe-holdings.co.jp/release/2024/02/240220.html)

World Steel Association 2024 Steel Sustainability Champions

JFE Steel was selected as the 2024 Steel Sustainability Champion by the World Steel Association.

Once a year, the association commends member companies for demonstrating leadership in developing a sustainable steel industry and society and achieving outstanding results in enhancing sustainability.

The JFE Group has been developing innovative technologies to mitigate environmental impact and published the JFE Group Environmental Vision for 2050. We inform stakeholders about our sustainability policies and achievements across a range of areas, including environment, human rights, health and safety, through publications such as the JFE Group Sustainability Report.

These endeavors were recognized with the award for the fourth consecutive year. Looking ahead, we plan to continue contributing to achieve the Sustainable Development Goals (SDGs) by strengthening our sustainability management practices and working to help resolve environmental and other issues in society through business.

Please see the following for further details.

➤ JFE Steel Recognized as 2024 Steel Sustainability Champion (https://www.jfe-steel.co.jp/en/release/2024/04/240410.html)

External Awards for Research and Development

■ Awards for Technologies and Product Developments (FY2023)

	Prize/Award	Project	Sponsor
JFE Steel	Safety and Health Excellence Recognition 2023	Horizontal development to prevent similar accidents	World Steel Association
	FY2023 Minister of the Environment Award for Climate Change Action (Product Development and Commercialization Category (Mitigation))	Development of ultra-high pressure hydrogen storage compressor based on combined resin layers reinforced by steel and carbon fiber	Ministry of the Environment
	FY2024 National Commendation for Invention, Invention Award	Invention of highly weather-resistant steel that can be used near coastal areas without coating	Japan Institute of Invention and Innovation
	Nikkei Superior Products and Services Awards 2023, Grand Prize	Anti-fatigue-damage steel (AFD steel)	Nikkei Inc.
	70th (FY2023) Okochi Memorial Technology Prize	Automation of blast furnace operation based on a cyber physical system	Okochi Memorial Foundation
	32nd Grand Prize for the Global Environment Award	Project team for creating a seaweed bed and ecosystem using recycled materials at areas around Shinto, Iwakuni City (Koujiro Fisheries Cooperative, National Institute of Technology, Ube College, and JFE Steel)	Fujisankei Communications Group (Secretariat: The Sankei Shimbun)
JFE Engineering	25th JICE Technology Development Award	Simple reinforcement technology for pile-style piers	Japan Institute of Country-ology and Engineering Coastal Development Institute of Technology
J Bio Food Recycle Co., Ltd. (JFE Engineering Group company)	6th EcoPro Awards, Minister of Agriculture, Forestry and Fisheries Award	Food recycling system with a double-recycling loop, creating a regional circular and ecological sphere with electricity and fertilizer	Sustainable Management Promotion Organization
Myoko Green Energy Co., Ltd. (JFE Engineering Group company)	1st PPP/PFI Project Excellence Award, Award of Excellence	Transfer of Myoko City's gas business and comprehensive private consignment of water and sewage services	Cabinet Office

Minister of the Environment Award for Climate Change Action

National Invention Award

Nikkei Superior Products and Services Awards

Okochi Memorial Technology Prize

Grand Prize for the Global Environment Award

25th JICE Technology Development Award

6th EcoPro Awards, Minister of Agriculture, Forestry and Fisheries Award

1st PPP/PFI Project Excellence Award, Award of Excellence

Third-Party Comments

Yoshinao Kozuma

Emeritus Professor
Sophia University

1. Improvement in the Transparency of the Transition Plan

The JFE Group's strategy of achieving carbon neutrality by 2050 consists mainly of reducing CO_2 emissions at JFE Steel and for society as a whole by contributing to the reductions. It is being promoted through the respective efforts of each Group company and through collaborations as in the offshore wind power generation business. Since these activities are integrated with business strategies, they inevitably have a financial impact. Generally speaking, however, information disclosure on the financial aspects of such transition plans is extremely rare, and inconsistencies between climate information and financial statements have actually emerged as a social issue.

In this regard, the JFE Group's decision to disclose the financial impact of its climate-related risks and opportunities starting this fiscal year is highly commendable as a measure that will greatly improve the transparency of its transition plan. I hope the JFE Group will enhance it through the disclosure of impairment and the revised useful life of fixed assets associated with climate-related investments in its financial statements at the earliest opportunity.

