JFE Group

CSR REPORT 2020

JFE

Revision History

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Contents

Message from the CEO

September 2020

Koji Kakigi

Representative Director, President and CEO of JFE Holdings, Inc.

Contributing to the Creation of a Sustainable Society by Leveraging the World's Most Innovative Technology to Resolve Climate Change Issues and Address Other Global Challenges

Where We Stand and What We Intend to Do

The JFE Group is committed to its corporate vision, "contributing to society with the world's most innovative technology," and by leveraging its comprehensive strengths gained through a broad range of businesses centered on iron and extending to steel, engineering, and trade, it has provided solutions that contribute to the sustainable development of society amid a rapidly changing business environment.

We face a severe economic environment as the US-China trade dispute, which has persisted since last year, along with other global trends toward protectionism, become more deeply entrenched, leading to stagnating steel demand and falling export steel prices. At the same time, the price of iron ore remained high as China expands its crude steel production, making it difficult for us to secure profit. Moreover, given the declining birthrate, an aging society, and falling population in Japan, we expect steel demand to decline over the medium to long term. In addition, the current global pandemic of COVID-19 has restricted economic activities around the world. The resulting sharp plunge in the global economy and slowing economic activities in Japan represent unprecedented challenges.

(Continued from the previous page.)

I believe the JFE Group must flexibly and effectively adapt to these immense changes in the business environment and demonstrate two qualities of sustainability: economic sustainability by creating economic value through sustainable growth and environmental and social sustainability by contributing to the resolution of social issues. We must become a resilient enterprise capable of consistently providing value over the long term.

Becoming a Truly Strong Enterprise through Efforts to Restructure the Steel Business and Address Climate Change

Given the continued uncertainty and severe environment, we have decided to take action on structural reform to create an optimal production framework within Japan. In our steel business, we will halt one blast furnace at the East Japan Works as part of our attempt to build a strong business structure capable of generating stable profit under any circumstances. At the same time, we will actively promote our ESG initiatives in environmental, social, and related aspects by positioning 2020 as the turning point.

As an enterprise engaged in iron and steel manufacturing, which is associated with emitting massive volumes of CO_2, the issue of climate change is a critical managerial concern from the perspective of business continuity. In May 2019, the JFE Group endorsed the final recommendations report released by the Task Force on Climate-related Financial Disclosures (TCFD) in 2017, which called for disclosing such information as a company's climate change strategies, and we included information such as our scenario analysis in our CSR report issued in September 2019. Our steel business, which emits 99.9% of the Group's total CO_2 emissions, has been developing various technologies for saving energy and reducing CO_2 emissions. Applying these to steel manufacturing has successfully reduced CO_2 emission intensity to the lowest level worldwide. In our disclosures consistent with TCFD recommendations, we explained our progress in developing innovative iron-making processes such as COURSE50 and ferro coke as well as our initiatives to realize zero-carbon steel. We also described our broad contributions to addressing climate change by explaining how we are reducing CO_2 emissions through the construction and operation of renewable energy plants in our engineering business and responding to the promotion of national resilience across the three business domains.

In 2020 the JFE Group set two ambitious targets: **(1) reduce CO_2 emissions in fiscal 2030 by 20% or more compared to fiscal 2013 in the steel business, which accounts for most of the JFE Group's CO_2 emissions, and (2) strive to be carbon neutral within the JFE Group as soon as possible after 2050, in line with the social transformation to establish carbon-free infrastructure over the long term.** With regard to the aforementioned structural reorganization of the steel business, we are trying to enhance economic sustainability by becoming a slim, stronger company with higher profitability. At the same time, by reinforcing initiatives against climate change, we intend to improve environmental sustainability, a critical concern the Group faces in its various ESG-related challenges. We plan to increase overall and sustainable corporate value through these efforts. This year will be the turning point for our business based on having made these major decisions, and we will take our first big step forward.

Risk Response in the Value Chain and Follow-up on KPIs to Resolve Material CSR Issues

In order to maintain the sustainability of the Group as a whole, it is extremely important to recognize the CSR challenges of the Group's global business and respond to the associated risks and opportunities. In this report, we treat our steel, engineering, and trading companies as well as all our stakeholders including suppliers and clients as a single value chain and organize and examine CSR challenges associated with each of them, particularly to confirm that we have not overlooked any risks or responses.

(Continued from the previous page.)

From the perspective of diverse stakeholders, the JFE Group has identified material CSR issues in the Group's business activities and set up KPIs for each operating company as a means of evaluating each of their initiatives. In FY2019, along with disclosing the initiatives, results, and evaluations of the previous year, we partially revised the KPI to strengthen initiatives to be taken during and after FY2020. The new KPIs will clarify the positioning of each material issue in management terms while ensuring that they are appropriate indices for measuring achievement and progress. They are also quantified insofar as possible to allow efficient implementation of PDCA cycles. Going forward, we will continue to regularly review each issue as well as the appropriateness of each index and enhance their effectiveness to further reinforce CSR management and strengthen the Group's sustainability.

Contributing to the Sustainable Development of Society

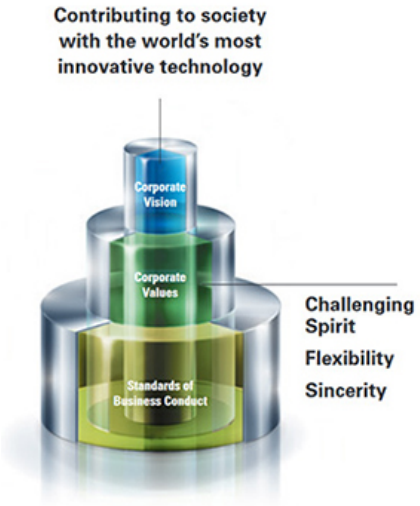
A female full-time Audit & Supervisory Board member was appointed at the JFE Group in 2019, followed by the appointment of the first female outside director in June 2020. We expect that the exchange of diverse opinions will enhance in achieving effective Group governance. We are also actively hiring female employees and mid-career talent to maximize the potential of employees with diverse values and background.

Under the JFE Group's corporate vision of contributing to society with the world's most innovative technology, we will deliver solutions that leverage our comprehensive strength and thereby strive to maintain the Group's sustainable growth, increase our corporate value, and ensure the development of a sustainable society.

Corporate Vision/Business Conduct

The JFE Group's corporate values and standards of business conduct are manifested in the company's vision of contributing to society with the world's most innovative technology. We proactively address critical issues regarding safety, disaster prevention, product quality, human rights, compliance, environmental protection and climate change.

The JFE Group considers the perspectives of all stakeholders, including customers, clients, shareholders, investors, community residents and employees, guided by a fair, objective and transparent system of corporate governance. In the spirit of its corporate values of Challenging Spirit, Flexibility and Sincerity, the JFE Group strives to earn society's trust by undertaking CSR with integrity.



JFE Group Standards of Business 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 in 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

Earn the trust and acclaim of customers by endeavoring to provide safe, high-quality products and services based on superior technologies, and by fully respecting and protecting the privacy of personal and customer information. Also, leverage our superior technologies for the sustainable growth of our Group and society.

2 Be open to society

Disclose corporate information actively and engage in constructive dialogues with diverse stakeholders to enhance our corporate value.

3 Work with communities

Actively contribute to host communities as a good corporate citizen by emphasizing harmony and cooperation.

4 Globalize

Endeavor to achieve understanding with people around the world, working from a global perspective and with respect to international norms, and also local cultures and customs.

(Continued from the previous page.)

5 Exist harmoniously with the global environment

Actively work to exist harmoniously with the global environment, as well as to raise living standards and advance societies.

6 Maintain proper relations with governments and political authorities

Endeavor to build and maintain sound and proper relationships with governments and political authorities.

7 Maintain crisis readiness

Firmly resist all elements and organizations that threaten social order and stability, and refuse all illegal or improper demands. Also, contribute to order and safety in society by thoroughly and methodically preparing for crises such as terrorism, cyberattacks, natural disasters and others, including by ensuring the stable availability of products and services.

8 Respect human rights

Respect all employees and members of the general public as individuals and refrain from any discrimination in corporate activities.

9 Provide challenging work environments

Provide employees with attractive, safe, healthy and challenging work environments.

10 Comply with laws and ordinances

Comply with all applicable laws and ordinances, endeavor to compete fairly and freely, refrain from illegal business activities, promote sound business practices, and be faithful and sincere in all activities and dealings.

JFE Group Value Chain

The JFE Group's value chain encompasses upstream and downstream activities across the globe. In conducting business, we seek to accurately identify and steadily respond to: (1)*1 the social challenges that the Group needs to address and (2)*2 the risks and opportunities that the Group must resolve through its business operations.

We will continue to implement further countermeasures throughout our value chain and strengthen the sustainability of the entire Group.

*1: Corresponds to social challenges in the Overview of the Value Chain
*2: Corresponds to risks and opportunities in the Overview of the Value Chain

Overview of the Value Chain

To ensure stable supply of iron ore and coal used as raw materials in the production of steel products, we purchase from various sources around the world such as Australia, North and South America, Russia, and Africa and transport materials to the steelworks on a special vessel. Equipment and materials used at steelworks plants are also purchased globally.

● Social ◆ Environment

Social Challenges

- ● Exercise fair procurement
- ● Complete abolition of child labor and forced labor
- ● Prohibit the use of conflict materials
- ● Respect human rights
- ● Implement workstyle reform
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources

Risks

<Common>

- ● Occurrence of accidents, including industrial accidents
- ● Potential human rights risks
- ● Labor risks
- ◆ Disruptions to the supply chain caused by climate change-related disasters, natural disasters such as earthquakes, and COVID-19

<Raw material: iron ore>

- ◆ Increased environmental impact (raw material procurement)

<Raw material: coal>

- ◆ Increased environmental impact (raw material procurement)
- ◆ Introduction of a carbon tax

<Machinery>

- ◆ Increased environmental impact (machinery procurement)

Opportunities

- ●◆ Develop a system to ensure stable procurement by expanding CSR procurement

Initiatives

- ●◆ Publicly release information on the Purchasing and Procurement Policies to suppliers and request that they take action
- ● Confirm that suppliers are not using conflict materials
- ◆ Reduce CO_2 emission during transportation by improving logistics efficiency
- ◆ Secure an alternative source of supply and distribute

<For more information:>

➤ Supply Chain Management (P. 37)
➤ JFE Group's Response to the TCFD (P. 74)

Manufacturing, Production, and Shipping

Employees | Local communities near manufacturing sites

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

● Social ◆ Environment

Social Challenges

- ● Ensure occupational health and safety
- ● Provide stable supply of products
- ● Ensure quality
- ● Achieve co-existence and mutual prosperity with local communities
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources
- ◆ Reduction of waste
- ◆ Prevention of water resource exhaustion

Risks

- ● Lose credibility with customers due to issues related to production and quality
- ● Culture of passing down technical skills is dying out
- ● Occurrence of accidents, including industrial accidents
- ● Potential human rights risks
- ● Labor risks
- ● Labor shortage
- ● Cyber security risks
- ◆ Physical and transitional impact of climate change (CO_2 emissions, water risk, etc.)
- ◆ Heightened decarbonization needs in iron and steelmaking process
- ◆ Risk of floods associated with rising sea levels
- ◆ Risk of drought in the water intake area, risk of pollution in the discharge area
- ◆ Shortage of disposal sites for waste generated by facilities and offices
- ◆ Tighter environmental regulations

Opportunities

- ● Ensure competitiveness through stable production and stable quality
- ● Construct favorable relationships with local communities
- ● Secure excellent human resources through workstyle reform
- ◆ Expand electric furnace steelmaking and electric furnace engineering businesses
- ◆ Develop eco-friendly innovative technologies and ensure competitiveness

Initiatives

- ● Testing, inspections and quality audits
- ● Strategic investment and renovation of facilities including R&D
- ● Production site tours for stakeholders
- ◆ Increase the efficiency of the iron and steelmaking process, develop and introduce super innovative technology
- ◆ Develop eco-friendly products
- ◆ Develop and install energy-saving equipment for environmental protection
- ◆ Recycle industrial water by water purification
- ◆ Conduct 3R (reducing, reusing, and recycling) activities
- ◆ Implement measures against flood and drought

For more information:

- Environmental Management (P. 39)
- Development and Provision of Eco-friendly Processes and Products (P. 46)
- Climate Change (P. 63)
- JFE Group's Response to the TCFD (P. 74)
- Efficient Use of Resources (P. 100)
- Water Security (P. 103)
- Customer Responsibility (P. 111)
- Community (P. 138)

Sales and Usage Employees Customers

The JFE Group is committed to developing eco-friendly products such as high tensile strength steel sheets that help reduce the weight of automobiles as well as electromagnetic steel plates used in electric vehicles. We support the frontier of production by responding to the diverse needs of different industries through research and development and by improving production technologies.

● Social ◆ Environment

Social Challenges

- ● Compete fairly
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources

Risks

- ● Legal risks such as violations of antitrust law or competition law
- ● Occurrence of accidents, including industrial accidents
- ● Potential human rights risks
- ● Labor risks
- ● Cyber security risks
- ◆ Increased environmental impact during product use

Opportunities

- ● Secure excellent human resources through workstyle reform
- ◆ Renewed interest in recyclability of steel
- ◆ Contribute to reduced CO_2 emissions by providing high-performance steel such as high tensile strength steel sheets and electromagnetic steel plates

Initiatives

- ● Conduct compliance training
- ◆ Reduce CO_2 emissions during product use
- ◆ Promote a shift in transportation modes
- ◆ Provide eco-friendly products

<For more information:>

- Climate Change (P. 63)
- Development and Provision of Eco-friendly Processes and Products (P. 46)
- Compliance (including Anti-corruption) (P. 158)

Collecting Steel Scrap Employees Customers Society

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

● Social ◆ Environment

Social Challenges

- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources
- ◆ Prevention of resource depletion
- ◆ Increase the volume of scrap generated

Risks

- ● Occurrence of accidents, including industrial accidents
- ● Potential human rights risks
- ● Labor risks
- ● Cyber security risks
- ◆ Decline in the grade of obsolete scrap
- ◆ Rising price and difficulty of obtaining obsolete scrap

Opportunities

- Increased use of scrap
- Expand the scrap distribution business

Initiatives

- Efficient transportation for collecting steel scrap
- Efficient use of resources based on increased use of scrap

<For more information:>

- Climate Change (P. 63)
- Efficient Use of Resources (P. 100)

Overview of the Value Chain

Engineering (Creating the Foundations for Daily Life)

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

Planning, Development, and Design Employees Customers

● Social ◆ Environment

Social Challenges

- ● Maintenance of social infrastructures, aging of facilities
- ● Disaster prevention and mitigation, national resilience
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Resource restriction
- ◆ Conservation of natural resources
- ◆ Reduce waste plastic
- ◆ Reduce food waste

Risks

- ● Lose credibility with customers due to issues related to production and quality
- ● Potential human rights risks
- ● Labor risks
- ● Labor shortage
- ● Cyber security risks
- ◆ Tighter environmental regulations

Opportunities

- ●◆ Implement requested functions
- ●◆ Need for cost reduction and energy saving
- ● Expand ESG investment
- ◆ More sophisticated needs in the energy-environment area
- ◆ Increased need for renewable energy solutions
- ◆ Increased demand for CCU/CCS facilities
- ◆ Increased response to climate change related disasters (disaster prevention and mitigation, disaster waste processing)
- ◆ Increased demand for plastic recycling
- ◆ Increased demand for food waste power generation

Initiatives

- ●◆ Pursue research and development
- ●◆ Design products that meet quality requirements, regulations, cost reduction, and energy-saving requirements
- ● Deliver solutions that meet customer needs
- ● Secure competitiveness by creating a new business model that contributes to addressing social problems (plastics and food products)
- ● Use big data and AI in design
- ◆ Plan for construction and operation of a power plant that utilizes renewable energy as well as the sales of electricity

<For more information:>

- Development and Provision of Eco-friendly Processes and Products (P. 46)
- Climate Change (P. 63)
- Customer Responsibility (P. 111)
- Business Model (JFE GROUP REPORT 2020 pp. 19–20) (https://www.jfe-holdings.co.jp/en/investor/library/group-report/)

Procurement Suppliers

● Social ◆ Environment

Social Challenges

- ● Fair procurement
- ● Complete abolition of child labor and forced labor
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources

Risks

- ● Potential human rights risks
- ● Labor risks
- ● Labor shortage
- ● Cyber security risks
- ◆ Increased environmental impact (material procurement)
- ◆ Disruptions to the supply chain caused by climate change-related disasters, and natural disasters such as earthquakes
- ◆ Risk of drought in the water intake area, risk of pollution in the discharge area

Opportunities

- ●◆ Development of stable procurement though expansion of CSR procurement.

