

Value Creation Framework

The JFE Group has contributed to the development of industries and society through products and services that originate from steel.

This section introduces the framework for value creation at the JFE Group.

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Column_1

JFE is

サステナブル!

Sus-tetsu-nable!*

* A term unique to our Company, it combines steel and sustainability, both of which are essential to society

The JFE Group is involved in a number of businesses centered on the production of steel. We strive to deliver to the world the diverse value that steel offers in pursuit of a sustainable society.

Steel Business JFE Steel

An integrated steel manufacturer that handles everything from raw materials such as iron ore to the production of steel products. JFE Steel has world-class steel production capacity as well as expertise in technological development.

Engineering Business JFE Engineering

A comprehensive engineering company that constructs and operates plants and structures. JFE Engineering supports people's livelihoods and industries alike in areas such as energy, the environment, and social infrastructure.

Trading Business JFE Shoji

JFE Shoji is the core trading company of the JFE Group. Centered on steel products, the company handles a broad range of goods, from raw materials for steel to foods and electronics, and conducts business globally through a comprehensive supply chain that covers both domestic and international markets.

Shipbuilding Business Japan Marine United

A leading shipbuilding company with top-class domestic construction capabilities and technological expertise. The company constructs large general merchant ships, various naval vessels, and icebreakers.

Reductions in CO₂ emissions

About **13%**
(comparison with FY2013)

Contribution of CO₂ emissions reductions

11.14 million tons

Steel scrap utilization

900,000 tons

Recycled water resource usage

93.2%

Introduction and implementation of eco-friendly products and technologies

16 cases

Figures based on fiscal 2022 results

CORPORATE VISION

Contributing to society
with the world's most
innovative technology

CORPORATE VALUES

Challenging Spirit.
Flexibility. Sincerity.

STANDARDS OF CONDUCT

All JFE Group personnel are required to faithfully adhere to the following Standards of Conduct in all corporate activities. These standards embody the JFE Group's Corporate Vision and go hand-in-hand with its Corporate Values.

Senior managers are responsible for communicating these standards to employees of Group companies and their supply chain partners, and creating effective systems and mechanisms to ensure adherence to ethical standards.

Senior managers are also responsible for measures to prevent the recurrence of any violation of these standards. Additionally, they must report violations promptly and accurately to internal and external stakeholders, determine the persons of relevant authority and accountability, and resolve matters rigorously.

- | | |
|---|---|
| 1. Provide quality products and services | 6. Maintain proper relations with governments and political authorities |
| 2. Be open to society | 7. Maintain crisis readiness |
| 3. Work with communities | 8. Respect human rights |
| 4. Globalize | 9. Provide challenging work environments |
| 5. Exist harmoniously with the global environment | 10. Comply with laws and ordinances |

Group Name

The name of the Group is JFE Group. "J" is for Japan, "F" is for steel (as in Fe, the atomic symbol of iron) and "E" is for engineering. The acronym can also be thought of as standing for "Japan FutureEnterprise," i.e., a future-oriented Japanese business group centered around the core businesses of steel and engineering.



Group Symbol

The continuously rotating globe represents a group that is in constant pursuit of new opportunities, actively seeking to make new contacts and to strengthen communication with its customers.

The blue color denotes trust and profundity, symbolizing a global company pursuing infinite business possibilities.



