Strategy to Create Value

The JFE Group strives to achieve a balance between environmental, social, and economic sustainability. This section focuses on strategies in the Seventh Medium-term Business Plan aimed at further realizing value creation.

Market Trends and Business Risks and Opportunities

Market Trends

Steel Business and Trading Business

Global demand for steel is likely to steadily increase over the long term amid economic growth in emerging countries, centered on Asia. Over the long term, we believe steel will retain its advantages over other materials, such as its overwhelming scale of production capacity, high economic viability, low environmental burden, and high processability.

With a falling birthrate and aging population shrinking the market in Japan, and depending on global economic conditions, demand for steel in Japan and other countries could have an impact on the JFE Group's steel sales volume and prices. In overseas markets, competition could intensify as a result of structural changes, such as higher exports from China as domestic demand weakens, and expansion in steel production capacity in emerging countries.

In response to such changes in the external environment, JFE is taking the following measures.

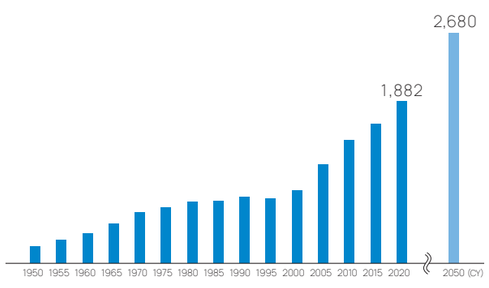
Steel business

1) Optimize production volume in tandem with changes in supply–demand balance for steel in Japan and overseas
2) Build an optimal production structure by retiring and consolidating facilities
3) Enhance cost competitiveness through strategic investments
4) Increase sales ratio of technologically advanced products
5) Develop and expand business with the aim of further deepening integrated production in high-demand overseas markets, including the provision of advanced manufacturing technologies as well as operational and research expertise

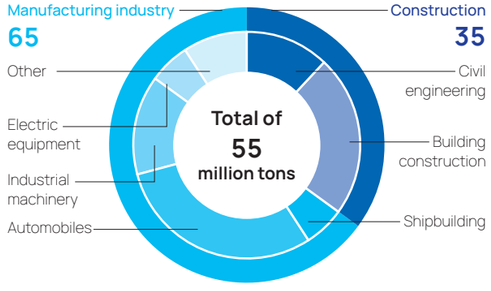
Trading business

1) Strengthen sales capabilities in Japan through a restructuring of distribution functions, upgrade processing equipment
2) Strengthen processing and distribution functions in our four-pronged global structure
3) Increase sales of JFE Steel's products in high-value-added fields
4) Use JFE Group materials (including alliance partners) and products of other suppliers overseas

Global crude steel output



Consumption of steel in Japan



Source: World Steel Association (actual), Japan Iron and Steel Federation (estimates)

Engineering Business

Public works infrastructure accounts for a majority of the engineering business portfolio, and in recent years domestic demand has been brisk for the upgrading of environmental plants, bridges, and other core infrastructure. There is considerable potential demand for moving public services from the government to the private sector, owing to aging lifestyle infrastructure, worker shortages, and insufficient financial resources in Japan. We are expanding the operation and maintenance (O&M) business by establishing new regional power utilities in collaboration with local governments, which we have been doing for a while, and we also established an integrated utility company for gas, water, and wastewater services.

Regarding private-sector demand, initiatives are gaining momentum to reduce GHG emissions after the national government declared its goal of achieving carbon neutral by 2050. In light of changes in society, we constructed the new Kasaoka Monopile Factory to manufacture foundational structures attached to the seabed (monopiles) for offshore wind power generation, and commenced operations of the factory in April 2024. We are also proactively developing CO_2 and ammonia transportation and storage technologies. To address the needs of companies for recycling, we are participating in the PET bottle recycling business and expanding bases in the food recycling business.

The JFE Group aims to forge a corporate structure where earnings are less affected by whether orders are received for public works projects that depend on the aims and policies of the national and local governments. We aim to build a stable business foundation while addressing the changing needs of society, such as by expanding our O&M business, which includes the recycling business.

Major Risks and Opportunities for the JFE Group

Major changes in external environment	Risks	Opportunities
Climate change problem ➡ Promotion of the JFE Group Environmental Vision for 2050 to Achieve Carbon Neutrality P. 45	• Sharply growing needs for decarbonization of (blast furnace) steelmaking process • Higher burden of investments to introduce ultra-innovative technologies • Carbon tax • Disruptions to supply chains from natural disasters • Risk of flooding of bases due to rising sea level • Competition from other materials • Tougher environmental regulations	• Development of ultra-innovative technologies and securing of competitive advantages • Contribution to reduction of CO_2 emissions by supplying high-strength steel, such as high-strength steel and electrical steel • Expansion of electric arc furnace steelmaking and electric arc furnace engineering business • Stronger demand for renewable energy solutions • Stronger response to disasters caused by climate change
Resource and energy problems ➡ Business Strategies P. 53	• Depletion of resources, harder to obtain raw materials and equipment, rising prices • Higher prices for scrap waste, harder to obtain materials, lower grade ores • Risk of depletion of water resources, risk of pollution at drainage sites	• Renewed attention on recyclability of steel • Expansion of logistics business and opportunities to use scrap • Stronger waste-to-resource demand (plastic recycling, power generation with food waste)
Falling birthrate and aging population in Japan ➡ Promotion of DX Strategy P. 43 ➡ Securing and Training Diverse Talent P. 65	• Labor shortage • Disruptions of skill transfer to next generation • Weaker domestic demand for steel • Decrease in EPC orders and projects due to shrinking private-sector investment	• Secure talented personnel with work-style reforms • Introduce new technologies to reduce personnel and save labor (stronger needs for automation, remote monitoring)
Globalization of markets, development of emerging countries ➡ Strengthening Momentum in the Solution Business P. 39 ➡ Business Strategies P. 53	• Expansion of steel production capacity in emerging countries • Constraints on export transactions due to higher duties and import restrictions • Country risk, impact from higher commodity prices and foreign exchange fluctuations	• Increase in demand for steel in growth markets • Greater use of high-value-added products • Increase in infrastructure projects in emerging countries
Aging of infrastructure facilities ➡ Business Strategies P. 53	• Impact from accidents and larger damage from natural disasters due to aging infrastructure • Contraction in domestic public utilities business from transition to preventive maintenance	• Stronger demand for infrastructure renewal, including reinforcement against natural disasters • Provision of high-quality products and services to meet demand for longer-living infrastructure • Business expansion from privatization of public services
Development of AI and IoT technologies ➡ Promotion of DX Strategy P. 43	• Information leaks and system damage due to cyberattacks and illicit use of systems	• Creation of new value added and expansion of service offerings with DX and AI

Material Issues of Corporate Management

Material Issues of Corporate Management (Materiality)

The JFE Group has identified material issues and set KPIs to address these issues with the objective of maximizing the creation of social value and minimizing its negative impact on society as Group capital is deployed to satisfy the needs of diverse stakeholders. In fiscal 2016, we identified our material CSR issues. In fiscal 2021, based on the Seventh Medium-term Business Plan, we embarked on a new initiative and identified material issues in corporate management by adding economic issues to our existing CSR issues. We will demonstrate the Group's vision of "contributing to society with the world's most innovative technology" by working to address these issues.

Process for identifying material issues

Fiscal 2016: Identifying material CSR issues

- Discuss issues at Groupwide meetings
- Prioritize issues based on stakeholder expectations and business relevance (impact on society)

Fiscal 2021: Identifying material issues of corporate management

STEP 1 Reevaluate existing material CSR issues
The material CSR issues were reassessed for their importance in terms of relating to current operations, stakeholder expectations, and achievement of KPIs.

STEP 2 Set material economic issues
Identify issues from an economic viewpoint based on sources of competitive advantages in the Seventh Medium-term Business Plan and the JFE Group's business model.

STEP 3 Select 20 material issue candidates
Economic-related issues were added to the list of reassessed material CSR issues and deliberated by the Group Management Strategy Committee, screening out 20 material issue candidates.

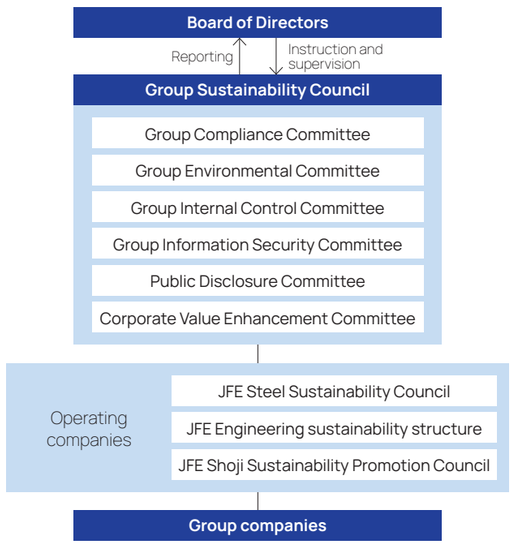
STEP 4 Identify the 13 most important material issues
The Group Management Strategy Committee and the Board of Directors discussed the candidates, and identified 13 material issues as the most important for the JFE Group

The JFE Group has set and worked toward achieving KPIs for the identified material issues. In fiscal 2023, we evaluated the results in the previous fiscal year, revised KPIs based on these results and the opinions of stakeholders, and undertook fresh initiatives to address issues. The fiscal 2023 KPIs for material issues of corporate management were deliberated and evaluated, and fiscal 2024 KPIs were set following examination by operating companies, discussion at management meetings, and deliberations by the Group Management Strategy Committee and the Board of Directors.

Sustainability Initiatives and Promotion Structure

The JFE Group, aware of its responsibility as a corporation and member of society, believes that striving for sustainability to build a better society is a central tenant of its management principles. Chaired by the president of JFE Holdings, the JFE Group Sustainability Council has been established as an organization for supervising and guiding Groupwide sustainability initiatives. Various committees are set up under the JFE Group Sustainability Council to deliberate Group policy; assess the state of policies, share information about issues, problems that arose; and examples of how they were addressed; supervising and guiding the Group's sustainability initiatives. Moreover, of the matters discussed by the JFE Group Sustainability Council, the Group's basic policy, action plans, details of important measures, and responses to critical events are periodically reported to and deliberated by the Board of Directors, which gives directions and supervision. Each operating company sets up their own councils to coordinate with the JFE Group Sustainability Council, working together Groupwide to improve and prevent deterioration in the JFE Group's corporate value.

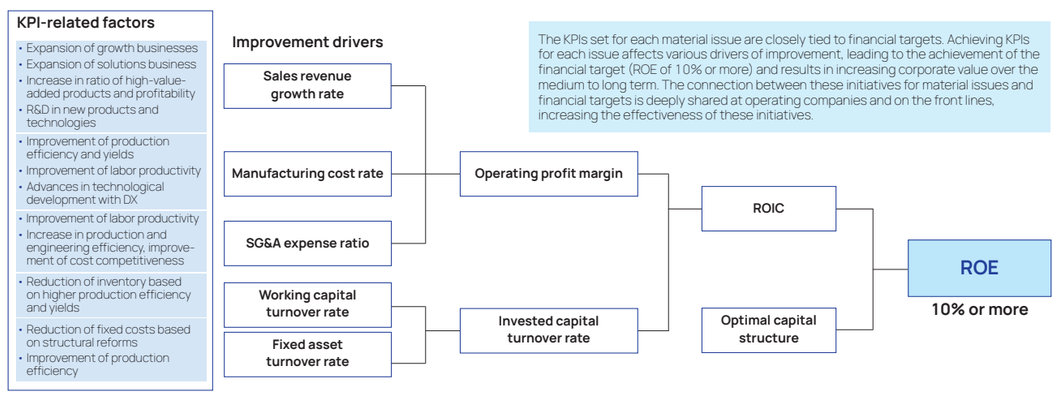
Sustainability promotion structure



	Areas of Focus	Details	Material Issues	Relevant SDGs
Activity	Contribute to resolving climate change issues (initiatives for achieving carbon neutrality by 2050) ▶P. 45	● Initiatives for achieving carbon neutrality by 2050 • Reduce the JFE Group's CO_2 emissions • Contribute to reduction of CO_2 emissions in society	• Reduce the JFE Group's CO_2 emissions • Contribute to reduction of CO_2 emissions across the society	
	Ensure occupational safety and health ▶P. 63	● Prioritize safety first ● Maintain the physical and mental health of employees and their families	• Prevent workplace accidents • Ensure the health of employees and their families	
	Recruit and nurture diverse human resources ▶P. 65	● Maintain work environments where all personnel can maximize their abilities ● Accumulate and hand down technologies and skills	• Pursue diversity and inclusion • Strengthen human resources development • Create workplaces that motivate employees	
	Reinforce resilience of production and engineering capabilities (realize world-class earnings power through DX and other measures) ▶P. 37,43	● 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 reforms) • Reduce costs to strengthen cost competitiveness and ensure quality competitiveness	• Increase efficiency and enhance cost competitiveness in production and engineering • Raise quality of products and services and ensure reliable supply	
	Strengthen competitiveness of products and services (promote the growth strategy by providing high-value-added solutions) ▶P. 39	● 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	• Expand business by increasing value added in products and services with advanced technologies • Sales strategies for realizing sustainable growth	
Basis of Activity	Thoroughly enforce compliance ▶P. 84		• Ensure adherence to corporate ethical standards and compliance	
	Respect human rights ▶P. 87		• Respect human rights across the supply chain	

▶Please see page 29 for KPIs for each priority issue.

Improvement in ROE by achieving KPIs



Material Issues of Corporate Management and KPIs

The JFE Group has set key performance indicators (KPIs) for its initiatives to address priority issues, and worked toward achieving its targets. In fiscal 2021, the Company revised its material CSR issues, adding material economic issues to the list, and defined key issues for management. As a unified Group, we aim to contribute to the realization of sustainable growth for both the JFE Group and society as a whole by tackling these key issues for management.

■Groupwide ■JFE Steel ■JFE Engineering ■JFE Shoji

Evaluation criteria*1

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

*1 In Groupwide evaluations, the lowest result among the companies is taken as the overall result.
*2 Prevention of occupational injuries evaluated as Groupwide (safety performance)

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	JFE Steel	• 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% • Total investment budget: 101% approved • Obtained third-party certification in June 2023, commenced supply of green steel 29,000 tons on a certified basis	○ ○ ○	• 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
		JFE Engineering	• 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
		JFE Shoji	• 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	JFE Steel	• 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)
			JFE Engineering	• 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
			JFE Shoji	1. Global resource recycling of steel scrap FY2023 scrap transactions: Above the transaction quantity for FY2020 (FY2024 target: +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	1. Global resource recycling of steel scrap • 5% reduction from FY2020 2. Created system for expansion and reliable supply of fuel for biomass power plants • Handling volume: +110% compared with FY2020 • Expanded new suppliers	× ○	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 • FY2024 biomass fuel (palm kernel shells and wood pellets) transactions: 100% increase from FY2020 • Diversify supply sources to ensure stable supply
	Ensure occupational safety and health	Prevent workplace accidents	Groupwide	■Workplace fatalities: Zero occurrences •Lost-workday injuries rate ■0.10 or less ■0.25 or less ■0.45 or less	■Workplace fatalities: One occurrence •Lost-workday injuries rate ■0.06 ■0.28 ■0.12 (Work-related accidents and frequency rates are tabulated on a calendar year basis.)	× *2	■Workplace fatalities: Zero occurrences •Lost-workday injuries rate ■0.10 or less ■0.25 or less ■0.15 or less
			JFE Steel	[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
			JFE Engineering	[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
			JFE Shoji	[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 ■60% (2023 target)	1. Provision rates of healthcare guidance ■71.1% ■42.7% ■35.0% * FY2022 results for eligible individuals	×	1. Provision rates of healthcare guidance ■60%
				2. Reduce rates of smokers (ensure employee health and prevent exposure to passive smoke) ■1.5% reduction per year (total for operating companies)	2. Reduce rates of smokers (ensure employee health and prevent exposure to passive smoke) ■0.8% reduction per year (total for operating companies)	×	2. Reduce rates of smokers (ensuring employee health and preventing passive smoking) ■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 ■Career-track (white-collar position): Degree of gender parity Career-track (technical position): 10% or more On-site position: 10% or more ■Career-track (white-collar position): Degree of gender parity Technical (Career-track, Production/construction position): 15% or more ■White-collar position: Degree of gender parity	1. Rates for female recruits ■Career-track (white-collar position): 39% Career-track (technical position): 11% On-site position: 7% ■Career-track (white-collar position): 50% Technical (career-track, production/construction position): 14% ■White-collar position: 47%	△	1. Rates for female recruits ■Career-track (white-collar position): Degree of gender parity Career-track (technical position): 10% or more On-site position: 10% or more ■Career-track (white-collar position): Degree of gender parity Technical (career-track, production/construction position) : 15% or more ■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 ■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 ■91% (total for operating companies)	△	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

Material Issues of Corporate Management and KPIs

■Groupwide ■JFE Steel ■JFE Engineering ■JFE Shoji

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 ■40 hours or more per year ■20 hours or more per year ■20 hours or more per year	1. Training hours per person ■44.9 hours per year ■23.4 hours per year ■22.1 hours per year	○	1. Training hours per person ■40 hours or more per year ■20 hours or more per year ■20 hours or more per year
				2. Train DX personnel ■Number of internal data scientist trainees: Total of 600 as of the end of FY2023 ■Number of employees who took internal data scientist training: Total of 170 as of the end of FY2023	2. Trained DX personnel ■Cumulative total as of end of FY2023: 610 ■Cumulative total as of end of FY2023: 179	○	2. Train DX personnel ■Number of internal data scientist trainees: Total of 660 as of end of FY2024 ■Number of employees who took internal data scientist training: Total of 210 as of end of FY2024
		Create work environment that motivate employees		1. ■Annual leave acquisition rate of 75% or more (total for operating companies)	1. ■Annual leave acquisition rate: 89% (total for operating companies)	○	1. ■Annual leave acquisition rate: 75% or higher (total for operating companies)
				2. Engagement survey ■Affirmative response to questions about motivation: At least 75%	2. Affirmative response to questions about motivation in engagement survey ■72% ■81% ■80%	△	2. Engagement survey ■Affirmative response to questions about motivation: At least 75%
	Reinforce resilience of production and engineering capabilities (realize world-class earnings power through DX and other measures)	Increase efficiency and enhance cost competitiveness in production and engineering	JFE Steel	1. Improvement in labor productivity Toward improving labor productivity by 20% by the end of FY2024 • Steadily implement FY2024 milestones each fiscal year for improving labor productivity by 20% • Approve and implement FY2023 investments for improving labor productivity, such as automation and remote operations • Steadily relocate facilities in accordance with structural reforms in Keihin district	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	○	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. Improve yields through DS* activities Stabilize production with DS, improve yields through application of quality prediction Improve yields by 1.5% in FY2023 from FY2020 levels to achieve 2.0% by FY2024 (based on figures after adjustments to the sales mix) * DS: Data science	2. FY2023 yield: +1.3% compared to FY2020 (87.4%)	△	2. Stabilize production with DS, improve yields through application of quality prediction technologies FY2024 yields: +2.0% compared to FY2020 * Adjusted for sales composition
			JFE Engineering	• Increase the efficiency of engineering operations by introducing DX technologies Engineers for big data analysis utilizing Pla'cello*: 2,200 * Pla'cello: Proprietary data analysis platform using AI	• 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
		Raise quality of products and services and ensure reliable supply	JFE Steel	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 automoted transmission of tensile test results at Group companies Target six companies: 67% introduction rate as of FY2024 (100% by FY2025)	1. Quality assurance • Reorganized to strengthen personnel development, budget allocation, and qualification acquisition in the quality assurance department • 74.8% in FY2023	○	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 the manufacturing infrastructures using DX Achieve CPS* installation rate of 60% or more on a companywide basis in FY2023 to implement CPS in all production processes * CPS: Cyber-physical system	2. Strengthened production infrastructure using DX Companywide CPS installation rate: 60%	△	2. Strengthen manufacturing infrastructure using DX Companywide CPS installation rate: 80% or more
			JFE Engineering	1. Secure a stable number of certificated managing engineers	1. Reliably secured certificated managing engineers amid high level of sales	○	1. Secure a stable number of certified managing engineers
				2. No major quality problems	2. Major quality issues: One incident	×	2. Enhance information sharing and verification functions by improving operation of quality management systems No major quality problem
			JFE Shoji	1. Make consistent investment in processing and distribution operations	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	○	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 (same as FY2022 levels) and overseas (audit completed: 100%)	2. Conducted quality audits on Group companies Conducted quality audits at 36 companies (100% audit implementation rate)	○	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%)
	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	JFE Steel	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)	○	1. Pursue strategic research and development focusing on priority development fields Develop new products and technologies: 20 or more
				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
			JFE Engineering	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	JFE Steel	• 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)
			JFE Engineering	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
			JFE Shoji	• 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		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

