

———— JCR Climate Transition Finance Evaluation By Japan Credit Rating Agency, Ltd. ————

Japan Credit Rating Agency, Ltd. (JCR) announces the following Climate Transition Bond Framework Evaluation as follows.

JCR Assigned Green 1 (T)(F) (Final Evaluation) to Green/Transition Bond Framework of JFE Holdings, Inc.

Issuer : JFE Holdings, Inc. (Securities code: 5411)
Subject : Green/Transition Bond Framework of JFE Holdings, Inc.

<Evaluation Results of Climate Transition Bond Framework>

Overall Evaluation	Green 1(T)(F)
Green/Transition Evaluation (Use of Proceeds)	gt1(F)
Management, Operation and Transparency Evaluation	m1(F)

Chapter 1: Overview of Evaluations

[Company Profile]

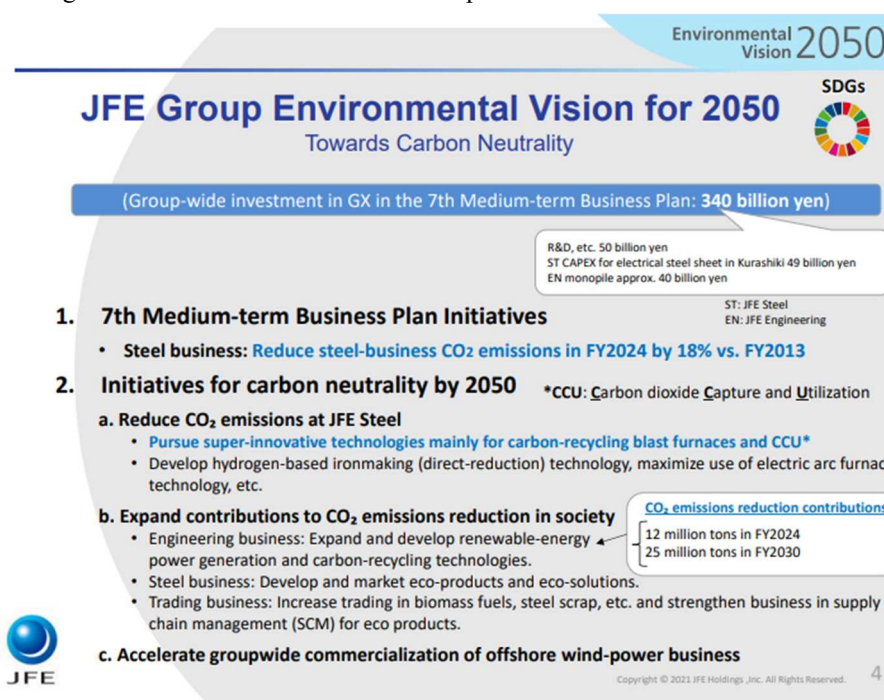
As an integrated iron and steel manufacturer, the JFE Group is primarily engaged in the manufacture and sale of various steel products. The JFE Group consists of three operating companies: JFE Steel Corporation, which manufactures and sells steel processed products, raw materials, and other products, as well as peripheral businesses such as transportation and equipment maintenance and construction; JFE Engineering Corporation, which engages in engineering, recycling, and electricity retailing related to energy, urban environment, steel structures, and industrial machinery; and JFE Shoji Corporation, which purchases, processes, and sells steel products, raw materials, non-ferrous metal products, and foodstuffs. The JFE Group is working to build an optimal business execution structure suited to the characteristics of each business field.

JFE Holdings, Inc. (hereinafter referred to as "JFE Holdings") serves as a slim group headquarters function as a representative listed company of the JFE Group, consolidating functions such as the formulation of management strategies for the JFE Group as a whole, the management and risk management of group companies, external briefings on Group IR and other matters, and the financing of the Group as a whole.

[Overview of Environmental Policy]

The JFE Group published its Environmental Vision for 2050 in May, 2021. The JFE Group claimed that “Climate change is an extremely important issue from the perspective of business continuity.” and “Global climate-change issues, such as increasingly abnormal weather, must be addressed urgently.” Based on its vision, JFE Group has positioned climate change as a top-priority issue in the Seventh Medium-term Business Plan, and expressed to achieve carbon neutrality by 2050. At the beginning of the Seventh Medium-term Business Plan, JFE Group stated the following about its contribution to the global environment. ”Our mission is to become a company and existence that is indispensable for the sustainable development of society and the safe and comfortable lives of people. However, considering the current situation, environmental and social sustainability is a very important factor after all. The other thing is economic sustainability, namely, stable profitability. Without those, there is nothing we can do. We will achieve medium- to long-term economic growth for the Group and increase corporate value.”

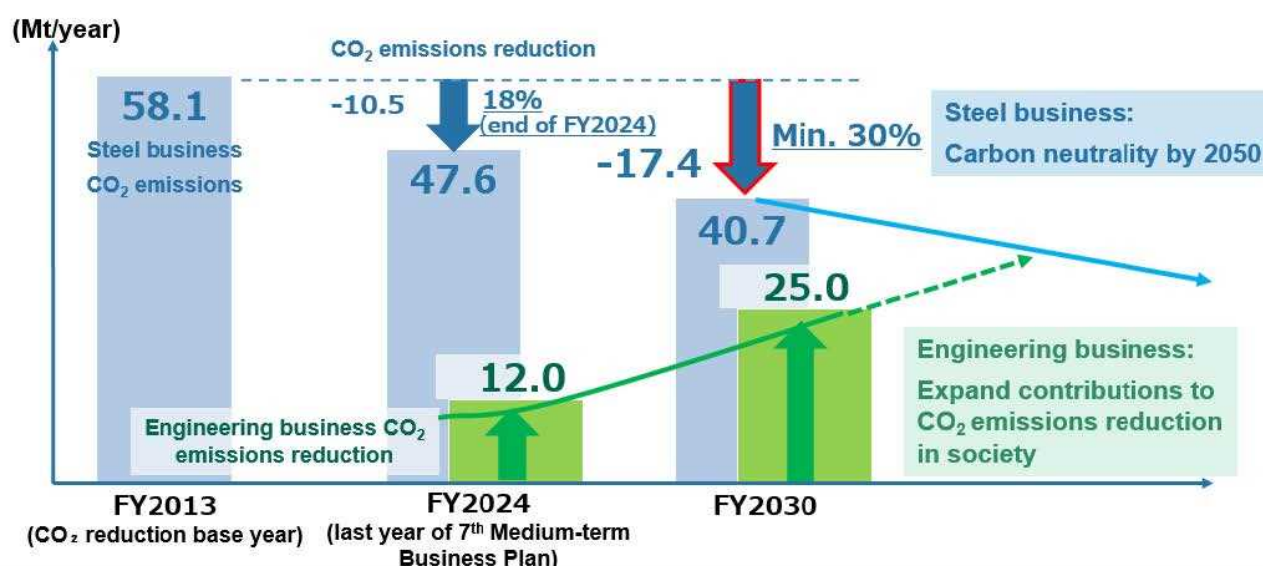
Figure. 1 the Overview of the JFE Group Environmental Vision for 2050



(Source: JFE Group Environmental Vision for 2050)

Specific measures will include first promoting energy conservation and improved efficiency in order to achieve the FY2024 target of reducing CO₂ emissions, and in addition, responding to business risks by taking on the challenge of ultra-innovative technologies for carbon decarbonization. Next, in order to contribute to reducing CO₂ of society as a whole by expanding business opportunities that contribute to the realization of a sustainable society, the JFE Group will expand and develop renewable energy and carbon recycling technologies, and develop and provide eco-friendly products. Through these initiatives, the company aims to increase corporate value over the long term. Medium-and long-term goals for carbon neutrality for the JFE Group as a whole are shown in the figure below. On February 8, 2022, JFE Holdings announced that it has raised its fiscal 2030 CO₂-reduction target to a minimum 30% above the JFE group’s fiscal 2013 level, up from a previous target of 20%.

Figure2. Initiatives in Carbon Neutrality by 2050



(Source: JFE Group News Release on Feb. 8, 2021)

Steel can be mass produced at low cost due to its abundant reserves, and is also a material that can be recycled repeatedly many times. Therefore, it is used in various applications as a material that serves as a foundation for people's lives and society. As materials for environmental load reduction, new demands such as NEV cars¹, eco-friendly products such as transformers for expansion of renewable energy power transmission and distribution network, and offshore wind power are emerging. The environmental impact of manufacturing is also much smaller than the GHG emissions per unit weight of aluminum and CFRP (carbon-fiber reinforced plastics).² On the other hand, 40% of CO₂ emissions in the industrial sector, which account for 35% of Japanese CO₂ emissions, are in the Iron and Steel industry, and total CO₂ emissions need to be further reduced. The JFE Group Environmental Vision 2050 is evaluated by JCR as a strategy that is formulated based on the above-mentioned demands for the importance and role of iron in society and the reduction of environmental impact.

[Overview of Evaluation Targets]

The subject of this evaluation is the Green/Transition Bond Framework established by JFE Holdings (this Framework). JFE Holdings has established four categories of Use of proceeds Candidates in this framework. Use of proceeds Category 1 is ultra-innovative technology development contributing to carbon neutral realization in 2050. Category 2 covers upgrades and retrofits that contribute to the reduction of CO₂ emissions (18% reduction by fiscal 2024) that the JFE Group aims to achieve under the Seventh Medium-Term Business Plan. These projects are the current best available technologies to reduce CO₂, all of which are included in the plan formulated by the Japan Iron and Steel Federation in Commitment to realize a Low Carbon Society. The JFE Group plans to develop ultra-innovative technologies and to make decarbonization of the steelmaking process in multi-track fashion from the viewpoint of the most efficient and energy-saving technologies at the present time. In particular, for Category 1 of Use of proceeds, initiatives for implementation will be promoted through collaboration with various stakeholders and the use of the Green Innovation Fund. This plan is consistent with the Steel Technology Roadmap established by the Ministry of Economy, Trade and Industry (METI), and JCR is evaluating it to greatly contribute to the steel industry's transition strategy toward 2050 carbon neutrality. Use of proceeds Categories 3 and 4 are all businesses that contribute to reducing CO₂ of other industries through the company's business activities.

¹ This is an abbreviation for New Energy Vehicle (New Energy) vehicles, and includes BEVs (Electric Vehicles), PHEV (Plug-in Hybrid) and FCVs (Fuel Cell Vehicles).

² CO₂ emissions per unit weight during production: 230 kg-CO₂ for Steel, 1106 for Aluminum. Source: JFE Group Report 2021

[Appropriateness of Transition Strategy and Contribution of the Use of Proceeds]

JCR confirmed that this Framework has been properly established and disclosed (to be established) for all four elements required by the Transition Finance and the Basic Guidelines for Climate Transition Finance issued by the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment in the Climate Transition Finance Handbook ("CTFH") issued by the International Capital Markets Association ("ICMA") in December 2020.

[Management and Transparency of the Proceeds]

JCR confirmed that selection criteria for the promotion of funds have been set appropriately in this Framework established by JFE Holdings and that specialized committees and departments for promoting transition strategies have been established throughout the Group and at each operating company and management is appropriately involved in the selection process. The funding plans, tracking systems and reporting are well planned. Based on the above, JCR believes that the administrative and operational system for the fundraising through the Bond is appropriate and that transparency is ensured. Furthermore, regarding the organization's efforts for the environment, the top management positioned environmental issues as a high priority issue, and in JFE Group Environmental Vision for 2050, JCR confirmed that the JFE group had set out a goal of the year 2050 carbon neutral, and established a system and investment plans for realizing this goal. This indicates that the organization's environmental efforts are also innovative and ambitious, and that management's commitment is clear.