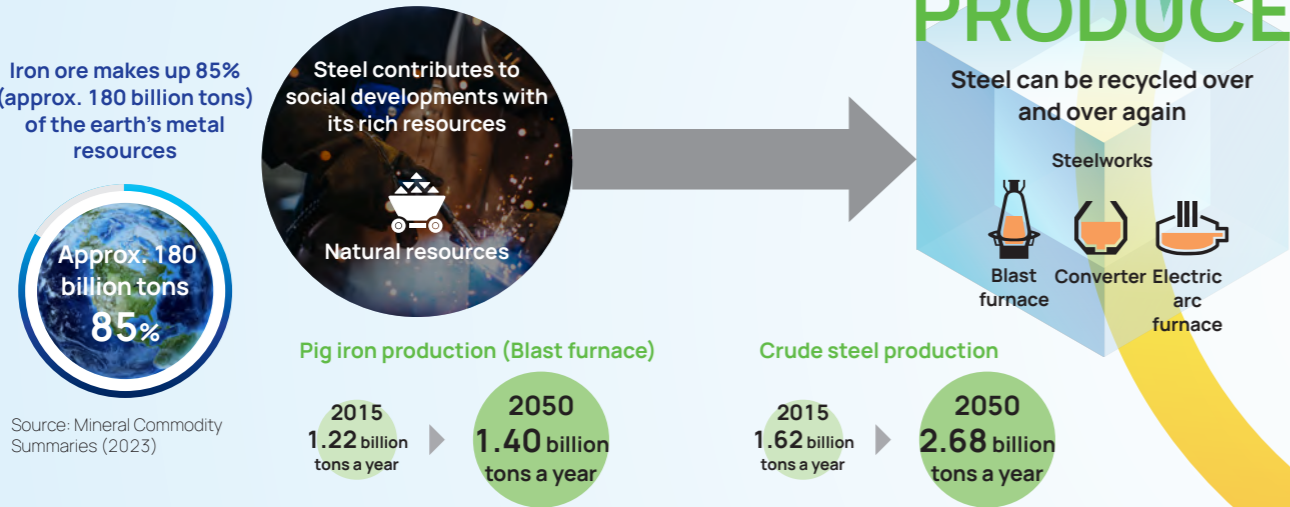
The Value of Steel

Steel supports safe and comfortable lives for an abundant world in the future

Steel's Life Cycle Assessment (LCA)

Steel establishes a highly sophisticated value chain of Produce-Use-Recycle thanks to its excellent recyclability, and is reborn as anything over and over again. Therefore, it is important to evaluate steel's environmental impact by encompassing the entire life cycle including recycling. JFE Steel participated in the initiative to quantify the life cycle environmental impact of steel products, which is led by the Japan Iron and Steel Federation, as one of the core members, and developed an ISO/JIS Standard*1 for the calculation. The results provided through the use of this standard have shown that the more superior the recyclability of material is, the less environmental impact such as global warming becomes. In Japan, there are 15 blast furnace and electric arc furnace steelmakers, including JFE Steel, that compile and disclose*2 average data for life cycle inventory (LCI) for each steel product.

*1 ISO 20915: Life Cycle Inventory Calculation Methodology for Steel Products (2018.11)
 *2 https://www.jisf.or.jp/en/activity/lca/data/index.html



High economic efficiency and low environmental impact

Steel can be reliably produced in large volumes to support our lives and society. Steel is also an environmentally friendly material, emitting far less CO₂ than other materials during production. Steel is an essential material for the safe and comfortable lives of people, and it is key to the sustainable development of society.

Mass production at low cost

Steel is a material with rich reserves and a long history of development. It can be stably mass produced at a reasonable price, contributing to the sustainable development of society.

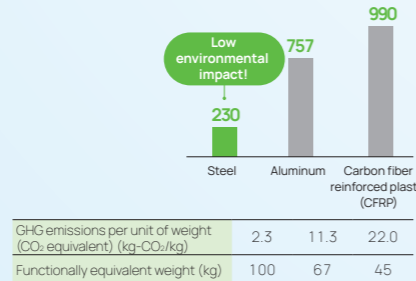
Global demand (2020) Price*



Extremely low environmental impact at the manufacturing stage when compared to other materials

The functional equivalent of greenhouse gas (GHG) emissions of steel at the manufacturing stage is 1/4 to 1/5 of that of aluminum and carbon fiber.

GHG emissions during material production (CO₂ equivalent) (kg-CO₂)

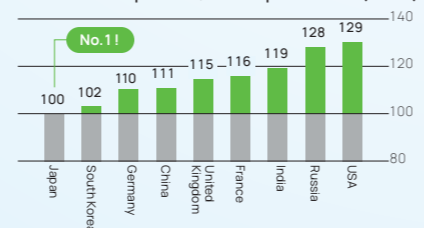


Source: World Auto Steel data

Japan's steel industry keeps the top energy efficiency in the world

The Japanese steel industry (converter furnace steel) produces steel with the lowest environmental impact when compared to other major countries in the world as a result of its longstanding efforts toward environmental conservation, including developing and spreading the use of energy-saving technologies.

The world's quotient, with Japan as 100 (2019)



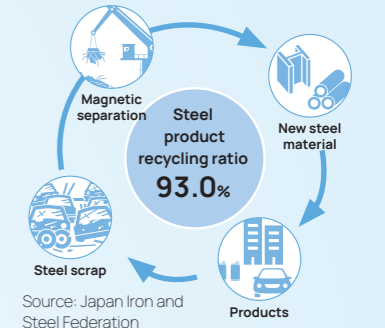
Source: Research Institute of Innovative Technology for the Earth (RITE)

Excellent recyclability

Steel is a material with excellent recyclability, such as its property enabling magnetic separation and retrieval. Even after a final product made of steel ends its life in society, it is reborn over and over again into a high-quality, high-functional product through highly efficient separation and retrieval technologies, thereby reducing environmental load throughout its life cycle.