Initiatives

- ●◆ Making public the procurement policy and requesting the commitment of suppliers
- ●◆ Requesting suppliers to take action in CSR initiatives
- ◆ Promote green procurement

<For more information:>

➤ Supply Chain Management (P. 37)
➤ JFE Group's Response to the TCFD (P. 74)

Production and Construction Employees Business associates

● Social ◆ Environment

Social Challenges

- ● Ensure quality
- ● Ensure occupational safety and health
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Conservation of natural resources
- ◆ Issues regarding waste reduction
- ◆ Preserve living environments

Risks

- ● Culture of passing down technical skills is dying out
- ● Occurrence of accidents, including industrial accidents
- ● Potential human rights risks
- ● Labor risks
- ● Labor shortage
- ● Cyber security risks
- ◆ Effects of meteorological disasters
- ◆ Violation of environmental regulations and laws
- ◆ Environmental accidents
- ◆ Pollution of the environment

Opportunities

- ● Saving labor through new technology

Initiatives

- ● Introduce a labor-saving construction method
- ◆ Promote waste recycling

<For more information:>

▸ Efficient Use of Resources (P. 100)

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

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

Maintenance and Operations Employees Customers

● Social ◆ Environment

Social Challenges

- ● Improve productivity
- ● Disaster prevention and mitigation
- ● Ensure occupational safety and health
- ● Respect human rights
- ● Implement workstyle reform
- ● Ensure information security
- ◆ Transition to decarbonized society (climate change actions)
- ◆ Reduce CO_2 emissions
- ◆ Conservation of natural resources
- ◆ Issues regarding waste reduction

Risks

- ● Cyber security risks
- ● Culture of passing down technical skills is dying out
- ● Occurrence of accidents, including industrial accidents
- ◆ Meteorological disasters affecting operations
- ◆ Risk of floods associated with rising sea levels
- ◆ Risk of drought in the water intake area, risk of pollution in the discharge area
- ◆ Violation of environmental regulations and laws
- ◆ Environmental accidents

Opportunities

- ● Expand the business scale through privatization of public services
- ● Need for remote monitoring and automation due to a lack of human resources
- ◆ Need for improving operational efficiency and reducing environmental impact

Initiatives

- Use AI and IoT to develop technologies for remote monitoring and automation as well as prediction of mechanical breakdowns

<For more information:>

- Development and Provision of Eco-friendly Processes and Products (P. 46)

- Optimize operations by analyzing incinerator combustion conditions, reduce environmental impact

Value of Steel

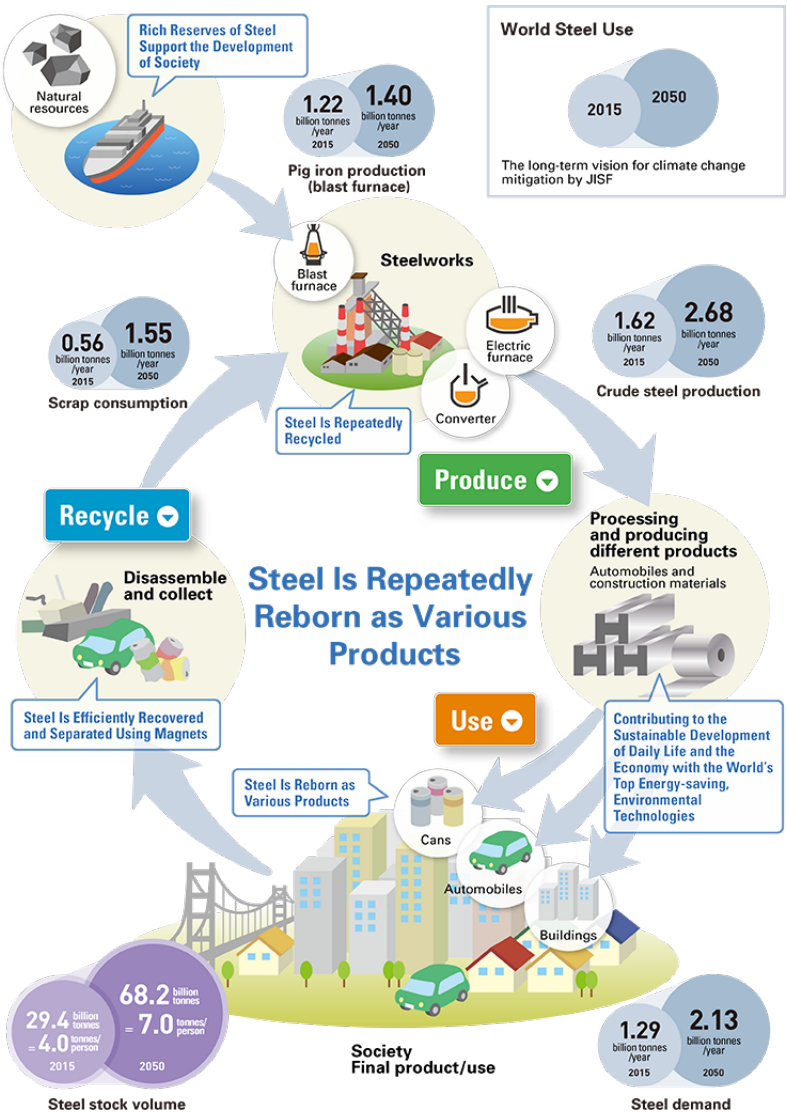
Iron makes up approximately 30% of the Earth's mass. Because of its rich reserves, steel can be mass produced at very low cost. Compared to other materials, the environmental impact of its production is extremely low and it has excellent recyclability. Steel can be recycled repeatedly and reborn as various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

Life Cycle Assessment of Steel

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

* ISO 20915: Life cycle inventory calculation methodology for steel products (2018.11)

JIS Q 20915: Life cycle inventory calculation methodology for steel products (2019.6)

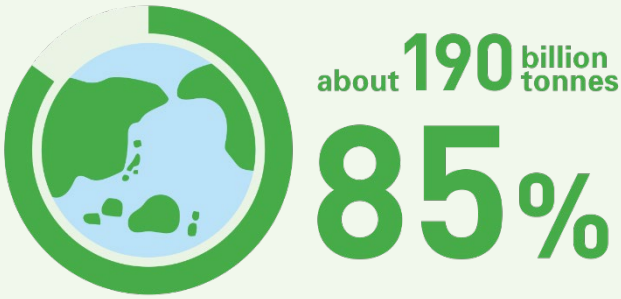


Produce High Economic Efficiency and Low Environmental Impact

Earth, a Planet of Iron (Abundant Resources)

As much as 85% of the Earth's metal resources are iron ore (190 billion tonnes).
Source: Mineral Commodity Summaries (2016)

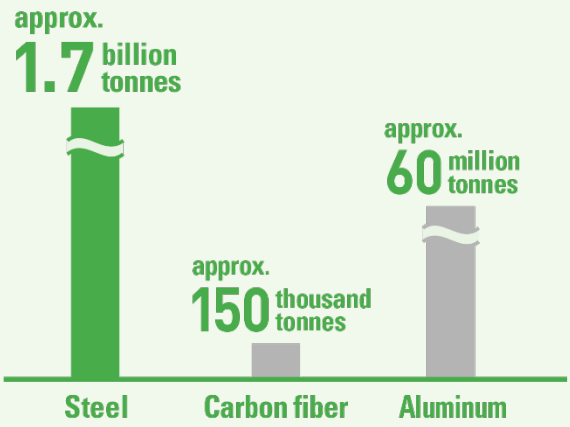
Recoverable Reserves of Iron Ore on the Earth



Mass Production at Low Cost

Iron is a material with rich reserves and a long history of development. It can be mass produced at reasonable price and supplied stably, thereby contribute to the sustainable growth of society.

Global Demand(2017)



Created by JFE Holdings with documents from Mizuho Bank Industry Research Division and economic forecasts by Fuji Kenzai Co., Ltd.

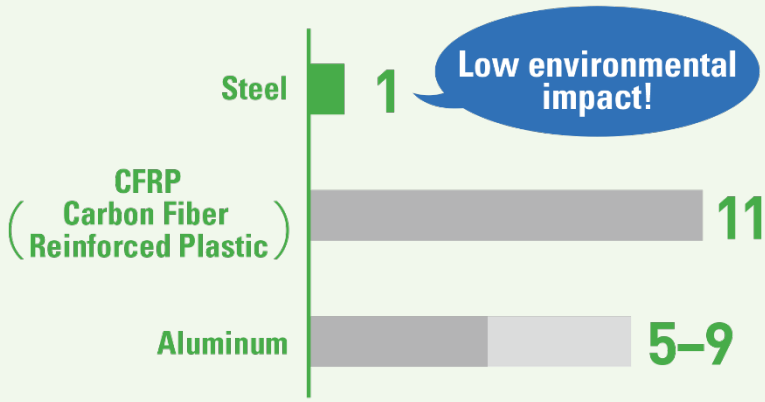
Price*

Research: JFE Holdings
* Cost of producing one unite weight of iron is indexed at 1 for comparison with other materials.

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

Greenhouse gas (GHG) emissions of steel at the manufacturing stage*1 is 1/5 to 1/9 of that of aluminum and approximately 1/11 of that of carbon fiber. 。

GHG Emissions at the Manufacturing Stage*2

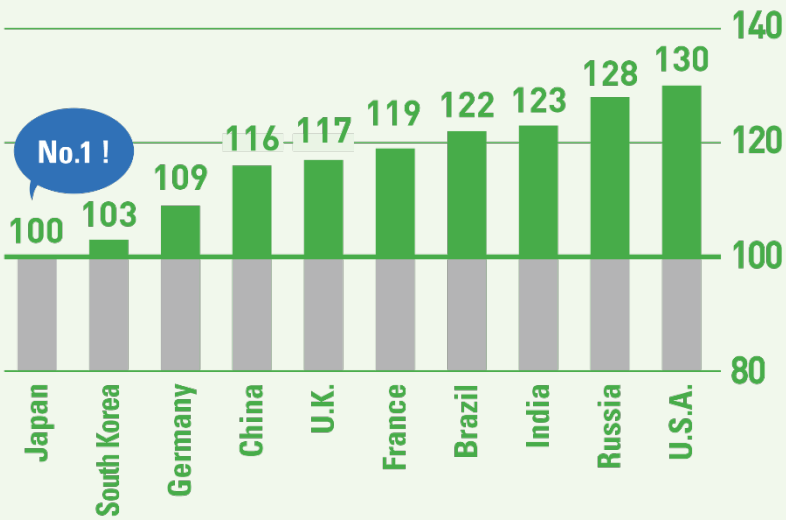


Source: Steel Recycling Institute
*1 From mining raw materials to factory shipment.
*2 Comparison with other materials' GHG emissions per unit weight, with steel as 1.

Japan's Steel Industry Keeps the Top Energy Efficiency in the World

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

World's Quotient, with Japan as 100 (2015)



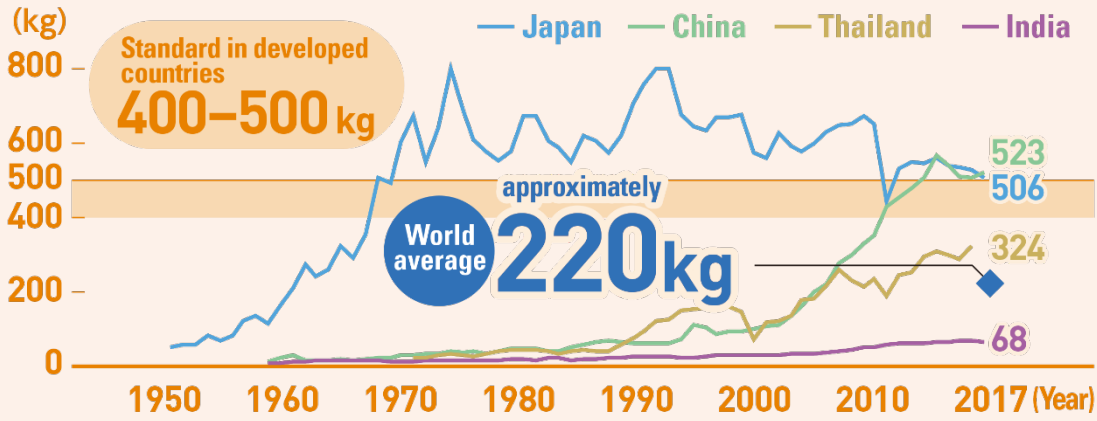
Source：Research Institute of Innovative Technology for the Earth(RITE)

Use Foundation of Daily Life and Society

The Potential to Grow on a Global Scale

Global average of annual consumption of steel is approximately 220 kg per capita. The long-term global demand for steel is expected to keep growing alongside the economic development of emerging countries.