Seventh Medium-term Business Plan (Fiscal 2021–2024)

Briefing Materials on the Seventh Medium-term Business Plan
https://www.jfe-holdings.co.jp/en/investor/management/plan/

01 Establish economic sustainability

Balance financial soundness with the effective execution of investment based on selection and concentration

P.34 Strategy 1 Financial Strategy: Message from the CFO

			Seventh Medium-term Business Plan FY2024
Groupwide	Consolidated business profit		¥320billion
	Profit attributable to owners of the parent		¥220billion
	ROE		10%
	Debt/EBITDA ratio		Around 3x
	D/E ratio*1		About 70%
Operating companies	Steel business	Profit per ton*2	¥10,000/ton
		Segment profit	¥230 billion
	Engineering business	Segment profit	¥35 billion
		Revenue	¥650 billion
	Trading business	Segment profit	¥40 billion
Shareholder returns	Dividend payout ratio		About 30%

*1 For liabilities with equity subject to credit ratings, these equities reflect the evaluations of rating agencies.
*2 Steel business profit per ton (Segment profit / unconsolidated sales volume in tons)

Shift focus from quantity to quality in the domestic steel business

P.37 Strategy 2 Shift focus from Quantity to Quality

- Cost reduction target: ¥120.0 billion for four years
- Improvement in labor productivity: +20%
- Ratio of high-value-added products: 50%

Promote growth strategies

P.39 Strategy 3 Strengthening Momentum in the Solution Business
P.53 Steel Business

- Steel business: Establishment of a joint venture with India's JSW Steel to manufacture and sell electrical steel sheets, and expansion of the solutions business
- Engineering business: Expand business to ¥1 trillion in sales by fiscal 2030
- Trading business: Strengthen supply chain management for high-performance electrical steel sheets

Greatly improve competitiveness with DX strategy

P.43 Strategy 5 Promotion of DX Strategy

Promotion of DX across all business areas, focusing on three areas: innovetively improving productivity, transforming existing businesses, and creating new businesses

02 Ensuring environmental and social sustainability

Environment Promotion of the JFE Group Environmental Vision for 2050

P.45 Strategy 6 Promotion of of the JFE Group Environmental Vision for 2050 to Achieve Carbon Neutrality/Advancing the Commercialization of Offshore Wind Power Business

- Steel Business: Reduce CO_2 emissions by 18% by the end of fiscal 2024 (compared to fiscal 2013)
- Initiatives to achieve carbon neutrality by 2050

Reduce CO_2 emissions in the steel business, contribute more to reducing CO_2 emissions in society, and promote initiatives in the offshore wind power business

Society Resolving social issues

- Safety and health management P.63 Human Resources
- Promote human resource development P.63 Human Resources
- Contribute to regional communities through the engineering business P.56 Engineering Business
- Respect for human rights within the supply chain P.87 Respect for Human Rights

Governance Further enhancing corporate governance

P.77 Corporate Governance

- Examine applying non-financial indicators to various indicators such as investment decisions and executive compensation

Seventh Medium-term Business Plan: Strategy 1

Financial Strategy: Message from the CFO

The JFE Group aims to double business profit while taking a financially disciplined approach to making aggressive investments, based on the stable earnings foundation established under the Seventh Medium-term Business Plan. The Company is keen to develop ultra-innovative technologies to realize carbon neutrality.

Masashi Terahata
Executive Vice President and CFO
JFE Holdings, Inc.

Review of the Seventh Medium-term Business Plan through Fiscal 2023

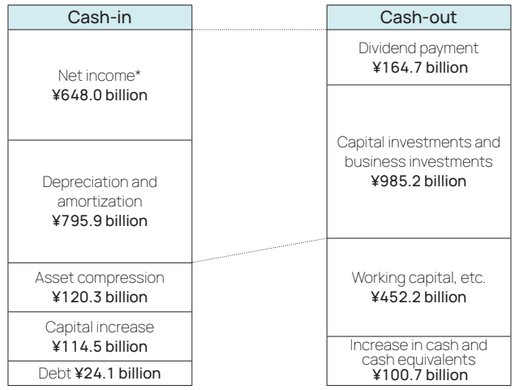
Earnings Conditions

In fiscal 2023, although the Japanese economy and the global economy showed a moderate recovery overall, earnings stalled due to a slump in the Chinese economy, rising geopolitical risks, and challenges in Japan, such as labor shortages and surging materials costs, particularly in the civil engineering and construction fields. In this difficult business environment, the Company raised selling prices and significantly lowered the break-even point by cutting fixed costs through structural reforms in Japan, recording business profit of ¥298.2 billion and profit attributable to owners of parent of ¥197.4 billion. JFE made solid progress toward its medium-term goal of shifting from quantity to quality.

Cash Flow and Financial Soundness

In total for the past three years, investment outlays were ¥985.2 billion, approximately 70% of the medium-term target, in line with our financial policy of keeping investment within the scope of after-tax, post-dividend profit plus depreciation. The Company reduced assets by ¥33.0 billion in fiscal 2023, bringing the total to ¥120.3 billion over the past three years. In September 2023, the Company raised ¥204.5 billion (¥114.5 billion from the issuance of new shares and disposal of treasury stock, and ¥90.0 billion from the issuance of convertible bonds with stock acquisition rights) through an international offering. We believe this funding has increased financial flexibility and has strengthened the financial foundation, enabling steady progress on green transformation (GX) initiatives, which are essential for the future, while continuing to pursue sustainable profit growth. As a result, the net interest-bearing debt balance decreased by ¥76.6 billion compared with the end of fiscal 2020, when the medium-term business plan was launched, reaching ¥1,587.1 billion. Moreover, the debt/EBITDA ratio was 3.2 times, and the debt-to-equity (D/E) ratio was 58.0%, significantly surpassing the medium-term target of 70%.

Total Consolidated Cash Flow from FY 2021 to FY 2023



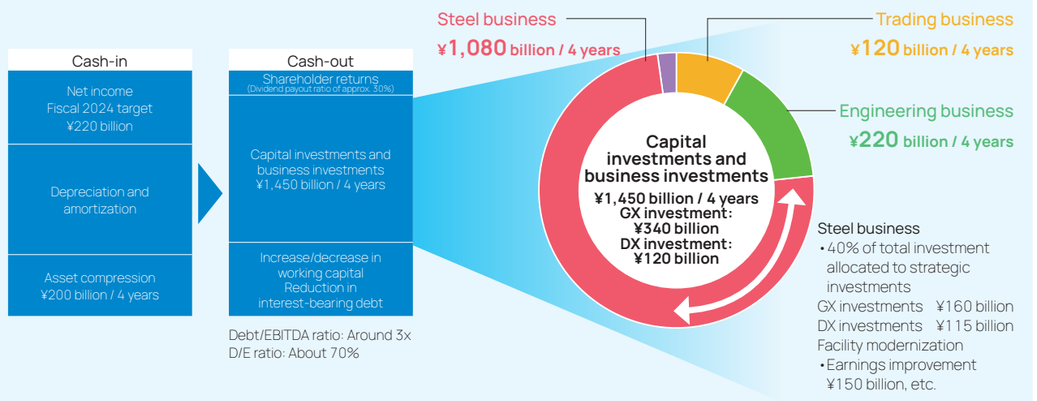
* Profit attributable to owners of parent

Trends in major financial indicators

	End of FY2020	End of FY2023
Interest-bearing debt outstanding	¥1,806.1 billion	¥1,830.2 billion
Net interest-bearing debt balance	¥1,663.7 billion	¥1,587.1 billion
Debt/EBITDA ratio	8.1 times	3.2 times
D/E ratio	93.2%	58.0%

Seventh Medium-term Business Plan: Strategy 1

Capital Allocation and Investment Plans under the Seventh Medium-term Business Plan



Outlook for Fiscal 2024 (Final Year of the Seventh Medium-term Business Plan)

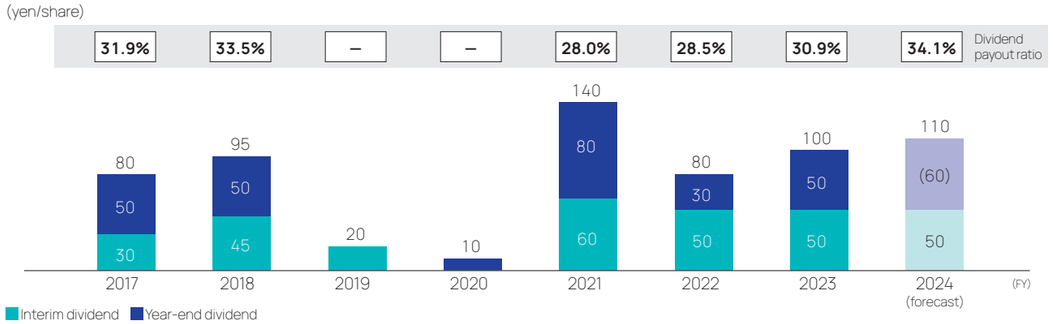
In fiscal 2024, the final year of the Seventh Medium-term Business Plan, the Company expects to secure business profit of ¥308 billion (excluding inventory valuation differences in the steel business), slightly below the medium-term target due to a one-off decline in steel demand, stemming from cuts in automobile production in the first half of the fiscal year. Even in a challenging business environment characterized by slack demand and stagnant market conditions overseas, the Company anticipates achieving profit of ¥10,000 per ton of steel, on a par with its medium-term target. We estimate net profit will be ¥205 billion in fiscal 2024.

Regarding cash flow, while securing a profit, the Company plans to keep cash used in investing activities at a high level in order to accelerate investments in GX and DX. At the same time, we expect to attain our medium-term target for ¥200 billion in asset reductions during the four years of the medium-term business plan, owing in part to the sale of some land in the Keihin district. Furthermore, management continues efforts to improve the cash conversion cycle (CCC). We would like to keep the balance of interest-bearing debt steady through these initiatives.

For shareholder returns, JFE is committed to proactively returning value to shareholders based on the policy in its medium-term business plan for a dividend payout ratio of about 30%. Based on its estimate of net profit for fiscal 2024, the Company anticipates distributing a dividend of ¥110 per share, a 10% increase from the previous fiscal year, for a dividend payout ratio of 34.1%.

		Seventh Medium-term Business Plan: FY2024	FY2021 results	FY2022 results	FY2023 results	FY2024 (assumes August 5 announcement)
Consolidated	Business profit (Excluding inventory valuation differences in the steel business)	¥320.0 billion	¥416.4 billion (¥222.4 billion)	¥235.8 billion (¥162.8 billion)	**¥298.2 billion (¥296.2 billion)**	**¥260.0 billion (¥308.0 billion)**
	Profit attributable to owners of parent	¥220.0 billion	¥288.0 billion	¥162.6 billion	**¥197.4 billion**	**¥205.0 billion**
	ROE	10%	15.7%	7.9%	**8.6%**	**8.1%**

Dividend Payments



Aiming to Improve Corporate Value Further

JFE views its share price as an important management indicator. However, JFE's stock currently trades at a price-to-book (P/B) multiple that is significantly lower than 1.0 times. Under the Seventh Medium-term Business Plan, JFE aims to maintain ROE above the cost of equity (at least 10%), but has failed to achieve this goal.

In order to improve the P/B multiple, JFE needs to expand ROE while at the same time reducing the cost of equity and improving the expected growth rate.

$$\text{P/B multiple} \uparrow = \frac{\text{ROE} \uparrow}{\text{COE}^{*} \downarrow - g\ (\text{expected growth rate}) \uparrow}$$

* Cost of equity: The minimum rate of return expected of JFE by the capital market.

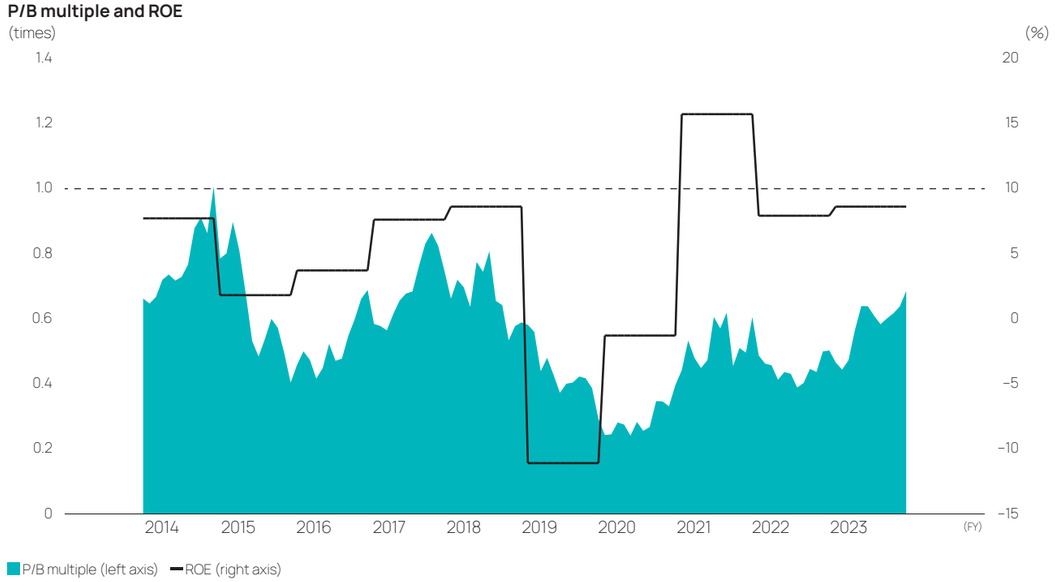
To expand ROE, it is essential to enhance asset efficiency and improve profitability (boost ROIC), as well as optimize the capital structure. Given the substantial capital investments required to achieve carbon neutrality in the future, it is critical that JFE maintains its financial soundness at this stage. In the previous fiscal year, JFE increased capital and was able to create an optimal capital structure. However, we recognize that improving profitability further remains a key challenge.

In terms of reducing the cost of equity and increasing our expected growth rate, the Company is keenly aware of the challenges posed by high earnings volatility in the steel industry, and the significant uncertainties in the steel sector's future, including how to deal with a decline in domestic growth expectations due to the aging population and other factors, and the need to address decarbonization.

Under the Seventh Medium-term Business Plan, JFE has made progress on reducing **earnings volatility** by implementing structural reforms in the steel business and shifting its focus from quantity to quality, which has led to the creation of a structure for steady earnings generation more resilient to external factors. As we look to **further enhance profitability and meet growth expectations**, we are formulating an action plan that will guide our efforts during the next medium-term business plan, which will commence in fiscal 2025, in line with our long-term vision. Under the plan, we will present a growth strategy that the market will appreciate through aggressive investments in growth fields and regions in order to double the Group's business profit, all while maintaining financial discipline with a base of stable earnings. Additionally, as **a step toward decarbonization**, we are committed to finishing the development of ultra-innovative technologies by the mid-2030s to realize carbon neutrality.

The Company will actively disclose information about these initiatives, including through IR activities. JFE aims to keep ROE above the cost of equity, thereby enhancing corporate value and improving market perceptions.

P/B multiple and ROE



Seventh Medium-term Business Plan: Strategy 2

Shift focus from Quantity to Quality

The JFE Group is committed to reinforcing its earnings foundation and improving profit per ton of steel by cutting fixed costs and increasing the ratio of high-value-added products.

STRATEGY / 2

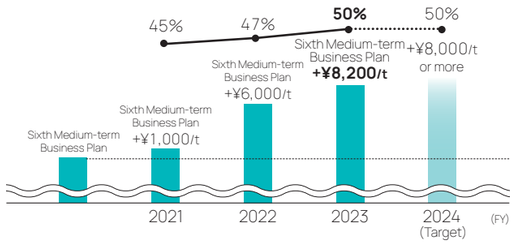
Pursuing World-Class Earnings Power

As part of the shift from quantity to quality under the Seventh Medium-term Business Plan, the JFE Group has focused on expanding sales of highly profitable, high-value-added products, a core strength of the Company. In fiscal 2023, the sales ratio of high-value-added products reached 50%. The earnings difference between high-value-added products and commodity products also widened to ¥8,200 per ton compared with the Sixth Medium-term Business Plan. To further increase sales of high-value-added products, we are expanding production capacity at the West Japan Works (Kurashiki district) for high-grade electrical steel used in EV motors, demand for which is likely to strengthen. In the first half of fiscal 2024, an expanded production line began operations at West Japan Works (Kurashiki district). Additionally, JFE Steel has established a production and supply system for large, extra-heavy steel plates that support the enormous wind turbines used in offshore wind power generation, a renewable energy market with significant growth potential. We have also started deliveries for overseas offshore wind power projects.

Overseas, the JFE Group is leveraging its strengths in high-value-added products to expand business. In India, where electricity demand is expected to grow, JFE Steel has established a joint venture with JSW Steel to manufacture and sell grain-oriented electrical steel sheet that is used in transformers.

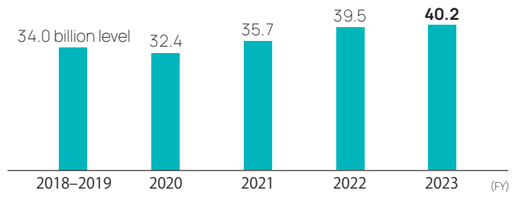
To move forward on these initiatives, we have allocated 15% more resources to R&D and capital expenditures compared to the Sixth Medium-term Business Plan. In research and development, which underpins our shift from quantity to quality, we are developing unique products that anticipate customer needs, based on our corporate vision of "contributing to society with the world's most innovative technology." We are forging ahead on the development of new products and technologies, such as high-strength steel sheets that contribute to vehicle weight reduction, and materials that enhance the longevity of steel structures.

Difference in profit per ton of steel compared with commodity products / ratio of high-value-added products



R&D expenditures (Steel business)

(billion yen)



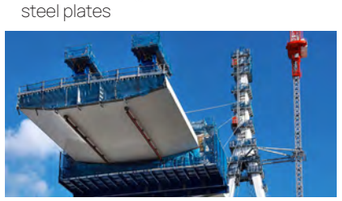
Expansion in Sales of High-Value-Added Products

Ultra-high-strength steel sheets for automobiles

- Helps reduce vehicle weight
  Adoption of 1.5 GPa high-strength steel for vehicle frame components
- Development of high-strength steel applications in BEVs
  Adoption of 980 MPa high-strength steel for battery structural components

Heavy plates

- Foundation structure of fixed-bottom offshore wind power installations
  J-TerraPlate™, large and heavy steel plates
- Contributes to longevity of bridges in Japan and overseas
  AFD™ Steel, anti-fatigue-damage steel LALAC™-HS, highly weather-resistant steel plates



Electrical steel sheets

- Contributes to energy savings in EVs and other applications
  Non-oriented electrical steel sheets
- Contributes to highly efficient power generation and transmission networks
  Grain-oriented electrical steel sheets
- Contributes to the reduction of noise and size in electrical equipment
  Super Core™

Creation of a Framework for Expanding High-Value-Added Products

The JFE Group is planning and making investments to augment production facilities in both Japan and overseas, focusing on high-value-added products that are likely to see market growth in a carbon neutral society.

Establishment of mass production system for large and heavy steel plates for offshore wind power

- West Japan Works (Kurashiki district)
  JFE Steel has invested in the No. 7 continuous casting machine, which began operating in fiscal 2021, and then in the heavy steel plate works and peripheral facilities. Together with the heavy steel plate works in the Keihin district, JFE Steel has established a mass production system.