Closed-loop recycling of steel

Steel can be recycled many times as the raw material of products made in the same steel material while maintaining the original properties of the iron material itself. Closed-loop recycling is superior to open-loop recycling* that recycles other materials in terms of sustainability. This is due to the fact that it is designed to reduce the amount of natural resources being newly introduced, moreover reduce the discharge of environmentally hazardous substances, and reduce waste.



* A limited form of material recycling that involves application of the heat generated from the incineration of materials as well as recycling where the material may deteriorate or change in quality.



Steel can be reborn as anything over and over again

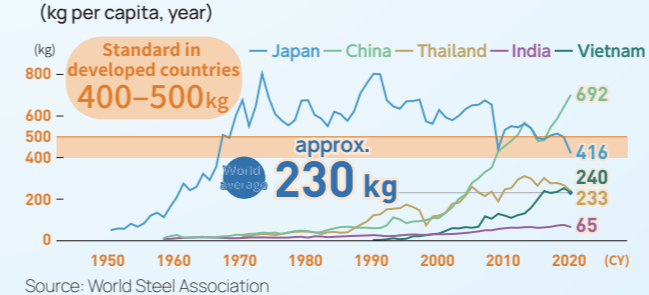
Foundation for life and society

In our lives, steel helps reduce our burden on the environment. For example, by using high-tensile steel (thinned-down steel sheets that keep their strength) in automobiles, automobile weight can be substantially reduced without sacrificing passenger safety during vehicle collisions, thereby contributing to lower CO₂ emissions in society as a whole.

The potential to grow on a global level

The world average of the annual consumption of steel currently stands at approximately 230 kg per capita. Going forward, the long-term global demand for steel is expected to keep growing alongside the economic development of emerging countries.

Trends in annual steel consumption per capita by country (kg per capita, year)

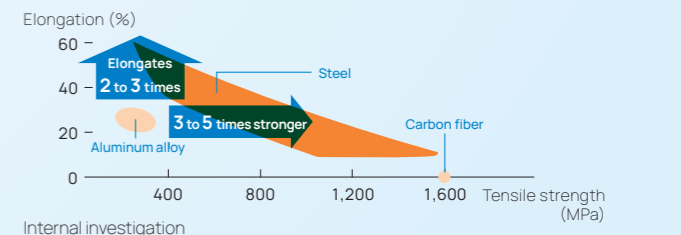


Source: World Steel Association

Potential for evolution

Steel can be elongated two to three times more than aluminum at the same strength, and is three to five times stronger at the same extended rate, making it the optimal material for the world-class structures of the times, such as Tokyo Skytree. Steel still has considerable potential for evolution. The emerging needs of society will make steel evolve, and contribute to a productive future.

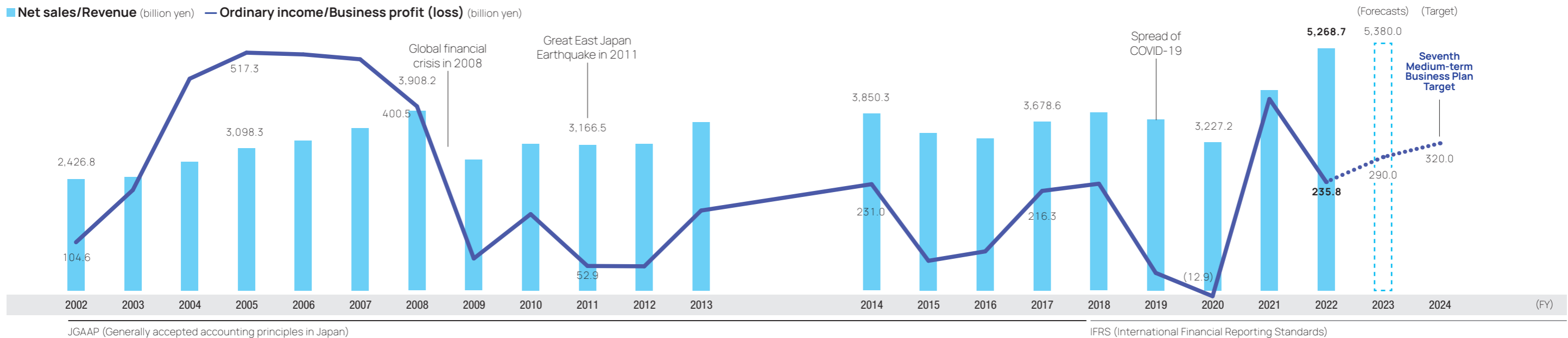
Comparison of strength and elongation between steel, aluminum, and carbon fiber