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

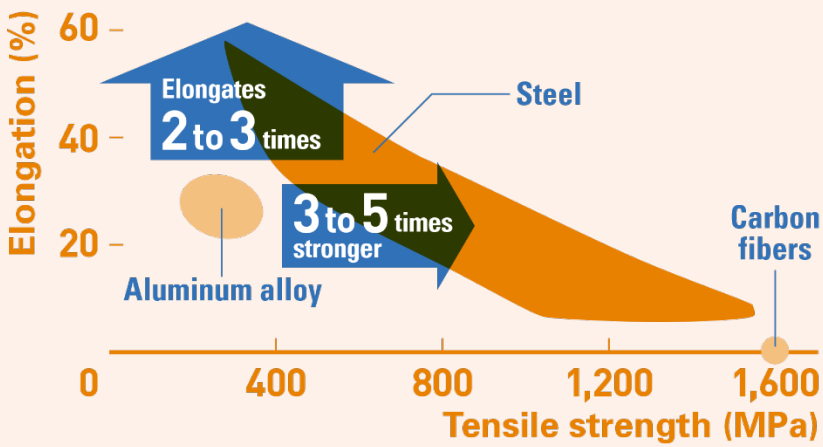


Source: World Steel Association

Potential for Evolution

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

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



Research: JFE Holdings

Recycle Excellent Recyclability

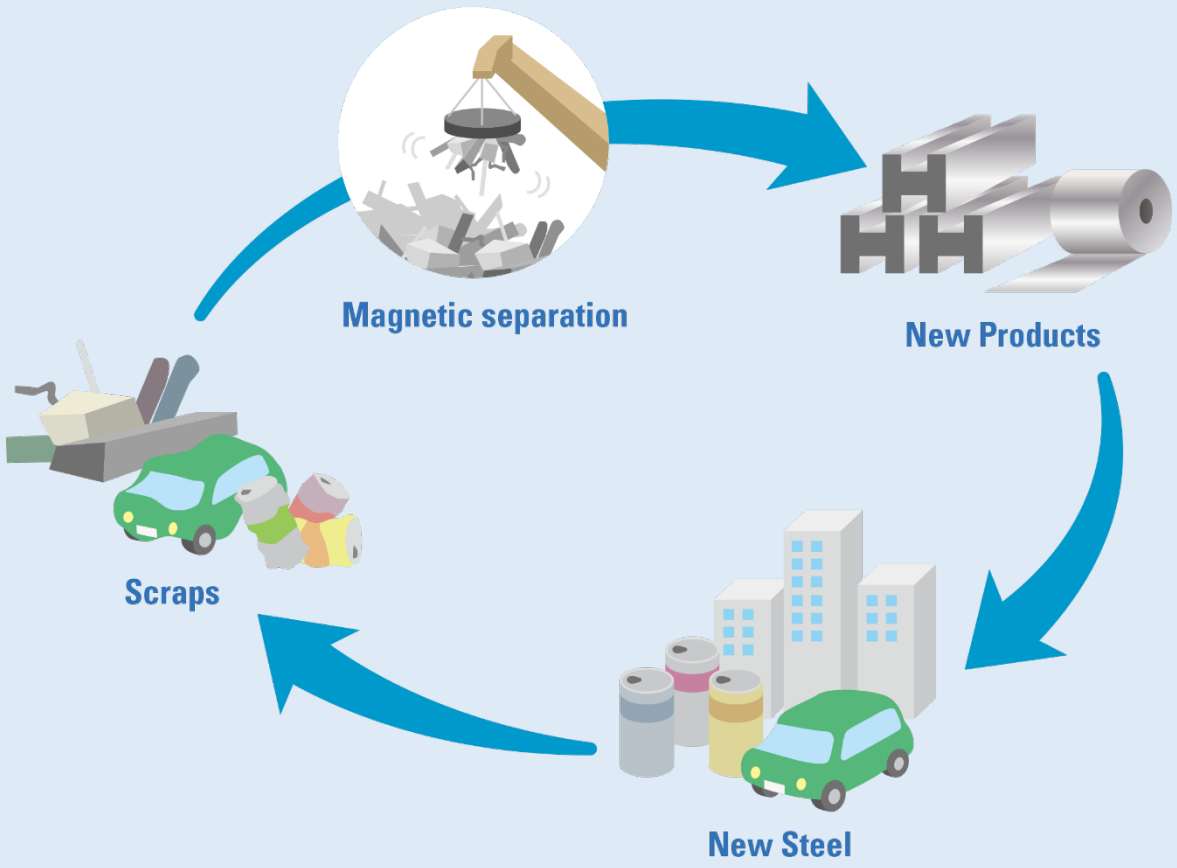
Steel is a highly recyclable material that can be easily recovered and separated using magnets. It can be efficiently recovered, separated, and recycled into high-quality, high-functioning products over and over again through closed-loop recycling.

Closed-loop Recycling of Steel

Steel can be recycled a number of times as a raw material for steel products while retaining its original properties.

Closed-loop recycling is superior to open-loop recycling in terms of sustainability, because closed-loop recycling reduces the consumption of natural resources, as well as the amount of environmentally hazardous substances and wastes.

Closed-loop Recycling



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

Material CSR Issues

Identifying material CSR issues

The JFE Group identified material CSR issues that strongly impact where and how it should invest its resources, making every effort to minimize negative societal impact and maximize the societal value as only the JFE Group can.

The following table summarizes five areas of focus and 13 specific issues identified as material CSR issues. The JFE Group will respect human rights as a fundamental aspect of its business and activities contributing to society and will advance its efforts to address these material CSR issues based on fair and transparent corporate governance. Such initiatives will demonstrate the Group's vision of "Contributing to society with the world's most innovative technology" and will contribute to its sustainable growth as well as the sustainability of society.

Contribution to the Sustainability Development Goals (SDGs) through Business Activity

In September 2015, a UN Summit adopted 17 SDGs to be addressed through worldwide efforts to achieve sustainable development. The JFE Group is responding to this call through contributions achieved by its business activities.

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

Areas of Focus		Details	Scope of Influence	Material CSR Issues	Relevant SDGs
Activity	Provide quality products (customer satisfaction)	• Provide products and services based on advanced technologies - Continue stable supply of safe, high-quality products - Solve customer problems	JFE Group Customers Society	Stably supply products Ensure quality Pursue research and development Respond to customer needs	7 9 10 11 12 13 17
	Protect the global environment	• Mitigate environmental impact • Contribute to the creation of a recycling-oriented society • Utilize Group technologies to develop products that contribute to environmental protection	JFE Group Local communities near manufacturing sites Customers Society	Develop and provide eco-friendly products Mitigate climate change Protect the global atmosphere Pursue resource recycling	6 7 9 12 13 14
	Ensure occupational safety and health	• Prioritize safety first • Maintain the physical and mental health of employees and their families and create rewarding workplaces	JFE Group Suppliers Business partners	Prevent workplace accidents Ensure the health of employees and their families	3 8
	Recruit and nurture diverse human resources	• Maintain work environments where all personnel can maximize their abilities • Accumulate and hand down technologies and skills	JFE Group Business associates	Pursue diversity and inclusion Strengthen human resources development	4 5 8 9 10
Basis of activity	Thoroughly enforce compliance		JFE Group Suppliers Political authorities Society	Ensure adherence to corporate ethical standards and compliance	10 16

Increased corporate value and sustainable growth

Goals

Help realize sustainable societies

Corporate Governance (Ensure Fairness, Objectivity and Transparency)

Respect and Maintain Awareness of Human Rights

Process for Identifying Material Issues

STEP1 Identification

By measuring the businesses of the JFE Group against the following yardsticks, we have identified 35 core issues with respect to society's expectations for our CSR initiatives.

- GRI G4 Sustainability Reporting Guideline
- ISO 26000
- Sustainability Development Goals (SDGs)
- ESG survey via external assessment organization
- Internal documents on employee satisfaction surveys, etc.
- Benchmark surveys conducted to the three businesses

35 Core Issues

Economy

1. Thorough compliance
2. Appropriate disclosure
3. Corporate governance
4. CSR management
5. Customer satisfaction
6. Supply chain management
7. Risk management
8. Transparent resource management
9. Tax management
10. Financial performance improvement
11. Innovation management
12. Provision of quality products
13. Information-security management

Environment

14. Environment management
15. Financial benefits through environmental investment
16. Eco-friendly products
17. Global warming mitigation
18. Energy efficiency improvement
19. Efficient use of water resources
20. Air pollutant emissions control
21. Resource recycling
22. Biodiversity
23. Renewable energy
24. Chemical substances management and release control

Society

25. Ensure occupational safety and health
26. Stakeholder engagement
27. Sound labor-management relations
28. Respect for human rights
29. Human resources diversity
30. Fair valuation and compensation for employees
31. Securing and cultivating outstanding human resources
32. Employee satisfaction improvement
33. Societal contribution through business
34. Societal contribution activities
35. Work-life balance

STEP2 Prioritization (Group-wide Meeting)

The 35 core issues identified in STEP 1 are prioritized through two criteria:
(1) Vertical axis: Stakeholder expectations
(2) Horizontal axis: Relevance to business (societal impact)
(1) We identified 13 issues in 5 focus areas by measuring the impact of decision-making on stakeholders for (1), and holding a Group-wide review meeting for (2).

Group-wide Meeting to Prioritize Material CSR Issues Held on November 29, 2016

Managers from each operating company discussed the prioritization of the 35 core issues from the perspectives of group management and their respective operating companies' interests.

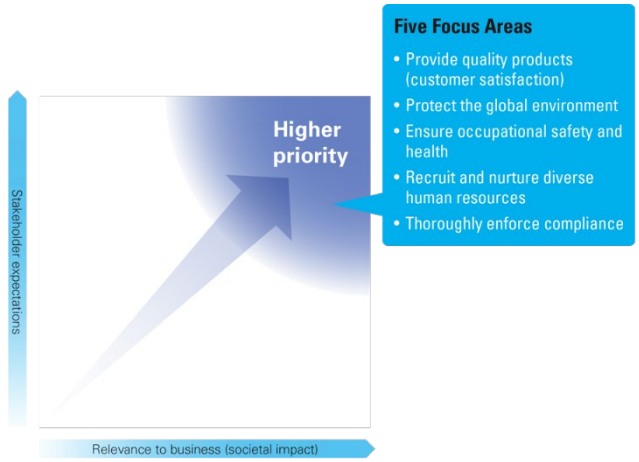


STEP3 Validation

The following process validated 13 material CSR issues in five focus areas:

- Confirmation and examination by each operating company
- Examination and approval by the JFE Group CSR Council*

* Participants: president of JFE Holdings (chairperson), executive vice president, corporate officers, full-time Audit & Supervisory Board members, presidents of operating companies, etc.



STEP4 Review and Set KPIs

We reviewed material CSR issues identified in FY2016 and set KPIs in FY2017.

- Review
  - Review by the JFE Group CSR Council
  - Examine comments by third-party experts on the CSR report

- Set KPIs
  Set KPIs in accordance with the following process and implement PDCA cycles
  - Review at each operating company
  - Submit draft KPIs to the JFE Group Environmental Committee for deliberation
  - Examination and approval by the JFE Group CSR Council

KPIs for Material Issues

KPIs for Material CSR Issues -Results for FY2019 and Revision to be Applied on and after FY2020

The JFE Group has established KPIs to address the CSR issues identified in FY2016. It tackles these KPIs by focusing the power of the entire Group.

In FY2020, the Group assessed the previous year's KPI results. Assessment results together with opinions exchanged with stakeholders were used to further review the KPIs.

The Group will efficiently implement PDCA cycles and promote effective CSR management by setting KPIs that take into consideration the business characteristics of each operating company.

■KPIs for Material CSR Issues
Results for FY2019 and Revision to be Applied on and after FY2020

Assessment Standards

Target Attribute		○	△	×
Quantitative	Single-year target	100% achievement	At least 80%	Less than 80%
	Medium- to long-term target (when target is to be achieved in the next several years)	Final target of 100% is achieved.	Working toward achieving the final target; partial success achieved (80% or more after linear interpolation)	Working toward the target, but short of success (less than 80% after linear interpolation)
Qualitative		Target is achieved.	Working toward the target; partial success achieved	Working toward the target but short of success

Note: For targets or KPIs set to assess the Group as a whole, the overall result will be that of the operating company that showed the lowest performance.

Area of Focus		Material CSR Issue	Operating Company	Targets/KPIs	Initiatives and Results for FY2019	Assessment	Targets/KPIs for FY2020
Activity	Provide quality products (customer satisfaction)	Stable supply of products	ST	(1) Maintain stable operations to ensure stable product supply (2) Make steady progress on strengthening the manufacturing base, including measures to stabilize blast furnace operation	• Operation of facilities at each steelworks and district were stable as a result of steady progress in strengthening the manufacturing infrastructure, which led to improvement of the y-o-y on-time delivery rate	○	(1) Flexibly respond to changes in demand arising from environmental changes and maintain stable operations to ensure stable product supply (2) Make steady progress on strengthening the manufacturing base, including measures to stabilize blast furnace operation
			EN	• Secure a stable number of certificated managing engineers	• Stable number of managing engineers was secured while achieving high sales revenue	○	• Secure a stable number of certificated managing engineers
			SH	• Make consistent investment in processing and distribution operations	• Investments necessary to realize stable product supply were all carried out during this fiscal year **Details of investments (amount resolved):** ▸Reinforcement: 1.7 billion yen ▸Renovation and security: 2.0 billion yen ▸System: 1.8 billion yen	○	• Make consistent investment in processing and distribution operations
		Ensure quality	ST	• Make steady progress on capital investments to improve the level of quality assurance and product testing in line with the Sixth Medium-term Business Plan	• Approval for investments for full automation of the four critical items set in the Sixth Medium-term Business Plan was mostly acquired during FY2019 (tensile test: 96.7%, molten steel analysis: 100%, automotive steel sheet thickness measurement: 100%, coating weight measurement: 100%)	○	• Make steady progress on capital investments to improve the level of quality assurance and product testing; achieve full automation of the four critical items: tensile test, molten steel analysis, steel sheet thickness measurement, and coating weight measurement
			EN	• No major quality problems	• No major quality problems	○	• No major quality problems
			SH	• Conduct quality audits on group companies Continue conducting quality audits at least once a year for the 30 group companies in Japan and overseas that engage in manufacturing (maintain 100% audit performance rate)	• Conduct quality audits at 30 group companies in Japan and overseas in accordance with the quality audit plan; audit for six companies was postponed to FY2020 from the end of FY2019 in view of COVID-19; audit performance rate: 80% (14 companies in Japan, 10 overseas)	○	• Conduct quality audits on group companies Continue conducting quality audits to 32 group companies in Japan and overseas that engage in manufacturing (expand the number of companies subject to audit from 30 to 32)
		Pursue research and development	ST	• Make steady progress in research and development as set out in the Sixth Medium-term Business Plan	• R&D expense equivalent to the previous fiscal year was spent to put the new product into market as planned • Optimal operation technology leveraging data science technology was implemented company-wide	○	• Pursue strategic research and development ▸By developing data science application technology, in FY2020 aim to inaugurate the JFE Digital Transformation Center (JDXC), promote an AI application at blast furnaces, promote a DS application at three sintering plants in Fukuyama, and apply J-dscom** to all hot strip lines ▸Number of new products and new technologies to be developed in FY2020: over 20 (target accumulated total of 135 for the period from FY2015 to FY2020) *JFE Detecting-anomaly-Signs & COlor-Mapping system
			EN	• Make consistent or increased investment in research and development	• Investment was maintained/increased FY2017: 3.8 billion yen FY2018: 4.1 billion yen FY2019: 4.7 billion yen (15% increase from FY2018)	○	• Pursue technological development in three critical areas: leveraging ICT, climate change, and recycling plastics **Numerical target:** Ratio of R&D expenses for the three critical areas: 30% or more
		Respond to customer needs	ST	(1) All sales personnel are to take rank-based training for the sales department within two years of being posted to the department (2) Conduct CS survey and ensure feedback of results	(1) Office heads, managers, and newly appointed employees took the course within two years (2) Provided feedback on CS survey results	○	(1) All sales personnel are to take rank-based training for the sales department within two years of being posted to the department (2) Conduct CS survey and ensure feedback of results
			EN	• Use data collected from customer surveys to enhance customer satisfaction	• Feedback was provided using construction evaluation forms for public works and quality management system customer surveys for private work	○	• Use data collected from customer surveys to enhance customer satisfaction
			SH	• Invest in the development of strong sales personnel All target employees are required to meet the goal of human resource development through skill training and participation of overseas employees in joint training held in Japan	• Fully achieved the target of human resource development through skill training and the participation of overseas employees in joint training in Japan; skill training: 4 courses, 130 participants; national staff training: 24 participants	○	• Invest in the development of strong sales personnel All target employees are required to meet the goal of human resource development through skill training and participation of overseas employees in joint training held in Japan