Based on the JCR Green Finance Evaluation Methods, JCR assigned "gt1(F)" for the evaluation of "Green/Transition Evaluation (Use of Proceeds)", "m1(F)" for the evaluation of "Management, Operation, and Transparency Evaluation." Consequently, JCR assigned "Green 1 (T)(F)" for the overall evaluation of the "JCR Climate Transition Finance Evaluation" for the Transition Bonds Framework. The Framework is considered to meet the standards for items required by "Green Bond Principles", "CTFH", "Basic Guidelines for Climate Transition Finance", and "Green Bond Guidelines".³⁴⁵⁶

³ LMA (Loan Market Association), APLMA (Asia Pacific Market Loan Association), LSTA (Loan Syndications and Trading Association) Green Loan Principle 2021 <https://www.lma.eu.com/>

⁴ ICMA Climate Transition Finance Handbook <https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/CTFH-December-2020-091220.pdf>

⁵ Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment's Basic Guidelines for Climate Transition Finance (May 2021) <https://www.meti.go.jp/press/2021/05/20210507001/20210507001-1.pdf>

⁶ Ministry of the Environment's Green Loan and Sustainability Link Loan Guidelines <http://www.env.go.jp/press/files/jp/113511.pdf>

Chapter 2: Current Status of Target Projects in Each Evaluation Item and JCR Evaluation

Evaluation Phase 1: Climate Transition Evaluation

Based on the current situation and JCR's evaluation, as detailed below, JCR assessed that 100% of the use of proceeds under the Framework is for Green Project and/or Environmental Improvement Effect Project (climate transition project) to be implemented during the transition phase to mitigate climate change, and evaluated Phase 1: Climate Transition Assessment at the highest level ("gt1(F)").

1. JCR's Key Consideration in this factor

Matters to be confirmed in this section

- ✓ Can the proceeds be used for Green Projects with clear environmental improvement effects and/or for projects with environmental improvement effects to be implemented at the transition stage (Climate Transition Projects)?
- ✓ When a negative impact on the environment is anticipated in the use of proceeds, whether the impact is sufficiently examined by a specialized internal department or an external third-party organization, and necessary avoidance and mitigation measures are taken?
- ✓ Does the issuers meet the four elements prescribed by ICMA's CTFH?
- ✓ Are there consistency of financial uses with the Sustainable Development Goals ("SDGs")?

2. Current Situation of Evaluation Subjects and JCR Evaluation

2-1. Outline of Use of Proceeds

Use of proceeds Candidates		Project Examples
1. Development of ultra-innovative steelmaking processes	Ultra-innovative steelmaking Process development	<ul style="list-style-type: none"> ▪ Funding for R&D on a carbon-recycling blast furnace, CCU, hydrogen ironmaking, and an electric furnace for high-grade steel production
2. Energy conservation For higher efficiency Initiatives	Equipment investments and R&D targeting conversion of blast furnaces to AI and IoT	<ul style="list-style-type: none"> ▪ Expenditures on the development of DS technology ** that can reduce CO₂ through operation stabilization and detect the status of the operating system and predict anomalies (CAF)
	Expanding the use of scrap	<ul style="list-style-type: none"> ▪ Expenditures for research development and capital investment aimed at increasing scrap usage in converters (capital investment funds and R&D funds)
	Improving coke furnaces	<ul style="list-style-type: none"> ▪ Cost of renovating coke ovens (improved combustion efficiency and reduced use by renovating aged coke ovens) ▪ Expenditures for renewal of heat furnaces,

		boilers, power generation facilities, and air separators
	Equipment investments targeting recovery and effective use of waste heat, byproduct gas	<ul style="list-style-type: none"> Expenditures for the effective use of waste heat and by-product gas generated at steelworks (capital investment funds)
	Resource conservation	<ul style="list-style-type: none"> Expenditures aimed at the reduction effect of reducing materials used in the BF (capital investment fund)
3. Manufacturing eco-friendly products*	Manufacture of high value-added electrical steel sheets	<ul style="list-style-type: none"> Equipment investments and R&D targeting the manufacture of electromagnetic steel sheets, etc.
4. Renewable energy*	Initiatives related to renewable energy (biomass, geothermal, and solar power generation)	<ul style="list-style-type: none"> Expenditures related to initiatives (EPC*** and operation) in the Renewable Energy Management (capital investment funds, working capital)

* : Projects recognized by JFE Holdings as Green Projects

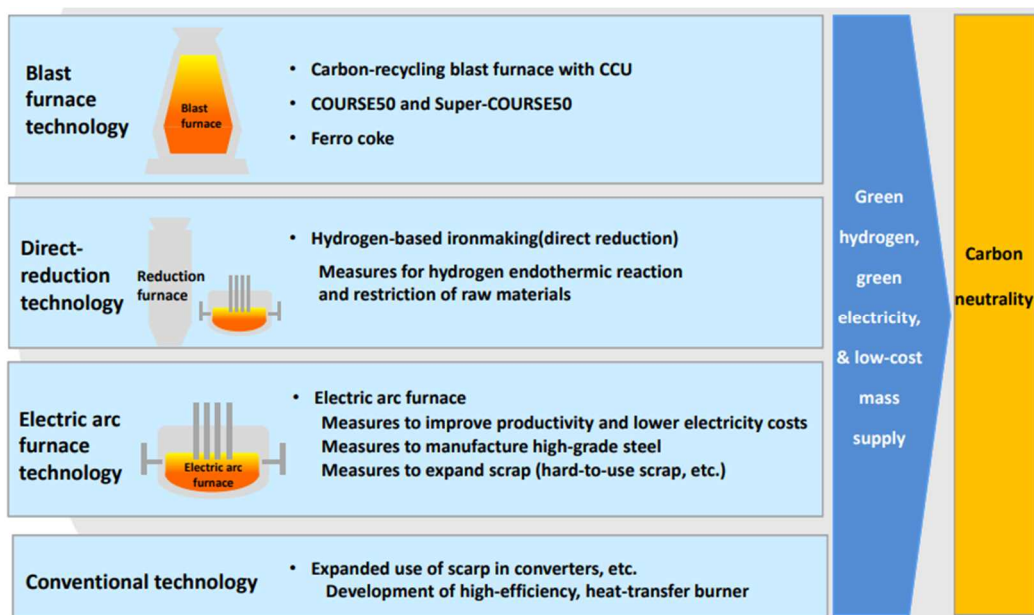
** : Data science technology

*** : Engineering, procurement and construction

<JCR's Evaluation of the Framework>

Of the uses of proceeds stipulated in this Framework, Categories 1 and 2 cover businesses that contribute to reducing CO₂ in the manufacturing process required for the JFE Group to achieve carbon neutrality in 2050 under JFE Group Environmental Vision 2050. JFE Holdings aims to be carbon neutral in 2050 through a double-linear approach through technological development of innovative steelmaking processes and deepening of existing energy-saving and high-efficiency technologies. All of the businesses covered are in line with the Japan Iron and Steel Federation's Basic Policy of the Japan steel industry on 2050 Carbon Neutrality aimed by the Japanese government and the key measures for reducing CO₂ formulated in Commitment to a Low Carbon Society. They are also consistent with the Iron and Steel Roadmap presented by the METI, and JCR values that they will greatly contribute to the steel industry's transition strategy toward carbon neutrality by 2050.

Figure.3 CO₂ Reduction Measures for the Steelmaking Process using a Double-track Approach



(Source: JFE Group Environmental Vision for 2050)

The manufacturing of eco-friendly products in Category 3 and the renewable energy in Category 4 are both positioned in Environmental Management Vision 2050 as businesses that contribute to reducing CO₂ of other industries through the business activities of the group. JCR has assessed that both are important businesses for achieving sustainable corporate growth by expanding new environment-related businesses while pursuing its own decarbonization.

Use of Proceeds Category 1: Financing for Technology Development in Super-Innovative Steelmaking Processes

This is the cost of technological developments related to super-innovative steelmaking processes that contribute to reducing CO₂ emissions in the steelmaking process. This use of proceeds corresponds to "energy efficiency" in the Green Bond Principles and "energy conservation projects" among the uses of funds illustrated in the Ministry of the Environment's Green Bond Guidelines.

In February 2021, the Japan Iron and Steel Federation announced its Basic Policy of the Japan steel industry on 2050 Carbon Neutrality aimed by the Japanese government that the Japanese steel industry will (i)contribute through its technologies and products, and (ii) work to reduce CO₂ emissions in the steel industry's own production processes (Zero Carbon Steel). According to this policy, there is no solution other than disposal of CO₂ inevitably incurred at a high cost by challenging advanced technological developments such as CCUS under the blast furnace method with high hydrogen reduction rate (reduction by carbon), or conducting hydrogen reduction steelmaking which does not generate CO₂, in order to realize zero carbon steel. Category 1 is funding for the development of super-innovative technologies to achieve zero carbon steel, etc.

Among the ultra-innovative technological developments, the hydrogen utilization project in the steelmaking process was adopted as the Green Innovation Fund Project in January 2022, and JFE Steel was selected as one of its participating companies. This project aims to develop technologies to reduce the use of fossil fuels from the entire steelmaking process, mainly by establishing a hydrogen reduction technology to the blast furnace method (a blast

furnace hydrogen reduction technology) and a technology to directly reduce low-grade iron ore with hydrogen (a direct hydrogen reduction technology), and to reduce CO₂ emissions by more than 50% each by 2030.

The following are examples of projects in which the JFE Group has begun research as super-innovative technological developments.

[Collaboration between Carbon Recycling Blast Furnace and CCU Technology]

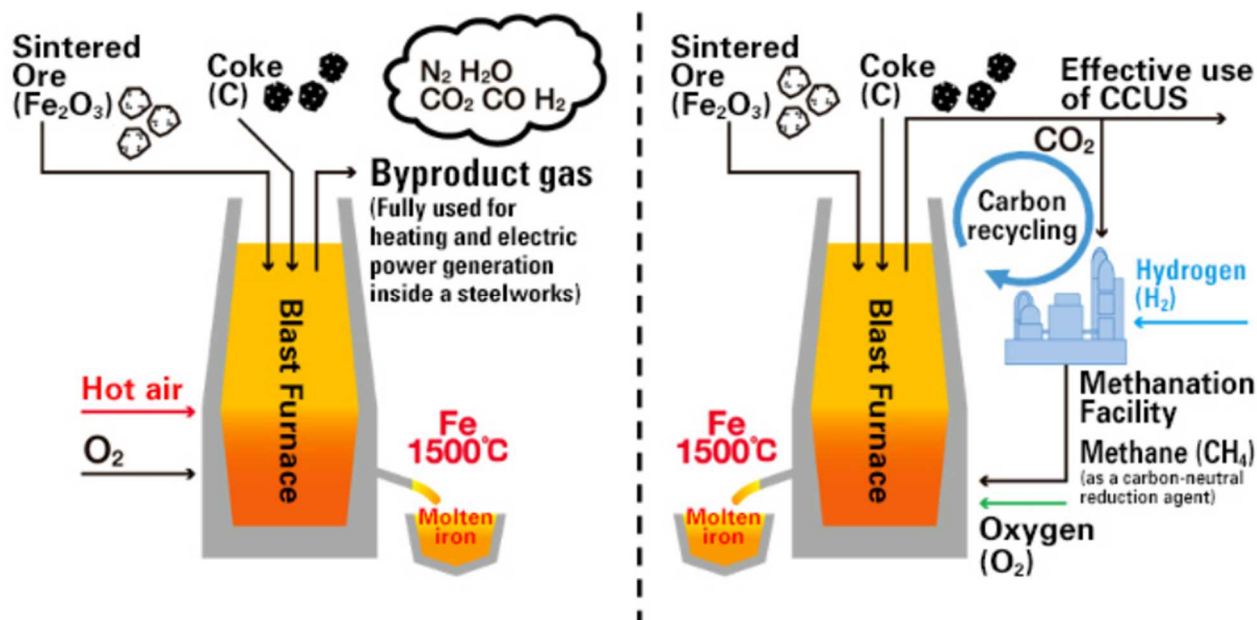
As a development of innovative steel processes, technology to reduce CO₂ in the blast furnace is crucial in order to take advantage of the mass and high-efficiency production of the blast furnace method and the characteristics of high-grade steel manufacturing. JFE Steel is aiming at eliminating CO₂ emissions by combining the recycled blast furnace with the CCU technology to enable CO₂ reuse in its steelworks.