Expansion of production capacity for top-grade non-oriented electrical steel sheets for EVs

- West Japan Works (Kurashiki district)
  We are expanding facilities for producing electrical steel sheet with the goal of doubling capacity by the first half of fiscal 2024 and tripling it by fiscal 2026.

Establishment of a manufacturing and sales company for grain-oriented electrical steel sheets used in transformers

- In partnership with JSW Steel in India, we aim to achieve full-scale production in fiscal 2027, contributing to the development of greener power transmission infrastructure with our high-value-added products, which excel in energy efficiency, a strength we have cultivated over many years.

Completion of Structural Reforms

The September 2023 suspension of upstream processes and hot-rolled steel facilities in the Keihin district marked the completion of the series of structural reforms aimed at transforming JFE Steel into a lean and resilient company. Cost cuts, including fixed cost reductions, should be roughly ¥42 billion in fiscal 2024, putting the Company on track to achieving the ¥120 billion target for cost reductions in the Seventh Medium-term Business Plan. Furthermore, we are enhancing our ability to secure stable earnings even in challenging business conditions, by reducing costs significantly and by improving quality and productivity with DX technologies.

Progress on cost reductions

FY	Cost reduction effect (structural reforms + operational improvements)	Main structural reform initiatives
Up to FY2022	¥38 billion	(FY2021) Refurbishment of No. 4 blast furnace at Kurashiki (FY2022) Suspension of can steel production facilities at Chiba, consolidation at Fukuyama, refurbishment of No. 6 blast furnace at Chiba
FY2023	¥45 billion	Suspension of upstream processes and hot-rolled steel facilities at Keihin
FY2024	¥42 billion	–
Medium-term target	¥120 billion	Establishment of an optimal production framework with seven blast furnace structure

COLUMN

Keihin Land Utilization

Reducing Fixed Costs and Establishing New Earnings Pillars

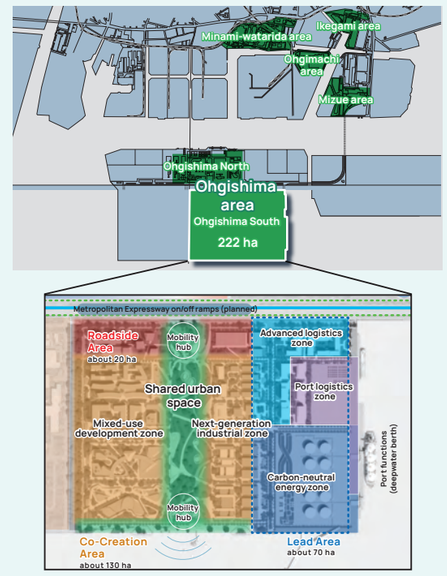
Following structural reforms, approximately 400 hectares of land in the Keihin district are now available for repurposing. Through a proper combination of land sales, land leasing, and business use, we will collaborate with local governments and neighboring companies to spearhead urban development that supports Japan's carbon neutrality goals.

In the Ohgimachi area, a portion of the land was sold in 2023, marking the first step toward new utilization. In the northern part of the Minami-watarida north area, we are advancing plans for urban development with a focus on R&D functions.

In the pioneering area of Ohgishima, JFE has signed a land lease agreement with Japan Suiso Energy, Ltd. to serve as a receiving terminal for the world's first commercial demonstration for building a liquefied hydrogen supply chain. This initiative will contribute to the start of hydrogen supply within Japan during fiscal 2030.

Moving forward, JFE intends to participate in the hydrogen supply chain by exploring projects to supply green electricity by utilizing hydrogen at its own power plants, and evaluate projects to provide cooling generated from hydrogen supply and heating from power generation to the district. These efforts are aimed at enhancing the environmental value of OHGISHIMA 2050.

JFE Steel East Japan Works (Keihin district)



Seventh Medium-term Business Plan: Strategy 3

Strengthening Momentum in the Solution Business

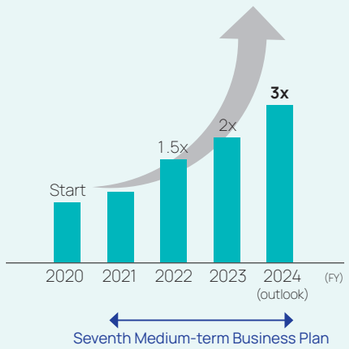
The JFE Group aims to expand its solution-based business model, where it provides the advanced manufacturing technologies, operational expertise, and research know-how it has developed over the years.

STRATEGY / 3

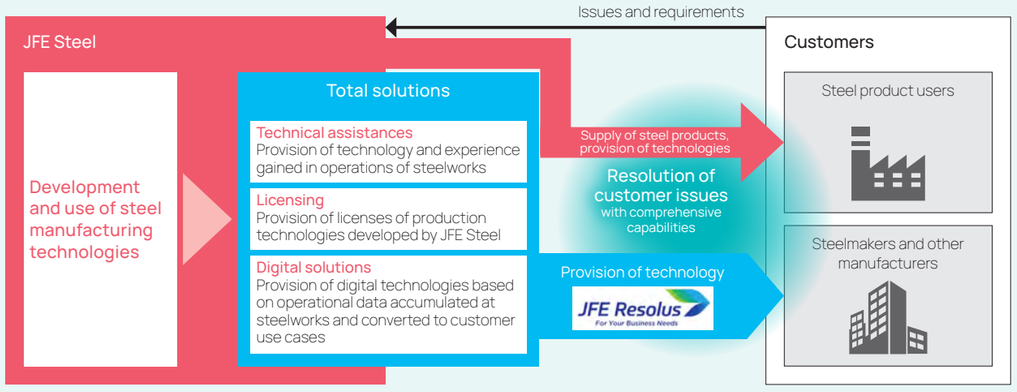
Overview of JFE Steel's Solution Business

JFE Steel has developed world-class steel manufacturing technologies, which have traditionally been used solely in the production of its own steel products. Under the Seventh Medium-term Business Plan, however, the Company aims to expand the solution business and has shifted its strategy from keeping these technologies in-house to proactively offering them to external companies. JFE Steel now intends to provide total solutions that combine technical assistances, licensing, digital solutions to solve issues faced by customers in a broad range of manufacturing sectors, starting with the steel industry.

This has resulted in greater technological cooperation that had been previously limited to partner companies, leading to an increase in revenue. Compared to the fiscal 2020 level, revenue was 1.5 times higher in fiscal 2022 and 2.0 times higher in fiscal 2023. JFE Steel plans to further expand its customer base in fiscal 2024, and expects revenue to reach 3.0 times the level in fiscal 2020. The Company will offer a wide range of solutions based on accurate understanding of customer needs, and aims to contribute to society while expanding revenue further.



External disclosure and provision of technologies



Message from the General Manager of the Technical Solution Department

JFE Steel's solution business aims to broadly offer the manufacturing and operations technologies it has developed through steelmaking, especially to customers in the manufacturing industry, as a part of contributing to the advancement of society. As a steelmaking engineer myself, I have dedicated many years to the production of high-grade steel and the advancement of manufacturing processes. This new initiative of offering these technologies and experiences to customers in a wide range of manufacturing sectors, including other companies in the steel industry, is a mission that encourages with a strong sense of purpose and fulfillment from maximizing the value of what we have built. The hallmark of our solutions lies in sharing with customers the challenges we have faced and overcome on our own, and we spare no effort in this endeavor. Our internal organization is a diverse mix of technical and administrative personnel, ranging from young members to seasoned veterans, all working together with an air of excitement. We are also actively collaborating with external partners. Looking ahead, we aim to grow the solution business into a core pillar of our operations, on par with the manufacture and sale of steel products.

Momoki Kamo
General Manager, Technical Solution Department, JFE Steel Corporation

Provision of Technologies to Overseas Partners

To support the acceleration and expansion of overseas business, a key initiative of the Seventh Medium-term Business Plan, the company continues to proactively provide technical assistances and manufacturing licenses to our partners.

For JSW Steel in India, the company has provided manufacturing technology for automotive steel sheets produced at its main steelworks, Vijayanagar Works, while also offering a broad range of technical support across various fields. In Vietnam, JFE Steel has partial ownership of Formosa Ha Tinh Steel Corporation, which was established by the Formosa Plastics Group, a comprehensive petrochemicals producer in Taiwan. JFE Steel helped Formosa Ha Tinh Steel launch operations of its integrated steelworks, followed by ongoing assistance to improve operations, focusing on blast furnaces, steelmaking, and hot rolling processes.

Furthermore, the company has started to proactively offer new digital technology solutions to its overseas partners.

Formosa Ha Tinh Steel Corporation's integrated steelworks

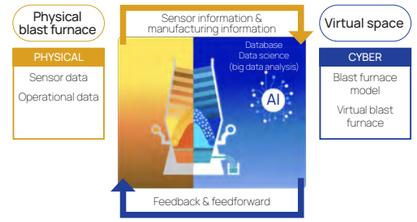
Providing Solutions that Utilize Digital and Robotics Technologies

Steel Technology

(1) Intelligent Blast Furnace Operation Support System (Blast Furnace CPS [Cyber-Physical System])

This system visualizes the condition of the blast furnace and warns when it predicts anomalies. It helps prevent major malfunctions in the blast furnace, ensures high-efficiency and stable operations, and contributes to the reduction of CO_2 emissions.

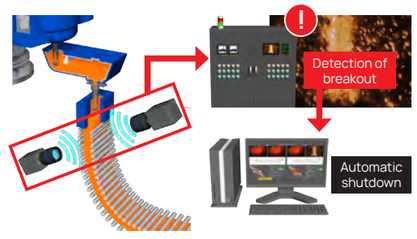
This system was installed at the No. 4 blast furnace of JSW Steel's Vijayanagar Works, and trial operations commenced at the outset of 2024.



(2) BO-Eye™ Breakout Detection System for Continuous Casting Machines

This system is designed to rapidly detect and minimize the impact of breakout incidents in continuous casting machines used in the steelmaking process, by constantly monitoring and analyzing images from cameras installed inside the machine, and automatically shutting down operations if a problem is detected.

The company will deliver the system to Formosa Ha Tinh Steel Corporation in 2024.



Multi-Use Technologies

(1) Fault Recovery Support System J-mAlster™

J-mAlster™ system facilitates appropriate responses in the event of equipment failures by using AI to provide optimal data sources from among massive amounts of stored data encompassing the history of past failures, response logs, operating manuals, and similar sources. It is particularly well-suited to addressing the challenge of skill transfer at manufacturing sites where a new generation of workers is being trained.

Developed in collaboration with IBM Japan, Ltd., sales of this system were launched in September 2023, targeting a wide range of domestic and international customers. Through the widespread adoption of this system, the company aims to help its customers solve their problems.

Concept of the Solution Business Brand JFE Resolus™

In May 2024, JFE Steel launched the new solution business brand JFE Resolus™ for the technologies it has been selling. The name JFE Resolus™ stands for JFE Steel, Revolution, Solution, and Synergy, expressing our commitment to meeting our customers' business needs through innovative solutions not seen before and creating synergies with customers.

For more details, please visit the JFE Steel Solution Business website: **https://www.jfe-steel.co.jp/en/products/solution/**

Seventh Medium-term Business Plan: Strategy 4

Intellectual Property Activities

The JFE Group strategically strengthens the intellectual property (IP) generated as a result of its advanced research and development to ensure sustainable growth. The Group also encourages international standardization and engages in other activities that further enhance its competitive edge.

STRATEGY / 4

JFE Group's Approach to IP

Under the corporate vision of "contributing to society with the world's most innovative technology," the JFE Group engages in highly creative research and development. The advanced technologies and products that result from research and development are vital management resources of the Group and essential for maintaining its competitiveness and achieving sustainable growth. We are committed to appropriately securing, strategically protecting, and utilizing these innovations as intellectual property.

Patent holdings (as of April 2024)

Domestic	Approx. 14,000 patents	International*	Approx. 14,000 patents

* Total number of registered patents in various countries

Outcomes of JFE Steel's IP Activities

JFE Steel is focused on building an IP portfolio that supports its business strategy, emphasizing both the quantity and quality of its IP rights. JFE Steel holds more than 10,000 patents both domestically and internationally, and has strategically increased its patent applications in foreign countries to support the expansion of its overseas business. As a result, the number of new international patent (PCT) publications reached 418 in fiscal 2023, the highest among global steel companies. These efforts have also led to the expansion of overseas patent licensing.

To encourage the creation of outstanding inventions, JFE Steel established the JFE Steel Patent Award system in 2018. The president recognizes more than 10 patent inventors every year.

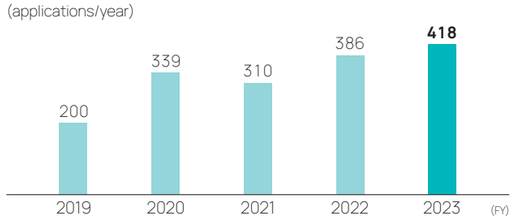
The patents we generate through these activities are highly regarded externally as well. For instance, our patent for highly weather-resistant steel usable without paint near coastal areas was honored with the Fiscal 2024 Invention Award at the National Invention Award hosted by the Japan Institute of Invention and Innovation, marking the 10th award in 11 years.

Additionally, JFE Steel ranked first among steel companies in terms of the patent asset value per patent in Patent Asset Size Ranking 2023 for the steel, non-ferrous metals, and metal products sector, as announced by Patent Result Co., Ltd.

Moreover, alongside our patent initiatives, we are advancing brand strategies that enhance corporate value, such as launching the green steel JGreeX™, the solution business brand JFE Resolus™ for manufacturing technologies, and the EVI brand JFESCRUM™ in the building materials sector.

Number of new international patent (PCT) publications

(applications/year)



JFE Resolus For Your Business Needs

JFESCRUM

JGreeX

Recent major external awards related to intellectual property and technology development

Awards	Invention	Organizers
FY2024 National Invention Award: Invention Award	Highly weather-resistant steel usable without paint near coastal areas	Japan Institute of Invention and Innovation
FY2023 Chugoku Region Invention Award: Awarded by the Minister of Education, Culture, Sports, Science and Technology	Steel sheet shape control technology in temper rolling	Japan Institute of Invention and Innovation
FY2023 Kanto Region Invention Award: Awarded by the Commissioner of the Japan Patent Office	Electrical steel sheets contributing to the enhancement of EV performance	Japan Institute of Invention and Innovation
FY2023 Okochi Memorial Technology Prize	Automation of blast furnace operations using cyber physical systems (CPS)	Okochi Memorial Foundation

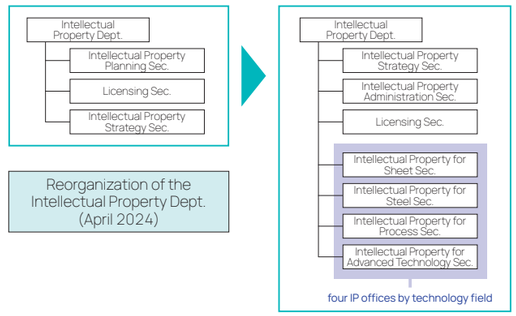
R&D and IP System to Accelerate Management Strategy

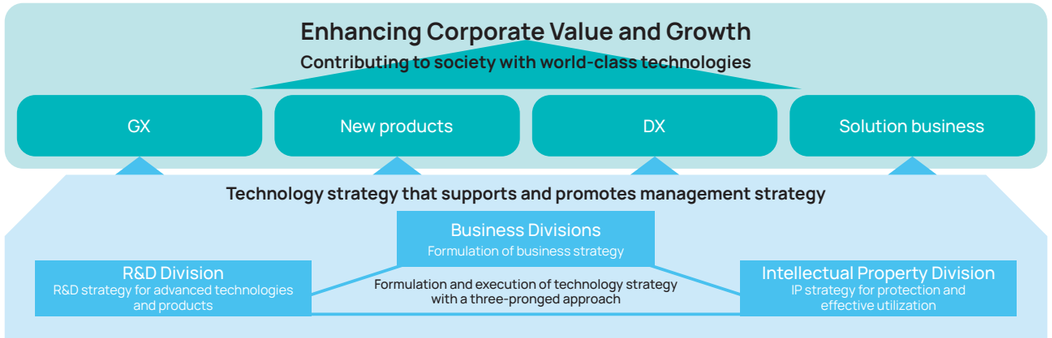
Intellectual property, which results from the development of technologies, is an important facet of our management strategy. At JFE Steel, the Intellectual Property Division plays a central role in setting up cross-departmental IP strategy meetings in various fields, ensuring a unified effort among business divisions, the R&D Division, and the Intellectual Property Division in formulating and executing technology strategies. In the R&D Division, the Steel Research Laboratory is creating a world-class technological development system that combines three fields. The first is the product development technology field, where new products, including high-value-added products, are developed. The second field is process technology, where new technologies are developed to improve productivity and reduce CO_2 emissions in manufacturing processes. The third field is Common Fundamental Technologies, such as for digital transformation (DX).

To promote strategic IP activities, the Intellectual Property Department is also responsible for developing IP talent, and underwent a reorganization in April 2024 to enhance functions. The IP Strategy Section was created to efficiently advance IP strategies across all fields, with a focus on critical areas such as the solution business and DX/ Green transformation initiatives. We expect the solution business to become a new business model for the JFE Group. In the solution business, we are advancing projects in collaboration with related departments, utilizing IP landscape techniques for seed development and need exploration. Additionally, four new IP Section were established in different technology fields to efficiently plan and execute IP strategies tailored to each field.

This robust structure ensures that the business divisions, R&D Division, and Intellectual Property Division work in unison to efficiently advance concrete technology strategies in each key area of the management strategy. By properly managing our proprietary technologies, a source of strength, as intellectual property, we not only drive growth in existing businesses but also make progress expanding new business models, with these technologies acting as seeds for the solution business.

Intellectual Property Dept. : Organization Chart





Initiatives in International Rule-Making and Standardization

JFE Steel actively participates in the formation of international rules and standards that are essential to the future of the steel industry, and strongly encourages their adoption. In the industry (The Japan Iron and Steel Federation), JFE Steel has been recognized as one of the few accredited industrial standardization bodies that undertakes standardization activities. Recently, Japan has taken on the role of chair and secretariat country for the newly established Environmental Subcommittee under ISO/TC17 (Steel). In the domestic committee, JFE Steel and other companies are involved in not only developing ISO standards but also exploring the potential of using standards as a market creation strategy with various companies. JFE Steel collaborates with the industry in these standardization activities, playing a key role in the development of international standards such as ISO 20915,* which outlines methodologies for calculating the life cycle environmental impact of steel products.

JFE Steel is also focused on differentiating its technology development and ensuring the appropriate protection of its IP rights. By linking standardization strategies and IP strategies with its management strategy from the R&D stage in collaboration with the Chief Standardization Officer (CSO), the Company aims to contribute to the steel industry while securing a competitive advantage within and outside the industry.

* Please refer to Page 11 LCA (Life Cycle Assessment) of Steel .

Seventh Medium-term Business Plan: Strategy 5

Promotion of DX Strategy

The JFE Group positions its DX strategy as one of the key strategies that will determine the success of the most significant transformation since its founding. Through this strategy, we are keen to unlock sustainable growth and enhance corporate value over the medium to long term.

STRATEGY / 5

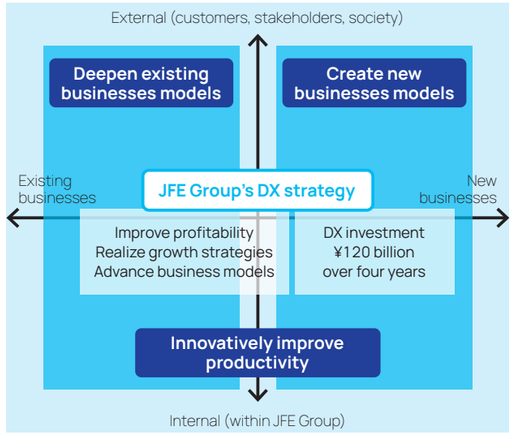
JFE Group's DX Strategy

Using its world-class technologies, the JFE Group creates value that supports society with its constantly evolving know-how and technologies, along with volumes of operational data accumulated over years of diverse business activities. We are advancing the use of these intangible assets by integrating them with cutting-edge technologies, such as AI, IoT, and data science. Both JFE Steel and JFE Engineering are creating environments that enable more advanced data utilization by building their own data platforms in the cloud, facilitating the integration of business and operational data and interactions with new technologies. Building on this foundation, we aim to further enhance productivity, deepen existing businesses, and create new ones. This will help us improve profitability while providing products and services that address various issues, such as labor shortages and the realization of a carbon-neutral society .