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Area of Focus		Material CSR Issue	Operating Company	Targets/KPIs	Initiatives and Results for FY2019	Assessment	Targets/KPIs for FY2020
Activity	Protect the global environment	Develop and provide eco-friendly products	ST	• Make steady progress in developing new products and technologies, as set out in the Sixth Medium-term Business Plan	• Commercialized 16 eco-friendly products as planned: LALAC-HS (weathering steel for high-salinity environment), BRITE-ACE® (Tin free steel for a welded can with excellent high-speed weldability), FM800 (nickel-free alloyed steel powder), etc.	○	• Expand eco-friendly products and technological offerings: 15 or more in FY2020 (target accumulated total of 105 for the period from FY2015 to FY2020)
			EN	—	—	—	• Create new business or products that contribute to environmental protection or expand business: at least one applicable case per year ▸Promote plastic recycling business ▸Promote food waste recycling business ▸Promote home electronic appliance and fluorescent light recycling business ▸Promote renewable energy-generated power supply business ▸Develop and offer eco-friendly products
		Mitigate climate change	ST	(1) CO_2 reduction target defined in the JISF's "Commitment to a Low Carbon Society" (2) Continue to invest in energy conservation	(1) Continuing to work in line with the plan to achieve the CO_2 reduction target defined in the JISF's "Commitment to a Low Carbon Society" (2) Made steady progress in energy conservation investment	○	• Aim to reduce our CO_2 emissions by at least 20% in FY2030 from FY2013 level • Establish project team and formulate and implement a scenario by the end of FY2020 to realize the above • Participate in technological development led by the New Energy and Industrial Technology Development Organization (NEDO) to realize zero-carbon steel; develop a long-term road map in 2020 to 2021 for technological development • Begin actual operation testing with a ferro-coke pilot plant
			EN	(1) Contribute to climate change mitigation through our products and services ▸Promote waste-fueled power generation ▸Promote biomass power generation ▸Reduce energy use at water and sewage treatment plants ▸Promote geothermal, solar photovoltaic, and wind power generation ▸Distribute renewable energy-generated power (2) Reduce the carbon footprint of factories and offices	(1) Exceeded the target of two offerings a year, providing three waste-to-energy power generation plants and three biomass power generation plants; CO_2 reduction achieved through our plants sold (currently in operation): 4.13 million t-CO_2/year (2) Exceeded the target of 1% or more y-o-y reduction, achieving 13.7% reduction (FY2018: 13,100 t/year, FY2019: 11,300 t/year)	○	(1) Two or more offerings per year of products/services that contribute to climate change mitigation ▸Promote waste-fueled power generation ▸Promote biomass power generation ▸Promote a digestion gas power generation plant ▸Promote geothermal, solar photovoltaic, and wind power generation (2) At least 1% y-o-y reduction of carbon footprint of factories and offices
		Protect the global atmosphere	ST	(1) Continue to work on keeping NOx and SOx emissions at low levels (2) VOC emissions: maintain a low level (30% decrease compared to FY2000) (3) Benzene emissions: maintain a low level (80% decrease compared to FY1999) (4) Dichloromethane emissions: maintain a low level (40% decrease compared to FY1999)	(1) Maintained low emissions of NOx and SOx through thorough combustion management (2) VOC emissions: 51% decrease (3) Benzene emissions: 93% decrease (4) Dichloromethane emissions: 71% decrease	○	(1) Continue to work on keeping NOx and SOx emissions at low levels (2) VOC emissions: maintain a low level (30% decrease compared to FY2000) (3) Benzene emissions: maintain a low level (80% decrease compared to FY1999) (4) Dichloromethane emissions: maintain a low level (40% decrease compared to FY1999)
			EN	• Continue to work on keeping NOx and SOx emissions at low levels	• Maintained low emissions as the amount discharged was significantly less than the total annual volume restriction equivalent; NOx: 178 Nm^3 (18,000 Nm^3); SOx: 40 Nm^3 (100 Nm^3) Note: The amount in parenthesis represents the total annual volume restriction equivalent.	○	• Continue to work on keeping NOx and SOx emissions at low levels **Numerical targets** (to maintain the emission below the total annual volume restriction equivalent): NOx: 18,000 Nm^3 SOx: 100 Nm^3
		Pursue resource recycling	ST	(1) Maintain the efficient use of water Recirculated water usage rate: 90% or more (2) Recycling rate of co-products: 99% or more	(1) Recirculated water usage rate: 93.4% (2) Recycling rate of co-products: 99.7%	○	(1) Maintain the efficient use of water Recirculated water usage rate: 90% or more (2) Recycling rate of co-products: 99% or more
			EN	(1) Recycling rate at construction sites ▸Recycle at least 99.5% of rubble ▸Recycle at least 95.0% of sludge ▸Recycle at least 85.0% of industrial waste (2) Recycle at least 98.0% of recyclable wastes generated at the Yokohama head office (3) Promote recycling business (plastics, foods, home appliances, fluorescent lamps, etc.)	(1) Recycling rate at construction sites ▸Recycled 99.7% of rubble ▸Recycled 98.8% of sludge ▸Recycled 85.0% of industrial waste (2) 98.8% (3) Promote J&T Recycling Corporation's food waste recycling business	○	(1) Recycling rate at construction sites ▸Recycle at least 99.5% of rubble ▸Recycle at least 95.0% of sludge ▸Recycle at least 85.0% of industrial waste (2) Recycle at least 98.0% of recyclable wastes generated at the Yokohama head office
			SH	• Global recycling of steel scraps Increase scrap transaction to exceed the volume for FY2017 (FY2020 target: +3% from FY2017)	• Increased scrap transaction to exceed the volume for FY2017 (+2.8%); contributed to the expansion of a recycling-oriented society by focusing on expanding domestic and overseas supplier bases as well as increasing Japanese exports and overseas transactions	○	• Global recycling of steel scraps Increase scrap transaction to exceed the volume for FY2017 (FY2020 target: +3% from FY2017)

(Continued from the previous page.)

Area of Focus		Material CSR Issue	Operating Company	Targets/KPIs	Initiatives and Results for FY2019	Assessment	Targets/KPIs for FY2020
Activity	Ensure occupational safety and health	Prevent workplace accidents	All Group	• Workplace fatalities: zero occurrences	• Number of workplace fatalities for FY2019: ST 4 EN 2 SH 0	×	(1) Workplace fatalities: zero occurrences (2) ST Lost-work injuries rate for ST: up to 0.10 **Key measures:** (1) Strengthen safety activities at each business unit to cover weak areas (2) Restructure the safety and health management system (introduce ISO) (3) Implement safety activities that utilize ICT (specific initiatives: introduce safety monitoring system, support for safe work using AI image analysis, etc.) EN Lost-work injuries rate for EN: up to 0.25 **Key measures:** (1) Build floor or hand rail for work in high places and wear safety belt (2) Do not allow people near hoisted objects or heavy machinery in operation (3) Turn off equipment, machines, and tools when not in use (4) Verbal communication on safety awareness during site patrol and implementing corrective measures **Example of advanced initiative:** ▸Safety training by experiencing dangerous situations using VR and special vehicles made to instill understanding of the sense of safety SH **Key measures:** ▸Improve equipment (promoting installation of safety sensors, etc.) to prevent contact between people and objects in motion
		Ensure the health of employees and their families	All Group	• Provision rates of health guidance (by FY2020): ST 35% EN 35% SH 40%	• Provision rates of health guidance: ST 56.9% EN 28.9% SH 36.8%	△	• Provision rates of health guidance: ST 60% (by FY2023) EN 35% (by FY2020) SH 40% (by FY2020)
				• Rate of health examination for spouses: 60% (by FY2020)	• Rate of health examination for spouses: ST 48.2% EN 51.7% SH 51.0%	△	• Rate of health examination for spouses: 60% (by FY2020)
	Recruit and nurture diverse human resources	Pursue diversity and inclusion	All Group	• Ratios for female recruits ST Career-track (white-collar position): 35% or more Career-track (technical position): 10% or more On-site position: 10% or more EN Career-track (white-collar position): 20% or more Production/construction position (technical): 5% or more SH Career-track (white-collar position): 25% or more	• Ratios for female recruits ST Career-track (white-collar position): 27% Career-track (technical position): 7% On-site position: 10% EN Career-track (white-collar position): 14% Production/construction position (technical): 14% SH Career-track (white-collar position): 25.5%	×	• Ratios for female recruits ST Career-track (white-collar position): 35% or more Career-track (technical position): 10% or more On-site position: 10% or more EN Career-track (white-collar position): 20% or more Production/construction position (technical): 5% or more SH Career-track (white-collar position): 25% or more
				• Females in managerial positions: five times the 2014 August figure by 2025	• Females in managerial positions: 3.5 times the 2014 August figure	△	• Females in managerial positions: five times the 2014 August figure by 2025
		Strengthen human resources development	All Group	• Improve technical skills and conduct high-quality training programs	• ST Training programs held Total program hours: 1,197,045 • EN Developed human resources through various training programs ▸Rank-based training: 389 participants ▸Overseas project human resources development program: 20 participants • SH Improve technical skills and conduct high-quality training programs (100% attendance from the target audience of rank-based training)	○	• Training hours per person ST Over 40 hours in each year EN Over 20 hours in each year SH Over 20 hours in each year • SH 100% attendance from the target audience of rank-based training
				• 100% attendance from the target audience for human rights awareness training	• Human rights awareness training attendance rate: ST 99.98% EN 100% SH 100%	△	• 100% attendance from the target audience for human rights awareness training
Basis of activity	Thoroughly enforce compliance	Ensure adherence to corporate ethical standards and compliance	All Group	• Steady execution of training to foster and maintain a sense of compliance (100% achievement)	• ST Conducted rank-based compliance training (100% achievement) • EN ▸Conducted rank-based compliance training and law-specific training (classroom instruction: total of 4,165 participants, e-learning: total of 17,897 participants) ▸Conducted hotline training and awareness-building activity (hotline training: 29 participants including group companies) • SH Conducted training to foster and maintain a sense of compliance (100% achievement) Compliance training: 13 bases in Japan (677 participants), 16 bases overseas (337 participants) Rank-based compliance training (237 participants) E-learning (3,487 participants)	○	• Steady execution of training to foster and maintain a sense of compliance (100% achievement)
				• Improve employee awareness of ethics reflected in the Corporate Ethics Awareness Survey • Conduct the Corporate Ethics Awareness Survey for all employees	• Conduct the Corporate Ethics Awareness Survey for all employees • ST Compliance awareness increased by four points from the previous survey (65% → 69%) Question: Do you think the Company's system and compliance initiatives have been improving, and has your own awareness increased as well? • EN Recognition of the hotline system increased by 14 points from the previous survey (63% → 77%) • SH Employee compliance awareness was confirmed to have increased in general compared to the previous survey; work is needed to address power harassment and increase recognition of the whistleblowing and hotline system	○	• Improve employee awareness of ethics reflected in the Corporate Ethics Awareness Survey

CSR Structure

JFE Group CSR System

The JFE Group realizes corporate responsibility by understanding itself as part of the society and considers corporate social responsibility (CSR) to be the foundation of its business as it contributes to the realization of a better society.

Supervision over CSR Initiatives (JFE Group CSR Council, Group Management Strategy Committee, and Board of Directors)

The Group established the JFE Group CSR Council, chaired by the president of JFE Holdings and comprised of the executive vice president (director), corporate officers, full-time Audit & Supervisory Board members, the presidents of operating companies, and other members to oversee and direct the CSR initiatives of the entire organization. Three independent, cross-Group committees have been established under the council, JFE Group Compliance Committee, JFE Group Environmental Committee, and JFE Group Internal Control Committee to discuss specific topics as well as to oversee and direct the Group's CSR initiatives. Topics regarding CSR policies and initiatives discussed at the meetings of the Group CSR Council and deemed important to management will also be deliberated at the Group Management Strategy Committee and reported to the Board of Directors. The board oversees the Group's CSR activities by discussing the key matters reported.

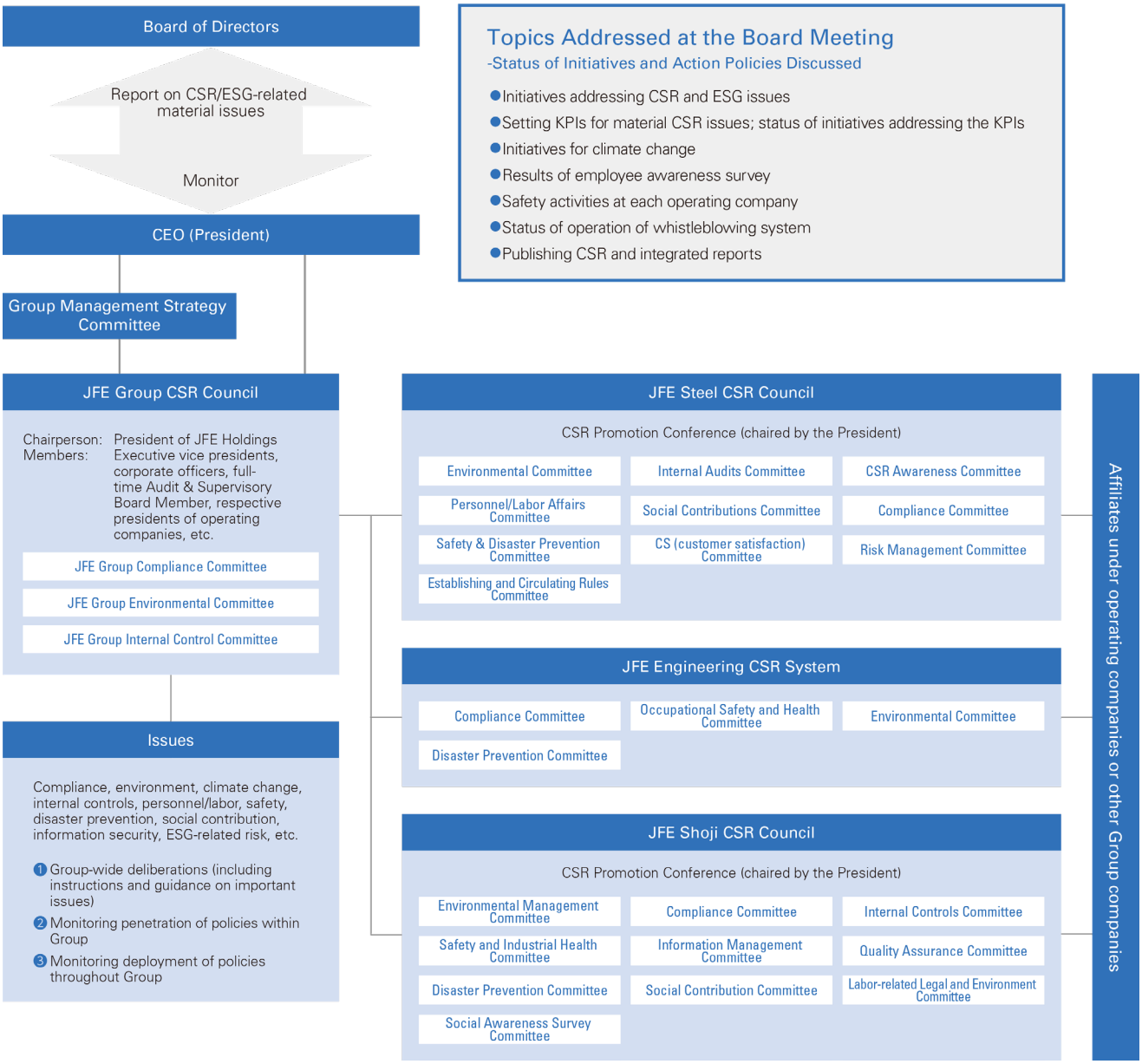
JFE Group CSR Council Activities

The Group CSR Council meets approximately once every three months to discuss policies related to the Group's CSR initiatives, including instruction and guidance on material issues, to monitor the penetration of the policies within the Group, and to share information and carry out horizontal communication regarding examples of our responses to issues and problems. The council deals with a broad scope of issues, including those related to compliance, the environment, climate change, human resources, labor issues, safety, disaster prevention, social contribution, addressing antisocial forces, and ESG-related risks.