The Carbon Recycle Blast Furnace is an ultra-innovative blast furnace technology that converts CO₂ generated from the blast furnace into methane by methanation technology and repeatedly uses it as a reducing agent in the blast furnace. This technology has the following features.

Features

1. Reducing CO₂ Emissions by Approximately 30% in the blast furnace alone.
2. Ultimately helping achieve carbon neutrality by leveraging CCU/CCUS
3. The thermal efficiency of the process can be further increased by replacing the air blown in the blast furnace with pure oxygen, the energy used to heat the nitrogen in the air can instead be used to heat methane.
4. The lack of nitrogen facilitates the separation of CO₂, so the equipment necessary to separate CO₂ for methanation can be smaller and more efficient while facilitating more effective gas utilization at CCUS.

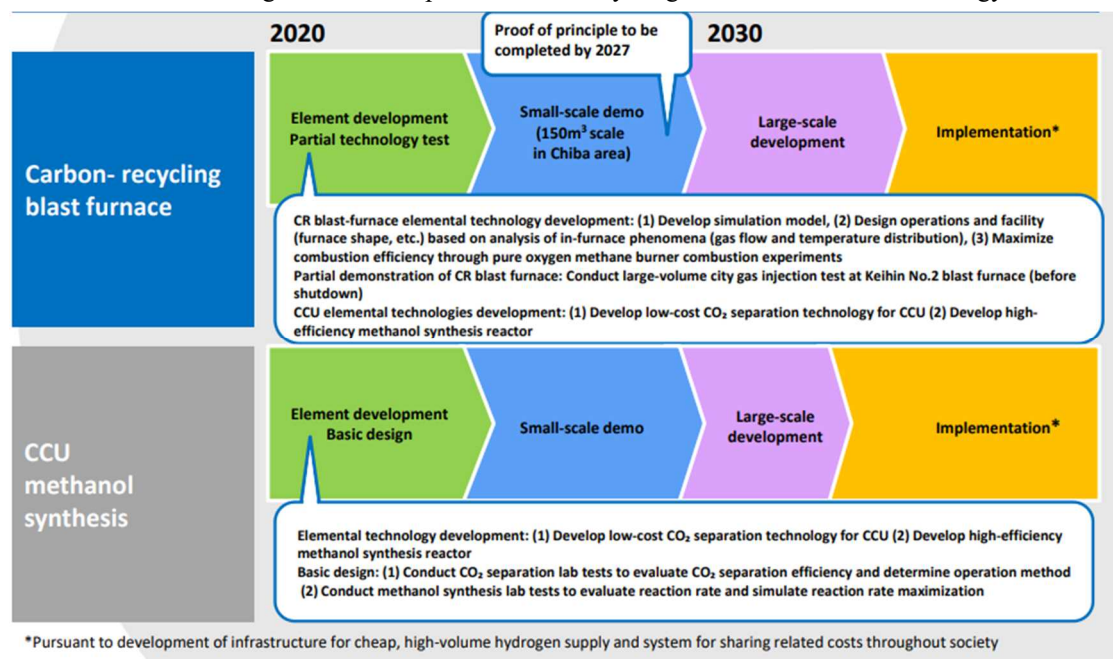
Figure.4 Conceptual Diagram of a Carbon Recycling Blast Furnace



(Source: JFE Group Report 2021)

JFE Steel will conduct elemental technology development and small-scale testing for both carbon-recycling blast furnaces and CCU methanol synthesis, targeting completion of proof-of-principle process by 2027.

Figure.5 Roadmap for Carbon-Recycling Blast furnace and Technology

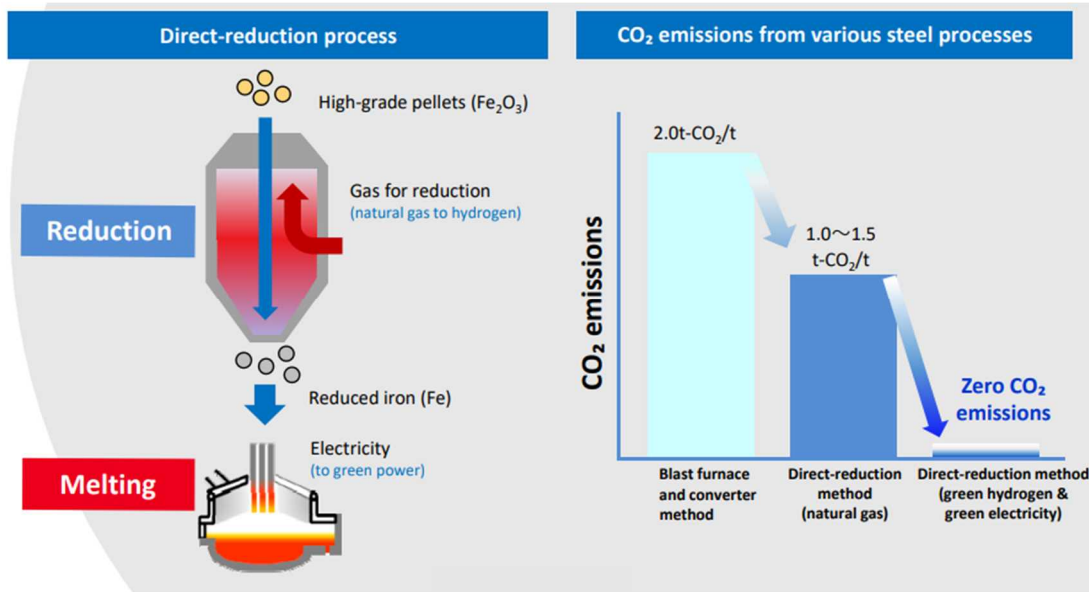


(Source: JFE Group Environmental Vision for 2050)

[Hydrogen-reduction steelmaking]

Hydrogen-reduction technology is a technology in which oxygen is removed from iron ore in a reduction furnace to produce reduced iron (Fe), which is then melted in an electric furnace. The amount of CO₂ generated with the current direct-reduction method is about 1/2 of that with the blast furnace method, but it is aimed zero CO₂ emissions by using hydrogen during reduction and green electricity during melting. There are two problems with respect to this technology. First, there is a problem that reduction failure occurs due to insufficient heat because endothermic reaction inhibits reduction. On the other hand, the development of raw material preheating technology and hydrogen heating technology is in progress. In addition, currently, direct reduction can only use scarce high-grade raw materials that are easier to pelletize than low- and medium-grade raw materials. However, when looking at global production volumes, the high-grade remains at 170 million t/year compared to 2.06 billion t/year for low- and medium-grade. The JFE Group is cooperating with BHP in Australia, one of the three largest suppliers of iron ore, to develop processing technology for low- and mid-grade materials as raw materials for direct reduction.

Figure.6 Hydrogen-reduction Technology

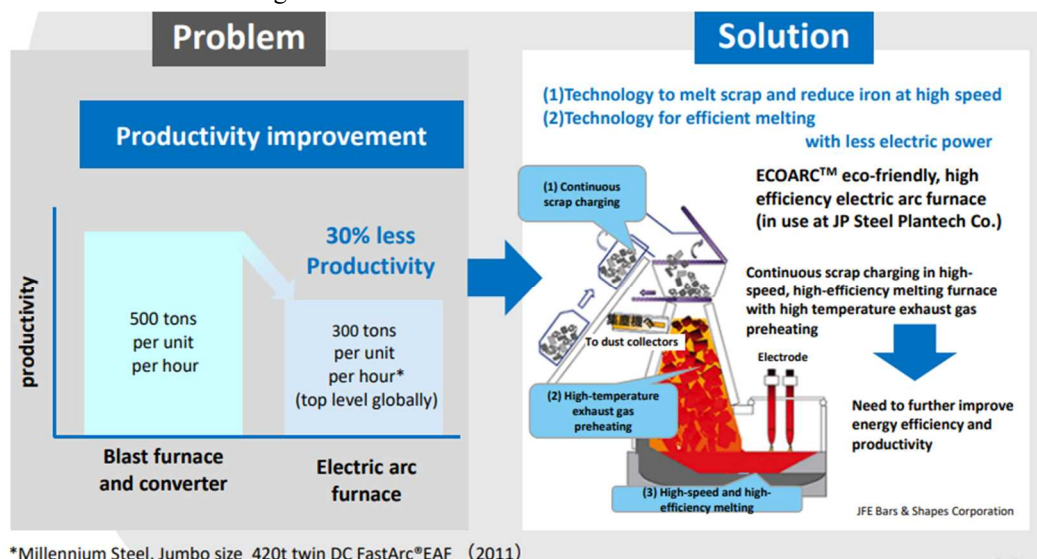


(Source: JFE Group Environmental Vision for 2050)

[Production of high-grade steel in electric arc furnace process]

Electric furnace is a technique for manufacturing steel products by melting steel scrap and direct-reduced iron in an electric arc furnace, and the resulting CO₂ amount is about 1/4 of that generated by the blast furnace-converter method. In addition, CO₂ emissions should be reducible to zero using hydrogen-reduced iron and green electricity in the future. The current problem is that the productivity of the electric arc furnace process remains about one-third of that of the blast furnace-converter process. JFE Steel has already introduced eco-friendly, high efficiency electric arc furnace "ECOARC™", but further improvement of energy efficiency and productivity is required. Next, in the electric furnace to melt the scrap, impurities will be mixed, there is a steel type hard to manufacture in electric arc furnaces such as vehicle steel sheets and electrical steel sheets. JFE Steel also plans to develop technologies to remove impurities and detoxify impurities

Figure.7 Problem of Electric Arc Furnace Process



(Source: JFE Group Environmental Vision for 2050)

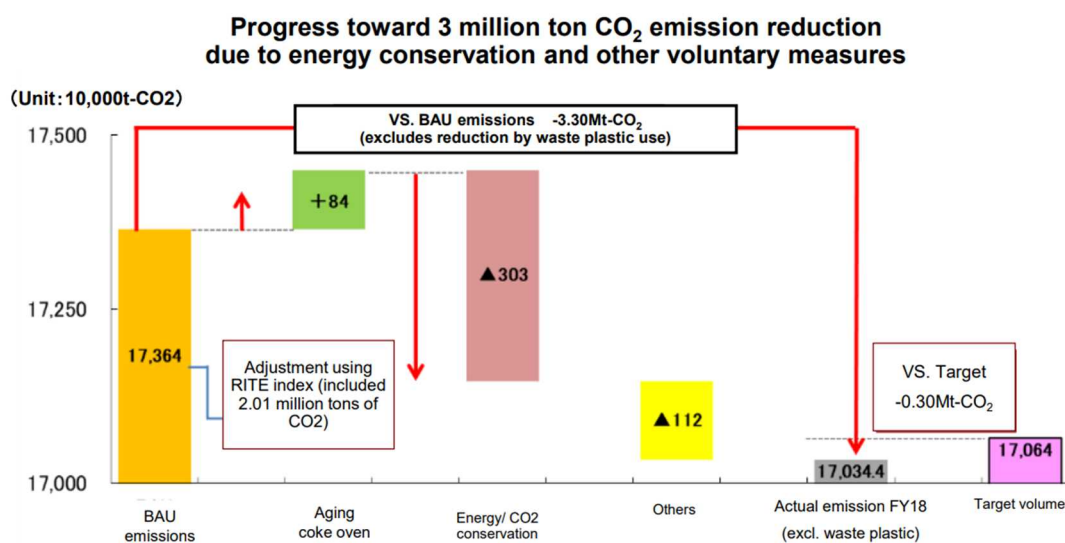
Use of Proceeds Category 2: Energy conservation and high efficiency

This use of proceeds is for capital investment and technological development related to the deployment of technologies that contribute to reducing CO₂ in the steelmaking process. This use of proceeds corresponds to "energy efficiency" in the Green Bond Principles and "energy conservation projects" among the uses of funds illustrated in the Ministry of the Environment's Green Bond Guidelines.