Internal investigation

To remain an essential presence in any era

<p>Start of the JFE Group 2002</p> <p>Creation of holding company and five operating company structure</p> <p>Merger of Nippon Kokan (1912-) and Kawasaki Steel (1950-)</p> 	<p>Second Medium-term Business Plan 2006-2008</p> <p>Expanding high-value-added products</p> <ul style="list-style-type: none"> JFE focused on the production and sale of high-value-added products. We actively invested management resources to establish a stable production structure and expanded sales of high-value-added products. 	<p>Fourth Medium-term Business Plan 2012-2014</p> <p>Expanding into growing markets overseas</p> <ul style="list-style-type: none"> We further strengthened our profit base for growth by investing overseas and developing innovative new products. Corporate resources were allocated intensively in emerging markets. We also reinforced production abroad and strengthened overseas sales and technical functions. 	<p>Sixth Medium-term Business Plan 2018-2020</p> <p>Boosting competitiveness with advanced technology</p> <ul style="list-style-type: none"> Our focus was on strengthening competitiveness through the application of data science and other advanced technologies to meet sophisticated and diversifying needs throughout society. Having made realizing a sustainable society one of our priorities, we pursued a number of ESG initiatives, including environmental protection, development of human resources, and establishment of a governance system. 
<p>First Medium-term Business Plan 2003-2005</p> <p>Realizing our merger's full potential</p> <ul style="list-style-type: none"> Secure stable profitability early on and strengthen the business foundation through active investment and financing We consolidated facilities and reorganized and integrated Group companies to build a strong business structure by strengthening the competitiveness of our core businesses in steel and engineering. 	<p>Third Medium-term Business Plan 2009-2011</p> <p>Targeting future-oriented technological development</p> <ul style="list-style-type: none"> Despite a harsh business environment, we pursued development of innovative technologies to accelerate our leap forward into the future, with a focus on envisioned developments in the following 10 years. We also reinforced our corporate structure to increase profitability as the No. 1 supplier of high-value-added products. 	<p>Fifth Medium-term Business Plan 2015-2017</p> <p>Capturing global demand to the fullest extent</p> <ul style="list-style-type: none"> We formulated a manufacturing and sales system to maximize opportunities for capturing demand in Japan stemming from government initiatives to upgrade disaster resilience and prepare for the Olympic and Paralympic Games in 2020. Overseas, we focused on capturing demand related to infrastructure reinforcement in emerging countries and initiatives for energy savings and environmental protection. We also continued to invest in new businesses in fields and geographic regions showing strong potential for future growth. 	<p>Seventh Medium-term Business Plan 2021-2024</p> <p>Biggest transformation in the Company's history</p> <ul style="list-style-type: none"> Promote the JFE Group Environmental Vision for 2050 toward carbon neutrality Pivot from quantity to quality in the domestic steel business (pursue world-class profitability) Advance the growth strategy with focus overseas, and the DX strategy to drastically improve productivity Effectively execute investments and ensure financial soundness 



Supporting Society with World-Class Technologies

With "Contributing to society with the world's most innovative technology" as our corporate vision, some of our innovative technologies are described below.

JFE Steel JFE Engineering

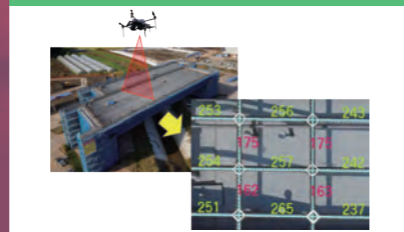
Updates to social infrastructure

HBL® Series of high-strength thick steel plate with low yield ratio for building structures



Featuring high strength and high deformation performance, the HBL® Series of thick steel plate is instrumental in making building structures taller and more resilient to earthquakes while saving welding-related labor. Contributes to resource conservation and CO₂ reduction by reducing the heaviness of steel plate through the application of high-strength steel