Cooperation with Operating Companies

Entities with functions similar to those of the Group CSR Council are set up at each operating company as well and coordinate the promotion of Group-wide CSR initiatives. JFE Steel established the CSR Council chaired by the President in July 2005, following the establishment of the CSR Section in April 2005. Specific committees and sub-committees in areas such as compliance, global environment, risk management, safety and disaster prevention, customer satisfaction, social contributions, etc. established under the CSR Council have been actively conducting the activities in each area, while promoting CSR awareness together with the Group companies. JFE Engineering and JFE Shoji also lead in the promotion of CSR through establishment of committees in areas such as compliance and environmental committees.

■ CSR Structure



Confirmation and Improvement through the Employee Awareness Survey

The JFE Group regularly conducts a Corporate Ethics Awareness Survey for directors and employees of the Company as well as the operating companies to confirm the penetration and thorough compliance of the Group's Corporate Vision, Corporate Values, and Standards of Business Conduct, along with the identification of potential risks. The survey conducted in 2019 confirmed that many employees acknowledged the vision and corporate policy and are aware of compliance matters when carrying out their work. On the other hand, the survey also brought to our attention issues to address going forward. The survey results were reported to the Board of Directors and JFE Group CSR Council, and each company worked on reflecting the information in their specific initiatives.

CSR Audit

To ensure that CSR activities are conducted properly, the JFE Group systematically audits environmental management, Antimonopoly Law compliance, expense management, overseas office management, tax law compliance, safety management, and disaster prevention. If an audit reveals a problem, the internal audit departments of JFE Holdings and relevant operating companies share information to support the implementation of corrective measures in their CSR activity.

Initiatives and Relevant SDGs

The JFE Group is taking action to address CSR issues, even in non-material areas.
The following chart summarizes all activities introduced in this report. Through these activities, the JFE Group intends to contribute to the achievement of the SDGs.

Activities		Related SDGs
CSR Management		
Supply Chain Management (P. 37)	• Procurement Policy and Initiatives for Each Business • Promoting Green Procurement	
Addressing ESG Issues		
Environmental Management (P. 39)	• Environmental Management System • Environmental Education	
Climate Change (P. 63)	• Saving Energy and Reducing CO_2 in Iron and Steelmaking Process • Initiatives for Reducing CO_2	
Prevention of Pollution (P. 95)	• Controlling Air Emissions • Preventing Water Pollution • Management of Chemical Substances	
Efficient Use of Resources (P. 100)	• Reducing Generation and Emission of Co-products and Reusing Co-products • Promoting Recycling • Resource Recycling Solution	

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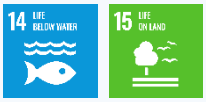
Water Security (P. 103)	・Efficient Use of Water	
Biodiversity (P. 106)	• Biodiversity Initiatives • Commitments to External Initiatives • Products and Technologies to Preserve Biodiversity	
Environmental Communication (P. 109)	• Disclosing Environmental Data • Disclosure and Exchange of Information	
Customer Responsibility (P. 111)	• Quality Initiatives • Quality Improvement and Enforcement of Quality Assurance Systems • Improving Customer Satisfaction • Responsible Export Practices	
Occupational Health and Safety (P. 117)	• Occupational Health and Safety • Employee Health	
Labor Standards (P. 124)	• Workstyle Reform • Operational Reform • Workforce Diversity Promotion • Developing Dynamic Work Environments	
Human Rights (P. 135)	• Respecting Human Rights Initiatives • Respecting the Rights of Workers	
Community (P. 138)	• Local Activities • Support for External Organizations • Support for Youth Development • JFE 21st Century Foundation	

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Shareholders and Investors (P. 147)	• Proactive Information Disclosure	
Compliance (including Anti-corruption) (P. 158)	• Adherence to Ethical Standard; Legal Compliance	
Tax Transparency (P. 164)	• Basic Policy	

Stakeholder Engagement

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

■ JFE Group's Major Stakeholders

Approach	Major Communication Methods, etc.	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 to 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 (convocation notices, notices of resolutions, etc.)	1	Approx. 150,000 shareholders
	Investors meeting (financial results, medium-term business plan, etc.)	5	Approx. 500 persons in total
	Individual meeting (financial results, medium-term business plan, etc.)	As needed	Approx. 400 persons in total
	Briefings (at the branch offices of securities firms, etc.)	11	Approx. 800 persons
	Plant tours for shareholders (steel, engineering, shipbuilding bases, etc.)	23	Approx. 1,800 persons
	Publishing shareholder newsletters (JFE Dayori)	2 (mid-year and annual)	Approx. 220,000 copies/issues
	Various reports, including integrated reports and CSR reports	1	Approx. 40,000 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	

(Continued from the previous page.)

Clients			
CSR initiatives are being actively pursued together with our clients, who are important business partners. We have established Purchasing and Procurement Policies to promote fair and sincere procurement activities and to construct healthy relationships with clients.	Communications through purchasing activities	As needed	Conducted at each operating company
	Briefing and discussions	As needed	Conducted at each operating company
	Information via website, 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 Health Declaration and are conducting various activities toward attaining the goals.	Communications through daily operations and in the workplace	As needed	
	Internal newsletters and intranet	As needed	
	Various labor-management committees	2 to 4	Management and labor unions at each operating company
	Corporate Ethics Hotline	As needed	101 calls in FY2019
	Various training sessions	As needed	Position-specific, compliance, human rights, etc.
	Family days (visits by employee families, lunch at employees' cafeterias, etc.)	As needed	Conducted at each operating company
	Corporate Ethics Awareness Survey	1 (every 3 years)	At the company and operating companies

(Continued from the previous page.)

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. 270,000 persons a year
	Plant tours	As needed	100,000 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 info, etc.)	As needed	
	Social contribution through JFE 21st Century Foundation (http://www.jfe-21st-cf.or.jp/eng/) (various research support, regional activity support, etc.)	As needed	

Supply Chain Management

Basic Policy

Through the adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement, the international community has called on companies to actively engage in actions to resolve global issues toward realizing a sustainable society. Existing harmoniously with the global environment, respecting human rights, and providing challenging work environments are some of the JFE Group's commitments in the JFE Standards of Business Conduct and the Group promotes initiatives under these standards. In order to realize a sustainable society, we believe it is important to address these challenges within the Group itself as well as across the entire supply chain. We will continue to push forward with our initiatives supported by the understanding of our suppliers and other business partners.

Promoting Green Procurement

The JFE Group's procurement policies help to conserve resources and protect the environment by ensuring adherence not only to all laws and regulations but also to procurement principles stated in the Charter of Corporate Behavior developed by the Japan Business Federation. Going forward, the JFE Group expects to accelerate such efforts in its supply chains.

Procurement Policy and Initiatives by Each Business

JFE Steel

Basic Policy on Procurement

JFE Steel upholds its Basic Policy on Procurement to conduct purchasing activities with fairness and sincerity and thereby continue earning supplier trust as a good business partner.
JFE Steel's basic purchasing and procurement policies are summarized below.

- Basic Policy on Procurement (https://www.jfe-steel.co.jp/en/company/purchase_policy.html)

As for material procurement, the company has established the Raw Material Purchasing Policy to develop and operate a sustainable procurement system for sourcing raw materials. Through the system, JFE Steel pays due consideration to human rights, including the prohibition of child labor and forced labor, as well as legal compliance and environmental protection. In addition, the company purchases raw materials after confirming that suppliers are not using conflict minerals.
JFE Steel's Raw Material Purchasing Policy is summarized below.

- Raw Material Purchasing Policy (https://www.jfe-steel.co.jp/en/company/purchase_policy.html#purchase_policy)

Requesting Suppliers to Promote CSR

JFE Steel believes that its social responsibility is to raise stakeholder satisfaction and enhance its corporate value. To that end, the company prioritizes efforts in areas such as environmental protection, safety, disaster prevention, and compliance, which are fundamental to its survival, and requests its suppliers to pursue their own CSR initiatives.
JFE Steel's CSR Procurement Guidelines are summarized below.

- CSR Procurement Guidelines
  (https://www.jfe-steel.co.jp/en/company/purchase_policy.html#to-our-business-partners)

Win-Win Relationships with Suppliers

JFE Steel establishes win-win relationships with our suppliers by leveraging their ideas for improving materials, designs, shapes, specifications and production methods. The company's value-analysis activities allow them to propose how to reduce costs, improve materials functions, and upgrade quality, safety and work efficiency. The company then strives to implement the ideas wherever possible.

JFE Engineering

Fair and Sincere Procurement

JFE Engineering, viewing its suppliers as key partners in achieving mutual growth, strives to nurture mutual trust and reinforce partnership relationships. The company seeks to engage in procurement activities with integrity by complying with guidelines on fair procurement and codes of conduct for building sound and equitable relationships with suppliers and providing training for staff who are responsible for contracts.

The company collaborates with suppliers on CSR initiatives and upholds its Purchasing and Procurement Policies as a standard for fair and transparent procurement activities.
JFE Engineering's Purchasing and Procurement Policies are summarized below.

- Purchasing and Procurement Policies (Japanese Only)
  (https://www.jfe-eng.co.jp/information/basic_policy.html)

JFE Engineering requests that suppliers implement the following measures.

Requests to Suppliers Regarding CSR Initiatives

(1) Comply with laws, regulations and social norms
(2) Implement thorough information management
(3) Provide safe and competitive products and services
(4) Observe human rights, work environments and occupational health and safety
(5) Respect the global environment
(6) Develop an organization for promoting CSR

JFE Shoji

Ensuring a Safe, Fair Supply Chain

Corporate social responsibility (CSR) is a pivotal element in JFE Shoji's supply chain for the provision of products, functions, and services through its global business. Customer demand for CSR-based procurement is increasing every year. In addition to its initiatives for quality, stable supply, safety, and reasonable prices, the company will also further consider the global environment, human rights, and occupational safety and health in terms of its procurement.

Environmental Management

Environmental Philosophy and Strategies

The JFE Group's environmental philosophy and strategies target the development of innovative technologies and international cooperation aimed at protecting the global environment by having the intention to achieve "Accordance with Global Environment" and "Improvement of Global Environment" within the corporate activity.

Environmental Philosophy

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

Environmental Strategies

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

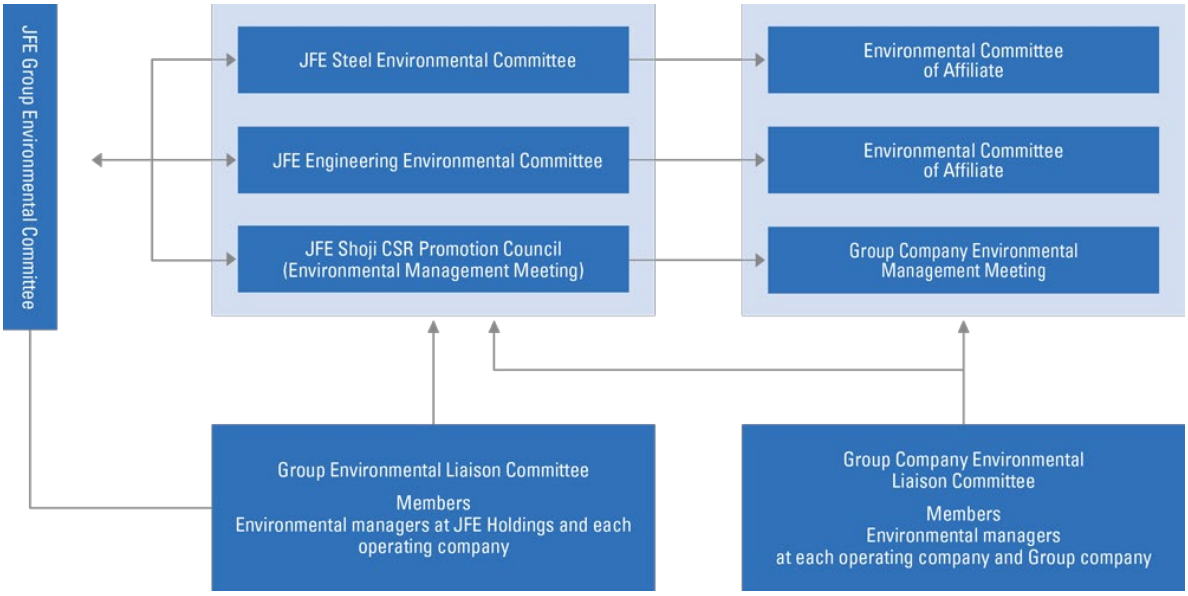
Framework for Environmental Management

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

Key issues for corporate management such as climate change are deliberated at the Group Management Strategy Committee as well and reported to the Board of Directors. The board oversees environmental challenges by discussing the reported material. Additionally, specialized committees set up by JFE Group operating companies and affiliates implement specific activities.
For the Group CSR System, please refer to the following information.

▶ CSR Structure: JFE CSR System (P. 29)

■Environmental Management System



Environmental Management System

Acquisition of ISO 14001 certification is an important part of every JFE Group company's environmental program. All global production sites of JFE Steel and JFE Engineering and major offices of JFE Shoji have received the certification, encompassing 75% of 41,305 employees at 80 companies covered in this report and 58% covered for total sites. In FY2019, there was no material breach of any environmental law or regulation involving fines by any operating company, and the total amount of fines and penalties was zero yen.

JFE Steel

JFE Steel has an Environment Management Department at its head office and in each business office, and the Environmental Committee chaired by its president and the Environment Management Committee in each local office.

JFE Engineering

JFE Engineering's Environmental Management System, which encompasses all employees, works to minimize environmental impact at production sites and branch offices and contribute to environmental protection through all products and services. The major strategies for FY2020 are (1) promote environmental contribution through products for mitigating global warming and climate change, (2) promote effective energy conservation and resource recycling that reflect the actual circumstances of each site and operation, and (3) prevent violations of the Waste Management and Public Cleansing Law.

JFE Shoji

JFE Shoji obtained ISO 14001 certification for its head office, Osaka branch, and Nagoya branch in 2000.
For quantitative data related to ISO 14001, please refer to the following information.

➤ ESG Data: Environmental Data (P. 165)

Environmental Audits

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

JFE Steel

Once a year, JFE Steel's Audit Department and the Environment, Disaster Prevention and Recycling Department conduct an environmental audit at each operational site. For group companies, companies are grouped by risk assessments of equipment, etc., using self-checks based on checklists, part of an extensive audit conducted every one to five years.

Environmental audit of JSGI in Indonesia

JFE Engineering

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

To verify compliance with these regulations, environmental inspections are conducted at all construction sites by the department responsible for construction, and the Tsurumi and Tsu manufacturing sites conduct self-checks on an annual basis to confirm legal compliance. In addition, about 50 locations, selected from among the manufacturing sites, construction sites in Japan, and group company sites, are audited each year by the Safety and Environment Department to confirm compliance with environmental laws and regulations. JFE Engineering also conducts internal audits on its own environment management system to evaluate and enhance the effectiveness of various environment-related initiatives.

JFE Shoji

At JFE Shoji, the Environmental Auditing Department conducts internal environmental audits at all of its affiliate companies that are ISO 14001-certified annually. Non-certified group companies are also audited once every three years by the Audit Department.
For quantitative data related to environmental audits, please refer to the following information.

➤ ESG Data: Environmental Data (P. 165)

Environmental Education

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

JFE Steel

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

JFE Engineering

JFE Engineering educates all employees about environmental issues to increase their understanding of the company's related policies and initiatives. To ensure proper environmental management at its production sites and construction sites, training is often tailored to the specific operations of employees, helping them to enhance their capabilities.

In FY2020, the Safety and Environment Department and other departments worked together to create and implement an education program with details tailored to the specific needs of each department.

JFE Shoji

JFE Shoji provides all employees with general environmental training in compliance with ISO 14001 and specialized training for internal audit staff on an annual basis. In addition, each company performs a self-check using its own extensive checklist to ensure understanding and rigorous compliance with environmental laws. Also, JFE Shoji provides environmental training to new executives and information about revised laws and regulations to environmental management personnel.