The Japan Iron and Steel Federation is promoting initiatives to fight global warming as Commitment to a Low Carbon Society⁷ in the steel industry, with three central components of eco-process, eco-solution, and eco-product, and development of a revolutionary ironmaking process (COURSE50, ferrocoke, etc.) as the four central components. Of these, the eco-process is the maximum introduction of state-of-the-art technologies that are in the practical use stage at the time of facility renewal, based on the assumed CO₂ emissions (BAU emissions) in the production volume of the steel companies. Of the 5 million t-CO₂ reduction target for FY2020, this refers to measures that take into account the amount of CO₂ reduction through the collection of waste plastic while focusing on achieving 3 million t-CO₂ based on self-help efforts such as energy conservation. In addition, as a target consistent with the 2030 energy mix, a Phase II target (target year: FY2030 a reduction of 9 million t-CO₂ compared to BAU emissions) has been set. Specific measures to reduce energy consumption through self-help efforts, and the steel industry's performance of reducing CO₂ emissions in 2019 are shown below.

Category 2 is a measure that contributes to this Commitment to a Low Carbon Society and JFE Holdings' target for reducing CO₂ emissions during the Seventh Medium-term Business Plan (a total reduction of 18% compared to FY2013 by the end of FY2024).

Figure.8 Components of Changes in FY2019 CO₂ Emissions



※FY2019 CO₂ emissions use the FY2005 electricity coefficient.

(Source: The Japan Iron and Steel Federation)

⁷ Steel Industry Initiatives Low-Carbon Society Action Planning <https://www.jisf.or.jp/business/ondanka/kouken/keikaku/>

	Phase II :2030	Phase I :2020
① Improvement of coke oven efficiency	1.30Mt-CO ₂	0.90Mt-CO ₂
② Improvement efficiency of power generation facilities	1.60Mt-CO ₂	1.10Mt-CO ₂
③ Enhancement of energy saving	1.50Mt-CO ₂	1.00Mt-CO ₂
④ Waste plastic	2.0Mt-CO ₂	-
⑤ Development and introduction of innovative technologies	2.6Mt-CO ₂	-
Total	9.0Mt-CO ₂	3.00Mt-CO ₂ +Waste plastic

(Menu of measures in the low-carbon society action plan)

Source: Prepared by JCR from the Japan Iron and Steel Federation's Implementation Plan for a Low-Carbon Society)

Use of Proceeds Category 2 Energy conservation and high efficiency I: AI and IoT of Blast Furnace, Introduction of Cyber Physical System (CPS)

The purpose of this fund is to invest in facilities related to the development of DS-technology, which contributes to reducing CO₂ through stabilizing operations in the steelmaking process. This use of proceeds corresponds to "energy efficiency" in the Green Bond Principles and "energy conservation projects" among the uses of funds illustrated in the Ministry of the Environment's Green Bond Guidelines.

In the Seventh Medium-term Business Plan, JFE Steel has identified the DX strategy, as well as decarbonization, as one of its important issues. The company introduced the data science technology aiming at the cyber physical system (CPS)⁸ conversion to the domestic blast furnace operations. This makes it possible to detect signs of abnormal conditions and to predict the conditions in the furnace, which are important for stable operation. By using big data to manage the steel process, it is expected to further improve the efficiency of the process and save energy, and it is also expected to contribute to worker safety. To enable data management that makes extensive use of DX technology, JFE Steel plans to increase the number of data scientists to 600 by the end of fiscal 2024, approximately 1.7 times the current level, and to focus on their training.

Typical systems for the use of this fund include the fuel, steam, and electricity management guidance system developed by JFE Steel to reduce energy and CO₂ in fuel and electricity operation at domestic steelworks.

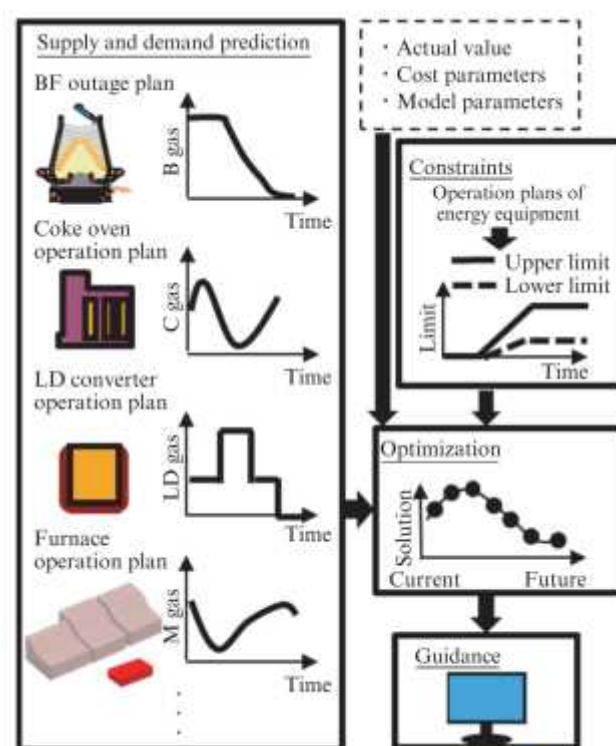
Since large amount of energy is required in the steelmaking process, optimizing the operation of fuel and electricity used is a crucial issue in order to save energy and reduce CO₂. In steelworks, by-product gases generated in the upstream processes, such as blast furnaces, coke ovens, and converter furnaces, as well as electric power and steam obtained from energy conversion facilities such as power generation facilities and waste heat recovery, are effectively utilized at plants in the steelworks, and the shortage is compensated by purchase from outside. In the operation of fuel and electricity, operators are required to determine various factors such as allocation of by-product gas to each process, amount of power purchases, fuel (heavy oil, city gas, etc.) purchases, and amount of by-product gas storage so as to minimize costs and energy losses based on data such as supply and demand conditions, operational status of power generation facilities, and contract information with electric power companies and gas companies.

⁸ Systems that create value by gathering data (big data) from diverse sensors installed in equipment and products, and then assemble the data in cyberspace to perform data analysis before feeding back the results to the physical realm in real time.

Existing systems for management of fuel, electricity, etc. perform optimal calculations by inputting supply and demand forecast values based on operators' experience and operational status. In a situation where supply and demand conditions change greatly, the supply and demand forecast error also increases, which makes it difficult to operate the system close to the optimal operating conditions. The new guidance system introduces the concept of CPS, and has three functions: a supply and demand forecast function that accurately predicts the supply and demand status of fuel and electricity based on the production plan of each plant from a vast amount of measurement data obtained in real time, a constraint value creation function that creates the constraint values required in the optimal operation simulation based on the operating status of the facilities, and optimal operation simulation and guidance function using model predictive control technology that uses mathematical programming to determine operating conditions that minimize energy loss. The above functions simulate optimal operating conditions and provide guidance to the operator, thereby minimizing energy use.⁸ In addition to increasing energy efficiency, this system also contributes to the improvement of worker safety because it can detect signs of abnormal conditions and predict the state of heat in the furnace, which is important for stable operation.

The introduction of this system to the West Japan Works has already been completed, and plans are in place to introduce it at other works in the future.

Figure.9 Guidance system for fuel and power management



(Source: JFE Technical Report No. 45)

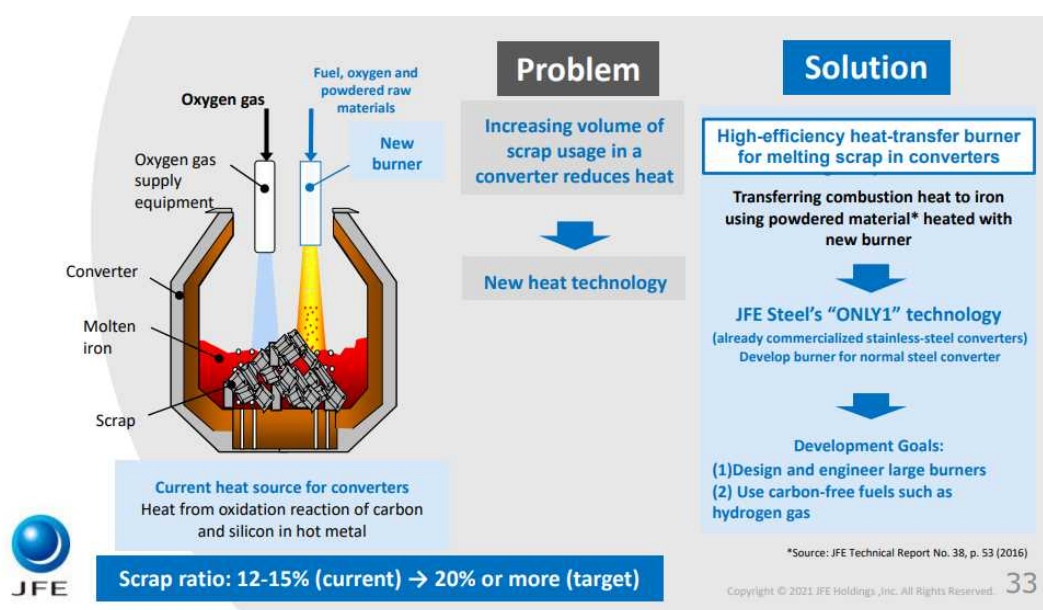
⁸Guidance for Fuel and Power Management in Steel Works Through Model Predictive Control February 2020 JFE Technical Report No. 45

Use of Proceeds Category 2 Energy conservation and high efficiency II: Capital Investment and Technology Development to Expand Scrap Use of Converters

A converter is a furnace in which pig iron and iron scrap melted in a blast furnace are injected, oxygen is blown in to remove carbon, and the steel is smelted into molten steel. Technological developments are underway to reduce CO₂ emissions through reduction of the amount of pig iron by increasing the ratio of iron scrap.