Under the Seventh Medium-term Business Plan, we have budgeted ¥120 billion for investments over four years and are steadily moving forward with our investment plans. Additionally, each operating company is training DX talent, including through DX literacy courses to elevate employees' digital skills and prepare them for advanced applications. (DX Human Resource Development on page 65)

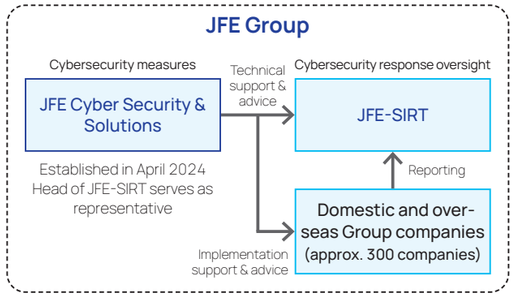
Furthermore, it is vital that we address increasingly sophisticated cyberattacks and the risk of information leaks, an extremely important management issue that cannot be overlooked, while we expand our business globally. The JFE Group established JFE-SIRT* in 2016 and JFE Cyber Security & Solutions, Ltd. under JFE Steel in April 2024. By strengthening the security monitoring system and acquiring and training security experts, the JFE Group will further enhance the security of the entire supply chain, covering approximately 300 Group companies.

* JFE-SIRT stands for JFE Security Integration and Response Team, an organization responsible for all measures and responses to computer security issues within the JFE Group.



Source: "DX Stock Selection 2024 Report," Secretariat of DX Survey, Ministry of Economy, Trade and Industry

Role of JFE Cyber Security & Solutions, Ltd.



Selected as DX Stock 2024

The JFE Group's DX strategy has been externally recognized, as JFE was the only company in the steel industry to be selected among the 25 companies that were honored with the DX Stock 2024 Award. The recipients of this award are jointly selected by the Ministry of Economy, Trade and Industry, the Tokyo Stock Exchange, and Information-technology Promotion Agency, Japan (IPA), from among approximately 3,800 listed companies. Since the launch of the Competitive IT Stock Award in 2015, the forerunner to the DX Stock Award, this marks the ninth time that JFE has been selected for this prestigious award.*

* In 2023, JFE was selected as a Noteworthy DX Company.

DX Stock (in Japanese only): **https://www.meti.go.jp/policy/it_policy/investment/keiei_meigara/dx_meigara.html**

DX銘柄2024
Digital Transformation

Initiatives of Operating Companies

JFE Steel — Acceleration of internal DX through organizational restructuring and promotion of solution business

In April 2024, JFE Steel launched the DX Strategy Headquarters by integrating internal IT, control, and data science departments. This new headquarters is tasked with 1) advancing the formulation and execution of a consistent DX strategy, 2) increasing efficiencies in technology development, implementation, deployment, and maintenance, and 3) strongly promoting the solution business. As part of strengthening the manufacturing base, the JFE Group aims to fully implement cyber-physical systems (CPS) in all processes, and has successfully automated the operations of some blast furnaces. Notably, our automation of blast furnace operations using CPS was awarded the 70th Okochi Memorial Technology Prize.

Additionally, we independently developed a self-propelled cleaning robot capable of operating in harsh conditions and a steel pipe grinding robot, both of which help to improve labor productivity while eliminating the so-called "3Ks" (*kitanai*, *kiken*, *kitsui*—dirty, dangerous, demanding) in workplaces.

JFE Steel is making steady progress on the full transition of all core systems to the cloud environment, with some product lines already finished at the Sendai Works and West Japan Works. Plans call for the main systems to finish the transition in fiscal 2025.

For more details on our initiatives in the solution business, please refer to page 39.

New DX promotion structure

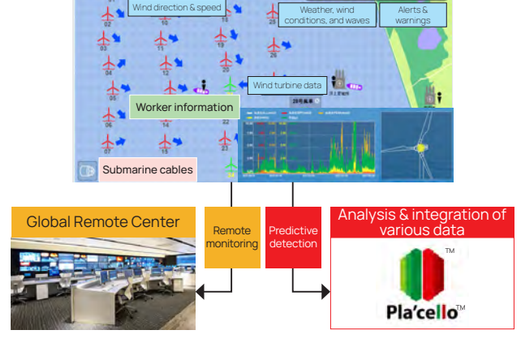
DX Strategy Headquarters	Digital Transformation Planning Dept.	Planning and formulation of DX strategies, development of DX-related products, and support for external sales
	Digitalization Leading Dept.	Operation and development of core systems, and support for business process reforms
	Intelligent Technology Development Dept.	Companywide deployment of technologies related to manufacturing processes and agile development of models
	Smart Factory Leading Dept. Automation Engineering Sec., Iron & Steelmaking Sec., Rolling Sec.	Implementation of developed technologies, such as CPS, automation, and voice/image recognition

Cleaning robot for harsh conditions

JFE Engineering — Advancing DX that contributes to expansion of offshore wind power generation

JFE Engineering is leveraging the digital technologies developed through its extensive experience in plant construction and operation to expand into new business domains. In the operation and maintenance (O&M) field for offshore wind power generation, JFE Engineering has developed ASUNAG, an integrated management system that enables flexible management of various information essential for the reliable operation of offshore wind projects, such as substation facilities, weather conditions, and maritime data. In November 2023, the first ASUNAG system was delivered to the Nyuzen Offshore Wind Power Farm, operated by Nyuzen Marine Wind LLC. JFE Engineering aims to achieve labor-saving and efficiency improvements in the management and operation of power generation facilities by utilizing the technology and expertise accumulated through its operation of the Global Remote Center which monitors 88 locations domestically and internationally (as of the end of March 2024), as well as its big data analysis technology for predictive detection, and its proprietary data analysis platform Pla'cello™.

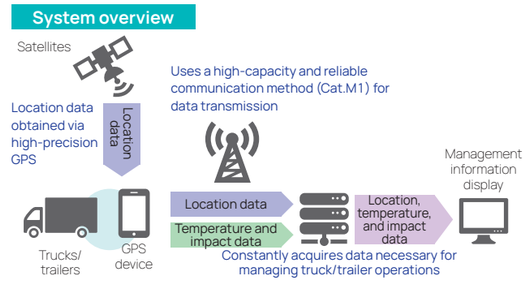
Diagram of ASUNAG integrated management system for offshore wind power



JFE Shoji — Logistics DX Solutions
Increase logistics efficiency and visualize truck and trailer operations with GPS

At JFE Shoji, efforts are underway to enhance the efficiency of the logistics supply chain by leveraging DX. In spring 2024, JFE Shoji Electronics began a pilot test of a logistics tracking solution service that uses GPS devices. These GPS devices allow the visualization of information, such as location, temperature, and impacts, contributing to the optimization of truck and trailer operations while reducing the workload of drivers, in a bid to address the so-called 2024 Problem and improve transportation quality.

Diagram of logistics DX solution system



Seventh Medium-term Business Plan: Strategy 6

Promotion of the JFE Group Environmental Vision for 2050 to Achieve Carbon Neutrality

STRATEGY / 6

As part of its mission to be essential to society's sustainable development and to create safe, comfortable lives for people everywhere, the JFE Group recognizes climate change as a critical management issue that must be addressed to achieve sustainable growth and enhance corporate value over the medium to long term. We are committed to developing various technologies and exploring all possibilities to achieve the ambitious goal of carbon neutrality by 2050 .

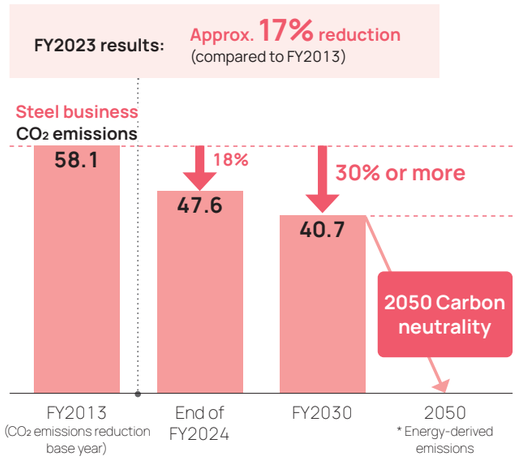
Progress on the JFE Group Environmental Vision for 2050

In 2021, the JFE Group formulated the JFE Group Environmental Vision for 2050 to achieve carbon neutrality by 2050, positioning climate change initiatives as one of the most important issues in its Seventh Medium-term Business Plan. In formulating this vision, we will systematically work to resolve climate change problems while reflecting TCFD concepts in our management strategy.

In the steel business, we aim to reduce CO_2 emissions by at least 18% by the end of fiscal 2024, compared with the fiscal 2013 level. The JFE Group targets a reduction of more than 30% in CO_2 emissions by fiscal 2030, compared with the fiscal 2013 level. To explore all possibilities to achieve carbon neutrality by 2050, we will take on the challenge of developing ultra-innovative technologies such as carbon-recycling blast furnaces developed with our unique technology while also adopting a multitrack approach for pursuing other technologies. In our engineering business, we will expand our contribution to the reduction of CO_2 emissions in society as a whole by expanding and advancing renewable power generation and carbon-recycling technologies, by supplying high-performance steel products in the steel business, and through other initiatives. Furthermore, we will accelerate commercialization of our offshore wind power business by applying the strengths of the Group.

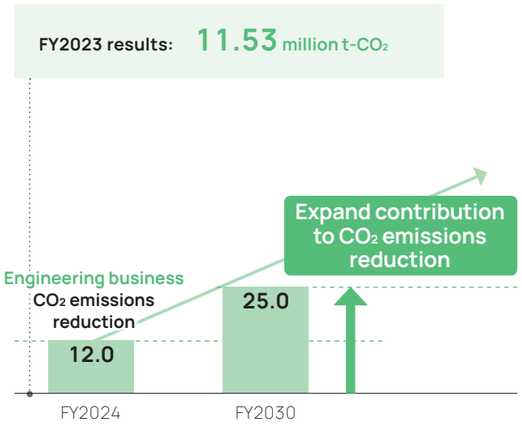
Steel business
Carbon neutrality by 2050

(million tons/year)



Engineering business
Expand contributions to CO_2 emissions reduction in society

(million tons/year)



Expansion of JGreeX™ Supply

In the first half of fiscal 2023, JFE Steel commenced the supply of JGreeX™, a steel product that offers significantly reduced CO_2 emissions compared to conventional products. JGreeX™ has already been adopted by multiple shipping companies, and sales are poised to expand. Reduction of CO_2 emissions by our technologies are allocated to any products upon the application of the mass balance approach with third-party certificate. By supplying the steel products as a green steel with high environmental value, JFE Steel contributes to the reduction of customers' CO_2 emissions.

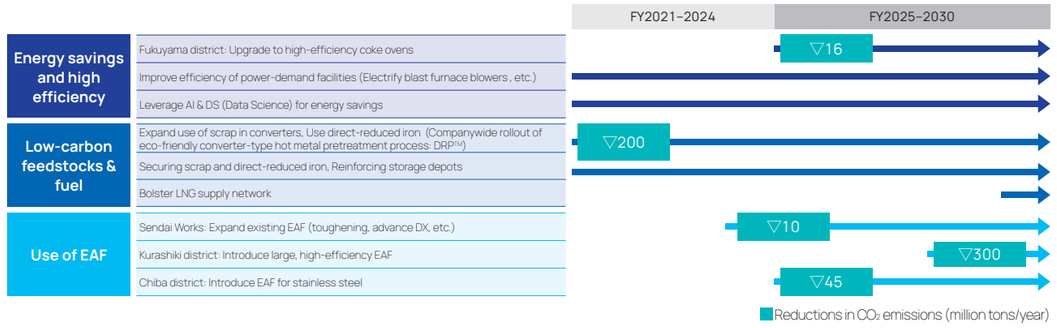
As reduction of CO_2 emissions across the whole supply chain gains momentum, JFE Steel aims to achieve further reduction by expanding adoption of various low-carbon technologies, energy-saving, and energy-efficiency technologies. JFE Steel will also contribute to the decarbonization of society by expanding the supply capacity of JGreeX™.

Demand for green steel is still in its early stages. JFE Steel believes that institutional backing such as government policies is needed to raise awareness of the environmental value of green steel and to stimulate demand. JFE Steel is actively engaging with governments on this front.

JGreeX

Transition to Low-Carbon Steel Process

JFE Steel is advancing multifaceted efforts, including the development of ultra-innovative technologies, toward achieving carbon neutrality by 2050. In the steel business, we have defined the period up to 2030 as the transition phase, and the period thereafter as the innovation phase. During the transition phase, JFE Steel is working on energy conservation and efficiency improvements in existing processes, as well as the utilization of electric arc furnace (EAF) technology. In anticipation of achieving our CO_2 emissions reduction target for fiscal 2030, we see the potential need for investments and loans on the order of ¥1 trillion, and have authorized approximately ¥300 billion as of fiscal 2023. In fiscal 2024, we plan to make an investment decision about installing a high-efficiency large-scale EAF in the Kurashiki district of the West Japan Works, which will enable the production of high-quality steel previously achievable only in traditional blast furnace basic oxygen furnace (BF-BOF) processes. JFE Steel will continue to steadily authorize and execute the necessary investments and loans to achieve these reduction targets.



Development of Ultra-Innovative Technologies

During the innovation phase, we will challenge ourselves with the research and development of ultra-innovative technologies such as carbon-recycling blast furnaces and hydrogen steelmaking (direct reduction), to achieve carbon neutrality by 2050. With the aim of achieving carbon neutrality by 2050, JFE Steel has formed a consortium with Nippon Steel Corporation, Kobe Steel, Ltd., and the Japan Research and Development Center for Metals that won a contract (project scale is approximately ¥573.7 billion*1) from NEDO (New Energy and Industrial Technology Development Organization) for its Green Innovation Fund Project / Project to Hydrogen Utilization in Iron and Steelmaking Process (GREINS). In total, the four companies have received roughly ¥449.9 billion in assistance.*2 JFE Steel is constructing facilities at East Japan Works (Chiba district) for conducting demonstration tests related to these projects, such as the carbon-recycling blast furnace, and has commenced some of the experiments. We aim to complete the development of these ultra-innovative technologies by the mid-2030s.

Furthermore, achieving carbon neutrality in steelmaking processes requires not only individual company efforts but also government policies and support. We are proactively proposing energy policies, including the necessity for a stable and large-scale supply of green electricity and the establishment of a hydrogen supply chain, at government-led study groups, subcommittees, and through industry organizations such as the Japan Iron and Steel Federation and Keidanren (Japan Business Federation). (Policy Engagement for Achieving Carbon Neutrality on page 67)

*1 Source: NEDO's materials outlining the Project to Hydrogen Utilization in Iron and Steelmaking Process (GREINS) (May 24, 2024).
*2 Includes incentive amounts. May change based on progress of project at future stage gates.

Details of plan for demonstration tests

Carbon-recycling blast furnace (150 m³ capacity)	Plan to start site construction in 2023, launch operations in April 2025, and complete demonstration tests by 2026
Direct reduction compact bench pilot furnace	Plan to start site construction in 2023, launch operations in the second half of 2024, and complete demonstration test by 2026
Pilot EAF (10 t pilot furnace)	Plan to start site construction in 2023, launch operations in the second half of 2024, and complete demonstration test by 2025

Seventh Medium-term Business Plan: Strategy 6

Promotion of the JFE Group Environmental Vision for 2050 to Achieve Carbon Neutrality

Information Disclosure Based on the TCFD Recommendations

In May 2019, JFE Holdings endorsed the recommendations outlined in the final report by the Task Force on Climate-related Financial Disclosures (TCFD). Based on this report, the Company discloses information related to the climate change problem .

(For details, please refer to the JFE Group Sustainability Report at https://www.jfe-holdings.co.jp/en/sustainability/environment/climate/tcfd/)

Climate-related risks and opportunities significantly affect the finance of companies in the medium to long term. The TCFD is a task force established by the Financial Stability Board (FSB) as requested at the G20, to reduce risks that could destabilize the financial market. The TCFD reviews methods of information disclosure that allows the financial market to appropriately evaluate climate-related risks and opportunities, and announces them as final recommendation reports.

The TCFD considers it important for investors and other parties to accurately grasp what effects climate-related risks and opportunities pose on the financial conditions of the investee before financial decision-making, based on which the TCFD recommends that information related to four core elements in organizational management—Governance, Strategy, Risk management, and Metrics and targets—should be disclosed.

Governance

The JFE Group's Standards of Conduct states that we will actively work to exist harmoniously with the global environment, as well as to raise living standards and advance societies. We acknowledge that activities to protect the global environment, such as reinforcement of environmental conservation and response to climate change issues, are absolutely essential to achieving a sustainable society.

In fiscal 2016, we designated "mitigating climate change" as our CSR materiality in order to pursue a steady plan–do–check–act (PDCA) cycle and appropriate management of our ongoing initiatives to reduce CO_2 emissions in iron and steelmaking processes and to develop and provide environmentally friendly products. In 2021, we added an economic perspective to materiality, prioritized issues based on importance, and launched new initiatives to address these important management issues.

The JFE Group Environmental Committee, established under the JFE Group Sustainability Council and chaired by the President of JFE Holdings, supervises and directs these initiatives across the Group by setting targets, assessing progress, and holding discussions to improve the Group's overall performance.

The Group Management Strategy Committee also deliberates topics that are vital to our business, such as climate change issues, and reports to the Board of Directors. The Board of Directors provides supervision through discussions on environmental issues such as climate change based on these reports.

Examples of climate change-related issues reported to, deliberated, and decided at Board of Directors' meetings

- Declaration of endorsement of the final TCFD recommendation report
- Information disclosure following the TCFD recommendations (scenario analysis, etc.)
- Formulation of the JFE Group Environmental Vision for 2050 in the Seventh Medium-term Business Plan
- Review reduction targets for CO_2 emissions by fiscal 2030
- Introduce executive compensation linked to climate change indicators

Strategy

The many risks and opportunities involved with climate change issues are integrated into the business strategies of the JFE Group in the following ways. The Group has created the Seventh Medium-term Business Plan to guide business and operations from fiscal 2021 to fiscal 2024. Initiatives to address climate change are positioned as a high priority issue for management within the context of achieving sustained growth over the medium to long term for the Group while increasing corporate value.

Moreover, the Company formulated the JFE Group Environmental Vision for 2050 to plot a path toward achieving carbon neutrality by 2050, with ensuring environmental and social sustainability as a key measure. While incorporating initiatives to address climate change in business strategies, the Company is systematically tackling climate change by reflecting the concepts of the TCFD in business strategies. The JFE Group is disclosing scenario analysis and other information in accordance with the TCFD recommendations, and reflecting in its business strategies its assessments of identified risks and opportunities.

Under the JFE Group Environmental Vision for 2050, the Company engages in corporate activities based on the three strategies of reducing CO_2 emissions in the steel business, making greater contributions to CO_2 emissions reductions in society, and taking initiatives in the offshore wind power generation business. We are taking steps to reduce CO_2 emissions in the steelmaking process and also taking aggressive action to reduce burden on the environment by developing environmentally friendly products and process technologies, and providing solutions for recycling resources.