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

➤ ESG Data: Environmental Data (P. 165)

Environmental Accounting

Basic Policy

The JFE Group is saving energy and reducing its environmental impacts by making its production facilities increasingly efficient and introducing more environmentally friendly equipment. Such investments, which are categorized as environmental costs, cover equipment, facilities, and related expenditures for environmental protection and impact reduction.

Environmental Investment and Expenses

Environmental capital investment totaled 46.8 billion yen and expenses amounted to 113.1 billion yen in FY2019. Capital expenditure included 26.7 billion yen for measures to prevent global warming (measures to address climate change), 11.0 billion yen for air pollution countermeasures, and 4.1 billion yen for water pollution prevention. Environmental capital investment as a percentage of overall capital investment was roughly 19%.

Environmental expenses for environmental activities included 34.1 billion yen for air pollution countermeasures, 27.6 billion yen for global warming countermeasures (measures to address climate change) and 18.3 billion yen for industrial water recycling. Environmental R&D expenses came to 11.3 billion yen.

Capital Investment

To save energy and reduce environmental impacts stemming from production, the JFE Group invests in environmental technologies for plants and equipment. Cumulative investment in energy savings, totaling 532.1 billion yen since 1990, has enabled the company to achieve energy efficiencies that are among the highest in the world. In total, the Group has invested 727.6 billion yen in environmental protection since 1973.

Results of Environmental Activities

Environmental protection costs include efforts to lower unit-based CO_2 emissions to prevent global warming and measures to reduce final-disposal waste and conserve natural resources through recycling. Other benefits include reduced discharges of airborne and waterborne substances with pollution loads and compliance with statutory regulations concerning exhaust gas emissions and discharged water.

The monetary value of energy savings realized through environmental capital investments and expenses in FY2019 is about 4.6 billion yen.

■ Breakdown of Environmental Costs

Main Items		FY2019	
		Investment (billion yen)	Cost (billion yen)
Management	Impact monitoring and measurement, and EMS expenses and education	0.1	2.6
Global warming countermeasures	Saving and efficiently using energy	26.7	27.6
Conservation of natural resources	Recycling industrial water	3.9	18.3
	Recycling and waste management of internally generated materials, etc.	0.06	5.1
Environmental protection	Air pollution countermeasures	11	34.1
	Water pollution countermeasures	4.1	11.3
	Prevention of soil contamination, noise, vibration, and subsidence	0.04	0.6
Other	Charges, etc.	-	1.5
R&D	Technologies for protecting the environment, saving energy, and preventing global warming	1	11.3
Societal activities	Support for nature preservation and forestation, information disclosure, exhibitions, and public relations	-	0.7
Total		46.8	113.1

Note: Data cover all investment activities of JFE Steel Corporation and R&D activities of JFE Engineering Corporation.

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

➤ ESG Data: Environmental Data (P. 165)

Development and Provision of Eco-friendly Processes and Products

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

➤ Development and Provision of Eco-friendly Processes and Products (P. 46)

Material Flow

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

- Material Flow (P. 61)

Related Links

- JFE Steel's Website: Environmental Initiatives (Japanese only)
  (https://www.jfe-steel.co.jp/research/environment.html)
- JFE Engineering's Website: 360° JFE Engineering
  (https://www.jfe-eng.co.jp/en/360_jfe_engineering/#env)
- JFE Shoji's Website: Environment Management (https://www.jfe-shoji.co.jp/en/csr/environment/)

Development and Provision of Eco-friendly Processes and Products

JFE Steel

Ferro Coke

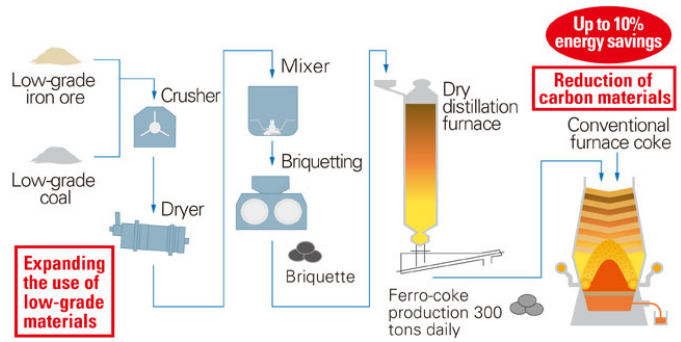
Ferro coke, an innovative raw material for blast furnaces, is made by mixing low-grade coke and iron ore. The ultra-fine metallic iron inside ferro coke acts as a catalyst and accelerates the reduction reaction rate in the blast furnace, significantly reducing the amount of coke required.

Since FY2017, JFE Steel has been conducting the New Energy and Industrial Technology Development Organization (NEDO)'s project, "the development of environmental technology for steelmaking process / technological development of iron making process utilizing ferro coke."

As part of the project, a medium-scale facility with the capacity to produce 300 tonnes of ferro coke per day is currently being constructed in the Fukuyama district of the JFE Steel West Japan Works, covering 12,600 square meters. The facility is designed to handle all steps involved in the production of ferro coke, from crushing and drying to molding and dry distillation. It is also capable of recycling ferro tar, a byproduct of ferro coke production, as a binding agent for briquetting.

Facility construction is scheduled for completion in September 2020. It will begin operations in October and demonstrate the effect of using ferro coke in blast furnaces over a long period. We expect to reduce energy consumption in the iron making process by 10% by 2023 and in turn achieve a significant reduction in CO_2 emissions.

■Process Flow of the Medium-scale Ferro Coke Production Facility



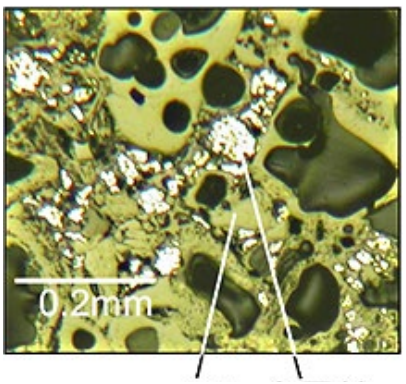
Medium-scale Ferro Coke Production Facility

■Ferro Coke

・Briquette

・Ferro coke

・Cross section of ferro coke



Coke Metallic iron

Introducing Data Science Technology at All Steelworks Blast Furnaces

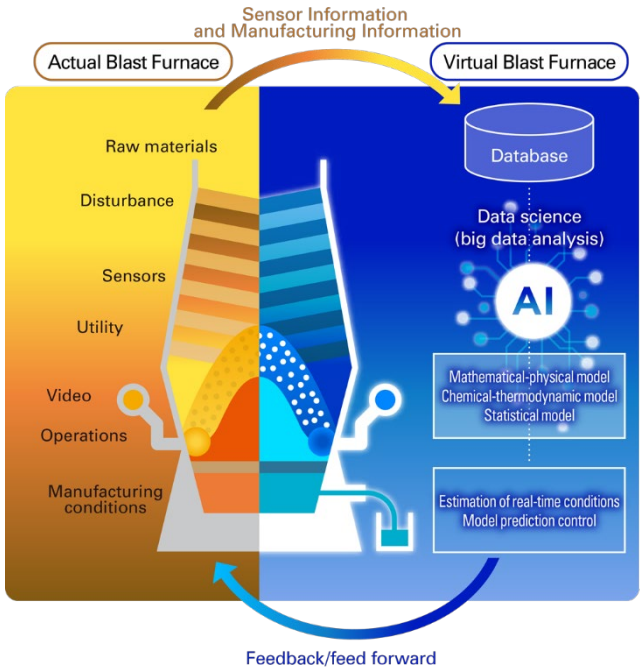
JFE Steel is introducing advanced data science technology (DS) at our blast furnaces.

To reduce CO_2 emissions from our steelworks, it is extremely important that blast furnaces, which remove oxygen in iron ore for the production of iron, operate stably and at high efficiency. However, attaining this level of operation is challenging because it is not possible to directly view the inside of the furnace and because operating conditions can change moment by moment depending on the raw materials used.

Consequently, JFE Steel is now deploying data science technology to convert its eight blast furnaces in Japan to cyber-physical systems (CPS) managed with computer-based algorithms. The conversion applies artificial intelligence to analyze sensor data collected from the physical manufacturing process and then creates a virtual (cyber) process in digital space using proprietary techniques, after which the two processes are linked in real time. The virtual process enables the visualization of the blast furnace's internal state to predict future conditions, allowing the blast furnace to operate stably, which in turn reduces CO_2 emissions.

In the longer term, JFE Steel intends to extend CPS conversion to other processes to realize innovative productivity and greater stability across all steel manufacturing operations.

■ Blast Furnace CPS Concept



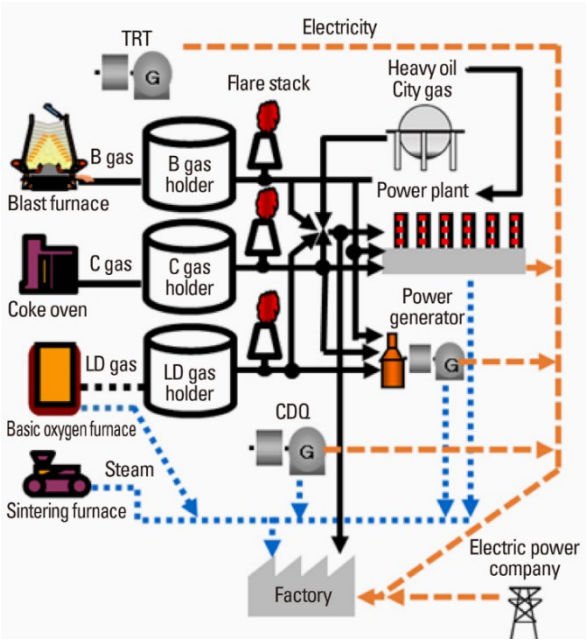
Introducing a Guidance System to Manage Fuels and Electricity Consumptions in Steelworks -Optimization of Consumption Based on Cyber-physical Systems

JFE Steel developed what it calls the Guidance System for operators to efficiently utilize fuels and electricity in domestic steelworks to reduce energy consumption and CO_2 emissions. So far, the system has been rolled out in the Kurashiki and Fukuyama districts in the JFE Steel West Japan Works and will be rolled out in other sites to increase the overall benefits in reduced energy consumption and CO_2 emissions.

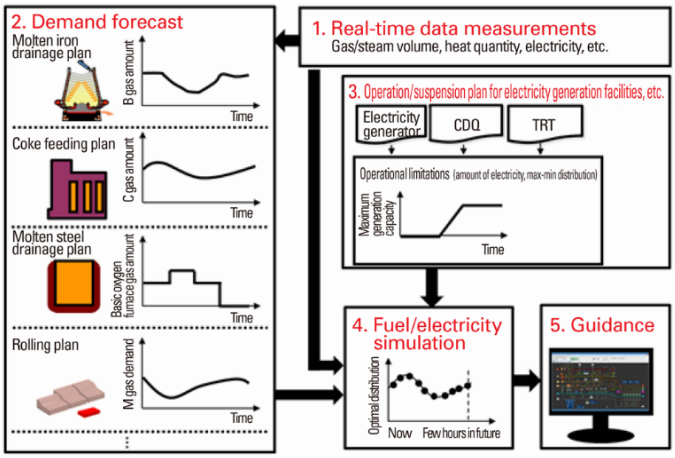
In steelworks, gases, electricity and steam that are generated as byproducts by upstream processes are consumed within the same premises. We also purchase fuel and electricity from external sources to meet actual demands. To efficiently utilize fuel and electricity, many different factors need to be managed to minimize cost and energy losses, including the ratio of byproduct gases to be distributed to each process, the amount of electricity and fuel to be purchased, and the storage volume of byproduct gases.

The Guidance System (1) uses the vast amount of real-time data obtained based on CPS and each factory's detail manufacturing plan, (2) calculates precise future demands, (3) considers operational and contractual limitations, (4) runs simulations to determine the optimal operational plan for minimizing external purchases and (5) guides operators toward this optimal plan.

■ Steelwork's Energy Flow



■ Guidance System Overview



Technology Development for Realizing Zero-Carbon Steel

JFE Steel Corporation, together with Nippon Steel Corporation, Kobe Steel, Ltd. and Japan Research and Development Center for Metals Foundation applied to NEDO's public project "technology development for realizing zero-carbon steel" and were selected as the participating members as of June 11.

(Continued from the previous page.)

Based on the knowledge gained from a previous project, “the development of environmental technology for steelmaking process / development of hydrogen reduction and other technologies (phase II - step 1)” (COURSE50), we will conduct research over the project duration of FY2020–2021, which will involve assessing current challenges and creating a research and development roadmap for the research and development toward zero-carbon steel. These activities can serve as the foundation for future research and development and help to accelerate them. JFE Steel will be involved in holistically assessing various technologies, including the latest blast furnace technology and hydrogen reduction technology.

Conserving Energy by Reducing Energy Loss from Molten Steel Vessels

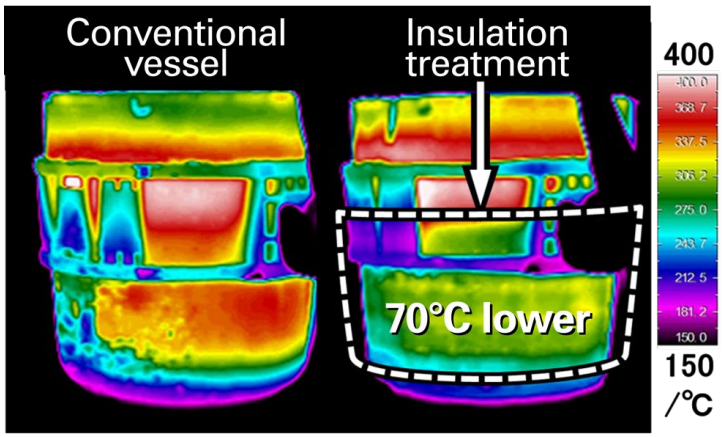
The vessels used in steelmaking to carry hot metal and molten steel are made of iron with inner walls covered in refractories. However, because the surface temperature of these vessels can exceed 300 degrees Celsius across such a large surface area, the vessel loses a significant amount to heat. To overcome this, we have developed a new technology that uses high-quality insulation material to lower the surface temperature and prevent radiation heat transfer.

After optimizing the insulation material layout, we conducted tests using production vessels over a long period and confirmed that the heat loss from the vessel surface was reduced to 55–75% of conventional vessels. Applying the technology to all of our molten metal vessels could achieve energy savings (in crude oil equivalent) of 21,000 kl annually, which equates to the annual consumption of 26,000 per the average household*.

The energy saving quality of this technology is highly regarded, and it received the ECCJ Chairman’s Award (The Energy Conservation Center, Japan Chairman's Award) in Energy Conservation Grand Prize 2019’s Best Practice Category.