According to JFE Steel, the current scrap ratio in the converter is 12-15%. As the amount of scrap used increases, the amount of heat supplied will be insufficient, so new heat-applying technology will need to be developed to increase the scrap ratio. However, the company aims to achieve its goal of increasing the scrap ratio to 20% or more by using large, highly efficient heat-applying burners, which are larger in size and more durable, in converter scrap melting, and promoting the use of carbon-free fuels such as hydrogen gas.

Figure.10 Technology for Scrap Use in Converters



(Source: JFE Group Environmental Vision for 2050)

To expand the use of steel scrap, the converter-type dephosphorization process⁹ will be fully utilized. In the converter, molten iron from the blast furnace is made into tough steel by removing impurities such as carbon, phosphorus, and silicon. By increasing the ratio of scrap metal to be included in the process, it is possible to reduce CO₂ emissions. Temperature control, which was difficult until now, can be made easier by improving the processing order and method, and scrap input can be increased. JFE Steel has introduced this equipment at all of its domestic steelworks during fiscal 2021. Originally, it is a facility to respond to the increase in demand for high-grade steel, but it is highly efficient to process and contributes to a low carbon.

⁹ Progress and Future Prospects of Steelmaking Technology August 2016 JFE Technical Report No. 38

Use of Proceeds Category 2 Energy conservation and high efficiency III: Renewal of aging facilities and various equipment such as coke oven renovation

A coke oven is an industrial furnace used for high-temperature carbonization of coal for coke production. The structure consists of dozens of firebrick carbonization chambers, and the space between the carbonization chambers serves as a heating chamber.

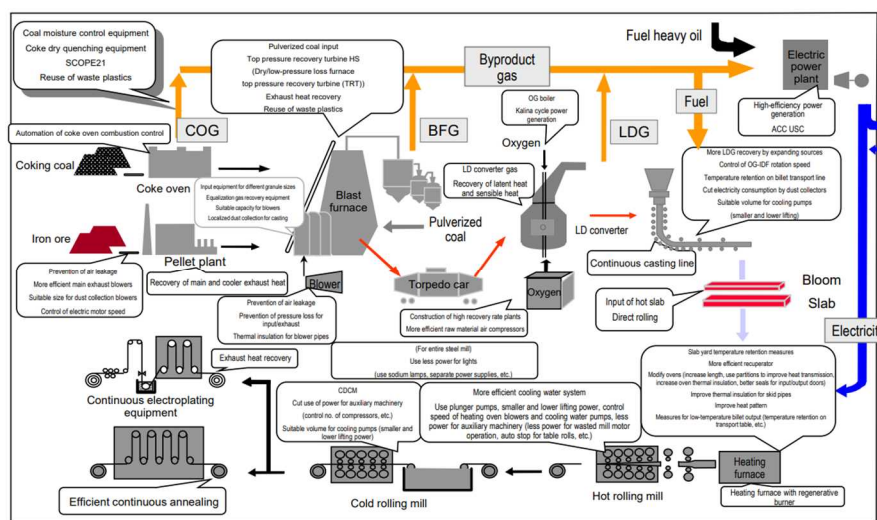
According to the Japan Iron and Steel Federation, CO₂ emissions in fiscal 2019 were 3.3 million t-CO₂ lower than BAUs. The 3.03 million t-CO₂ was reduced by energy and CO₂ saving, while 0.84 million t-CO₂ was increased by the loss effect of firebricks of coke oven, and 1.12 million t-CO₂ was reduced by t-CO₂ by other measures. Consequently, reducing CO₂ emissions by modifying and upgrading coke ovens is an indispensable effort to reduce CO₂ in the ironmaking process. The deterioration of the coke furnace's fireproof bricks is likely to be affected by aging and the Great East Japan Earthquake. However, the Iron and Steel Federation member companies gradually began upgrading their furnaces, resulting in a reduction in the rate of increase in CO₂ emissions for the second consecutive year (an increase of 1.01 million t-CO₂ in fiscal 2018 and 0.84 million t-CO₂ in fiscal 2019). According to the Japan Iron and Steel Federation, the renewal of coke furnaces conducted by JFE Steel since fiscal 2013 has already been carried out six times. Update is planned to continue from fiscal 2021 onward.¹⁰

In addition to coke oven, JFE Steel has also included in this project category reductions in CO₂ emissions from renovations and upgrades of aging and less heat-efficient facilities and equipment.

Use of Proceeds Category 2 Energy conservation and high efficiency IV: Recovery and effective use of exhaust heat and by-product gas

In the steelmaking process, by-product gas and exhaust heat are generated, but these are directly supplied with heat or are converted into energy as in-house power generation and steam. (See the chart below). According to the Japan Steel Federation, approximately 40 percent of the fuel inputs to power generation and vapor are covered by byproduct gas and heat, which are considered important infrastructure not only to save energy and reduce purchased power, but also to enhance resilience in the event of a disaster.

Figure.11 Steel Production Processes and Development and Use of Energy Conservation Technologies

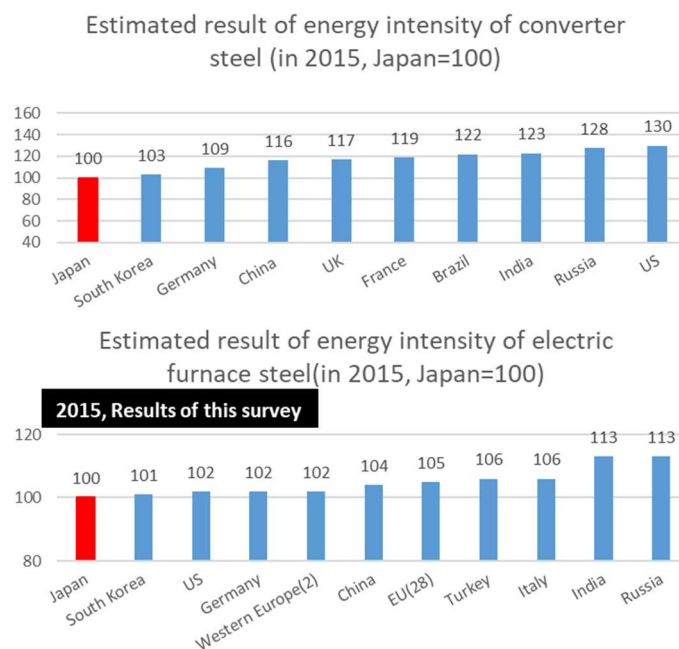


(Source: The Japan Iron and Steel Federation)

¹⁰ Japan Iron and Steel Federation's Report of "Commitment to a Low-Carbon Society", February 8, 2021

Thanks to the promotion of by-product gas utilization, etc. and further improvement of power generation efficiency through equipment renewal, etc., the energy efficiency of the Japanese steel industry is outstanding compared with other countries as shown in the figure below.¹¹

Figure.12 Energy Efficiency of the Steel industry (Converter Steel, Electric Furnace steel) of each Country



(Source: Prepared by JCR from The Japan Iron and Steel Federation)

Use of Proceeds Category 2 Energy conservation and high efficiency V: Resource saving

Assumed in this use is capital investment aimed at reducing the reduction of the reduction material used in the BF. There are a variety of investments to reduce the amount of reducing materials, and as for the replacement of coke ovens, some of the effects will be seen in the form of reduction of reducing materials. However, as an example of currently anticipated businesses, investments related to the improvement of properties of raw material, such as coke, are cited.

Use of Proceeds Category 3 Production of eco-products: Production of high-value-added magnetic steel sheets

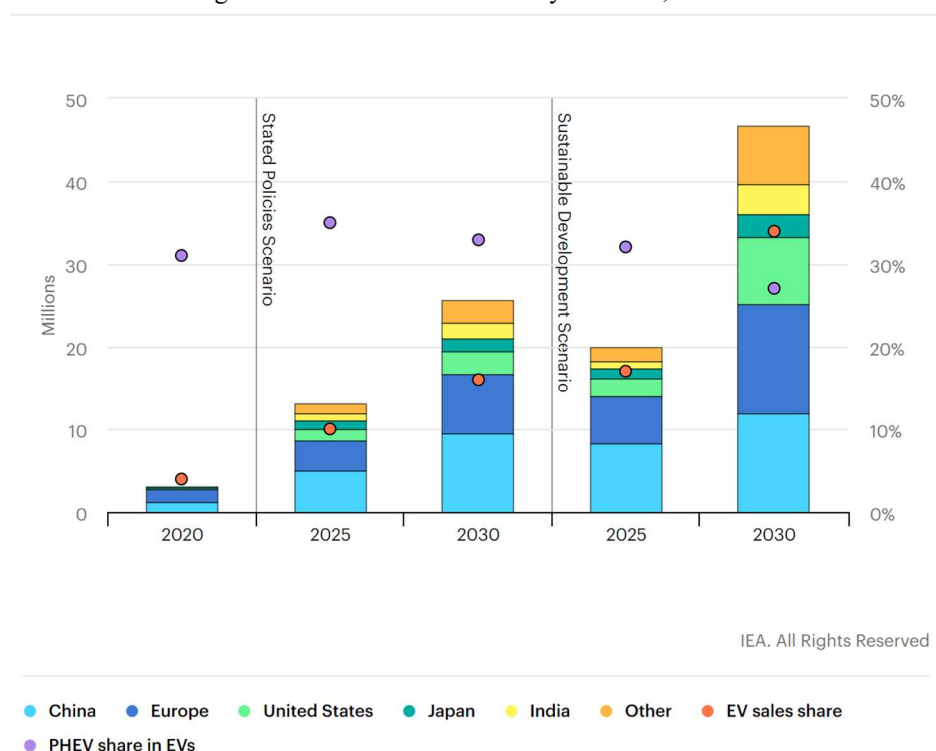
This use of proceeds is mainly related to the expansion of manufacturing facility capacity in line with the growing demand for high-grade non-oriented electrical steel sheets, which are essential for the electrification of automobiles. This use of proceeds corresponds to "clean transportation" in the Green Bond Principles and "businesses related to clean transportation" among the uses of funds illustrated in the Ministry of the Environment's Green Bond Guidelines.

¹¹ Industrial Structure Council, Industrial Technology and Environmental Subcommittee, Global Environment Subcommittee, Steel WG Steel Industry Initiatives to Prevent Global Warming February 8, 2021

High-value-added electrical steel sheets are widely used as core materials for electrical equipment such as motors and transformers, and are important materials that affect the performance of electrical equipment. Motors are indispensable for the manufacture of electric vehicles (NEV cars), and the demand for grain-oriented electrical steel sheets used in transformers is also expanding worldwide due to the expansion of the transmission and distribution network in line with the expansion of the supply of renewable energy. The current use of proceeds is to increase the production capacity of high-grade non-oriented electrical steel sheets at domestic manufacturing bases, mainly against the backdrop of expanding demand for NEV cars.