TCFD content index

TCFD Disclosure Recommendations	Summary of TCFD Recommendations	JFE's Disclosure (relevant sections in the Sustainability Report)
‹Governance› Disclose the organization's governance associated with climate-related risks and opportunities	a. Describe the Board of Directors' oversight of climate-related risks and opportunities	Corporate governance Risk management Climate change (Governance)
	b. Describe assessment of climate-related risks and opportunities, and management's role in company management	
‹Strategy› Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's business, strategy, and financial planning (if such information is important)	a. Describe the climate-related risks and opportunities over the short, medium, and long term the organization has identified	Seventh Medium-term Business Plan (Major measures) JFE Group's value chain Climate change (JFE Group Environmental Vision for 2050) Climate change (JFE Group's climate change strategy) Scenario analysis based on the TCFD recommendations
	b. Describe the impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning	
	c. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C scenario	
‹Risk management› Disclose the processes used by the organization to identify, assess, and manage climate-related risks	a. Describe the organization's processes for identifying and assessing climate-related risks	Risk management Environmental management Climate change (Risk management)
	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 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	Seventh Medium-term Business Plan (Major measures) Important management issues (materiality) Climate change (Metrics and targets)
	b. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 GHG emissions, and the related risks	Climate change (Metrics and targets) Environmental data
	c. Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets	Important management issues (materiality) Climate change (JFE Group Environmental Vision for 2050) Climate change (Metrics and targets)

Risk management

JFE Holdings is responsible for comprehensive risk management in accordance with its Basic Stance for Building an Internal Control System. The JFE Group Sustainability Council, chaired by the President of JFE Holdings, collects Groupwide information and enhances management for the purpose of reducing the frequency and impact of risks. The Corporate Officer responsible for risk works to identify potential risks associated with ESG risks such as climate change. If potential risks are identified, they are reviewed and assessed by the JFE Group Sustainability Council as necessary for further examination or the deployment of countermeasures.

The Board of Directors deliberates, decides, and receives reports on important matters related to ESG risks and sustainability, including climate change issues.

We identify and evaluate climate-related risks at the corporate level, taking into account scenario analysis based on the framework recommended by the TCFD. We select material factors impacting business and perform a closer analysis of their effects, then utilize this in formulating future business strategies, including the Seventh Medium-term Business Plan.

Methods of monitoring risks relating to climate change

The JFE Group Sustainability Council, the Group Management Strategy Committee, and the Management Committee monitor risks that may impact our business. Monitoring is conducted through quarterly reports on climate change issues from each operating company deliberated by its environmental committee, etc., to take suitable measures. The JFE Group Environmental Committee strengthens the collection and management of information relating to risks, to not only reduce the likelihood of risks occurring and their impact but also to strive to maximize opportunities.

Metrics and targets

In May 2021, the JFE Group announced new targets for reducing CO_2 emissions, formulating the JFE Group Environmental Vision for 2050, which aims to achieve carbon neutrality by 2050. Initiatives to address climate change are also positioned as an issue of the highest priority in the Seventh Medium-term Business Plan. In February 2022, we raised the fiscal 2030 CO_2 emissions reduction target for the steel business to 30% or more, compared with fiscal 2013. Moreover, JFE Steel's major domestic Group companies set CO_2 emissions reduction targets on a par with JFE Steel. Our business strategies include the initiatives of all Group companies within and outside Japan to tackle climate change.

Seventh Medium-term Business Plan: Strategy 6

Promotion of the JFE Group Environmental Vision for 2050 to Achieve Carbon Neutrality

Scenario analysis

While using scenario analysis to correctly understand the risks and opportunities related to climate, we evaluate the effects they have on current business strategies, and utilize them in establishing future strategies. Due to our business having the potential to be significantly affected by climate change, we analyze a wide range of scenarios, including the 1.5°C, 2°C, and 4°C scenarios. In fiscal 2023, we newly disclosed calculations of the impact on finances from risks and opportunities.

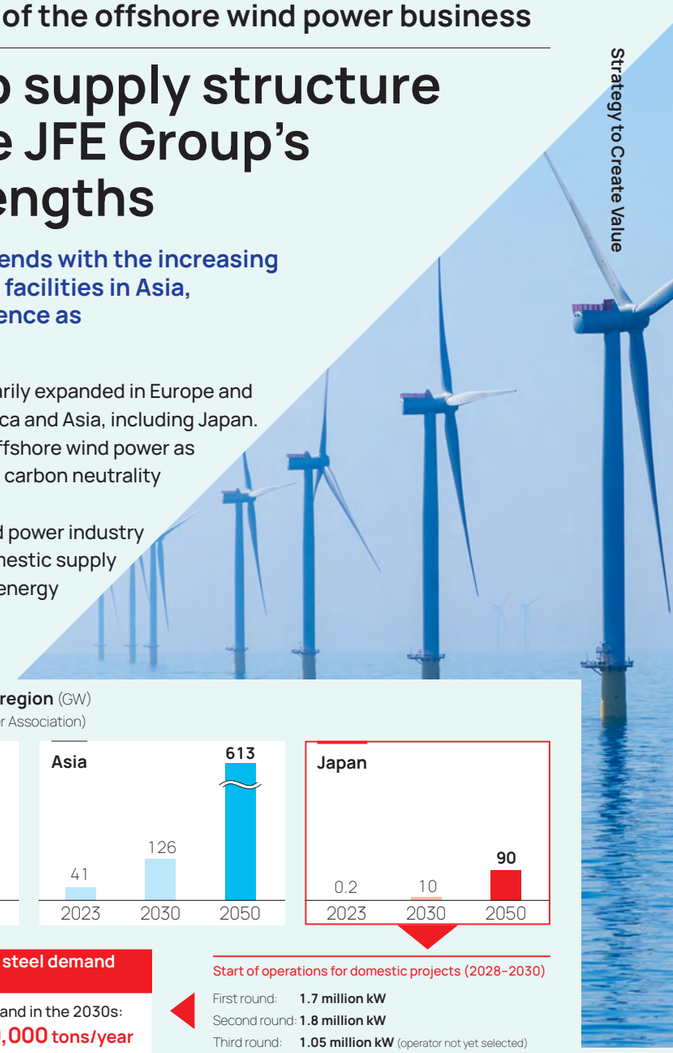
All scenarios are based on the scenarios announced by the International Energy Agency (IEA). The analysis was performed under the assumption that carbon pricing would be introduced into major CO_2 generating countries in order to achieve the 2°C target. Under the 1.5°C scenario we added for reference, we need to accelerate the development and implementation of decarbonization technologies, but there are issues related to development costs, green hydrogen, and green electricity that need to be addressed. The JFE Group is promoting various measures to decarbonize ahead of schedule.

	Societal Changes	Opportunities/Risks		Expectations and Concerns of Stakeholders toward the JFE Group	Strategies and Initiatives	Financial Impact (2030 Estimates)*	
						Item	Amount/scale
1.5°C / 2°C scenario Important factor ① Decarbonization in steel production processes	Increasing in societal demands for decarbonization of steel production processes	Introduction of ultra-innovative technologies for drastic decarbonization	Opportunities	JFE leading the supply of high-environmental-value steel through the introduction of ultra-innovative technologies such as EAF	• Implementation of conventional low-carbon technologies • Introduction of large-scale EAF capable of producing high-quality steel • Utilization of low-carbon direct-reduced iron • Development and implementation of ultra-innovative technologies • Studies of feasibility to commercialize CCUS • Expansion of JGreeX™ supply capacity • Lobbying to create demand for steel with environmental value • Collaboration with other companies in the Japan Iron and Steel Federation to promote steel with environmental value	Increase in sales of steel with added environmental value	+¥120 billion to +¥150 billion per year
			Transition risks	Increase in investment to introduce ultra-innovative technologies such as EAF	• Reinforcement of the earnings base • Secure funding for investments and technology development • Lobbying for government support • Expansion of JGreeX™ sales	Amount of GX-related investment for 2024–2030	Approx. -¥0.7 trillion
		Implementation of carbon pricing	Transition risks	Higher financial burden due to the mandatory implementation of carbon pricing Further deepening/strengthening of targets due to environmental changes	• Establishment of reliable carbon-neutral technologies • Policy engagement toward achieving carbon neutrality	Increase in carbon pricing burden	Approx. -¥10 billion per 1% shortfall from emissions reduction target per year
1.5°C / 2°C scenario Important factor ② Increase in demand for the effective utilization of steel scraps	Increased attention on EAF process as low CO_2 emission	Higher competition and prices for cold iron sources (scrap/direct-reduced iron)	Transition risks	Increase in the cost of purchasing cold iron sources	• Collaboration with customers and users for scrap collection • Establishment of technologies for use of low-grade and difficult-to-use scrap • Participation in direct-reduced iron projects • Expansion of scrap handling volume • Reduction of manufacturing costs • Pass higher costs onto steel prices	Increase in purchase cost for cold iron sources	Up to about ¥50 billion per year
		Stronger demand for electric power due to shift from BF-BOF process to EAF process	Transition risks	Increase in manufacturing costs due to higher electricity usage (increase in electricity consumption, reduction in co-product gas generation)	• Reduction of manufacturing costs • Pass higher costs onto steel prices • Lobbying for stable electricity supply and prices	Increase in manufacturing costs due to process transition (equivalent to 0.5 nuclear power plants' worth of additional electricity usage)	Undisclosed due to relationship with management strategy
1.5°C / 2°C scenario Important factor ③ Change in demand for steel for automotive use	Change in demand for automobiles	Changes in product sales mix due to EV production	Opportunities	Increase in sales volume of electrical steel as material for EV motors	• Expansion of production facilities for electrical steel sheets • Establishment of a global processing and distribution system for electrical steel sheets	Increase in sales of electrical steel sheets	Undisclosed due to relationship with management strategy
			Opportunities	Increase in sales volume of high-strength steel to improve vehicle crush safety	Increase in production capacity for ultra-high-strength steel sheets	Increase in sales due to expanded orders for high-strength steel sheets	
			Transition risks	Decrease in steel sales volume due to decline in internal combustion engines and shift to other materials through use of multi-materials	Development of high-performance products	Decrease in sales of conventional automotive steel sheets	Small impact
1.5°C / 2°C scenario Important factor ④ Increase in demand for solutions promoting decarbonization	Transition to decarbonized society	Expansion of business opportunities in decarbonization and solution business	Opportunities	Expansion of renewable energy-related business	Expansion of integrated construction and operation businesses for renewable energy plants (biomass, geothermal, solar, offshore wind, etc.)	Sales in carbon neutrality-related fields in the engineering business	Approx. ¥200 billion per year
			Opportunities	Expansion of low-carbon business (eco-solutions) as cutting-edge energy conservation technologies developed and commercialized in Japan are offered to emerging countries	Support for low-carbon steel manufacturing technology	Increase in sales in the overseas solution business	Currently being calculated
4°C scenario Important factor ⑤ Unstable procurement of raw materials due to increased frequency in climate disasters	Intensifying climate disasters alongside global warming	Instability in raw material procurement	Physical risks	Reduction in sales due to decreases in production Increase in raw material costs	• Alternative procurement, diversification of raw material sources, and stockpiling • Acquisition of raw material interests	Decrease in sales of steel due to depletion of raw material inventories	Approx. -¥30 billion per year per 1% decrease in annual sales volume
4°C scenario Important factor ⑥ Damages to business bases due to climate disasters	Intensifying climate disasters alongside global warming	Occurrence of typhoon, heavy rain, and drought damage at manufacturing sites	Physical risks	Reduction in sales due to decreases in production	Implementation of flood and drought countermeasures at manufacturing sites	Negative impact of flooding and drought on production and sales	No impact due to countermeasures in place
4°C scenario Important factor ⑦ National resilience	Intensifying climate disasters alongside global warming	Strengthening of infrastructure and disaster countermeasures	Opportunities	Increase in orders due to investments to make infrastructure more resilient and last longer	• Strengthening of businesses to meet needs for improving resilience and longevity of domestic and international infrastructure • Increase in sales of infrastructure-related steel products	Increase in sales in infrastructure field of the engineering business	Currently difficult to estimate

* Financial impact is solely an estimated figure based on scenario analysis and does not match with actual business performance.

Advancing the commercialization of the offshore wind power business

Building a full lineup supply structure while leveraging the JFE Group's comprehensive strengths



Point 1

Capitalizing on changing market trends with the increasing installation of offshore wind power facilities in Asia, JFE aims to establish a strong presence as a leading supplier in Japan.

The offshore wind power business has primarily expanded in Europe and China, but growth looks likely in North America and Asia, including Japan. The Japanese government has positioned offshore wind power as a key renewable energy source for achieving carbon neutrality by 2050.

However, since most of the offshore wind power industry is based overseas, establishing a robust domestic supply chain is critical from the standpoint of both energy security and economic security.

Forecast of cumulative offshore wind power installation by region (GW)
(Based on IRENA's "Future of Wind" (2019) and data from the Japan Wind Power Association)

Forecast for domestic monopile steel demand
(JFE's own estimate)

Steel demand in 2026: **100,000 tons/year**

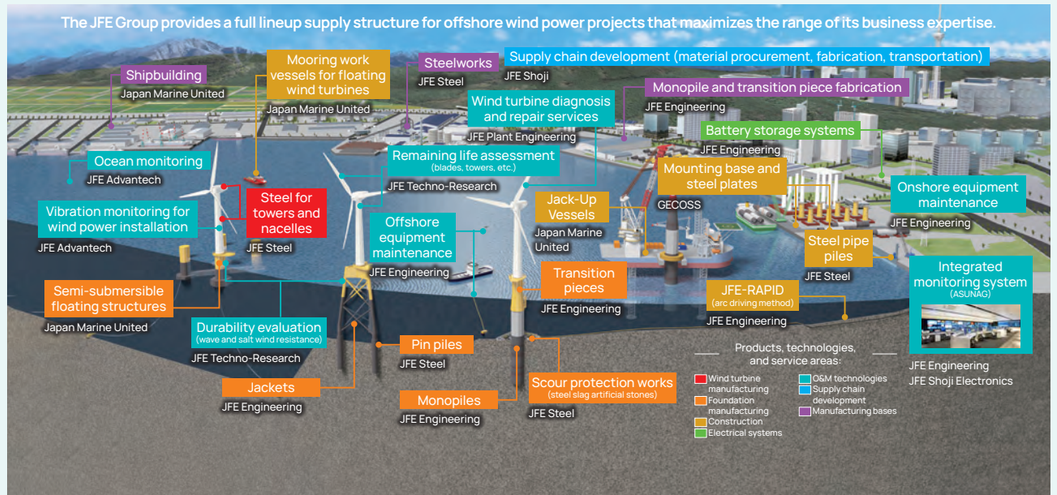
Steel demand in the 2030s: **Over 200,000 tons/year**

Start of operations for domestic projects (2028–2030)

First round: **1.7 million kW**
Second round: **1.8 million kW**
Third round: **1.05 million kW** (operator not yet selected)

Point 2

The JFE Group's strengths are derived from its ability to leverage the collective expertise of its diverse businesses that span steel, engineering, trading, and shipbuilding. By maximizing the Group's comprehensive capabilities, JFE is building a full lineup supply structure to contribute to the development of the offshore wind power business and the realization of a carbon-neutral society.



Seventh Medium-term Business Plan: Strategy 6

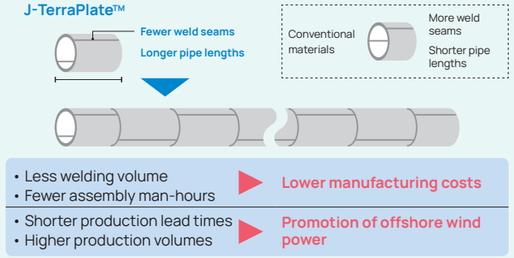
Advancing the commercialization of the offshore wind power business

JFE Steel

Supporting Tomorrow's Green Energy with J-TerraPlate™ large and heavy Steel Plates

As offshore wind turbines grow in size to reduce power generation costs and increase output, the foundation structures that support these turbines are also becoming larger. To meet this need, JFE Steel is enhancing its production system for steel plates used in monopiles, a key component of foundation structures for offshore wind turbines. The startup of the seventh continuous casting machine at the West Japan Works (Kurashiki district) in 2021 has enabled the production of larger and heavier semi-finished products for steel plates than before. In addition, JFE is investing in steel plate mills and peripheral facilities at both the West Japan Works (Kurashiki district) and East Japan Works (Keihin district), and is commencing mass production in both districts of high-quality large and heavy steel plates, branded as J-TerraPlate™, for offshore wind power applications.

There are only a few steelmakers globally that can produce and supply large quantities of heavy steel plates, and JFE Steel's plates, weighing up to 37 tons each, are among the largest in Asia. J-TerraPlate™ helps to reduce welding volume and assembly work during monopile fabrication. The advantages of J-TerraPlate™ have been recognized by offshore wind power operators and monopile manufacturers, and it has already been used in overseas offshore wind power projects. JFE Steel has also received numerous inquiries from companies both domestic and international. Going forward, JFE Steel will continue to encourage the adoption of offshore wind power, an important source of green energy, by supplying J-TerraPlate™ worldwide.



J-TerraPlate™ large and heavy steel plate helps to increase the efficiency of monopile fabrication

JFE Engineering

Aiming to Be a Leading Company in Offshore Wind Power Foundation Manufacturing

Offshore wind power is a promising source of green energy. In Japan, public bidding on offshore wind power projects began in 2020 and have ramped up since then, based on the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities. The foundations of offshore wind turbines can be broadly classified into fixed-bottom and floating types, with fixed-bottom monopile foundations being the most economical option for shallow water areas.

JFE Engineering constructed Japan's first monopile manufacturing plant, the Kasaoka Monopile Factory, at JFE Steel's West Japan Works (Fukuyama district) in Kasaoka City, Okayama Prefecture, which began operations in April 2024. Utilizing the large and heavy steel plates supplied by the West Japan Works (Kurashiki district), the Kasaoka Monopile Factory has been able to reduce welding volume and improve assembly efficiency, enabling the competitive fabrication of monopiles. The factory has the capacity to produce approximately 100,000 tons of monopiles annually, equivalent to around 50 offshore wind turbines (15 MW class). Our aim is to secure a 50% market share in Japan.

Additionally, the factory can manufacture transition pieces, which connect monopiles to wind turbine towers, as well as large steel pipes used in the columns of floating foundations. This has allowed JFE Steel to establish a position as a versatile manufacturer capable of supporting a wide range of foundation structures. We are committed to contributing to Japan's carbon neutrality by supplying these essential components of offshore wind power installations.

Japan Marine United

Secured "Green Innovation Fund*" (GIF) to Build Floating Offshore Wind Demos

Offshore wind is expected to become a major power source of renewable energy due to its potential for large-scale generation capacity, cost reductions, and positive contributions to the local economy. In particular, the use of floating offshore wind is expected to grow rapidly as its power generation facilities can be installed in a wider range of sea areas, allowing for cost reductions at an early stage.

The Southern Akita Floating Offshore Wind Demonstration Project Aimed at Overseas Expansion via Cost Reductions (the Project), proposed by a consortium in which Japan Marine United and JFE Engineering participate, has been awarded under the GIF project.

The Project is planned to deploy two units of over 15 MW wind turbine on-site at approximately 400 meters deep off the southern coast of Akita Prefecture, with commercial operation scheduled to start in autumn 2029.

Japan Marine United will advance cost reduction of floating offshore wind working with the consortium members by utilizing optimized design technology for floating foundations, integrated load analysis technology for wind turbines and floating foundations, in-water joint technology for split-building floating foundations, hybrid mooring systems combining steel chains and fiber ropes, and application of digital twin technology to floating foundations, etc., which aims to accelerate the adoption of floating offshore wind as well as help to the development of domestic industry, including the establishment of domestic supply chains and human resource development, thus contributing to achieving carbon neutrality.

*A fund established by NEDO under the Ministry of Economy, Trade and Industry to support companies committed to ambitious goals toward achieving carbon neutrality by 2050.

Image of semi-submersible floating foundation developed by Japan Marine United for the Southern Akita Offshore Project

Jack-Up Vessel built by Japan Marine United

JFE Engineering

Entering the Offshore Wind Power O&M Business by Leveraging Experience and Group Resources

For over 25 years, since 1996, JFE Engineering has been involved in engineering, procurement, and construction (EPC), equipment supply, and maintenance of onshore wind power plants (25 sites/131 turbines). By utilizing to its fullest this extensive experience and knowledge in onshore wind power and by maximizing the technologies of JFE Group companies, JFE Engineering is advancing into operation and maintenance (O&M) business for offshore wind power.