* Calculated using a 31.3 GJ/household, the actual energy supply-demand data for FY2018 provided by the Agency for Natural Resources and Energy

■ Insulating Effect of High-quality Insulation Material



Anode Material for All-polymer Battery, a Next-generation Lithium-ion Battery (JFE Chemical Corporation)

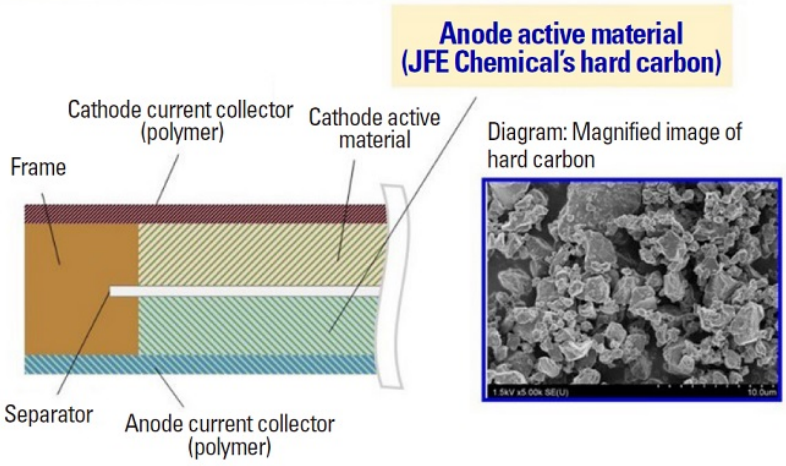
Electric vehicles and renewable energy are key pillars for realizing a decarbonized society in the future, and the further advance of these technologies will depend on the development of high-quality lithium-ion batteries. The all-polymer battery is a next-generation lithium-ion battery. It realizes greater safety, durability and energy density and will significantly reduce production costs and ensure high reliability under abuse. This innovative battery overcomes the shortcomings of conventional lithium-ion batteries and is expected to stabilize the use of solar power generation and other renewable energies while accelerating the pace of transition toward a decarbonized society. APB Corporation is a start-up company engaged in the development, manufacturing and sales of all-polymer batteries.

(Continued from the previous page.)

JFE Chemical, JFE Group's driving force in its chemical businesses, has been involved in mass-producing and selling anode materials for lithium-ion batteries using pitch derived from coal-tar, a steel manufacturing byproduct. Recently, the company invested in the above mentioned APB Corporation and agreed to supply them with hard carbon, a critical anode material for all-polymer batteries.

Using the technologies and know-how that it has accumulated over the years, JFE Chemical will work with APB Corporation and contribute to the mass-production of all-polymer batteries through the production and supply of hard carbon, which features low expansion and shrinkage and is suitable for the anode material of all-polymer batteries.

■ Structure of All-polymer Battery (Single Cell)



Steel Slag Hydrated Matrix

Steel slag hydrated matrix is a steel slag product that can be used as a substitute for concrete but uses ground granulated blast furnace slag instead of cement and steel slag instead of natural gravel and sand aggregate as its ingredients. It effectively uses steel slag and does not rely on natural aggregate, thereby reducing environmental impact, uses less cement and in turn reduces CO_2 emissions.

There are many examples of blocks and artificial stones made from steel slag hydrated matrix being used as a substitute for concrete blocks and natural stones in harbor works, including the runway D construction project at Haneda Airport by the Ministry of Land, Infrastructure, Transport and the coastal reconstruction project after the Great East Japan Earthquake. In addition, we are conducting onsite monitoring in the Katsunan Central Zone in Chiba port with the help of a local fishing association to assess the impact of these blocks on marine diversity.

Breakwater armor block

Coastal construction work using artificial stones made from steel slag hydrated matrix

Use of Granulated Blast Furnace Slag to Reduce CO_2 Emission

Granulated blast furnace slag in crushed and powdered form can be mixed with cement and used as a substitute for cement for making concrete. This leads to reducing the production of cement hence lower CO_2 emissions. For example, producing one tonne of blast furnace slag cement with 45% of its content substituted with granulated blast furnace slag emits 41% less CO_2 than conventional cement. In FY2019, JFE Steel supplied approximately 6.8 million tonnes of granulated blast furnace slag to cement production, equivalent to a reduction of approximately 4.83 million tonnes of CO_2 emissions.

In addition, we are focusing on blue carbon (carbon removed from the atmosphere by ocean ecosystems), which has been a field of active research in recent years. We are involved in creating seagrass beds using steel slag products, measuring the amount of carbon absorbed and fixed by the seagrass beds and testing steel slag products as beds for seaweeds and corals.

■ CO_2 Emission for Producing 1 Tonne of Cement (Unit: kg- CO_2)

CO_2 Emissions Source	Regular Cement	Blast Furnace Slag Cement
Limestone	473	272
Electricity/energy	311	190
Total	784	463

Coral attached to Marine Block™

Precast Concrete Products Mixed with Finely Ground Blast Furnace Slag

Finely ground blast furnace slag can be used as a cementing material in concrete. This type of concrete exhibits significantly higher durability under harsh conditions such as applications in seweres and exposure to anti-freeze. Its effectiveness in reducing enviromental impact has been widely understood, although there has recently been growing interest in its practical applications for concrete constructions that require higher durability.

As one of the deliverables for the Japanese government's Strategic Innovation Promotion Program (SIP), the Japan Society of Civil Engineers published a (draft) guideline in March 2019 on the application of finely ground blast furnace slag to precast concrete product and its application now includes precast concrete slabs installed in highways and piers. With the application of finely ground blast furnace slag in concrete, the durability of precast products is expected to be greater and more consistent, allowing them to contribute to building a stronger nation.

Precast concrete products for extending road width

Restoring Marine Ecosystems Using Steel Slag Products

Marine Stone™, a gravel-type steel slag product, is a habitat forming material that suppresses hydrogen sulfide, which arises from an unhealthy seabed and improves water and sediment quality in enclosed coastal waters. Its effectiveness in improving marine environments has been widely recognized, and the joint project with Hiroshima University received the Minister's Prize (Ministry of Agriculture, Forestry and Fisheries) in the 12th Eco Products Awards and the Grand Prize in the 26th Nikkei Global Environmental Technology Award.

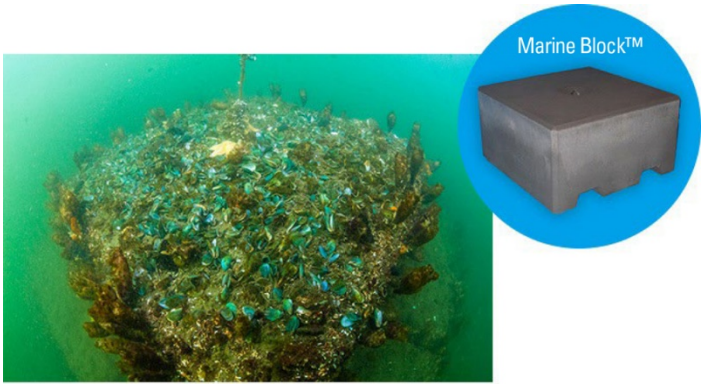
Hiroshima Prefecture has used a total of 38,000 tonnes of Marine Stone™ in its Fukuyama Port Marine Environment Creation Project (inner harbor area). Its marine environment improvement property was confirmed to still be effective in 2019, four years after its initial placement.

Inner harbor area of Fukuyama Port, Hiroshima Prefecture, at low tide, where Marine Stone™ is laid out. The entire area is covered by seaweed and the marine ecosystems restored!

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

In a joint research project with Yokohama City, JFE Steel has confirmed that steel slag products, including Marine Block™, which is steel slag absorbing CO_2 gas, provide a highly effective base for nurturing and growing sea organisms while also facilitating the natural cleansing of seabeds and seawater. To continue improving the marine environment in Yokohama Bay and developing an attractive seaside town, we signed a new partnership agreement* with Yokohama City in March 2020. Under this new agreement, we will continue to work toward improving the marine environment.

* Partnership agreement to improve the marine environment in Yokohama Bay and develop an attractive seaside town



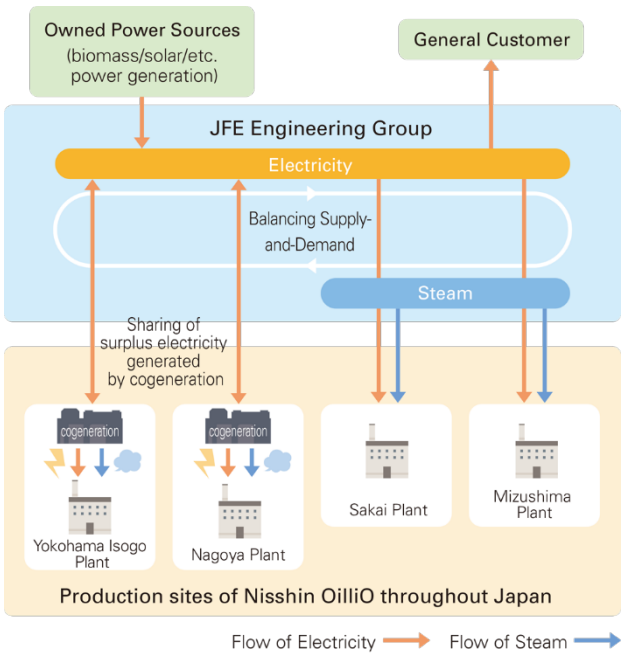
Marine Block™ covered by marine bivalves (Yokohama Bay area)

JFE Engineering

JFE-METS (Multisite Energy Total Service) Receives the Minister of Economy, Trade and Industry Award in Energy Conservation Grand Prize 2019

Typically, energy optimization is considered and addressed at a site level. JFE-METS is a new energy optimization service that offers energy optimization across multiple sites, for example, for an entire company or region. It offers a holistic energy conservation solution by analyzing what the customer's energy consumption currently looks like, installing and operating the most appropriate energy facilities that work across all their sites on their behalf and managing overall energy demand, including offsite locations.

■ Example of JFE-METS



Commercialization of the New Sewage Sludge Treatment Technology OdySSEA —an Innovative Technology Satisfying Both a Large Reduction in Greenhouse Gas (GHG) and High-efficiency Power Generation

In a joint project with the Japan Sewage Works Agency (president: Toshihiro Tsujihara, head office: Bunkyo-ku, Tokyo) and Kawasaki City extending over the two-year period of FY2017-2018, JFE Engineering carried out demonstration research combining a high-efficiency power generation technology that utilizes unused waste heat from a sewage sludge incineration facility and a technology that simultaneously reduces nitrous oxide (N_2O) and nitrogen oxides (NOx) by optimizing the air injection method. The demonstration research was also selected in the B-DASH Project[*1] of Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

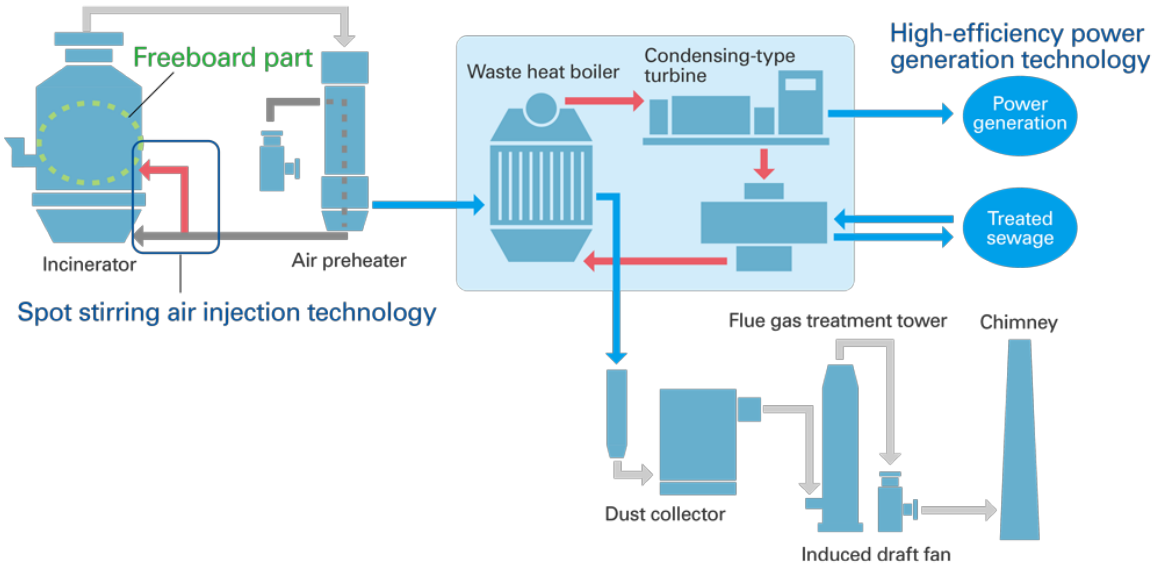
In this demonstration research, JFE Engineering verified that high-efficiency power generation is possible even in small-scale incinerators with a capacity on the order of 60 wet-t/d by introducing a newly developed condensing-type steam turbine and a system that utilizes treated sewage water for cooling. This confirmed that the OdySSEA technology realizes so-called complete electric energy self-sufficiency, in which the amount of generated power exceeds the power consumption of the facility.[*2]

(Continued from the previous page.)

This research also confirmed that NOx generation can be suppressed while simultaneously promoting decomposition of N_2O by efficiently burning sewage by concentrated spot stirring injection of air into the furnace from the optimum position and stirring the air in the furnace. While compact in size, OdySSEA realizes high performance, achieving reductions of more than 50 % in both N_2O and NOx.

*1 B-DASH is an abbreviation for the “Breakthrough by Dynamic Approach in Sewage High Technology Project” of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).
*2 Under conditions of an incineration rate of 140 wet-t/d and 73% water content.

■ System



Realization of Fully Automatic Operation of Waste Incinerator by New System Incorporating Operators’ Know-how

In waste treatment facilities, the stable operation of the incinerator is performed by an automatic combustion control system (ACC). However, because waste incinerators handle wastes of different sizes, shapes and materials, operation must be monitored by the operators from the central control room of the facility or from JFE Engineering’s Global Remote Center*, with manual interventions as necessary.

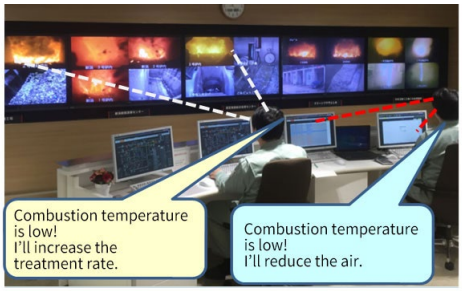
JFE Engineering has been working on advancing its ACC technology and on developing a system that automates the manual intervention operations, which are conventionally performed by operators. In October 2018, a new system that fully automated incinerator operation was rolled out in the Niigata City Shinden Clean Center and began its demonstration run.

The system successfully ran without requiring any manual interventions by the operators and maintained a combustion state more stable than a conventional system for more than two weeks. The stability of steam generated by the boiler also improved, leading to an increase in the amount of electricity generated. In the future, we will continue to run and monitor the incinerator operation using this system to verify its long-term stability and at the same time work on commercializing the system and installing it in waste treatment facilities delivered by JFE Engineering and to newly constructed plants.

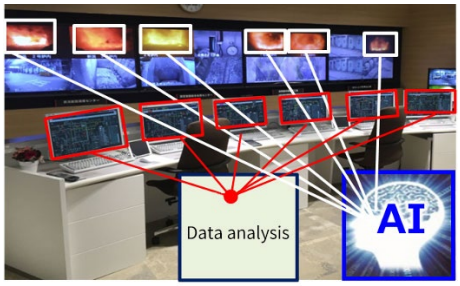
JFE Engineering will continue to work on these advanced initiatives toward achieving total plant automation. As a company that creates and supports the foundations for life, we will make full use of our abundant knowledge and leading-edge technologies to contribute to the formation of a recycling society and preservation of the global environment.

(Continued from the previous page.)

* Global Remote Center (GRC): A centralized monitoring center for various types of plants, which began operation at the JFE Engineering Yokohama head office in March 2018. GRC performs remote monitoring and operation support for object plants throughout Japan through a 24-hour system.