2. Development in Policy Engagement Information

The disclosure of information on climate-related policy engagement is another area for which the public has expressed strong demand. Information on initiatives that comprise many of the components of JFE's policy engagement had already been disclosed in past sustainability reports. However, JFE has recognized these initiatives as its responsibility to engage with public policy and compiled them for disclosure as engagement activities, and this is a major point that deserves praise this fiscal year. A look at the current situation shows that the JFE Group is already having a significant impact on the direction of climate policy through its engagement with the Iron and Steel Federation, the business community, government, and overseas, and I expect the Group will remain committed to these initiatives going forward.

3. Reorganization of the Environment Section

On the environmental front, I was particularly impressed by reorganization of the information section. Information that was previously divided into "effective use of resources" and "prevention of pollution" in line with the technical categories of environmental management has been reorganized as information related to resource recycling under "Realizing a Recycling-Oriented Society," while water security and biodiversity are now categorized as information related to natural capital under "Preserving Biodiversity." These are not just changes in disclosure categories; they represent significant improvements that reflect a shift in the JFE Group's awareness of environmental management.

4. Future Challenges

Given JFE's top-priority goal of zero major accidents, the fact that fatal accidents continued to occur in FY2023 must be taken very seriously. Perhaps the situation requires verifying the effectiveness of safety measures that are being strengthened, including massive investments that are being made. As for the wage gap between men and women, JFE lags behind the OECD average, with some operating companies falling below the Japanese average. Further improvement are needed in this area, along with increasing the ratio of female managers.

Mariko Kawaguchi

Specially appointed professor of the Graduate School of Social Design Studies, Rikkyo University

Over the past eight years, I have had the opportunity to observe the intensifying of JFE Holdings' sustainability efforts. Its JFE Group Environmental Vision for 2050, released in 2019, was a particularly bold plan for a steel manufacturer that targeted achieving carbon neutrality by 2050, which had some skeptics doubting whether it was possible at the time. However, JFE has achieved a 17% reduction in FY2023, compared to its target of 18% for FY2024, confirming that the Group is definitely on course to attaining carbon neutrality by 2050. With regard to the Vision's first key strategy of reducing CO_2 emissions at JFE Steel, highly effective initiatives such as introducing electric-arc furnaces and starting the technological development for new experimental furnaces have been accelerated, raising the feasibility of a 30% reduction by 2030 and making the 2050 Road Map (P. 69) more persuasive. Similarly, in the second key strategy of expanding contributions to CO_2 emissions in society, the volume of reductions achieved in FY2023 was 11.53 million tonnes against the target of 12 million tonnes in FY2024, thus clearing the path to achieving the reduction target of 25 million tonnes by FY2030. The third key strategy of accelerating the offshore wind power generation business will test the Group's comprehensive strengths at all stages, including foundation, implementation, operation, and supply chain. JFE's proactive efforts should lead directly to increasing its corporate value. JFE also introduced its disaster prevention-related technologies such as tide embankments and slit dams as measures for adapting to climate change. From the perspective of developing Group-wide capabilities, I suggest that JFE devise a mechanism for incorporating comprehensive thinking into fieldwork, to constantly integrate its technologies with large-scale climate change mitigation measures such as offshore wind power generation.

Another aspect that caught my eye in this report was the disclosure of estimated figures for financial impact assessment in the TCFD scenario analysis. Disclosure of financial figures, even estimates, is an area of great interest to investors. Given the current lack of internationally standardized financial assessment methods, information disclosure ahead of other companies demonstrates management's strong commitment to combating climate change, and I encourage JFE to continue to lead Japanese companies in climate change mitigation. Furthermore, in light of this summer's heat wave, JFE may need to revise the 1.5°C and 4.0°C scenarios.

Looking ahead, I expect the same strong leadership in initiatives for a recycling-oriented society and biodiversity. Recycling-oriented initiatives are not limited to traditional onsite environmental actions such as in-house waste disposal and water resource management; they also encompass areas where the JFE Group can easily demonstrate its strengths, such as waste to-energy power generation and plastic recycling. A circular economy is not about in-house waste disposal, but about realizing a resource cycle that eliminates the concept of waste altogether. In particular, upcycling is an aggressive strategy for creating high value-added products and services from waste and byproducts, and I hope JFE's engineering technology will play an active role in this strategy.