In October 2023, we began a 20-year O&M business for the offshore wind power facilities located off the coast of Nyuzen, Toyama Prefecture. For this business, we adopted the first-ever remote integrated management system for offshore wind power, and this will enable scheduled preventive maintenance, predictive detection through sensors and data analysis and management, and fault diagnosis.

Offshore wind power facility maintenance is much more complicated than for onshore wind power, such as accessing the turbines, operating heavy machinery, and conducting underwater inspections. However, we are steadily accumulating O&M experience at Nyuzen. By using drones and remotely operated vehicles (ROVs), we have increased the work efficiency of personnel, and our maintenance equipment enables repairs and maintenance of equipment in need of attention. By establishing proprietary technologies such as these, JFE Engineering aims to acquire O&M businesses for more domestic offshore wind power projects.

Photo provided by Venti Japan Inc.

Materials production
- High-quality large and heavy steel plates

Foundation manufacturing
- Fixed-bottom foundations (monopile and jacket types)
- Floating foundations (semi-submersible type)

Installation
- Construction of work vessels (Jack-Up Vessels)
- Installation of cable landing pipes

O&M
- Remote monitoring and operation technologies
- Offshore support vessels

Supply chain
- Supply of components for foundation structures
- Supply of materials and equipment for the O&M business

JFE Shoji

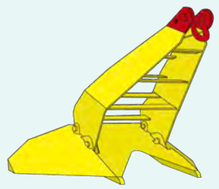
Contributing to the Offshore Wind Power Industry through Supply Chain Development

Backed by its long-standing business expertise in steel materials, processed products, raw materials, and equipment sales, JFE Shoji collaborates with both domestic and overseas manufacturers to supply parts and materials for foundation structures, such as steel for offshore wind power and to supply equipment, parts, and materials for O&M.

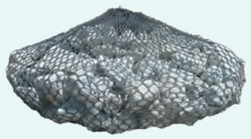
JFE Shoji proposes optimal supply chains by aiming to match the needs of regional power producers and other companies to the technologies of the JFE Group and JFE Shoji's suppliers as potential suppliers for the offshore wind industry.

JFE Shoji contributes to the development of both the offshore wind power industry and regional communities through the creation of robust supply chains.

Taiwan
Steel plates for pin piles



Mooring components for floating foundations



Scour protection materials

Remote cameras for operations monitoring

Business Strategies

Steel Business

JFE Steel Corporation

Transforming carbon neutrality into a growth opportunity and advancing long-term management strategies

JFE Holdings recognizes that carbon neutrality, an issue of the highest priority, is a significant growth opportunity and is committed to developing ultra-innovative technologies ahead of the competition. By shifting our focus from quantity to quality as outlined in the Seventh Medium-term Business Plan, we aim to establish a stable profit foundation and implement long-term management strategies to achieve sustainable growth.

Masayuki Hirose
President and CEO
JFE Steel Corporation

Key measures in the Seventh Medium-term Business Plan and fiscal 2024 earnings targets

1. Transition to a lean, robust business structure by shifting focus from quantity to quality
2. Pursue innovation aimed at achieving carbon neutrality
3. Use digital technologies to strengthen production bases and achieve new growth
4. Expand and accelerate overseas business via solutions based on knowledge, skills, and data

Per-ton profit*
¥10,000 ton
(Target segment profit of ¥230.0 billion)
* Segment profit / unconsolidated sales volume in tons

Strengths

- World-class technologies that reduce environmental load and contribute to carbon neutrality
- World-class production technologies for high-value-added products
- Abundant world-leading technologies and operational/research know-how
- Cutting-edge AI, IoT, and data science technologies to evolve the company through DX
- Extensive customer base built up over the decades, alliances with steelmakers around the world

Threats and risks

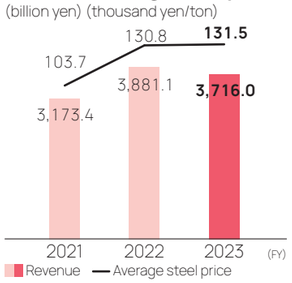
- Long-term decline in domestic steel demand
- Local production for local consumption of steel in emerging countries
- Anti-globalization movement around the world
- Uncertain outlook for global economy due to heightened geopolitical risks
- Rising commodity prices, including energy and logistics costs
- Rapid changes in foreign exchange rates
- Increase in exports of steel products due to China's economic slump centered on its real estate sector

Opportunities

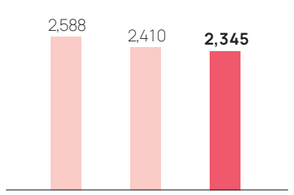
- Stronger demand for eco-products and solutions that help reduce CO_2 emissions
- Increasing demand for high-grade steel due to the shift to lighter and EVs and greater safety and durability
- Increasing demand for steel materials due to medium- and long-term growth in emerging countries, and needs for operational and environmental technical assistance from local steelmakers
- Increasing demand for infrastructure for natural disaster prevention and replacement to make Japan more resilient
- Top global runner in carbon-free manufacturing processes

Fiscal 2023 results

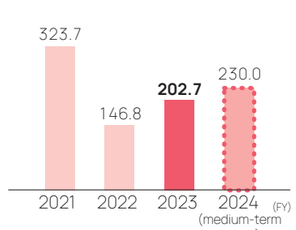
Revenue/Average steel price
(billion yen) (thousand yen/ton)



Non-consolidated crude steel output
(10,000 tons)



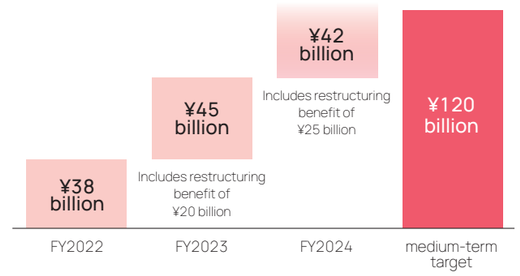
Segment profit
(billion yen)



Initiatives in Fiscal 2023

In Japan, despite a modest recovery in the automobile sector, demand remained low due to projects being postponed amid labor shortages in the civil engineering and construction sectors, the so-called 2024 Problem. Overseas, the sales environment was challenging, with weak domestic demand in China due to a slump in its real estate sector and a deteriorating supply-demand balance in global markets caused by higher exports from China. Despite these challenges, JFE Steel worked to expand earnings by restructuring production systems through the completion of structural reforms, reducing costs, increasing selling prices, and shifting to high-value-added products. As a result of these initiatives, a segment profit of ¥202.7 billion was recorded, an increase from the previous fiscal year, underscoring a successful transition to a structure able to secure stable earnings, unaffected by external factors such as intensified competition in foreign markets. Additionally, as a part of efforts to realize a carbon-neutral society, JFE Steel launched sales of JGreeX™, a green steel product that features significantly reduced CO_2 emissions in the manufacturing process.

Progress on cost reductions (structural reforms + operational improvements)



Medium- to Long-term Strategy and Future Initiatives

Initiatives toward Carbon Neutrality

In line with the goal of achieving carbon neutrality by 2050, in the Chiba District, JFE Steel plans to commence operations of a small-scale prototype direct-reduction ironmaking furnace and a small-scale prototype electric arc furnace in fiscal 2024, as well as a prototype carbon recycling blast furnace in fiscal 2025 as a part of demonstration testing facilities for the Hydrogen Utilization in Iron and Steelmaking Processes Project, which has been selected as a NEDO Green Innovation Fund Project. JGreeX™, a green steel product that features significantly reduced CO_2 emissions in the manufacturing process, was initially adopted in the fiscal year that deliveries commenced (fiscal 2023) for large ship and building construction projects, as well as in the electric power sector. In fiscal 2024, we aim to expand sales of JGreeX™ across all product lines and sectors to further integrate the environmental value of green steel into society

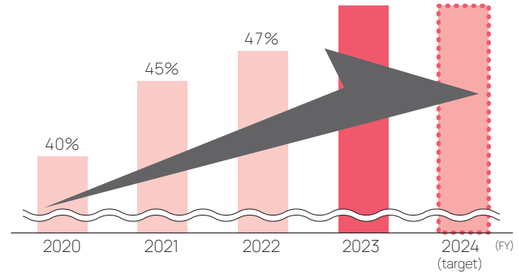
Dry bulk carrier constructed with only JGreeX™ green steel

Shift from Quantity to Quality

Anticipating a global increase in demand for high-performance electrical steel sheets driven by the electrification of automobiles, JFE Steel has decided to invest in expanding production capacity for top-grade non-oriented electrical steel sheets for the main drive motors of electric vehicles (EVs) at the West Japan Works (Kurashiki district). The first phase of this expansion was completed in the first half of 2024, roughly doubling production capacity compared to before.

Furthermore, a second expansion phase is being planned to roughly triple production capacity compared to before by the end of fiscal 2026, ensuring that we can tap into growing demand. Additionally, we are focusing on the new development of ultra-high strength steel for automobiles, while expanding sales of J-TerraPlate™, a large and heavy steel plate for wind power generation, as eco-products and high-value-added products that contribute to carbon neutrality. Including the boosts from initiatives to increase selling prices and to reduce fixed costs through structural reforms, but excluding inventory valuation differences, we expect profit per ton to reach ¥10,000 in fiscal 2024, in line with our medium-term target, as we continue to shift our focus from quantity to quality.

Ratio of high-value-added products



Overseas Strategy

Our overseas business strategy focuses on leveraging our advanced manufacturing technologies, operational expertise, and research know-how to drive business expansion and integration into growth markets. In India, where demand for electricity is likely to increase, JFE Steel established a joint venture with JSW Steel to manufacture and sell grain-oriented electrical steel sheets, with full-scale production slated to begin in fiscal 2027. Additionally, in the United Arab Emirates (UAE), we are exploring the development of a supply chain for low-carbon direct reduced iron. To support the decarbonization movement, we recognize the need for securing high-quality coking coal and will continue to explore investments in coking coal mines to ensure a stable long-term supply.

DX and Solution Business

We are strengthening our manufacturing foundation and executing new growth strategies with digital technologies. As part of our structural reforms with IT, we are accelerating a refresh of core Companywide systems, aiming to complete full cloud migration by fiscal 2025, two years ahead of the initial schedule, to enhance productivity and competitiveness. Furthermore, we are launching JFEResolus™ as a solutions business that applies our wealth of technology, know-how, and data accumulated in the steel business to other sectors. We have also established a cybersecurity company to enhance responsiveness to the increasing risks posed by cyberattacks in recent years.

Steel Business

TOPICS

Growth Strategy Implementation Framework

Establishment of Strategy Headquarters

In our long-term vision, we have positioned the GX strategy, DX strategy, and human resources strategy as our three key strategies. In fiscal 2024, we established a new strategy headquarters for each. The GX Strategy Headquarters aims to steadily reduce CO_2 emissions by switching to a unified management structure with double the human resources for related operations in order to boost work efficiency. The DX Strategy Headquarters was established to formulate medium- to long-term strategies across the entire digital domain. Finally, the Human Resources Strategy Headquarters aims to secure and develop the talent that will drive growth, invest heavily in human capital, and foster a new corporate culture.

GX strategy

- Accelerate the development of ultra-innovative technologies and encourage early social implementation
- Create demand for and expand sales of high-quality green steel by enhancing understanding of its environmental value
- Build CCUS and green infrastructure through collaboration between industrial complexes and companies
- Propose government policies and communicate information to stakeholders to realize a carbon-free society

DX strategy

- Fundamentally reform business processes by leveraging digital technologies
- Realize intelligent steelworks through Companywide CPS integration, as well as automation and remote operations
- Develop technologies to promote and accelerate DX and support external sales
- Cultivate DX talent

Human resources strategy

- Synchronize management strategies with human resources strategies
- Secure and develop high-quality talent that will drive growth
- Enhance job satisfaction and foster a new corporate culture where both the Company and employees grow together
- Promote DE&I to create an environment where diverse talent can thrive

ReFuture PROJECT

A Reform Project that Aims to Enhance Job Satisfaction and Foster Mutual Growth of the Company and Employees

Recognizing that enhancing job satisfaction is an important management issue, we define job satisfaction as a combination of ease of working and sense of satisfaction from work. To improve these aspects of work, we have commenced a full-scale effort to implement various measures aimed at improving the work environment, reforming business processes, revising the personnel wage system, and transforming the corporate culture. Additionally, we have formulated a Purpose (the Company's reason for existence) and Values (the values we prioritize) as expressions of our vision for the future and clarifications of how we contribute to society, which will shape our growth strategies and act as a guide for employees to find value and fulfillment in their work. These aspects of our corporate culture will be reflected in the creation of a vision for the Eighth Medium-term Business Plan.

ReFuture PROJECT

Dialogue between management and employees

We create opportunities for two-way communication, where management can clearly convey the Company's future direction and what is expected of employees, while employees can share with management their concerns and issues related to the Company and their work.

JFE Steel Purpose

Dream for your Future, Steel takes you Further.

For 4,000 years, people has been transforming iron into various products, fulfilling dreams, and shaping civilizations.
Yet, the full potential of iron remains unrealized, awaiting future exploration and development.
JFE Steel is committed to delivering pioneering technology and superior steel that together empower society and meet the evolving needs of the global market. By partnering with industry leaders, we are determined to drive sustainable development, improve quality of life, and revolutionize industrial processes.
We will lead the way in technological innovation with unwavering dedication and a focus on delivering exceptional results.

Engineering Business

Engineering Business

JFE Engineering Corporation

Becoming an engineering company that contributes to the achievement of the SDGs with the mission of foundation of life

When formulating a medium- to long-term strategy targeting the year 2030, JFE Engineering came up with its purpose called "foundation of life, Just for the Earth." We strongly back people's lives and the creation of a safe society for current and future generations. Driven by a mission of "Just for the Earth," the entire company is working diligently to contribute to the achievement of the SDGs and achieve its targets in the Seventh Medium-term Business Plan.

Kazuyoshi Fukuda
President and CEO
JFE Engineering Corporation

Key measures in the Seventh Medium-term Business Plan and fiscal 2024 earnings targets

1. Enhance medium- to long-term priority areas as growth fields
   - Waste to resources
   - Carbon neutrality
   - Combined utility services
   - Infrastructure
2. Expand overseas operations by developing business in tune with local needs
3. Advance DX projects for all engineering work

Revenue
¥650.0 billion
Segment profit
¥35.0 billion

Strengths

- Track record and technological capabilities in the broader infrastructure business
- Track record and technological prowess in the environmental, recycling, and renewable energy fields
- Stable earnings foundation thanks to expansion in the O&M business
- Integrated provision of utilities (water, electricity, gas, etc.)

Threats and risks

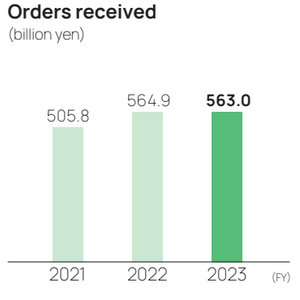
- Contraction in domestic public works projects in line with government aims and policies
- Increase in construction costs due to changes in prices for equipment and materials
- Decline in EPC projects due to fall in private-sector capital investment
- Uncertainties in the global economy caused by geopolitical risks

Opportunities

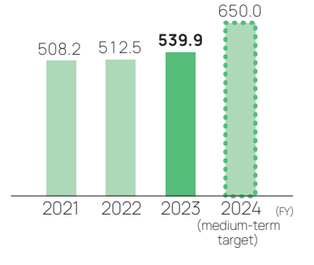
- Greater social expectations for SDGs achievement
- Stronger demand for infrastructure upgrades and service life extension
- Changes in social structure with privatization of public services
- Growing needs for renewable energy

Fiscal 2023 results

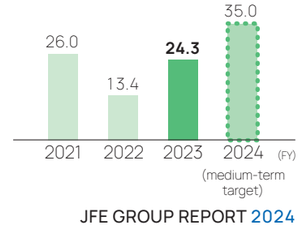
Orders received
(billion yen)



Revenue
(billion yen)



Segment profit
(billion yen)



Business Strategies

Initiatives in Fiscal 2023

JFE Engineering has been expanding into the operation and maintenance (O&M) business that supports the foundation of life, including public-private partnership (PPP) projects, power generation and electric power businesses, and recycling operations, in addition to its traditional engineering, procurement, and construction (EPC) business.

In the EPC business, as a "creation" business of the foundation of life, JFE Engineering achieved record-high revenue for two consecutive fiscal years. We successfully executed large-scale projects in Japan and abroad centered on core infrastructure areas, such as environmental plants, pipelines, and bridges, our areas of excellence.

In O&M businesses, JFE Engineering is addressing future issues, such as labor shortages and the passing down of technical expertise, while expanding and advancing remote monitoring bases with DX technology in O&M and related businesses with a focus on environmental plants.

Earnings have become more stable along with a higher weighting of O&M businesses, including DBO* projects for environmental plants and new local electric power businesses. In the combined utility services field, we have installed gas cogeneration systems in the production plants of pharmaceuticals companies to provide heat and power. JFE Engineering has also won contracts in the energy services business for electric power interchange across 11 sites in Japan. In the waste to resource field, Group company J&T Recycling in the recycling business has decided to build one of the largest plastic recycling facilities in the Tokyo metropolitan area, located along the Kawasaki coastal area.

As part of our efforts to achieve carbon neutrality, we are conducting demonstration tests of CO_2 separation and capture technologies at various plants, as well as our waste chemical recycling technologies, in addition to ongoing renewable energy EPC and business management.

Overseas, we have contributed to the development of rapidly growing countries and regions by commencing operations of waste-to-energy plants in Vietnam and Malaysia, securing orders for chemical plants in Singapore, and constructing viaducts, railway bridges, and other critical infrastructure in countries across Africa and Asia.

In Japan, we completed the integration of water engineering businesses with Tsukishima Holdings, and commenced operations at Tsukishima JFE Aqua Solutions. This business integration combines and leverages the technologies, services, and business expertise of both companies, as we aim to expand business as a leading company in the domestic water and sewage sector.

Leveraging our accumulated technologies and know-how, we have expanded and advanced business domains related to "creation," "responsibility," and "connections" to the future as the foundation of life.

* DBO: A method where design, build, and operation processes are commissioned as a single package.

Medium- to Long-term Strategy and Future Initiatives

JFE Engineering has formulated a medium- to long-term vision with 2030 as the target year. To realize our vision for a circular economy, we are strengthening initiatives in five key areas: waste to resources, combined utility services, core infrastructure, carbon neutral (i.e., contributing to CO_2 reductions), and DX projects (i.e., the technological foundation that supports the other initiatives).

In **the waste to resources field**, with the intention of creating a business model centered on thoroughly using waste, we will build a rock-solid earnings foundation by steadily expanding assets over the long term and tapping into demand for replacing aging waste-to-energy power facilities. Overseas, we are accelerating the development of O&M businesses, in addition to EPC projects. In the recycling business, we have identified three core businesses with strong social needs: food recycling, plastic recycling, and waste incineration / power generation. Through aggressive investment, we will expand our bases nationwide.

In **the carbon neutrality field**, in addition to solar and biomass power generation that we have focused on, we are strengthening our presence in the fields of offshore wind power and geothermal power generation. In the offshore wind power field, we constructed the Kasaoka Monopile Factory as Japan's first plant to manufacture seabed foundational structures for wind power plants, putting the finishing touches on our production system. JFE Engineering is also accelerating the development of carbon-neutral technology by leveraging its accumulated know-how in incineration technology.

In **the combined utility services field**, as an O&M business that is a "responsible" foundation of life, JFE Engineering comprehensively provides utility services (water, electricity, and gas) to regions, including heat supply services, through the launch of new local electric power companies and participation in concessions for the privatization of waterworks services, which has expanded in recent years.

In **the infrastructure field**, JFE Engineering is developing and introducing new products, construction methods, and materials that address needs to maximize the use of already built infrastructure, by reinforcing and extending the service life of infrastructure such as bridges, gas plants, waterworks systems, and pipelines.

DX projects: We are advancing the use of digital technology in all kinds of engineering work. In addition to increasing the efficiency of work, our aim is to widely reform work processes and provide digital twin and digital services that utilize AI and IoT, such as adding new functionality to products and services.