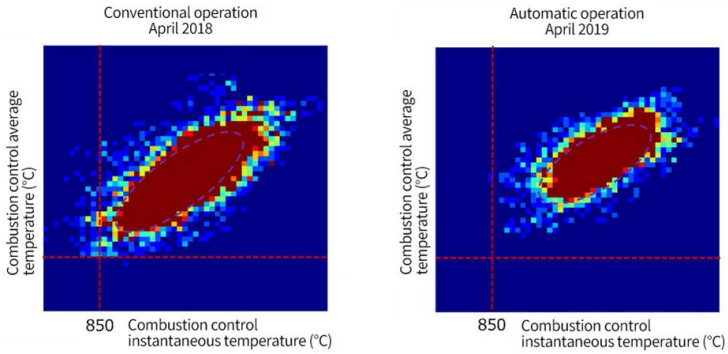


Conventional operation
(manual interventions by operators)



Operation using the new system
(fully automated)

Example tool of the newly developed system
(screens that visualize the AI analysis performed on flame images)



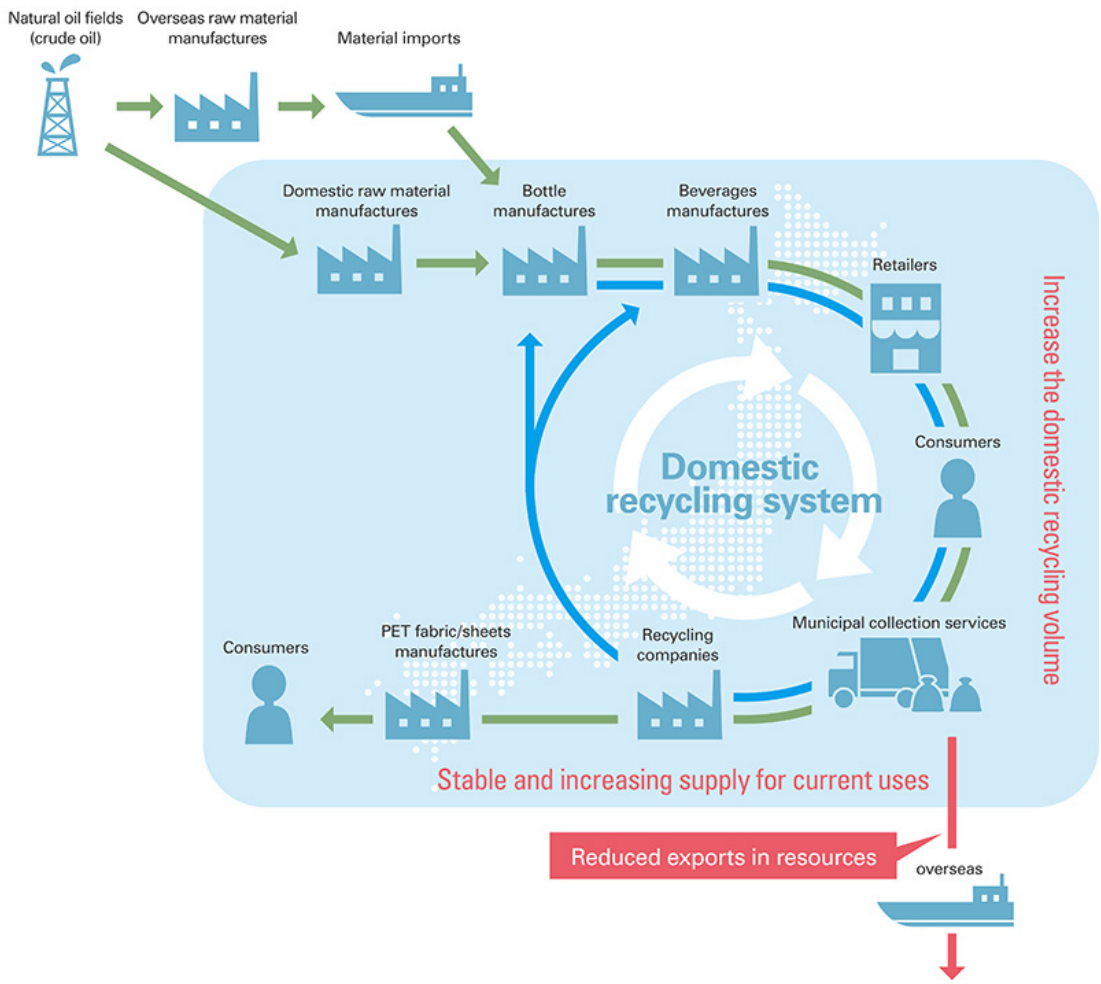
The distribution area of controlled combustion temperature is more than 20% smaller
→ combustion is more stable and generation is also more stable

Construction of a New Recycled PET Resin Manufacturing Factory to Realize Bottle-to-Bottle Recycling

In response to the marine pollution caused by plastic wastes, beverage manufactures have declared their intention*1 to shift completely from using petroleum-based PET bottles to PET bottles made from recycled PET resin*2 by FY2030. Following this trend, Kyoei Industry Co., Ltd., which was the first in Japan to establish the bottle-to-bottle*3 mechanical recycling system*4, and J&T Recycling Corporation, which has been supplying ingredient materials to the company for many years, have set up a new joint venture company in an effort to realize the system and build a new recycled PET resin manufacturing factory, the largest of its kind in Japan. The factory is to become the first recycling base for the JFE Engineering Group and Kyoei Industry Group in the Chubu/Kansai region.

*1 Declaration of Plastic Resources Recycling by the Soft Drinks Industry in November 2018
*2 Recycled PET resin is the raw material recovered from recycled PET bottles. The PET bottles are crushed, washed and dried to form flakes, which are then melted to even out quality and shaped into granular forms called pellets; resins are manufactured by extracting moisture from these pellets.
*3 The creation of a new PET bottle from recycled bottles
*4 Recovered resin obtained through material recycled (returning used products to material status via pulverization, cleansing and other processing) is processed for a regulated period under a high temperature and low pressure to remove impurities from the regenerated materials.

■ Bottle-to-Bottle Recycling



Resource Recycling Businesses of JFE Engineering

For more on the resource recycling businesses, please refer to the following information.

- JFE Engineering's Website: Recycling (https://www.jfe-eng.co.jp/en/products/recycle/rec01.html)

Promotion of Renewable Energy

JFE Engineering has established an array of electrical power generation plants that use renewable sources such as waste, biomass, solar and geothermal and has been commissioned to manage their operations. In response to the increasing number of corporations becoming more environmentally aware in recent years, its subsidiary, Urban Energy Corporation, introduced the special electricity tariff Zero Emission Plan in July 2018 for corporations and organizations, which supplies them with 100% renewable energy. JFE Engineering will continue its electricity retail business using its renewable energy sources through Urban Energy Corporation and contribute to renewable energy dissemination.

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

- Urban Energy Corporation' Website: Electricity Retail Business (Japanese only)
  (https://u-energy.jp/service/retail.html)

Regional Electricity Retail Businesses in Partnership with the Local Municipal Governments

JFE Engineering has established several regional electricity retail companies in partnership with local municipal governments. It is actively involved in the regional electricity business, with a particular focus on the distribution of renewable energy.

It sources its electricity from waste-fueled and other renewable-energy power generation plants that it has built and distributes the electricity to local areas and public facilities, thus promoting local production and consumption of electricity. Through these regional electricity businesses, JFE Engineering intends to promote renewable energy, reduce electricity cost for public facilities, and expand the region's industrial infrastructure.

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

- Urban Energy Corporation's Website: Regional Electricity Supply Business (Japanese only)
  (https://u-energy.jp/service/municipality.html)

Waste Incinerator that Uses a Counter Current Combustion Method

Massive demand for waste incinerators has recently emerged to cope with such concerns as reducing environmental impact, improving the efficiency of electricity generation, and lowering operational costs.

JFE Engineering became the first in the world to adopt the counter current combustion method, developed by deriving from high temperature air combustion technology, for waste incinerators, and it successfully reduced NOx concentration in exhaust gas by 20% to 30%, compared to the conventional method, while maintaining the same carbon monoxide (CO) concentration level. This eliminates the need for equipment to reduce the NOx concentration in exhaust gas and makes possible a more compact facility requiring less maintenance. In addition, the steam that had previously been consumed by denitration equipment can now be fed to turbines to generate electricity.

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

- JFE Engineering's website: Won the Minister of Economy, Trade and Industry Prize in the 44th Excellent Environmental Instrument Award (Japanese only)
  (https://www.jfe-eng.co.jp/news/2018/20180625.html)

JFE Shoji

Building a Global Supply Chain for the Steel Sheets Business

The key factor in initiatives for countering climate change, including those aimed at reducing CO_2 emissions, is minimizing electricity loss and using generated electricity without loss.

Motors found in places such as power plants, factories and homes are responsible for 40–50% of all electricity consumed globally. In Japan, the ratio is approximately 60%. Improving the efficiency of motors by 1% in Japan that would contribute to the equivalent of a 500,000 kw-class power generation plant in energy savings.

Technological advances are expected in electrical vehicle's engine motors, for which demand is expected to rise as we transition to a decarbonized society as well as in the various types of motors used inside cars, which could be as many as 50 to 100 motors per car. We expect improvements in efficiency, smaller size and lighter weight.

In addition, in order to minimize energy loss while distributing electricity from source to factories and homes, continuous improvement, not just at JFE, is required in transformers, where the most loss of electricity occurs, to make them more efficient.

JFE Steel's electrical steel sheets significantly contribute to improving the efficiency of manufacturing motors and transformers. In addition to supplying these high-quality products to customers, JFE Shoji has the necessary infrastructure to ensure the stable supply of processed products tailored to each customer's requirements.

Customers who require high-quality electrical steel sheets, such as motor manufacturers and transformer manufacturers, typically operate manufacturing facilities across the globe. We are aligning ourselves to this trend and establishing a global quad-polar organization that includes Japan, America, China and ASEAN. This enables us to respond to the specific needs of customers, which in turn will contribute to tackling climate change.

Biomass Fuel

In response to growing demand for biomass fuels by biomass power generation companies, JFE Shoji imports palm kernel shells to Japan from Malaysia and Indonesia.

In addition, as the trend toward reducing CO_2 emissions accelerates, demand for renewable energy is rising, especially for biomass power generation which is not affected by weather conditions. We will respond to this demand by exploring other types of biomass fuels, such as wood pellets, to ensure a stable supply of biomass fuels.

Wood pellets are a biomass fuel that allows for the effective reuse of wood materials from thinning and pruning forests or waste materials from woodworking operations.

We will continue to supply fuel to biomass power generation companies, including JFE Engineering, and do our part in the JFE Group's overall contribution toward realizing an eco-friendly society.

■ Shipping Bases for Palm Kernel Shells

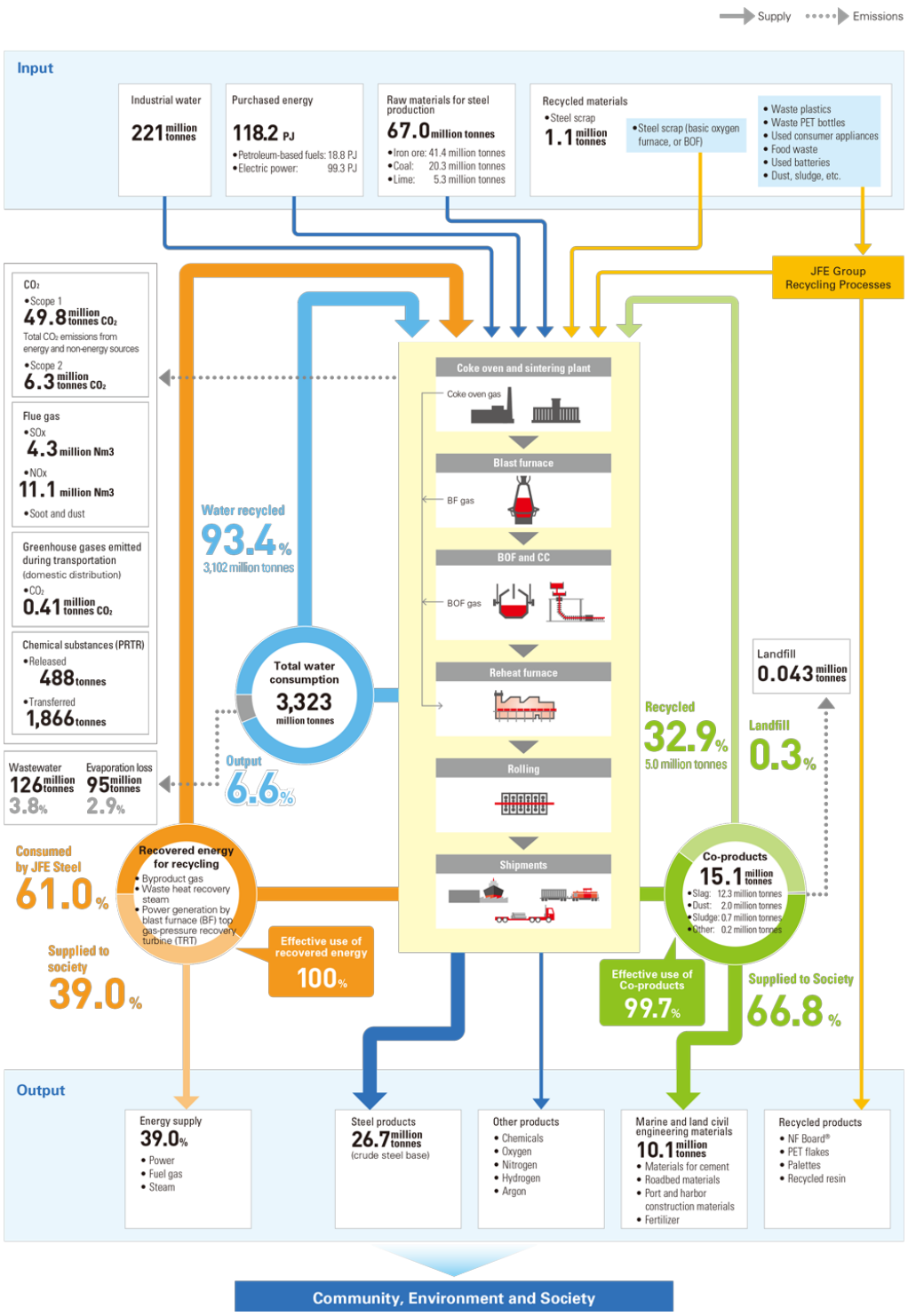
Expansion of Scrap Trading Helps in the Development of a Recycling Society

JFE Shoji's recycling business for steel and aluminum scrap includes the export of steel scrap to Asian countries, where it is sold for both offshore and domestic trading. Although steel scrap exported from Japan is mainly transported by bulk carriers in general, timely shipments of small lots is now also possible due to the container loading system introduced by JFE Shoji, contributing to the development of recycling societies in Asia.

Material Flow

JFE Steel works to reduce the environmental impact of its iron and steelmaking processes, including through the effective use of resources. The company recycles 93.4% of the water it uses for production and uses 99.7% of its co-products, such as ironsteel slag. In addition, 100% of co-product gas generated during production is reused as fuel for reheating slabs, generating power for internal use and supplying power to the public.

JFE Steel (Non-consolidated)



JFE Engineering (Head Office and Works)

Input

Steel	**39,400** tonnes
Energy	
•Electric power purchased	**26.3** GWh
•Class A heavy oil	**150** kl
•Kerosene	**8.5** kl
•Light oil	**235** kl
•Gasoline	**13.8** kl
•City gas	**453,300** tonnes
•LPG	**111.4** tonnes
Water	**106,000** tonnes

JFE Engineering

- **Tsurumi Works**
- **Tsu Works**

Output and Emissions

Products	**36,600** tonnes
CO_2	**9,700** tonnes CO_2
•Scope 1	**3,000** tonnes CO_2
•Scope 2	**6,700** tonnes CO_2
Waste generated	**1,800** tonnes
•Industrial wastes	**1,500** tonnes
•General wastes	**313** tonnes
Wastewater (ocean only)	**126,000** tonnes
Others (PRTR)	**136** tonnes