With regard to biodiversity initiatives, the report suggests that the LEAP approach-based assessment had revealed a dependence and impact on natural resources during the mining of iron ore and coking coal. Fundamentally, mine development and mining are recognized as activities that not only generate serious environmental impacts but also pose significant risks for forced labor, forced displacement, and human rights violations affecting local populations. In some cases, they also pose business risks such as interruptions to mining activity. In the future, measures for biodiversity preservation are expected to become as stringent as those associated with climate change. I think the JFE Group will need to view its current social contribution activities such as biotopes as a starting point and formulate a strategy linked to its core business, from a perspective that includes its supply chain.

While climate change, resource recycling, and biodiversity represent different global environmental challenges, they are all attributable to the disruption of the harmonious circulation of the Earth's materials and energy. I believe that by keeping this idea in mind and strengthening interdepartmental coordination between those responsible for each area, you can accelerate the qualitative and quantitative development of your activities.

OHGISHIMA2050 is the perfect symbol of such an integration. The site is envisioned to include a new decarbonized energy supply center and recycling center, and I hope it will be developed into an integrated practice and testing ground for achieving carbon neutrality by 2050, implementing nature-positive initiatives and realizing a circular economy.

Executing the above activities will require creative ideas and communication skills to mobilize vertically structured organizations through flexible integration and networking; timely dissemination of information from the perspective of consumers, not suppliers; and DX skills to enhance execution. AI can never be the decisive factor for such an endeavor. The importance of human capital was emphasized in the Message from the CEO, and the key to attaining sustainability lies in our human capital policy—how we nurture human resources with the necessary talent, motivation, and practical skills while working with a sense of mission and joy.

Editorial Policy

Basic Approach

This report provides stakeholders with a comprehensive account of the JFE Group's sustainability-related initiatives and data and elicits feedback toward enhancing the Company's activities and information disclosure. The 2024 report was compiled with a focus on the following.

- Progress of the Seventh Medium-term Business Plan and FY2023 KPI Results and FY2024 KPIs
- Results of initiatives aimed at addressing climate change (reduction of CO_2 emissions, contribution to reducing CO_2 in society as a whole)
- Policy engagement for addressing climate change
- Results of TCFD-recommended scenario analysis
- Upgraded information on the development and pro-vision of eco-friendly processes and products
- Results of activities on diversity and inclusion, and future initiatives
- Results of human rights due diligence and future initiatives

Scope of Report

Reporting Period

FY2023 (April 1, 2023 to March 31, 2024)
Reports on some activities undertaken before or after this period are included.

Organization Covered

The report mainly covers the activities of JFE Holdings, Inc. and its three operating companies: JFE Steel Corporation, JFE Engineering Corporation, and JFE Shoji Corporation, but also includes reports on activities of other companies in the JFE Group (406 companies, of which 322 are consolidated subsidiaries and 84 are equity-method affiliates). Quantitative information on the environ-ment includes data from the following JFE Group operating companies.

JFE Steel

JFE Steel Group: JFE Steel Corporation and 26 domestic and overseas consolidated subsidiaries (total: 27 companies)

21 domestic companies:
JFE Mineral & Alloy Company, Ltd., CHIBA RIVERMENT AND CEMENT CORP., MIZUSHIMA RIVERMENT CORP., JFE Precision Corporation, JFE Plastic Resource Corporation, JFE Bars & Shapes Corporation, JFE Metal Products & Engineering Inc., JFE Galvanizing & Coating Co., Ltd., JFE Container Co., Ltd., JFE Welded Pipe Manufacturing Co., Ltd., JFE Steel Pipe Co., Ltd., Galvatex Corporation, JFE Techno-wire Corporation, JFE Kozai Corporation, JFE LOGISTICS CORPORATION, JFE Chemical Corporation, JFE LIFE CORPORATION, GECOSS CORPORATION, JFE KENZAI FENCE CO., LTD., J-Logitec Co., Ltd., K-plasheet Corporation