According to the International Energy Agency's (IEA) forecast, global EV vehicle production in 2030 is expected to rapidly expand from 3.16 million to 46.64 million in 2020 in a sustainable scenario, accounting for approximately 35% of total unit sales.¹²

Figure.13 IEA Global EV Sales by Scenario, 2020-2030

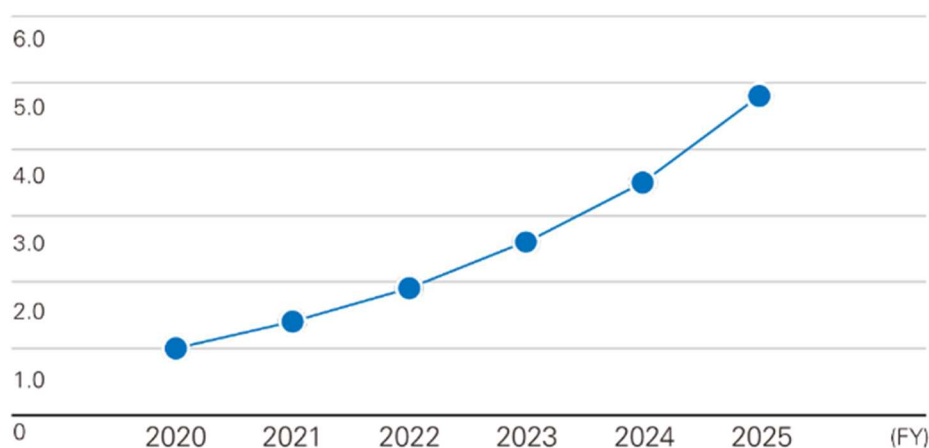


(Source: IEA Global EV car sales scenario 2020-2030)

As a result, demand for high-grade non-oriented electrical steel sheets manufactured by JFE Holdings is expected to rapidly expand. The figure below shows the forecast of demand for high-grade non-oriented electrical steel sheets by JFE Holdings. In response to this demand, JFE Group has decided to invest approximately 49 billion yen to double the production capacity of high-grade non-oriented electrical steel sheets at the West Japan Works (Kurashiki district) in the first half of FY2024.

¹² IEA Global EV car sales scenario 2020-2030 (Updated April 28, 2021) <https://www.iea.org/data-and-statistics/charts/global-ev-sales-by-scenario-2020-2030>

Figure.14 Demand for Non-Oriented Electrical Steel Sheets (Calculated; 2019 results=1.0)



(Source: JFE Holdings Web site)

Use of Proceeds Category 4 Renewable Energy: Biomass, Geothermal, Solar (EPC, Managements)

This use of proceeds relates to the renewable energy generation business in which JFE Engineering undertakes EPC and managements. This use of proceeds corresponds to "renewable energy" in the Green Bond Principles and "businesses related to renewable energy" among the uses of funds illustrated in the Ministry of the Environment's Green Bond Guidelines.

In the Sixth Basic Energy Plan, Japan plans to increase the share of renewable energy from 22% to 24% in FY2019 to 34% to 38%, and even higher if technological progress is made, and it is a field in which further supply expansion is expected in the future.

The JFE Engineering Medium-to Long-Term Strategy identifies the following two perspectives in order to accelerate contributions to SDGs.

1. Promotion of businesses that contribute to CO₂ reduction
2. Development of businesses for realizing a circular economy

Renewable energy, which is the use of this fund, is classified as carbon neutral among the fields in which JFE Engineering promotes mid-to long-term initiatives from the above viewpoint. JFE Engineering is contributing to this field as a business that is responsible for the construction and operation of biomass, geothermal, and solar power generation identified in this use of proceeds. The company's sales in the carbon neutral field in fiscal 2020 was 79 billion yen, and the goal is to expand to 200 billion yen in fiscal 2030.

2-2. Negative impact on the environment and others

In its business activities, the JFE Group strives to reduce the burden on the environment as follows.

<Measures established in this framework to mitigate negative impacts on the environment>

When selecting the target project, we confirm that we take measures that take into account the following anticipated reduction of environmental and social risks.

– **Controlling Air Emissions**

JFE Steel is controlling emissions by installing low-nitrogen oxides (NOx) burners in reheat furnaces, switching to low-sulfur fuels and deploying desulfurization and denitration devices in sintering plants, all major sources of sulfur oxides (SOx) and NOx emissions. In addition, the company suppresses dust dispersion through measures that include enhancing on-site cleaning, installing sprinklers and windbreak fences in raw material yards, and improving the performance of dust collectors.

To ensure compliance with the Air Pollution Control Law and relevant local regulations, JFE Engineering properly manages facilities that emit soot and smoke, by regularly measuring NOx emissions, etc., at its Yokohama head office, Tsurumi works, and Tsu works. In addition, efforts are being made at construction sites to protect the environment through the use of construction machinery and on-site vehicles in compliance with the Automotive NOx and PM Law and Act on Regulation, Etc. of Emissions From Non-road Special Motor Vehicles (Off-Road Vehicle Law).

– **Preventing Water Pollution**

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

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

– **Management of Chemical Substances and Emission Control**

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

– **Biodiversity Preservation**

To minimize the ecological impact of our business activities on surrounding areas, we are monitoring biodiversity around all of our business sites and planting trees while also preserving rare species in the compound. An environmental impact assessment is conducted in accordance with laws and regulations before launching construction of a new manufacturing site or business. We assess the biodiversity of the surrounding areas as well as our premises to fully understand the situation and to implement the necessary measures for preserving the ecosystem. In addition, for large-scale construction or construction work carried out near watersheds or mountainsides, customers and/or the relevant authorities may conduct preliminary investigations depending on the importance of preserving the surrounding environment. Various preservation conditions may then be required, including the protection of living creatures. JFE Engineering respect the proposed conditions and thoughtfully consider biodiversity preservation by keeping the impact of construction works at a minimum. For example, the company may propose a construction method that minimizes the impact of noise or drainage pollution. For its steelworks, the status of biodiversity on its premises and in surrounding areas are checked, and necessary measures are taken to ensure preservation.

Exclusion criteria

Funds raised from Green Bonds or Transition Bonds will not be used for projects related to:

- Unfair trade, bribery, corruption, extortion, embezzlement, and other inappropriate relationships that do not comply with the laws and regulations of the host country.
- Transactions that could cause social problems such as human rights and the environment.

(1) Negative Impacts on the Environment in the Implementation of Businesses

JCR evaluates that JFE Steel and JFE Engineering, the implementing organizations for each use of proceeds, take measures to appropriately identify, avoid, mitigate, and manage the anticipated negative impacts on the environment and society.

(2) Potential Lock-in to Fossil Fuels

In the Environmental Management Vision 2050, JFE Holdings aims at carbon neutrality by 2050, and a concrete roadmap for this has also been formulated. Among the uses of funds in this framework, projects related to reducing CO₂ of the steelmaking process are all positioned as contents to be addressed prior to the implementation of innovative technological developments in the Technical Roadmap established by JFE Holdings, the Ministry of Economy, Trade and Industry, and the Low-Carbon Society Implementation Plan established by the Japan Iron and Steel Federation. Therefore, JFE Holdings' transition strategy does not lock in to fossil fuels.

(3) Do No Significant Harm Assessment¹³

The use of the proceeds of the Framework may not significantly harm other Green Projects.

(4) Consideration for a Fair Transition

There is no danger that the promotion of businesses in the use of proceeds stipulated in this framework will have a major impact on current status employment. The transition strategy for JFE Steel to decarbonization is a transition strategy that takes into account a fair transition, as it will advance the energy conservation and high efficiency of existing facilities, the maximum utilization of carbon recycling, and the development of ultra-innovative decarbonization technologies in parallel, and it is not accompanied by a rapid industrial conversion.

2-3. Fulfillment of Matters Required in the CTFH

Element 1: Issuer's Climate Transition Strategy and Governance

(1) Whether the issuer that raises funds has a strategy for the transition for climate change mitigation or not.

The JFE Group formulated JFE Group Environmental Vision for 2050 in May 2021. The JFE Group claimed that "Climate change is an extremely important issue from the perspective of business continuity." and "Global climate-change issues, such as increasingly abnormal weather, must be addressed urgently." Based

¹³ To verify whether implementing the project will hinder other green-eligible projects (projects that contribute to climate change adaptation, pollution/contamination prevention, clean water and ocean conservation, recycling-oriented economies, energy conservation, and the protection of the ecosystem).

on its vision, JFE Group has positioned climate change as a top-priority issue in the Seventh Medium-term Business Plan, and expressed to achieve carbon neutrality by 2050.

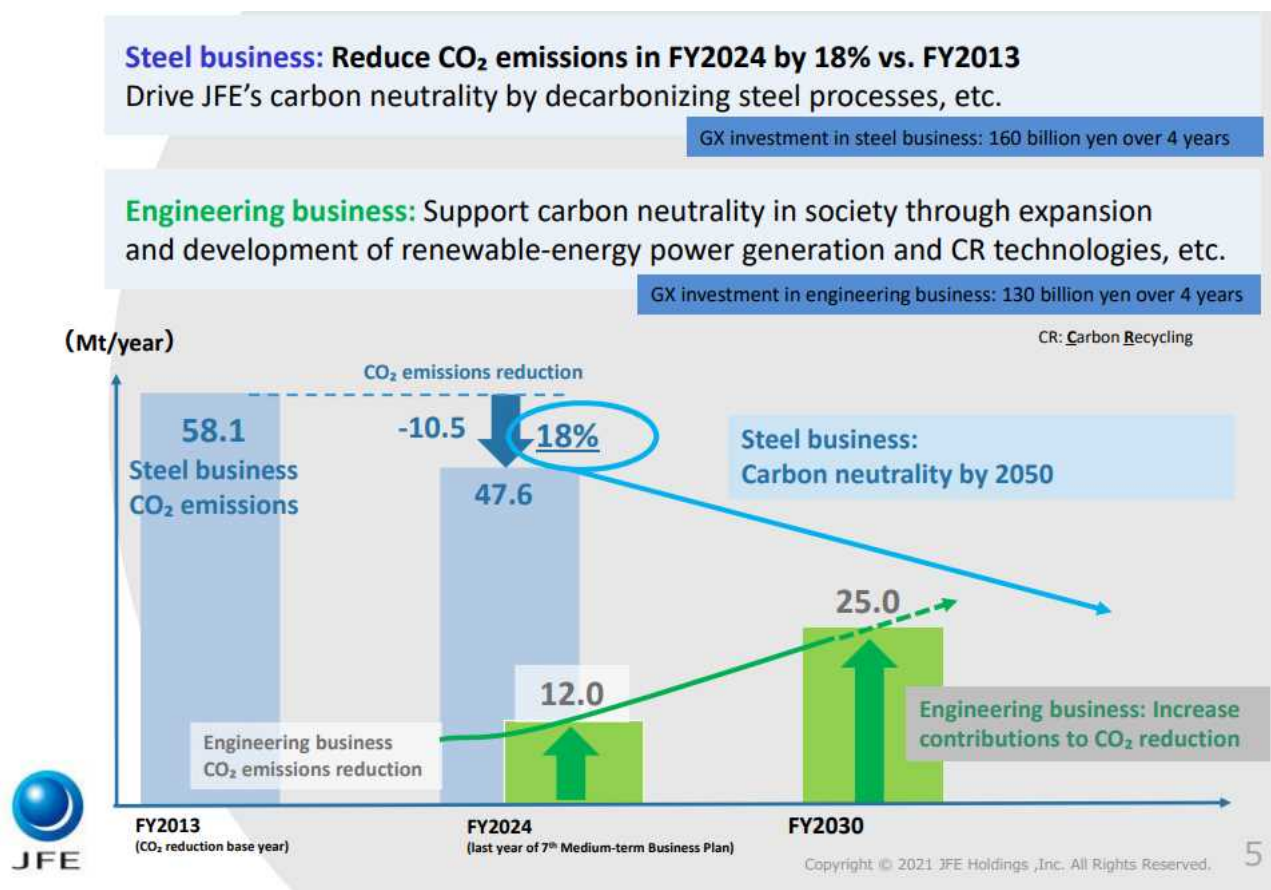
<p>I. Reduce CO₂ emissions at JFE Steel</p>	<ul style="list-style-type: none"> ➤ Pursue super-innovative technologies mainly for carbon-recycling blast furnaces and CCU ➤ Develop hydrogen-based ironmaking (direct-reduction) technology ➤ Leverage top--class electric arc furnace technology for high-grade steel manufacturing, high efficiency, etc. ➤ Develop transitional technologies for carbon neutrality, including ferrocoke, increased use of steel scrap in converters, energy savings, and low - carbon energy transformations.
<p>II. Expand contributions to CO₂ emissions reduction in society</p>	<ul style="list-style-type: none"> ➤ JFE Engineering: Expand and develop renewable - energy power generation and carbon - recycling technologies. Reduce CO₂ emissions by 12 million ton in FY2024 and 25 million tons in FY2030. ➤ JFE Steel: Develop and market eco - products and eco - solutions ➤ JFE Shoji: Increase trading in biomass fuels, steel scrap, etc., and strengthen business in supply chain management (SCM) for eco products.
<p>III. Offshore wind-power generation business</p>	<ul style="list-style-type: none"> ➤ Accelerate commercialization of the offshore wind - power business by applying the strengths of the Group. ➤ Engineering business: Manufacture and market monopiles and other seabed - fixed structures for offshore wind - power generation. ➤ Steel business: Use the new continuous casting machine in Kurashiki to produce large heavy plates. ➤ Trading business: Carry out SCM for steel materials and processed products. ➤ Shipbuilding business* : Manufacture offshore wind power - generation floating structures and construct work vessels. *equity-method affiliate : Japan Marine United Corporation <p>Group-wide: Operation and maintenance (O&M) making maximum use of Group resources.</p>