Business fields for medium- to long-term initiatives

Field	Main Applicable Businesses	Revenue Target for FY2030
Waste to resources	Establish stable profit base in the domestic environment business Priority investment and expansion of domestic market in the recycling business—Food, plastic, waste incineration, and power generation	¥450 billion
Carbon neutrality	Put priority in renewable energy (offshore wind power generation, biomass power plant, solar power plant, geothermal power plant, etc.) Develop carbon-neutral technologies	¥200 billion
Combined utility services	Shift to comprehensive business model, including for efficient operation of facilities to contribute to energy savings and decarbonization	¥100 billion
Infrastructure	New technologies (new products, construction methods, and materials) to address newly arising needs for strengthening and improving life of infrastructure	¥250 billion

Advances in DX
Strongly advancing DX as a technology platform in four business fields

TOPICS

Infrastructure / Overseas

Construction of LNG Receiving Facility in Taiwan

JFE Engineering is currently constructing LNG receiving process pipe facilities as part of an order received from Taiwan's state-run oil and gas company. This project involves the construction of offshore facilities 1.2 kilometers from the coast at the third LNG receiving facility in Taoyuan City. To minimize the risk of construction interruptions due to severe marine conditions and to shorten the construction period, we adopted a modular construction method,* in a first for Taiwan. The Taiwanese government has set a goal to increase the percentage of electricity generated with natural gas to 50% of the total by 2025, making the development of LNG infrastructure an urgent task. Since the 1970s, when LNG was first introduced in Japan, JFE Engineering has built an extensive track record in the construction of LNG receiving facilities. Leveraging our wealth of experience and technology, we will continue to contribute to a reliable energy supply around the world and facilitate the transition to low carbon.

* A construction method where structures, piping, electrical instrumentation, and other components are assembled in modular units, with pipe pressure testing, cleaning, painting, and insulation completed before being transported by sea to the construction site for installation.

Infrastructure

Removal of Bridge Girders and Piers at Gofukubashi and Edobashi Entrances of Tokyo Metropolitan Expressway

Our joint venture with Shimizu Corporation successfully completed the removal of the bridge girders at the Gofukubashi and Edobashi entrances on the Tokyo Metropolitan Expressway's beltway route in December 2023, followed by the removal of the bridge piers in February 2024. Despite severe constraints, we devised and implemented various construction methods, including utilizing the tidal changes of the Nihonbashi River for the removal, minimizing the impact on the operational trunk line of the expressway, successfully completing this challenging project. This marks the first step toward the undergrounding of this section, which will restore views of clear blue skies above the Nihonbashi River. Moving forward, we will continue to meet needs for the reconstruction and modernization of bridges nationwide by utilizing the latest technology and our extensive experience.

Photos courtesy of Metropolitan Expressway Co., Ltd.

Carbon Neutrality

Mori Binary Power Plant Commences Operations

In June 2021, we established Mori Binary Power LLC in collaboration with Hokkaido Electric Power Co., Inc. and Tokyo Century Corporation to promote geothermal binary-cycle power generation. This joint venture constructed the Mori Binary Power Plant in Mori Town, Kayabe district, Hokkaido, which began commercial operations in November 2023. Binary-cycle power generation uses a medium with a lower boiling point than water to drive turbines. It effectively utilizes the thermal energy from hot water that was previously reinjected into the ground at the adjacent Mori Power Plant operated by Hokkaido Electric Power. By reliably providing electricity generated from geothermal energy, a sustainable and 100% domestic renewable energy source, we contribute to achieving carbon neutrality by 2050.

Trading Business

JFE Shoji Corporation

Increasing our abilities to offer proposals and convey information, aiming to be a trading company with presence

As the JFE Group's core trading company, we constantly consider the overall optimum sharing strategies with other Group companies to work on strengthening functions. As well, we seek to further increase our abilities to offer proposals and convey information, growing sustainably with our customers to be a company with a strong market presence. The company contributes to the realization of a sustainable society by providing eco-products via its corporate activities and initiatives for the global recycling of resources. to achieve sustainable growth.

Toshinori Kobayashi
President and CEO
JFE Shoji Corporation

Strengths

- Robust business foundation with steel-related businesses such as steel products, raw materials, and machinery
- Solid sales, processing, and distribution network in the four global key regions (Japan, the Americas, China, and ASEAN)
- Comprehensive Group capabilities through strong collaboration with JFE Steel and JFE Engineering
- Highly specialized human resources with the ability to propose projects backed by extensive experience in steel-related businesses

Threats and risks

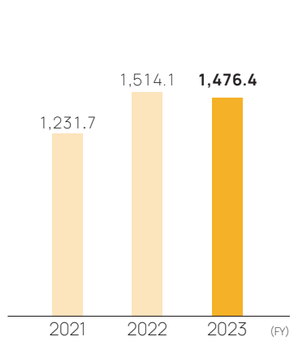
- Heightened geopolitical risks and disruptions in global trade caused by protectionist government policies
- Slowdown in the global economy from monetary tightening to control inflation in Europe and the United States
- Oversupply of steel products due to prolonged slump in China's real estate sector
- Slower growth in the domestic market and contraction in the manufacturing industry due to declining population

Opportunities

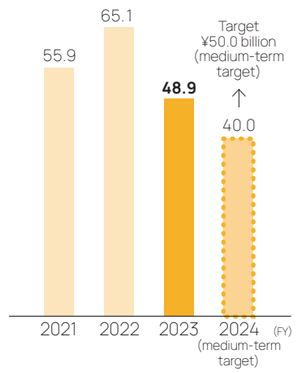
- Growth in construction materials markets in the United States and Australia, where demand is likely to hold steady
- Increase in demand for automotive motors from advances in electrification amid tougher environmental regulations in Europe
- Stronger demand for steel in the emerging market of India
- Higher demand for eco-products that can help reduce CO_2 emissions and conserve energy, in response to growing social expectations in the context of ESG and the SDGs
- Increasing potential to create new value added and provide services in distribution using DX and AI

Fiscal 2023 results

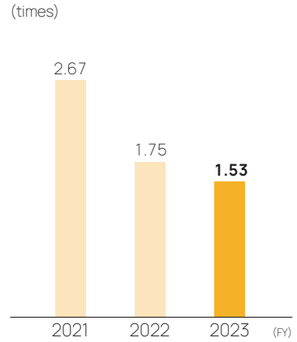
Revenue
(billion yen)



Segment profit
(billion yen)



Ratio of consolidated income to non-consolidated income
(times)



Key measures in the Seventh Medium-term Business Plan and fiscal 2024 earnings targets

1. Initiatives in priority fields
- Electrical steel: Establish No. 1 position in global processing and distribution
- Strengthen supply chain management of automotive steel composite materials
- Accelerate activities overseas in construction materials business
- Fully capture steel demand in Japan

2. Strengthen purchasing and sales capabilities
- Expand our presence in steel, raw materials, machinery and materials

3. Initiatives for new business opportunities
- Expand environmental-solution businesses
- Promotion of DX

Segment profit
¥40 billion*
(Build a structure able to reliably generate segment profit of ¥40 billion)
* Target ¥50 billion by final year of the medium-term business plan

Initiatives in Fiscal 2023

In Japan, demand for steel recovered in the automobile sector as semiconductor supply constraints were alleviated. In the civil engineering and construction sectors, however, demand was largely unchanged from the previous fiscal year, as small/medium-size projects were postponed due to labor shortages and rising material costs. Overseas, steel demand continued to grow strongly in India, while in the United States and other advanced economies, high interest rates and inflation led to a slower recovery in demand. In China, demand for steel remained weak amid a prolonged slump in the real estate sector.

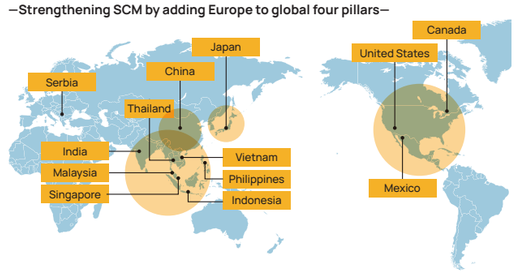
In this business environment, the JFE Shoji Group continued to strengthen the processing and distribution functions of core businesses—electrical steel sheets, automotive steel, overseas construction materials, and domestic steel—based on the Seventh Medium-term Business Plan formulated in fiscal 2021, with a focus on its global four-pillar strategy.

In electrical steel sheets, JFE Shoji Serbia d.o.o. Beograd (JSS) was established in Europe, where demand for motor cores is likely to grow due to stricter environmental regulations aimed at achieving carbon neutrality. In automotive steel, JFE Shoji Steel Service Center Bajio (JSSB) installed a laser blanking line in Mexico, where automakers are making new and additional investments, to capture expanding demand. In the overseas construction materials business, we worked to enhance our presence on the West Coast of the United States by strengthening distribution functions through deeper collaboration between CEMCO, which we acquired last fiscal year, and our existing operating companies. Additionally, in May 2024 we acquired Studco Global Holdings, Inc. (STUDCO), which has manufacturing and sales bases on the East Coast of the United States and in Australia, with the aim of further expanding business revenue. In the domestic steel business, we focused on expanding functions, such as processing capacity, especially in the East Japan area.

We also invested in OM Holdings Limited, which operates a ferroalloy production business in Sarawak, Malaysia, to reinforce our stable supply system for green ferroalloys using renewable energy from hydropower. In India, we invested in Arfin India Limited, a producer and seller of aluminum products and ferroalloys, in an effort to expand sales of aluminum deoxidizers for steel production in India and surrounding regions, where production of steel is expected to grow.

Going forward, in both Japan and abroad, we will continue to strengthen our processing and distribution supply chain and steel processing businesses to build a stable earnings base.

JFE Shoji Group's locations of electrical steel sheet processing bases by country
—Strengthening SCM by adding Europe to global four pillars—



TOPICS

Electrical Steel Sheets

Electrical Steel Sheet Processing and Sales Company in the Republic of Serbia

We have established JFE Shoji Serbia d.o.o. Beograd (JSS), our first processing base in Europe, in the city of Inđija, Republic of Serbia. We will construct a new plant in Serbia, which is located almost at the center of the Balkan Peninsula and borders numerous Eastern European countries. Due to its advantageous location for production bases, Serbia has recently attracted a number of automobile manufacturers and EV-related companies. The groundbreaking ceremony for JSS' new plant in March 2024 was attended by approximately 50 guests, including the President of Serbia and the Japanese Ambassador to Serbia. The President said that this investment is significant for Serbia, and promised full support for this endeavor.

In Europe, demand looks likely to increase for drive motors used in EVs in response to stricter environmental regulations, as well as demand for automotive motors used to enhance the functionality and convenience of automobiles. We therefore expect demand to strengthen for our motor cores. The new plant is scheduled to start full-scale operations in July 2025. By establishing this processing and sales base in Europe, a growing market, we are expanding our global four-pillar system (Japan, the Americas, China, and ASEAN) to include Europe. With this move, we aim to tap into growing demand for motor cores in Europe and strengthen our business to become the No. 1 global processor and distributor of electrical steel sheets.


JFE Shoji Serbia d.o.o. Beograd

Business Strategies

Shipbuilding Business

Shipbuilding Business

Japan Marine United Corporation (equity-method affiliate)

Challenges and Changes in a New World
A company that creates shared value with customers

Japan Marine United provides high-value-added products and services while swiftly responding to the latest changes. Balancing manufacturing with technological development, the basis of its cutting-edge technologies, Japan Marine United is committed to addressing issues in a sustainable society, such as carbon neutrality, safety and security, and digitalization.

Nobuyuki Nada
President and CEO
Japan Marine United Corporation

Strengths

- Ability to build large merchant ships, such as high-performance GHG-reducing ships
- Ability to develop new fuel ships and new fuel carriers
- Extensive years of experience and development capabilities in icebreakers
- Renewable energy technologies, including offshore wind power
- Capital and business alliance with Imabari Shipbuilding Co., Ltd.
- Naval ship building and repair structure with four shipyards and five base

Threats and risks

- Greater volatility in foreign exchange rates, personnel costs, and prices for steel and machinery
- Tougher competition due to excess supply of ships from China and South Korea
- Slowdown in the global economy and maritime transportation due to inflation, rising interest rates, and international tensions
- Concerns about training advanced technical personnel, securing production workforce

Opportunities

- Stronger demand for new ships and replacements to reduce GHG emissions
  - ▶ Stricter regulations for CO_2 emissions from ships
  - ▶ More demand for carbon-neutral chemistry carriers
  - ▶ Expansion in wind farm experiments and projects
- Stronger needs for building and maintaining naval ships as national security strategy is reinforced

Initiatives in Fiscal 2023

In the merchant ships business, we expanded our order book in collaboration with Nihon Shipyard Co., Ltd. We secured orders for ammonia-fueled ships, methanol dual-fuel ships, and LNG dual-fuel ships,* with our development, engineering, and construction capabilities receiving high praise. Additionally, a 24,000-TEU container ship, one of the largest in the world that we delivered last year, was recognized with the Ship of the Year Award for fiscal 2023 for its high performance and rapid delivery as part of a joint lot order with Imabari Shipbuilding Co., Ltd. We also constructed the first LNG dual-fuel Capesize bulk carrier in Japan, which is now operated by JFE Steel. On the technology front, Japan Marine United is engaged in the development and engineering of new fuel ships and R&D in unmanned navigation technology, while also expanding its digital navigation services for ships.

In the naval ships business, we received orders for four new patrol vessels from the Ministry of Defense, and earnings increased for the repair of naval vessels for the Ministry of Defense and the U.S. Navy.

In the offshore and engineering business, we completed the development of floating offshore wind platforms for a Green Innovation Fund Project. Japan Marine United has formed a consortium with several related companies, including JFE Engineering, and applied for the next phase of this project, which will involve demonstration testing.

* Dual-fuel ships: Vessels capable of switching between heavy oil and gas as fuels.

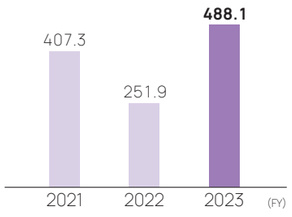
Future Initiatives

In the core merchant ships and naval ships businesses, Japan Marine United will tap into growing needs for shipbuilding and ship repair, build a sustainably profitable business structure, and advance growth strategies that combine technologies, businesses, and human resources. In addition to past initiatives, we are keen to reduce costs, eliminate bottlenecks in the shipbuilding process, alleviate long-term labor shortages, establish advanced digital designs that leverage AI and robotics technologies, mechanize and automate the shipbuilding process, and improve the capacity of our existing facilities. In technological development, Japan Marine United intends to participate in social implementation related to the development of practical offshore wind power, early establishment of design and shipbuilding technologies for new carriers of ammonia, hydrogen, and liquefied carbon dioxide, with an eye on achieving the SDGs and a carbon-free society from 2030.

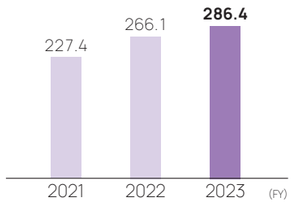
Image of
ammonia-fueled ammonia carrier

Fiscal 2023 results

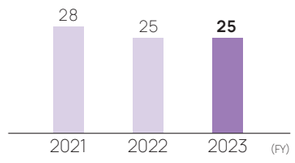
Orders received
(billion yen)



Net sales
(billion yen)



Vessels built
(vessels)



Annual Highlights

JFE Holdings

2023
Apr. Revised JFE Group Basic Policy on Human Rights
Jun. Selected for Noteworthy DX Companies 2024
Jul. Selected for inclusion in all ESG investment indexes used by GPIF
Sep. Announced issuance of euro-yen convertible bonds with new stock warrants due 2028
Sep. Announced OHGISHIMA 2050 conceptual plan for re-use of land housing JFE Steel's East Japan Works (Keihin district)
Sep. Decided terms for issuance of euro-yen convertible bonds with new stock warrants due 2028
Sep. Published JFE Group Report 2023
Sep. JFE 21st Century Foundation decided university research grants and grant research for fiscal 2023
Sep. Published JFE Group Sustainability Report 2023
Dec. Started to air a new commercial

2024
Jan. Updated green/transition finance framework
Feb. Published JFE Group DX Report 2023
Feb. Won Copper Medal in Environmental & Sustainable Corporation Division of ESG Finance Awards
Feb. Exhibited at WIND EXPO Wind Power Exhibition
Mar. Won DEALWATCH AWARDS 2023 sponsored by London Stock Exchange Group

JFE Steel (Steel Business)

2023
Apr. Received FY2023 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, Awards for Science and Technology (Development Category) for development of ultra-heavy high-strength steel plate for construction of ultra-large containerships
Apr. Awarded 2023 Steel Sustainability Champion by World Steel Association
May Commenced supply of JGreeX™ green steel
Jun. Received National Invention Award for development of ultra-high-strength thin steel sheet that improves automobile fuel efficiency and collision safety
Jun. R&D into line pipe for transporting high-pressure hydrogen gas selected for Nippon Foundation's DeepStar Joint Project
Jul. Transitioned a portion of Kurashiki district to open environments for core systems
Jul. Acquired new construction method technology certification for CaO-improved soil, a material that uses steel slag
Jul. Built a collaborative structure for establishing a supply chain for Green Ironmaking with Low Carbon Emission
Jul. Developed FLExB™ Welding, a welding method that helps improve fatigue resistance of steel structures
Aug. Conducted demonstration test of automatic steel material transport using special heavy-duty vehicles in Kurashiki district
Aug. J-TerraPlate™, a large and heavy steel plate, chosen for wind power projects
Aug. Developed GAZMASTAR™ automatic cleaning robot for harsh conditions
Sep. Began selling J-mAlster™ fault recovery support system with IBM Japan
Oct. Received Safety and Health Excellence Recognition from World Steel Association
Oct. Commenced sales of BO-Eye™ breakout detection system for continuous casters
Nov. Held Carbon Neutral Strategy Briefing 2023
Nov. Developed SHIBORAN-NEO™ welding method that helps reduce labor in construction work
Dec. Received 2023 Environmental Minister's Award for Climate Change Action in the development of ultra-high-pressure hydrogen storage containers that combine steel and carbon fiber reinforced plastic layers
Dec. Signed a long-term sales agreement with U.S.-based ZAG Corporation for blast furnace granulated slag for cement raw materials
Dec. Reached a basic agreement with MyFarm and Indonesia's KUD to promote direct seeding method for rice using KONBIJIN™

2024
Jan. Obtained ISO 27001 certification for information security management systems
Jan. Finished construction of Japan's first large-size LNG-fueled ship for transporting steel raw materials
Feb. Established grain-oriented electrical steel sheet production and sales company with JSW Steel in India
Feb. Obtained certification for fire-resistant coating method ARCHITETSUT™ Wood Fireproof Column using wood for steel pipe columns
Mar. Developed drone-mounted gas leak detector
Mar. Increased wages to acquire, retain, and better motivate talented personnel
Mar. Started to provide solutions for steel industry in collaboration with Hitachi
Mar. Received Okochi Memorial Foundation's 70th Technology Prize for cyber-physical system for blast furnaces

JFE Engineering (Engineering Business)

2023
Apr. Finished acquiring shares in Omuta Recycle Power
Apr. Introduced Zero EmissionsPlan™ On-Site Service, a solar power generation PPA model of Urban Energy, and achieved 50 MW
May. Commenced full-scale operation of food biogas power generation company Bios Komaki (J&T Recycling)
Jun. Introduced JFE-Multisite Energy Total Service at 11 sites of Nippon Kayaku
Jul. Commenced proof-of-concept testing of GX-Marble, a CO_2 separation and collection package
Jul. Received order for plant reinforcement project from AGC Si-Tech
Aug. Started operations of large-scale customer-side battery energy storage system
Aug. Entered into capital and business agreement with Kankyo no Mikata (J&T Recycling)
Aug. Completed installation of container crane at Fushiki Toyama Port in Toyama Prefecture
Sep. Commenced operations of Nyuzen Offshore Wind Farm
Oct. Launched operations of Tsukishima JFE Aqua Solution
Nov. Started commercial operations of Mori Binary Power Plant

2024
Jan. Established J Circular system with plans to construct largest plastic recycling facility in Tokyo metropolitan area
Feb. Received order for PVC resin raw material storage facility expansion project in Indonesia
Mar. Commenced full-scale operations of waste processing facility in Malaysia (J&T Recycling, JFE Engineering Malaysia)

JFE Shoji (Trading Business)

2023
Nov. Installed solar power panels at subsidiary Tochigi Shearing, a thick steel plate processor
Dec. Invested in OM Holdings, which engages in ferroalloy production in Malaysia

2024
Mar. JFE Shoji India invested in Arfin India, a production and sales company in aluminum products and ferroalloys
Mar. Held a groundbreaking ceremony for newly established electrical steel sheet processing and sales company (JSS) in Serbia

Japan Marine United (Shipbuilding Business)

2023
Jun. Delivered ONE INNOVATION, a 24,000-TEU containership, one of the world's largest
Jul. Participated in second stage of Nippon Foundation's unmanned ship project, aiming for social implementation
Oct. Conducted christening and launch ceremony for a minesweeper planned in fiscal 2020

2024
Jan. Decided to construct an ammonia-fueled gas carrier
Jan. Delivered Japan's first LNG dual-fuel Capesize bulk carrier, SG OCEAN
Feb. Received Approval in Principle (AiP) certification for a special vessel for installing floating offshore wind turbines as a Green Innovation Fund Project
Mar. Established method for evaluating ship performance in actual seas for ships under construction contracts

Human Resources

The abilities of each and every employee are a crucial factor in ensuring that the JFE Group is able to continue enhancing its corporate value in a rapidly changing and increasingly complex business environment. The Company views its employees as the driving force behind corporate growth, and is committed to securing and nurturing talent through active investment in human resources. JFE is focused on initiatives that maximize the skills and vitality of its employees. Specifically, the Company has identified "ensuring occupational safety and health" and "securing and training diverse talent" as key management priorities related to human resources. To tackle these priorities, JFE has established and is actively working to achieve quantitative KPIs.