AI-driven rebar arrangement inspection



Development of a world-first system that automates inspections of reinforcing rebar layout using AI-driven image recognition and photographs taken from flying drones, in order to inspect rebar at bridge construction sites. Helps shorten inspection time and increases labor efficiency

SP 3 pearlitic steel rail with excellent wear resistance for heavy cargo railways with improved abrasion resistance



Increases the lifespan of train rails, helps reduce rail maintenance costs of railway operators

Marine Blocks® for seaweed beds and coral reefs



Contributes to revitalization of coral reefs by using by-products from the steelmaking process

JFE-METS (Integrated multi-site energy network services)



Optimizes energy services with integrated management of multiple sites (not optimized energy of a single site) at business owner and area levels

JGreeX™

JGreeX™ is a steel product with significantly lower CO₂ emissions than conventional products, which helps reduce CO₂ emissions related to the use of steel products by customers, calculated using the mass balance method.

Contributions to carbon neutrality

Denjiro® insulation-coated pure-iron powder for soft magnetic composites

Contributes to thinner monitors



JESOLVA® technology for using automotive steel sheets

Contributes to lighter and improved performance of vehicles by expanding applications for ultra-high-strength steel sheet with our unique application technologies

Gradient Si Super Core® contributes to energy savings of electrical equipment



Contributes to greater efficiency and downsizing of electrical equipment with high-performance materials that excel in energy conversion efficiency

Bottle to bottle



The West Japan PET Bottle MR Center has an integrated production system for bottle-to-bottle raw material, a first in the Chubu and West Japan region, that leveraged the operational experience of Kyoei Industry Co., Ltd. and J&T Recycling Corporation.

J-STAR® Weld high-efficiency ultra-narrow groove welding system



Helps reduce energy usage and CO₂ emissions, in addition to shortening construction times and lowering installation costs with major improvements in welding efficiency

JEFORMA® Series of highly formable ultra-high-strength steel sheet

Contributes to reliable production of high-strength, lightweight parts and expands applications for high-strength steel sheet by providing high-performance, optimal steel sheet that meets required characteristics in parts

Development of industry

Crack Arrest Steel Plate that improves safety of ships



Steel plate with excellent performance that helps stop spread of rare brittle cracks in welded areas and minimizes damage to ship hulls

Information about other technologies can be found below.
 Green transformation: P57-62
 Intellectual property strategy: P63
 Digital transformation: P64

Process of Value Creation

- External conditions with significant impact**
- Climate change
 - Resource and energy problems
 - Falling birthrate and aging population
 - Market globalization, development of emerging countries
 - Aging of infrastructure and equipment
 - Advances in AI and IoT

Intellectual capital

R&D expenses (FY2022): 43.0 billion yen
 Number of registered patents: Approx. 27,000 patents (about 14,000 in Japan, 13,000 overseas)

Manufacturing capital

Number of blast furnaces (as of October 2023):
 West Japan Works: 6, East Japan Works: 1
 Number of bases (as of April 2023):
 116 locations in 22 countries and regions (Group total)
 Capital expenditures (FY2022): 325.6 billion yen

Natural capital

Steel raw materials (FY2022): 62.2 million tons (iron ore, coal, and limestone)
 Recycled raw materials (FY2022): 0.9 million tons (steel scrap)