(The Overview of JFE Group Environmental Vision for 2050

Source: JFE Group Environmental Vision for 2050)

Specific measures include addressing business risks by pursuing super-innovative technologies to combat climate change, and the JFE Group will seek business opportunities that allow it to help realize a more sustainable world and enhance its corporate value by contributing to CO₂ emissions reduction across society. Medium-and long-term goals for carbon neutrality for the JFE Group as a whole are shown in the figure below.

Figure15. Initiatives in Carbon Neutrality in 2050



Note: Mid-term CO₂ reduction target has been raised to 30% (base year 2013), on Feb. 8, 2022.

(Source: JFE Group Environmental Vision for 2050)

The use of proceeds stipulated in this framework will contribute to measures for carbon neutrality in the steel business, the provision of eco-products aimed at in the engineering business, and the expansion of the volume of contributions to reducing CO₂ to other industries through renewable energy power generation. JCR evaluates this as a strategy for the JFE Group's transition to climate change mitigation.

In addition, for the Seventh Medium-Term Business Plan and super-innovative technologies aimed at implementation in fiscal 2030 and beyond, the company is aiming for early commercialization by utilizing the Green Innovation Fund¹⁴.

¹⁴ the Green Innovation Fund

The Japanese government declared "2050 Carbon Neutral" in October 2020, and has set a target to reduce overall greenhouse gas emissions to zero by 2050. This goal will greatly advance the conventional government policy, and in order to realize it, it is necessary to greatly accelerate the current efforts, such as the structural transformation of the energy and industrial sectors and innovation through bold investment. For this reason, the Ministry of Economy, Trade and Industry established a fund totaling 2 trillion yen at the New Energy and Industrial Technology Development Organization (NEDO). After sharing ambitious and concrete goals between the public and private sectors, the Ministry of Economy, Trade and Industry launched a Green Innovation Fund project to provide ongoing support for 10 years from R&D and demonstration to social implementation for companies and other entities working on this as a management issue. https://www.nedo.go.jp/news/press/AA5_101503.html

In December 2021, the following four development projects were adopted as the "Hydrogen Reduction Project in the Ironmaking Process" as research and development of technology to utilize more hydrogen in the blast furnace and hydrogen reduction technology to utilize low-grade iron ore in the direct reduction furnace.

1-1. Development of Hydrogen Reduction Technologies Utilizing Hydrogen in Steelworks

- Implementation of technology to reduce CO₂ emissions by 30% or more from the ironmaking process through hydrogen reduction technology and CO₂ separation/recovery technology in the blast furnace utilizing hydrogen inside a steelworks by 2030.

1-2. Development of low-carbon technologies utilizing external hydrogen CO₂ contained in and blast furnace exhaust gas

- Demonstrating a technique to reduce CO₂ emissions from ironmaking processes by at least 50% in medium-scale test blast furnaces by 2030.

2-1. Development of Direct Hydrogen Reduction Technology

- Demonstration of technology to reduce CO₂ emissions by more than 50% in a medium-scale direct reduction furnace compared to the current blast furnace method by 2030 through technology to directly reduce low-grade iron ore with hydrogen.

*For 2-1, joint implementation by three companies: Nippon Steel Corporation, JFE Steel Corporation, and The Japan Research and Development Center for Metals (JRCM)

2-2. Development of technology for removing impurities in electric furnaces utilizing direct reduced iron

- By 2030, in order to produce high-grade steel usable for the outer panels of automobiles in a hydrogen direct reduction-electric furnace integrated process utilizing low-grade iron ore, a technology to control the concentration of impurities (components affecting products) to the same level as the blast furnace process was demonstrated in a large-scale test electric furnace.

The operators of this project are JFE Steel, Nippon Steel, Kobe Steel, and JRCM.

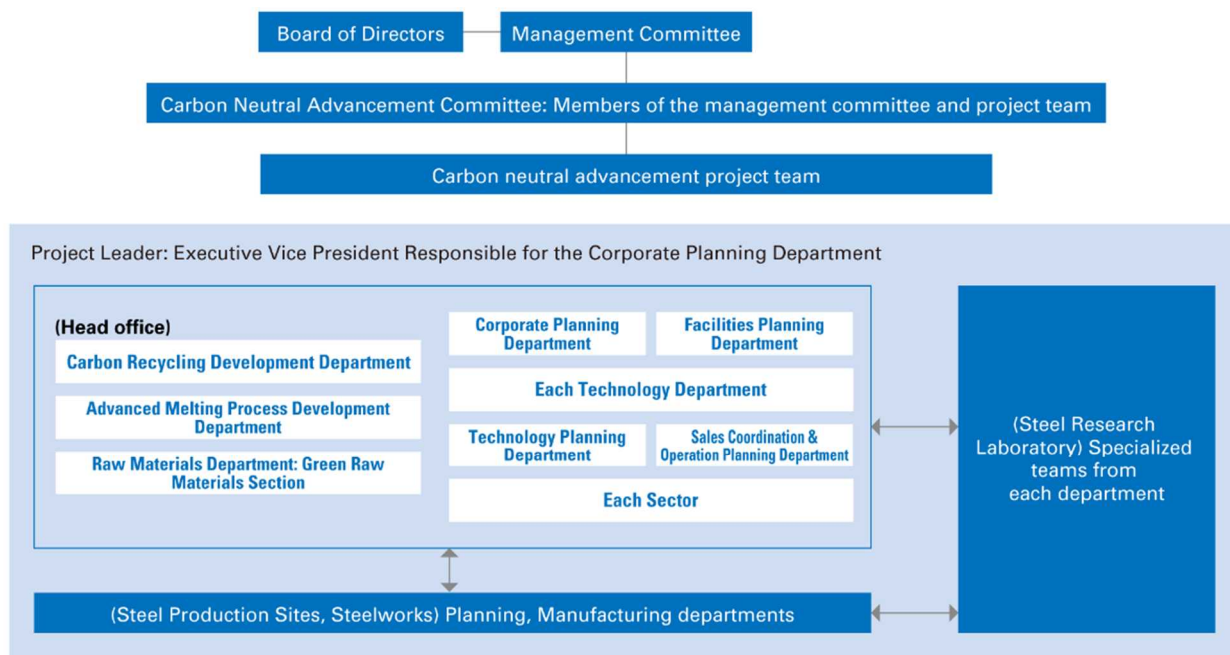
(2) The purpose of using the "Transition" label in procuring funds to contribute to the realization of corporate strategies for Issuer, etc. to move to a business model that can effectively address climate change-related risks and contribute to the achievement of the goals of the Paris Agreement.

The JFE Group's transition strategy has been developed based on the results of risk scenario-analysis in accordance with TCFD guidance, and JCR assesses that it is an important strategy for the Group's business model transition.

(3) The governance system established to ensure the effectiveness of the transition strategy.

JFE Steel has established the following system to ensure the effectiveness of its transition strategy.

Figure16. JFE Steel's Management Structure to Promote Carbon Neutrality



(Source: JFE Group web site)

Element 2: Business Model Environmental Materiality

According to data from the National Institute for Environmental Studies, CO₂ emissions in the steel industry were 155 million tons (FY2019), accounting for about 40% of the industrial sector (about 14% of the Japanese total). Globally, amid growing expectations for Green Steel, JFE Holdings' promotion of carbon neutral initiatives in the steel business and development of engineering and other businesses that encourage other industries to contribute to reducing CO₂ emissions are among the most important issues in the company's business model.

The JFE Group cites contributing to reducing CO₂ for the JFE Group, its customers, and society as a whole as the first priority issue (materiality) in the Group's management. The company has also formulated its Environmental Vision 2050, and is now incorporating specific investment plans in the Seventh Medium-term Business Plan.

Figure 17. Material Issues of JFE Group

	Areas of Focus	Details	Material Issues	Relevant SDGs
Activity	Contribute to resolving climate change issues (initiatives for achieving carbon neutrality by 2050) → P.29, 65	<ul style="list-style-type: none"> ● Initiatives for achieving carbon neutrality by 2050 ● Reduce the JFE Group's CO₂ emissions ● Contribute to reduction of CO₂ emissions in society 	<ul style="list-style-type: none"> ● Reduce the JFE Group's CO₂ emissions ● Contribute to reduction of CO₂ emissions across the society 	
	Ensure occupational safety and health → P.71	<ul style="list-style-type: none"> ● Prioritize safety first ● Maintain the physical and mental health of employees and their families 	<ul style="list-style-type: none"> ● Prevent workplace accidents ● Ensure the health of employees and their families 	
	Recruit and nurture diverse human resources → P.73	<ul style="list-style-type: none"> ● Maintain work environments where all personnel can maximize their abilities ● Accumulate and hand down technologies and skills 	<ul style="list-style-type: none"> ● Pursue diversity and inclusion ● Strengthen human resources development ● Create workplaces that motivate employees 	
	Reinforce resilience of production and engineering capabilities (realize world-class earnings power through DX and other measures)	<ul style="list-style-type: none"> ● Pursue world-class earnings power ● Promote DX and other measures to improve production efficiency, yields, and labor productivity ● Shift focus of steel business from quantity to quality (structural reform) ● Reduce costs to strengthen cost competitiveness and ensure quality competitiveness 	<ul style="list-style-type: none"> ● Increase efficiency and enhance cost competitiveness in production and engineering ● Raise quality of products and services and ensure reliable supply 	
	Strengthen competitiveness of products and services (promote the growth strategy by providing high-value-added solutions)	<ul style="list-style-type: none"> ● Improve margins and ensure stable earnings power ● Increase ratio of high-value-added products and services ● Ensure stable earnings power based on the sales strategy, including technological solutions and expansion of growth businesses 	<ul style="list-style-type: none"> ● Expand business by increasing value added in products and services with advanced technologies ● Sales strategies for realizing sustainable growth 	
Basis of activity	Thoroughly enforce compliance → P.77		<ul style="list-style-type: none"> ● Ensure adherence to corporate ethical standards and compliance 	
	Respect human rights → P.75		<ul style="list-style-type: none"> ● Respect human rights across the supply chain 	

(Source: JFE Group Report 2021)

Element 3: Climate Transition Strategy to be Science-based Including Targets and Pathways

JCR has confirmed the following four points regarding the roadmap for JFE Holdings' transition.