Ensuring Occupational Safety and Health

In order to sustain business activities, our basic stance is to prioritize safety above all else and help employees and their families maintain their physical and mental health. Working together with Group companies and our partners, we aim to create safe and healthy workplaces.

Prevention of Workplace Accidents

The JFE Group views establishing a safe work environment and preventing occupational accidents as fundamental requirements for allowing diverse employees to work with peace of mind. We have set KPIs for the number of fatal accidents (zero incidents) and the lost-work injuries rate. Although we did not meet our goals for fiscal 2023, we will continue to prioritize investment in safety measures as outlined in the Seventh Medium-term Business Plan, with an annual investment of approximately ¥10 billion across the Group. We are advancing initiatives aimed at fundamentally preventing accidents caused by the equipment itself.

We aim to create safer and healthier work environments by continuing to effectively operate the occupational health and safety management system.

JFE Steel's Initiative

Acquisition of ISO 45001 certification across all business units

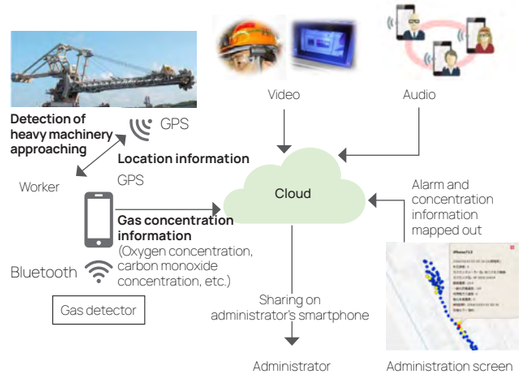
At JFE Steel, we are focusing on the companywide deployment of countermeasures to prevent similar and recurring accidents, including near-miss incidents. We are also strengthening workplace activities so that employees take ownership of past accidents. Furthermore, to promote occupational safety and health management more autonomously and systematically throughout the organization, we have established an occupational safety and health management system compliant with ISO 45001. We have obtained ISO 45001 (JIS Q 45001) certification for all business units.

By continually and effectively operating the occupational safety and health management system, we are committed to creating a safer and healthier workplace.

Key points of PDCA cycle at JFE Steel

Securing the safety of employees using AI

We ensure the safety of workers at manufacturing sites by utilizing the latest ICT, AI, and data science to pursue the development and commercialization of further advanced technologies. One example is the use of the safety support system. This system has communications functions such as audio and video sharing within the Group, and also allows the sharing of information including the locations and status of workers, detection of approaching heavy machinery, and operational environment such as the presence of gas, to ensure the safety of workers. This information is also shared to administrators through smartphones and the cloud. Moreover, we are digitalizing on-site risk prediction activities with voice recognition input instead of the previous paper-based process, and this is leading to more accurate risk predictions. We will continue to strive to secure the safety of workers using the latest technology.



JFE Engineering's Initiatives

JFE Engineering has set shared companywide priorities that must be adhered to by all of its employees and the employees of its partner companies. Focusing on eradicating work injuries, management promotes safety measures while identifying the sources of risks through risk assessments that take into account the uniqueness of operations in each business division. JFE Engineering is taking a multifaceted approach to occupational health and safety management with the use of IT for remote surveillance and measurement, work surveillance, information dissemination systems, and safety management administrative support systems. For work entailing the installation of equipment on top of silos with complex shapes, JFE Engineering creates a high-precision diagram using 3D measurement data from drones in order to reduce the amount of work performed in high locations, and to avoid the need to redo work, creating a safer work environment.


Example of reducing work in high locations by using high-precision 3D measurement data generated with drones

JFE Shoji's Initiatives

JFE Shoji aims to achieve zero serious injuries at its coil centers and other processing bases, and has set the goal of eliminating unsafe work that could result in serious injuries. Patrolling worksites and using security camera recordings to identify unsafe work conditions, JFE Shoji is taking steps to improve facilities. Management aims to enhance the level of occupational health and safety activities at each company by sharing knowledge and information through safety managers assigned to each group company.

Additionally, from the perspective of enhancing safety to prevent accidents caused by equipment, JFE Shoji is promoting the interlocking of coil lifting equipment as part of its disaster prevention measures related to suspended loads. This interlock system ensures that the equipment will not operate unless certain conditions are met.


Regular safety inspection at a group company conducted by the vice president in charge of safety (Vice President Kitajima)

Ensuring the Health of Employees and Their Families

In order to realize safe and highly attractive workplaces that provide motivation to workers and to powerfully promote the development of environments where diverse human resources can demonstrate their full potential, the JFE Group has formulated the JFE Group Health Declaration and collaborates with its health insurance union and industrial health staff to strengthen employee health.

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.

The JFE Group has set KPIs related to the implementation rate of specific health guidance as well as for reducing smoking rates. The reduction of smoking rates is positioned as an initiative that also contributes to the maintenance and promotion of family health, through measures targeted at employees to prevent passive smoking at home. As we make progress toward these goals, information exchanges are regularly carried out among the various operating companies. Going forward, we aim to achieve further improvement by horizontally deploying initiatives that have had a significant impact at each company.

Securing and Training Diverse Talent

The JFE Group views human resources as the driving force behind corporate growth and is committed to securing and developing the talent necessary to advance its management strategies. The Company is also focused on fostering a corporate culture where employees can work with enthusiasm and take on new challenges by promoting diversity and inclusion, while enhancing job satisfaction.

Basic Policy on Human Resource Management

The Basic Policy on Human Resource Management serves as an overall guideline for the JFE Group in securing and developing diverse talent. Each Group company implements specific measures based on this policy.

JFE Group's Basic Policy on Human Resource Management
(Full text: https://www.jfe-holdings.co.jp/en/sustainability/social/human_capital/)

1. Respect human rights and facilitate fair management of human resources
2. Foster a corporate culture that nurtures people and promotes satisfying workplaces
3. Diversify human resources
4. Recruit and steadily nurture excellent human resources

DX Human Resource Development

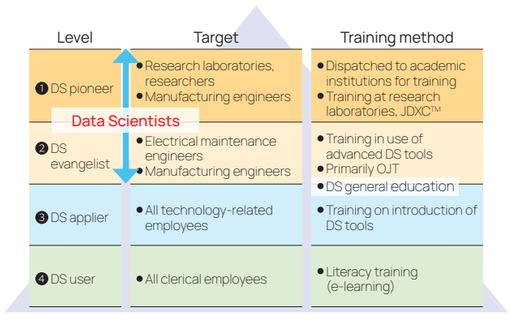
We aim to enhance our training and education systems to improve the abilities of each and every employee, while placing emphasis on the training of global human resources for expanding overseas businesses. In recent years, the JFE Group has been focused on securing and developing the human resources necessary to pursue DX strategy, which is one of its management strategies.

Data science (DS) technology is being applied in industry at a rapid pace. In order to incorporate DS technology into its business processes, JFE Steel has established a system to independently foster data scientists in-house. Having knowledge unique to the field of the steel industry is essential to applying DS in actual manufacturing and on R&D front lines. With the aim of fostering in-house data scientists and human resources that can harness DS, the Company established a pyramid-shaped rank-based training system according to the required level.

As of the end of fiscal 2023, we have trained 610 in-house data scientists, increasing by about 4 times the number of annual DS-related initiatives compared with fiscal 2018 (average between fiscal 2021 and fiscal 2024). By pursuing further training, we plan to increase the quality of our trained in-house data scientists while increasing their number to 660 by the end of fiscal 2024. Starting in fiscal 2023, we aim to instill our vision and change mindsets through training on DX literacy for all employees, in addition to mindset training for executive officers and managers.

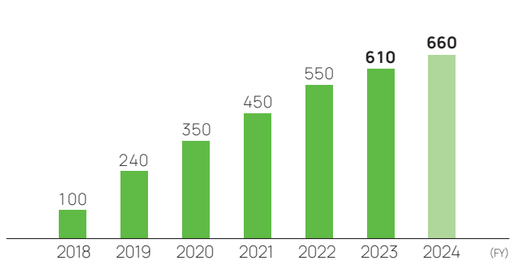
At JFE Engineering, we are holding data scientist training courses where employees can gain expert knowledge about data analysis and visualization, as well as machine learning. We aim to have a total of 210 employees take this course by the end of fiscal 2024.

Educational programs by level (JFE Steel)



- Launched level-specific training programs companywide in FY2018
- **More than 80%** of data scientists working on DS operational issues

Training of data scientists (JFE Steel)



We have trained about 610 data scientists as of the end of FY2023.
We aim to increase this to 660 people by the end of FY2024.

Diversity and Inclusion

Positioning diversity & inclusion (D&I) as an important management issue, the JFE Group must be committed to diversity to see it flourish. Working in unison, we are formulating and rolling out Companywide policies that include setting up D&I promotion committees chaired by the presidents of each operating company. We also have an ongoing effort to raise awareness of diversity through training tailored to managers.

The Board of Directors discussed policies and targets related to the empowerment of women, and in fiscal 2022 raised its target for the ratio of female hires and set a target for women qualified as section managers or above to be 10% or more by fiscal 2030 (20% or more in management and sales divisions). At each operating company, management is advancing various measures related to recruitment, retention, and placement and development. In recruitment, for example, JFE Steel is expanding the hiring of mid-career women and augmenting advertising activities so that women can more easily envision a career working at JFE Steel. In terms of retention, we are focusing efforts on hosting networking events for female employees and actively dispatching them to external training programs at Keidanren (Japan Business Federation) and Japan Women's Innovative Network (J-Win), in order to promote networking both inside and outside the Company and create role models for others to follow. Regarding placement and development, we are formulating individual placement and development plans for female employees and carrying out systematic training aimed at management positions. JFE Engineering has introduced a mentoring program for female managers led by executive officers. JFE Shoji is also conducting training for supervisors and their female employees aimed at cultivating an awareness of career options for women and a career-supporting mindset among managers.

We are also focusing efforts on helping male employees participate in child-rearing, and have set as a common target for all operating companies the goal of getting all male employees whose partner has given birth time off for child-rearing and also days off as needed for childcare. In addition to disseminating information about in-house systems, we are working to cultivate a culture in which more male employees can take paternity leave, by conveying messages aimed at encouraging men to take paternity leave and sharing examples of employees who have availed themselves of this leave.

Good examples from each operating company are regularly shared among Group companies, and joint initiatives across operating companies are also underway. In fiscal 2023, the presidents of the Company and its operating companies gathered for a round table discussion of the importance of promoting D&I and future issues, and committed to fostering a culture with broad internal awareness of these issues. Through such efforts, we aim to further promote diversity across the entire JFE Group.

Engagement

We believe that establishing an internal environment where employees find value in their work is essential for diverse talent to fully demonstrate their abilities. Each operating company conducts an engagement survey once a year to regularly grasp employee sentiment. As a KPI, we have set a target of "over 75% affirmative responses to questions related to job satisfaction," and this KPI helps us identify issues related to job satisfaction and consider measures for improving the work environment. We have implemented various measures, such as instituting an in-house open recruitment system that offers opportunities for new career challenges through voluntary actions, and holding one-on-one meetings to support employee growth. Moving forward, we aim to further improve work motivation through discussions with management and other initiatives. In addition, wages are a key factor in improving job satisfaction. In fiscal 2024, JFE Steel and JFE Engineering introduced new financial resources of ¥30,000 per month, resulting in an average wage increase of over 12% when combined with regular pay increases. JFE Steel also established the Human Resources Strategy Department in April 2024 to implement multifaceted initiatives, including not only human resource systems but also corporate culture reform. We launched the ReFuture PROJECT as part of a corporate transformation aimed at enhancing employee job satisfaction and fostering mutual growth of the Company and its employees. This project entails the creation of a future vision for the Company, investing in manufacturing sites, business offices, and welfare facilities to create a more employee-friendly work environment, and revising the personnel wage system to improve job satisfaction for all employees. We will continue to pursue initiatives to further improve job satisfaction through ongoing discussions with management, among other efforts.

Creating a comfortable work environment is also a critical element for employees to find their work fulfilling. Therefore, at the JFE Group, we are promoting initiatives for a new way of working aimed at allowing diverse employees to choose flexible working styles based on their individual circumstances. This is to ensure that they find motivation and job satisfaction while helping to improve the Company's productivity. For example, we have expanded remote work systems, introduced coreless flextime systems, implemented chat and web conferencing tools, advanced RPA, and have moved toward paperless operations. Through these initiatives, we aim for higher-value-added work styles. We are also cultivating a culture that makes it easier to take time off, for instance by setting recommended annual leave days, to enhance work–life balance.

Advertising Activities (Sus-tetsu-nable)

サス鉄ナブル!

Sus-tetsu-nable!*

* A term unique to our Company, it combines "TETSU" ("steel" in English) and sustainability, both of which are essential to society

We produce corporate commercials aimed at introducing our stakeholders to our efforts toward realizing a sustainable future for the JFE Group. The objective is to get stakeholders to feel more closely connected with us.

We actively engage in these efforts in anticipation that they are broadening awareness through advertising and promotional activities, and will also contribute to enhancing employee engagement and strengthening our hiring capabilities.

Social and Relationship Capital

Examples of Dialogues with Our Main Stakeholders

Stakeholders	Approach	Examples of dialogues with our main stakeholders	Others	
			Frequency (per year)	Scale, etc.
Shareholders/ 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 promote constructive dialogue as well as provide management with the information acquired, with the aim of maintaining and improving the relationship of trust.	Ordinary General Meeting of Shareholders	1	Approx. 230,000 persons (Unit shareholders)
		IR meetings (mainly with fund managers and analysts at institutional investors)		54 domestic companies (181 times) 86 overseas companies (150 times)
		SR meetings (mainly with ESG and voting rights officers at institutional investors)		25 domestic companies (44 times) 18 overseas companies (25 times)
		Investors' meeting ESG briefings (for analysts and ESG officers)	5	Approx. 1,100 persons in total
		Online corporate briefings (for individual investors)		Online views: 20,000 times
		On-site and online plant tours (for individual investors)	14	Approx. 1,900 persons
		Shareholder newsletters (JFE Dayori)	2 (Mid-year and annual)	Approx. 300,000 copies/issue
		Various reports, including integrated reports and sustainability reports (* Number of copies for integrated report; sustainability report only available on the Company's website)	1	Approx. 23,000 copies
		Information via websites (for shareholders and investors), etc.	As needed	
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.	Communication through sales activities and support for quality assurance	As needed	Conducted at each operating company
		Interviews and questionnaires, such as that on customer satisfaction	As needed	Conducted at each operating company
		Information via websites (product information), etc.	As needed	
Employees	With the recognition of top management that creating workplaces to provide dignity and job satisfaction for all is essential for maximizing the potential of individuals, we have formulated the Basic Policy on Human Resource Management and the Health Declaration and are conducting various activities toward attaining the goals.	Communication 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	134 calls in FY2023
		Various training sessions	As needed	Position-specific, compliance, human rights, etc.
		Family days (visits by employee families, lunch at employees' cafeterias, etc.) * Online for FY2020 and FY2021	As needed	Conducted at each operating company
		Corporate Ethics Awareness Survey	1 (every 2 years)	At the Company and operating companies
		Engagement survey (employee satisfaction survey) * An all-employee survey to understand the level of satisfaction with the Company, used to shape measures and operations	1	At the Company and operating companies
		Management feedback (360-degree diagnosis) * Corporate Officers and top managers evaluate their peers and subordinates, providing feedback to individuals	1	At the Company and JFE Steel
Local communities	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.	Communication through local residents' associations, events, etc.	As needed	
		Events at manufacturing bases (festivals, etc.)	Approx. once in each region	Approx. 170,000 persons a year
		Plant tours	As needed	80,000 or more persons a year
		Clean-up activities (vicinity of manufacturing bases, regional cleaning, etc.)	As needed	
		Sports promotion (baseball or jogging workshops, various sports competitions, etc.)	As needed	
		Others (education at elementary schools, craft workshops, workplace experience events, etc.)	As needed	
		Information via websites (environmental information, etc.)	As needed	
		Social contribution through JFE 21st Century Foundation (various research support, regional activity support, etc.) ▶JFE 21st Century Foundation: http://www.jfe-21st-cf.or.jp/eng/	As needed	

Engagement with Government Entities to Attain Carbon Neutrality

Initiatives in the steel industry	Participation in Japan Iron and Steel Federation's Carbon Neutrality Action Plan
Initiatives in Japan's financial circles	Participation as member of Japan Iron and Steel Federation in Ministry of Economy, Trade and Industry (METI) 's Formulation of Technology Roadmap for Transition Finance in Iron and Steel Sector
	State of adoption of Green Innovation Fund Projects • Steel business: Hydrogen Utilization in Iron and Steelmaking Processes (COURSE 50, carbon-recycling blast furnace, hydrogen direct-reduction steelmaking, electric arc furnace) • Engineering business: Achieving Carbon Neutrality in Waste and Resource Circulation • Engineering business, shipbuilding business: Cost Reductions for Offshore Wind Power Generation
	Participation in GX League
	Financing for GX Acceleration Agency
	Provision of policy ideas to the government • Eighth GX Implementation Council (November 7, 2023) • 56th Advisory Committee for Natural Resources and Energy (June 6, 2024)
	Participation in external initiatives • TCFD Consortium • Japan Climate Leaders' Partnership (JCLP) • UN Global Compact
	Presentations in Japan • GGX x TCFD Summit (sponsored by METI) • Roundtable discussion on "IRA and GX Strategy: U.S.- Japan Partnership for a Net-Zero World." (sponsored by the U.S. Embassy in Tokyo, the U.S.-Japan Council, and the Institute of Energy Economics, Japan)
Global initiatives	Participation in World Steel Association's Climate Action Data Collection Programme
	India-Japan Public and Private Collaborative Meeting on Iron and Steel Industry
	ASEAN-Japan Steel Initiative
	China-Japan Steel Sector Environmental Preservation and Energy Conservation Advanced Technology Exchange
	Presentations in foreign countries • Low-Carbon Transition for the Built Environment (sponsored by the IES/IStructE Joint Committee and National University of Singapore) • 1st Japan-Korea Green Steel Joint Seminar (co-sponsored by the Japan Iron and Steel Federation and Korea Iron and Steel Association)

Please refer to the Policy Engagement section of the JFE Group Sustainability Report at
https://www.jfe-holdings.co.jp/en/sustainability/environment/climate/steel_industry_efforts/ (scheduled to be published in November 2024)