5 overseas companies:
Nova Era Silicon S.A., JFE Steel Galvanizing (Thailand) Ltd., Thai Coated Steel Sheet Co., Ltd., Philippine Sinter Corporation, PT. JFE STEEL GALVANIZING INDONESIA

JFE Engineering

JFE Engineering Group: JFE Engineering Corporation and 15 domestic and overseas consolidated subsidiaries (total: 16 companies)

13 domestic companies:
J&T Recycling Corporation, JFE Environmental Service Corporation, NORTHERN JAPAN MACHINERY Corporation, TOHOKU DOCK TEKKO CO., LTD., Fujikako, Inc., Asuka Soken Co., Ltd., JFE Pipeline Engineering Corporation, JFE Technos Co., Ltd., J Farm Corporation, JFE Business Support YOKOHAMA Corporation, JFE Project One Co., Ltd., JFE Environment Technology Co., Ltd., Myoko Green Energy Co., Ltd.

1 overseas subsidiary:
J&M Steel Solutions Co., Ltd.

JFE Shoji

JFE Shoji Group: JFE Shoji Corporation and 35 domestic and overseas consolidated subsidiaries (steel-processing companies) (total: 36 companies)

19 domestic subsidiaries:
JFE Shoji Electrical Steel Co., LTD., JFE Shoji Coil Center Corporation, JFE Shoji Kohnan Steel Center Co., Ltd., JFE Shoji Tinplate Center Corporation, Aichi Kanzai Kogyo Corporation, Kyushu-Tech Corporation, JFE Shoji Kohnan Steel Center Co., Ltd., Shinnihon kogyo Corporation, Taisei Kogyo Corporation, Toyo Kinzoku Corporation, Tochigi Shearing Corporation, Naigai Steel Corporation, Nagano Can Corporation, Niigata Steel Corporation, NIHON JISEIZAI KOGYO CO., LTD., Hokuriku Kogyo Corporation, Hokuriku Steel Co., Ltd., Mizushima Steel Corporation, Mizushima Metal Products Corporation

16 overseas subsidiaries:
Dongguan JFE Shoji Steel Products Co., Ltd., Guangzhou JFE Shoji Steel Products Co., Ltd., Zhejiang JFE Shoji Steel Products Co., Ltd., Jiangsu JFE Shoji Steel Products Co., Ltd., JFE Shoji Steel Philippines, Inc., Central Metals (Thailand) Ltd., Steel Alliance Service Center Co., Ltd., JFE Shoji Steel Vietnam Co., Ltd., JFE Shoji Steel Hai Phong Co., Ltd., JFE Shoji Steel Malaysia Sdn. Bhd., PT. JFE Shoji Steel Indonesia, JFE Shoji Steel India Private Limited, VEST Inc., JFE Shoji Steel de Mexico, S.A. de C.V., JFE Shoji Steel Service Center Bajio, S.A.P.I. de C.V., JFE Shoji Power Canada Inc.

Reference Guidelines

GRI Sustainability Reporting Standards 2016, 2018, 2019, 2020, and 2021 Ministry of the Environment (Japan): Environmental Reporting Guidelines 2018 Ministry of the Environment (Japan): Environmental Accounting Guidelines 2005 Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

Publication Date

Website: September 2024, PDF file: September 2024
(previous report: September 2023; next report: scheduled for September 2025)

Related Reports

The following information is available at:
➤ https://www.jfe-holdings.co.jp/en/

Company Information

Outline of the JFE Group, corporate governance, etc.

Shareholder and Investor Information

JFE Group business information, financial data, stock and rating information, etc.

JFE Group Report (Integrated Report)

Financial information including the JFE Group's mid- to long-term business strategies, business performance, management strategies, and non-financial information, including initiatives on sustainability and corporate governance.

Guidelines Content Index

GRI Standard Content Index

■ GRI 1: Foundation 2021

The statement of use;	The JFE Group has reported in accordance with the GRI Standards for the period from April 1, 2023 to March 31, 2024.
The title of GRI 1 used;	GRI 1: Foundation 2021

Note: We refer to the JFE GROUP REPORT 2024 (Integrated Report), Securities Report from April 1, 2023 to March 31, 2024), and Corporate Governance Report published on June 25, 2024.