Social and other related capital

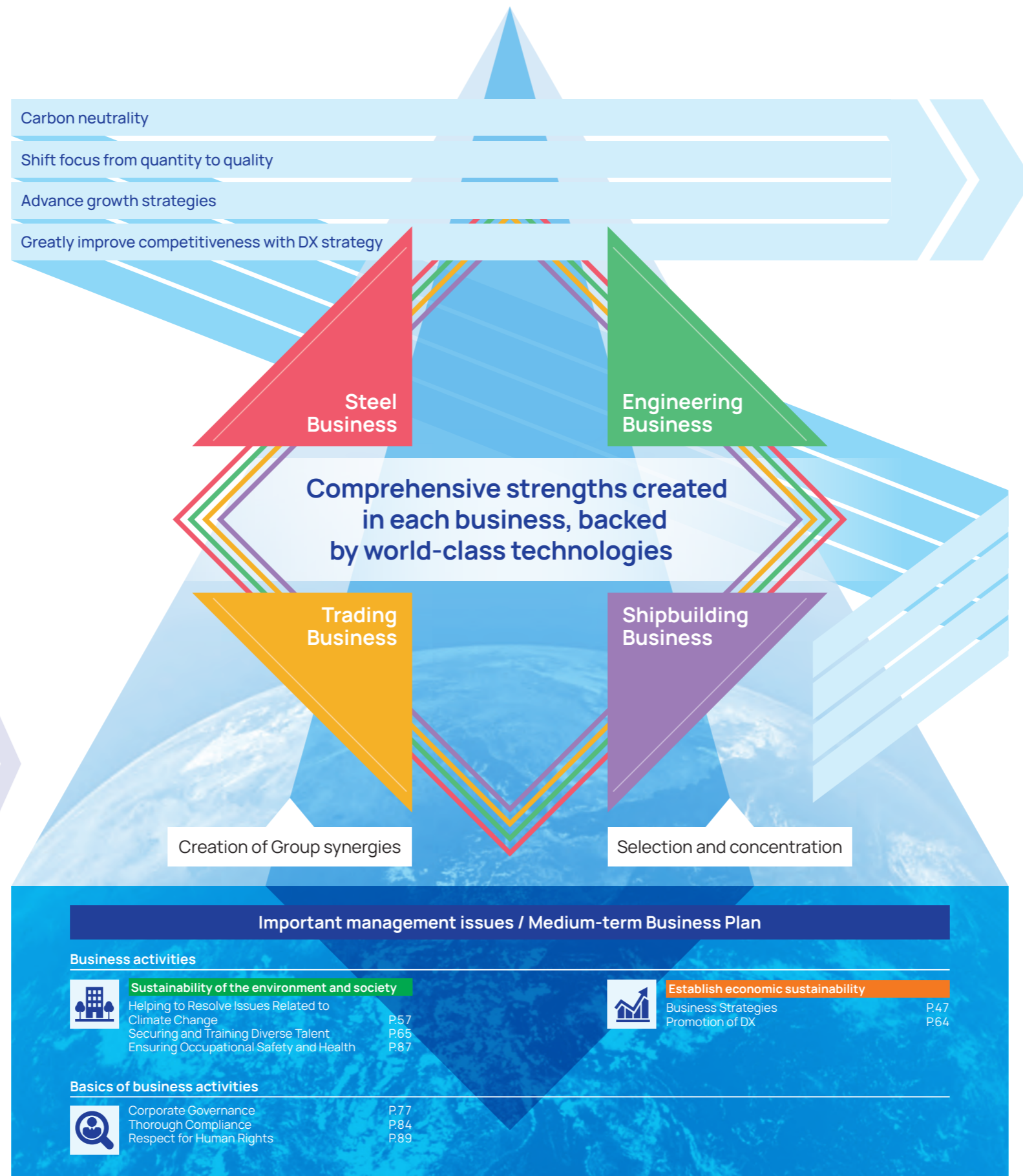
Number of customers (delivery destinations) (FY2022): Approx. 24,000 customers
 * Total of JFE Steel, JFE Engineering, and JFE Shoji (FY2022)

Human capital

Number of employees (as of the end of March 2023): 64,241 persons (Group consolidated)
 Annual training hours (FY2022): Approx. 0.79 million hours a year (total of operating companies: approx. 39 hours a year per employee)
 Safety investments: 10 billion yen annually

Financial capital

Total equity (IFRS) (as of the end of March 2023): 2,193.3 billion yen



Be essential to society

Increase economic value

- Increase cash flow
- Achieve world-class earnings power
- Ongoing investment in technological development
- Return value to stakeholders
- Establish a robust financial foundation

Increase environmental value and social value

- Become carbon neutral
- Contribute to safe and comfortable lives
- Secure excellent human resources and enhance job satisfaction
- Create a prosperous coexistence with local communities

FY2022 results

- Contributions to resolving climate change
 - JFE Steel
Reductions in CO₂ emissions:
About 13% (comparison with FY2013)
 - JFE Engineering
Contribution of CO₂ emissions reductions:
11.14 million tons
 - JFE Steel
Recycled water resource usage: 93.2%
- Earnings capabilities
 - JFE Group revenue: 5,268.7 billion yen
 - JFE Group business profit: 235.8 billion yen
- Increase competitiveness
 - < DX >
 - JFE Steel
Data scientists: 550
 - < World-class technological capabilities >
 - JFE Steel
Ratio of high-value-added products: 47%
 - JFE Group
Domestic patent publications: 1,037
 - * Total patents published in Japan and patents published under Patent Cooperation Treaty, designated to be transferred to Japan
- Dividends
 - JFE Group
Dividends per share: 80 yen