■ GRI 2: General Disclosures 2021

Disclosure		Pages	
		Sustainability report	Other
1. The organization and its reporting practices			
2-1	Organizational details	—	➤ Outline of JFE Holdings (https://www.jfe-holdings.co.jp/en/company/info/) ➤ Global Network (https://www.jfe-holdings.co.jp/en/g-about/global.html)
2-2	Entities included in the organization's sustainability reporting	➤ Editorial Policy (P.275)	—
2-3	Reporting period, frequency and contact point	➤ Editorial Policy (P.275) ➤ Submit Comments on the JFE Group Sustainability Report (Japanese Only) (https://frlb.f.msgs.jp/webapp/form/25459_frlb_1/index.do)	➤ Contact Us (https://www.jfe-holdings.co.jp/en/contact.html)
2-4	Restatements of information	➤ Environmental Data (P.235) ➤ Social Data (P.253)	—
2-5	External assurance	➤ Independent Assurance Statement (P.264)	—
2. Activities and workers			
2-6	Activities, value chain and other business relationships	➤ Policy Engagement (P.90) ➤ JFE Group Value Chain (P.26)	JFE GROUP REPORT (Integrated Report): P.17-20,P.21-22, P.25-26
2-7	Employees	➤ Social Data (P.253)	JFE GROUP REPORT (Integrated Report): P.103-104
2-8	Workers who are not employees	—	—
3. Governance			
2-9	Governance structure and composition	➤ Corporate Governance (P.214) ➤ Social Data (P.253)	—
2-10	Nomination and selection of the highest governance body	➤ Corporate Governance (P.214)	JFE GROUP REPORT (Integrated Report): P.77-79
2-11	Chair of the highest governance body	—	Corporate Governance Report: P.10

Disclosure		Pages	
		Sustainability report	Other
2-12	Role of the highest governance body in overseeing the management of impacts	➤ Sustainability Management (P.10) ➤ Environmental Management (P.46) ➤ Human Rights (P.166) ➤ Risk Management (P.231)	Securities Report: P.22-31
2-13	Delegation of responsibility for managing impacts	➤ Sustainability Management (P.10)	—
2-14	Role of the highest governance body in sustainability reporting	➤ Sustainability Management (P.10)	—
2-15	Conflicts of interest	➤ Corporate Governance (P.214)	Corporate Governance Report: P.10
2-16	Communication of critical concerns	➤ Compliance (P.227)	—
2-17	Collective knowledge of the highest governance body	—	—
2-18	Evaluation of the performance of the highest governance body	➤ Corporate Governance (P.214)	—
2-19	Remuneration policies	➤ Corporate Governance (P.214)	JFE GROUP REPORT (Integrated Report): P.80-81
2-20	Process to determine remuneration	—	JFE GROUP REPORT (Integrated Report): P.79-81
2-21	Annual total compensation ratio	—	—
4. Strategy, policies and practices			
2-22	Statement on sustainable development strategy	➤ Message from the CEO (P.1)	JFE GROUP REPORT (Integrated Report): P.3-9
2-23	Policy commitments	➤ Human Rights (P.166)	JFE GROUP REPORT (Integrated Report): P.87-88
2-24	Embedding policy commitments	➤ Supply Chain Management (P.182) ➤ Environmental Management (P.46) ➤ Human Rights (P.166) ➤ Compliance (P.227) ➤ Corporate Governance (P.214) ➤ Risk Management (P.231)	—
2-25	Processes to remediate negative impacts	➤ Human Rights (P.166) ➤ Compliance (P.227)	—
2-26	Mechanisms for seeking advice and raising concerns	—	—
2-27	Compliance with laws and regulations	➤ Environmental Management (P.46) ➤ Compliance (P.227)	—
2-28	Membership associations	➤ Policy Engagement (P.90)	—
5. Stakeholder engagement			
2-29	Approach to stakeholder engagement	➤ Sustainability Management (P.10)	—
2-30	Collective bargaining agreements	➤ Human Rights (P.166)	—

■ GRI 3: Material Topics 2021

Disclosure		Pages	
		Sustainability report	Other
2. Disclosures on material topics			
3-1	Process to determine material topics	➤ Sustainability Management (P.10)	—
3-2	List of material topics	➤ Sustainability Management (P.10)	—
3-3	Management of material topics	➤ Sustainability Management (P.10) ➤ Supply Chain Management (P.182) ➤ Environmental Management (P.46) ➤ Initiatives to Address Climate Change Issues (P.52) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104) ➤ Realizing a Recycling-Oriented Society (P.115) ➤ Preserving Biodiversity (P.122) ➤ Providing Quality Products and Enhancing Customer Satisfaction (P.175) ➤ Occupational Health and Safety (P.186) ➤ Diversity and Inclusion (P.193) ➤ Strengthening Human Resource Development (P.197) ➤ Creating Work Environments that Motivate Employees (P.199)	—

■ GRI 200: Economic topics

Disclosure		Pages	
		Sustainability report	Other
GRI 201: Economic Performance 2016			
201-1	Direct economic value generated and distributed	➤ Environmental Management (P.46) ➤ Community (P.204)	Securities Report: P.1(Transition of Key Management Indicators, etc.), P.13 (Status of Employees), P.67 (Dividend Policy), P.102 (Consolidated Income Statement)
201-2	Financial implications and other risks and opportunities due to climate change	➤ Scenario Analysis in Line with the TCFD Recommendations (P.104) ➤ Environmental Management (P.46)	—
201-3	Defined benefit plan obligations and other retirement plans	—	Securities Report: P.114 (Postemployment benefits)
201-4	Financial assistance received from government	—	—

Disclosure		Pages	
		Sustainability report	Other
GRI 202: Market Presence 2016			
202-1	Ratios of standard entry level wage by gender compared to local minimum wage	—	—
202-2	Proportion of senior management hired from the local community	—	—
GRI 203: Indirect Economic Impacts 2016			
203-1	Infrastructure investments and services supported	➤ Environmental Management (P.46) ➤ Community (P.204)	—
203-2	Significant indirect economic impacts	➤ Message from the CEO (P.1) ➤ JFE Group Value Chain (P.26) ➤ Sustainability Management (P.10) ➤ Initiatives to Address Climate Change Issues (P.52)	—
GRI 204: Procurement Practices 2016			
204-1	Proportion of spending on local suppliers	—	—
GRI 205: Anti-corruption 2016			
205-1	Operations assessed for risks related to corruption	—	—
205-2	Communication and training about anti-corruption policies and procedures	➤ Compliance (P.227)	—
205-3	Confirmed incidents of corruption and actions taken	➤ Compliance (P.227)	—
GRI 206: Anti-competitive Behavior 2016			
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	—	—
GRI 207: Tax 2019			
207-1	Approach to tax	➤ Compliance (P.227)	—
207-2	Tax governance, control, and risk management	—	—

Disclosure		Pages	
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207-3	Stakeholder engagement and management of concerns related to tax	—	—
207-4	Country-by-country reporting	—	—

■ **GRI 300: Environmental topics**

Disclosure		Pages	
		Sustainability report	Other
GRI 301: Materials2016			
301-1	Materials used by weight or volume	➤ Environmental Data (P.235)	—
301-2	Recycled input materials used	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
301-3	Reclaimed products and their packaging materials	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
GRI 302: Energy 2016			
302-1	Energy consumption within the organization	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
302-2	Energy consumption outside of the organization	—	—
302-3	Energy intensity	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
302-4	Reduction of energy consumption	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
302-5	Reductions in energy requirements of products and services	➤ Policy Engagement (P.90)	—

Disclosure		Pages	
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GRI 303: Water and Effluents 2018			
303-1	Interactions with water as a shared resource	➤ Preserving Biodiversity (P.122)	—
303-2	Management of water discharge-related impacts	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
303-3	Water withdrawal	➤ Preserving Biodiversity (P.122) ➤ Environmental Data (P.235)	—
303-4	Water discharge	➤ Environmental Data (P.235)	—
303-5	Water consumption	➤ Preserving Biodiversity (P.122) ➤ Environmental Data (P.235)	—
GRI 304: Biodiversity 2016			
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	—	—
304-2	Significant impacts of activities, products, and services on biodiversity	➤ Preserving Biodiversity (P.122)	—
304-3	Habitats protected or restored	➤ Preserving Biodiversity (P.122)	—
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	—	—
GRI 305: Emissions 2016			
305-1	Direct (Scope 1) GHG emissions	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
305-2	Energy indirect (Scope 2) GHG emissions	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
305-3	Other indirect (Scope 3) GHG emissions	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
305-4	GHG emissions intensity	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—

Disclosure		Pages	
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305-5	Reduction of GHG emissions	➤ Initiatives to Address Climate Change Issues (P.52) ➤ Environmental Data (P.235)	—
305-6	Emissions of ozone-depleting substances (ODS)	—	—
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	➤ Environmental Management (P.46) ➤ Environmental Data (P.235)	—
GRI 306: Waste 2020			
306-1	Waste generation and significant waste-related impacts	➤ Environmental Data (P.235)	—
306-2	Management of significant waste-related impacts	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
306-3	Waste generated	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
306-4	Waste diverted from disposal	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
306-5	Waste directed to disposal	➤ Realizing a Recycling-Oriented Society (P.115) ➤ Environmental Data (P.235)	—
GRI 308: Supplier Environmental Assessment 2016			
308-1	New suppliers that were screened using environmental criteria	—	—
308-2	Negative environmental impacts in the supply chain and actions taken	—	—

■ GRI 400: Social topics

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GRI 401: Employment 2016			
401-1	New employee hires and employee turnover	➤ Diversity and Inclusion (P.193) ➤ Social Data (P.253)	—
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	—	—
401-3	Parental leave	➤ Social Data (P.253)	—
GRI 402: Labor/Management Relations 2016			
402-1	Minimum notice periods regarding operational changes	—	—
GRI 403: Occupational Health and Safety 2018			
403-1	Occupational health and safety management system	➤ Occupational Health and Safety (P.186)	—
403-2	Hazard identification, risk assessment, and incident investigation	➤ Occupational Health and Safety (P.186)	—
403-3	Occupational health services	➤ Occupational Health and Safety (P.186)	—
403-4	Worker participation, consultation, and communication on occupational health and safety	➤ Occupational Health and Safety (P.186)	—
403-5	Worker training on occupational health and safety	➤ Occupational Health and Safety (P.186)	—
403-6	Promotion of worker health	➤ Occupational Health and Safety (P.186)	—
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	➤ Occupational Health and Safety (P.186)	—
403-8	Workers covered by an occupational health and safety management system	—	—
403-9	Work-related injuries	➤ Social Data (P.253)	—
403-10	Work-related ill health	➤ Occupational Health and Safety (P.186)	—

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GRI 404: Training and Education 2016			
404-1	Average hours of training per year per employee	➤ Material Issues of Corporate Management and KPIs (P.18)	—
404-2	Programs for upgrading employee skills and transition assistance programs	➤ Strengthening Human Resource Development (P.197)	—
404-3	Percentage of employees receiving regular performance and career development reviews	—	—
GRI 405: Diversity and Equal Opportunity2016			
405-1	Diversity of governance bodies and employees	➤ Diversity and Inclusion (P.193)	—
405-2	Ratio of basic salary and remuneration of women to men	—	—
GRI 406: Non-discrimination 2016			
406-1	Incidents of discrimination and corrective actions taken	—	—
GRI 407: Freedom of Association and Collective Bargaining 2016			
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	—	—
GRI 408: Child Labor 2016			
408-1	Operations and suppliers at significant risk for incidents of child labor	—	—
GRI 409: Forced or Compulsory Labor 2016			
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	—	—
GRI 410: Security Practices 2016			
410-1	Security personnel trained in human rights policies or procedures	—	—
GRI 411: Rights of Indigenous Peoples 2016			
411-1	Incidents of violations involving rights of indigenous peoples	—	—

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GRI 413: Local Communities 2016			
413-1	Operations with local community engagement, impact assessments, and development programs	➤ Community (P.204)	—
413-2	Operations with significant actual and potential negative impacts on local communities	Not applicable	—
GRI 414: Supplier Social Assessment 2016			
414-1	New suppliers that were screened using social criteria	—	—
414-2	Negative social impacts in the supply chain and actions taken	➤ JFE Group Value Chain (P.26)	—
GRI 415: Public Policy 2016			
415-1	Political contributions	—	—
GRI 416: Customer Health and Safety 2016			
416-1	Assessment of the health and safety impacts of product and service categories	➤ Providing Quality Products and Enhancing Customer Satisfaction (P.175)	—
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	—	—
GRI 417: Marketing and Labeling 2016			
417-1	Requirements for product and service information and labeling	—	—
417-2	Incidents of non-compliance concerning product and service information and labeling	Not applicable	—
417-3	Incidents of non-compliance concerning marketing communications	—	—
GRI 418: Customer Privacy 2016			
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	—	—

Comparison with Environmental Reporting Guidelines 2018 (Ministry of the Environment, Japan)

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(2) Reporting period	➤ Editorial Policy (P.275)
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(1) Top management commitments to the JFE Group's response to material environmental issues	➤ Message from the CEO (P.1)
2. Governance	
(1) JFE Group governance structure	➤ Sustainability Management (P.10)
(2) Manager responsible for material environmental issues	➤ Environmental Management (P.46) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
(3) Roles of the board of directors and board of executive officers in the management of material environmental issues	➤ Environmental Management (P.46) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
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(2) Overview of stakeholder engagement activities conducted in the reporting period	➤ JFE Group Value Chain (P.26) ➤ Stakeholder Engagement (P.38)
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(2) Positioning of the above processes in the JFE Group's overall risk management	➤ Sustainability Management (P.10) ➤ Risk Management (P.231)
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7. Long-term Vision	
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8. Strategy	
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(3) Reasons that the identified environmental issues were judged material	➤ Material Issues of Corporate Management (P.14) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
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(2) Status and extent of the dependency of the JFE Group's business activities on biodiversity	➤ Preserving Biodiversity (P.122)
(3) Business activities that contribute to biodiversity conservation	➤ Preserving Biodiversity (P.122)
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Reference: Major Environmental Issues and Their Performance Indicators	
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6. Pollution Prevention	
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(1) Status of legal compliance	➤ Environmental Management (P.46)
Air quality conservation	
(1) Air-pollutant emissions volume, emission concentration in air pollution regulations	➤ Environmental Management (P.46) ➤ Environmental Data (P.235)
Water pollution	
(1) Water pollution load, emission concentration in emissions regulations	➤ Preserving Biodiversity (P.122) ➤ Environmental Data (P.235)
Soil pollution	
(1) Status of soil pollution	➤ Environmental Management (P.46) ➤ Preserving Biodiversity (P.122)

TCFD Content Index

Recommended Disclosures	Overview of TCFD Recommendations	Contents
【Governance】 Disclose the organization's governance around climaterelated risks and opportunities.	a. Describe the board's oversight of climate-related risks and opportunities	➤ Corporate Governance (P.214) ➤ Risk Management (P.231) ➤ Initiatives to Address Climate Change Issues (Governance) (P.55)
	b. Describe management's role in assessing and managing climate-related risks and opportunities	
【Strategy】 Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning where such information is material.	a. Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	➤ Progress of the Seventh Medium-term Business Plan (P.22) ➤ JFE Group Value Chain (P.26) ➤ Initiatives to Address Climate Change Issues (JFE Group Environmental Vision for 2050) (P.53) ➤ Initiatives to Address Climate Change Issues (JFE Group's Climate Change Strategy) (P.55) ➤ Scenario Analysis in Line with the TCFD Recommendations (P.104)
	b. Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	
	c. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	
【Risk Management】 Disclose how the organization identifies, assesses, and manages climate-related risks.	a. Describe the organization's processes for identifying and assessing climate-related risks	➤ Risk Management (P.231) ➤ Environmental Management (P.46) ➤ Initiatives to Address Climate Change Issues (Risk Management) (P.83)
	b. Describe the organization's processes for managing climate-related risks	
	c. Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization's overall risk management	
【Metrics and Targets】 Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.	a. Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	➤ Progress of the Seventh Medium-term Business Plan (P.22) ➤ Material Issues of Corporate Management (P.14) ➤ Initiatives to Address Climate Change Issues (Metrics and Targets) (P.84)
	b. Disclose Scopes 1 and 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and related risks	➤ Initiatives to Address Climate Change Issues (Metrics and Targets) (P.84) ➤ Environmental Data (P.235)
	c. Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	➤ Material Issues of Corporate Management (P.14) ➤ Initiatives to Address Climate Change Issues (JFE Group Environmental Vision for 2050) (P.53) ➤ Initiatives to Address Climate Change Issues (Metrics and Targets) (P.84)