- (1) It should be quantitatively measurable and cover Scope 1 and 2 (it is desirable to set a target for Scope 3 to the extent feasible)

JFE Holdings computes and publishes CO₂ emissions for Scope 1, 2, and 3 as follows.

	2016	2017	2018	2019	2020
Scope 1	55.0	54.9	52.3	52.9	46.6
Scope 2	6.7	7.4	7.6	7.6	6.5
Scope 3	13.9	16.2	16.8	16.4	14.4

*Per year, in millions of t-CO₂

*Scope 1 covers a total of 76 companies. Scope 2 shows CO₂ emissions factor for purchased power in fiscal 2020.

*The scope of Scope 3 is Category 1, 2, 3, 4, 5, 6, 7, and 15

Targets are set for high-emission Scope1 and 2. For the downstream of the JFE Group's value chain, targets are being set for the contribution of the company's products to CO₂ reduction. JCR evaluates the scope of the JFE Group's target setting as being quantitatively measurable and taking into account the entire value chain.

(2) Consistent with target setting based on generally accepted scientific evidence

The JFE Group's transition strategy has been prepared based on the following scenario analysis.

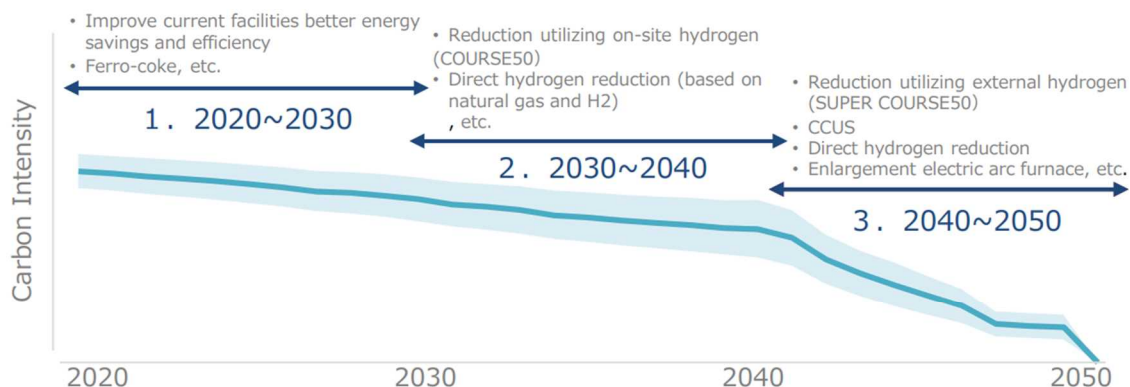
Figure. 18 JFE-Group TCFD Scenario-Analysis

Selected Scenario		2°C Scenario	4°C Scenario
Reference Scenario	Transition Risks	Transition scenarios developed by the IEA <ul style="list-style-type: none"> • Sustainable Development Scenario (SDS)^{*1} • 2°C Scenario (2DS)^{*2} 	Transition scenarios developed by the IEA <ul style="list-style-type: none"> • New Policies Scenario (NPS)^{*1} • Reference Technology Scenario (RTS)^{*2}
	Physical Risk	Climate change projection scenario developed by the Panel on Climate Change (IPCC) <ul style="list-style-type: none"> • Representative Concentration Pathways (RCP) Scenario^{*3} 	
How Society will Look		Dynamic policies will be adopted and technical innovations will progress to limit the average temperature rise by the end of this century to 2°C and realize sustainable development. Assume a society in which our business is affected by social changes accompanying transition to a decarbonized society. <ul style="list-style-type: none"> • World-wide/industry-wide uniform carbon pricing^{*4} • Increase in the ratio of sales of electric vehicles to overall vehicle sales 	Despite new policies implemented in each country based on approaches under the Paris Agreement, average temperature rises about 4°C by the end of this century. Assume a society in which our business is affected by temperature rise and other climate change. <ul style="list-style-type: none"> • Increase in the occurrence of flooding • Sea level rise

(Source: JFE Group Report 2021)

In addition, JCR also assesses that it is consistent with the technology roadmap for the iron and steel sector on "Transition Finance" formulated by the Ministry of Economy, Trade and Industry.

Figure. 19 Technology Roadmap in the Iron and Steel Field of the Ministry of Economy, Trade and Industry



1 2020~2030

The Japanese iron and steel industry already meets the world's best standards on energy efficiency, though further efforts will be made for low-carbonization through energy efficiency in blast furnaces and other means. Moreover, high-quality steel such as eco products that are expected to grow in demand will be produced. This income will be the foundation of future R&D and demonstration for decarbonization technology.

2 2030~2040

Along with increased energy savings and efficiency, new technologies as COURSE50 will be introduced and establish innovative technologies for decarbonization through continuous R&D and demonstration.

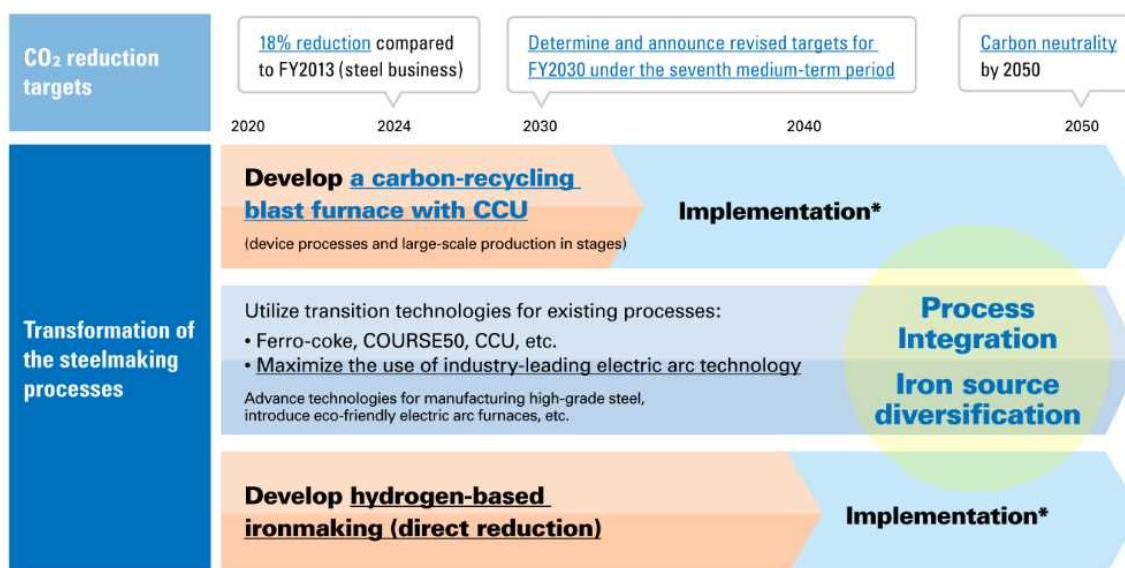
3 2040~2050

Assuming hydrogen infrastructure and CCUS to be introduced, innovative technologies such as hydrogen reduction ironmaking will achieve immense reduction of CO₂ by 2050 and hence reach carbon neutrality.

※This only illustrates the assumption of overall Japanese iron and steel industry's decarbonization pathway. In reality, decarbonization will be achieved based on each company's long-term strategy and hence, will not necessary be the reflection of this assumption.

(Source: Technology Roadmap in the Iron and Steel Sector, Ministry of Economy, Trade and Industry)

Figure. 20 JFE Group Transition Roadmap



*As prerequisites for implementation, the necessary social infrastructure is in place, including the supply of hydrogen at low cost and in large quantities, the mechanism for cost sharing across society, etc.

Note: Mid-term CO₂ reduction target has been raised to 30% (base year 2013) on Feb. 8, 2022.

(Source: JFE Group Environmental Management Vision 2050)

Element 4: Implementation Transparency

In the Seventh Medium-term Business Plan, JFE Holdings has announced future investment plans for the Green Transformation (GX investment) and carbon neutral.

Figure 21. JFE Group the Seventh Medium-term Business Plan Investment Plan (Group / 4years)

Contents		7th Medium-term Business Plan	Remarks
Group investment	Capital Expenditures	Approx.¥ ¥1.2 trillion	
	Business investment and loans	Approx.¥ 250 billion	
	Total	Approx. ¥ 1.45 trillion	Steel business: Approx. ¥1.08 trillion Ratio of investment in maintenance of steel business functions: Approx. 30%
(Of the investment amount)	GX Investment	Approx. ¥ 340 billion	• Steel business: ¥160 billion • Engineering Business : ¥130 billion • Trading business: ¥50 billion
	DX Investment	Approx. ¥ 120 billion	
Asset reduction		Approx.¥ 200 billion	
Crude Steel Production in Fiscal 2024		Approx. 26 million tons	(Only JFE Steel)
Steel business cost reduction		¥120 billion	

(Source: prepared by JCR from JFE Group's Seventh Medium-term Business Plan)

<JCR's Views on Satisfying the Transition Finance Handbook and Basic Guidelines>

Based on the above, JCR has evaluated that this framework satisfies the four elements required by the Climate Transition Finance Handbook.

2-4. Consistency with SDGs

The JCR has assessed that the use of resources in the Framework will contribute to the following SDGs goals and targets, with reference to ICMA's SDGs mapping.

Category 1 • 2 :



Goal 7: Affordable and clean energy

Target7.3 By 2030, double the global rate of improvement in energy efficiency



Goal9 : Industry, innovation and infrastructure

Target9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities



Goal11 : Sustainable cities and communities

Target11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries



Goal12 : Responsible consumption and production

Target12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment



Goal13 : Climate action

Target13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Category 3 :



Goal11 : Sustainable cities and communities

Target11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

Category 4 :



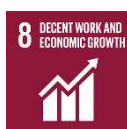
Goal 3 : Good health and well-health

Target3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination



Goal7 : Affordable and clean energy

Target7.2 By 2030, increase substantially the share of renewable energy in the global energy mix



Goal8 : Decent work and economic growth

Target8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead



Goal9 : Industry, innovation and infrastructure

Target9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all



Goal12 : Responsible consumption and production

Target12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment



Goal13 : Climate action

Target13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Target13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Evaluation Phase 2: Management, Management, and Transparency Evaluation

Based on the current situation described in detail below and JCR's evaluation of it, JCR evaluated that the management and operation system was firmly established, that the transparency was extremely high, and that the implementation of the project as planned and the appropriation of the procurement funds were sufficiently expected. Based on this evaluation, Phase 2: Management, Operation, and Transparency Evaluation was placed at the highest level, "m1(F)."

1. Appropriateness and transparency of the standards for selecting the use of proceeds and its process

1-1. JCR's Key Consideration in this factor

In this section, JCR confirms that the objectives to be achieved through the green/Transition Projects, the criteria for selecting green projects, the appropriateness of the process, and the series of processes are appropriately disclosed to lenders.

1-2. Current Situation of Evaluation Targets and JCR Evaluation

a. Goal

The JFE Group's corporate philosophy and aspirations are shown in the diagram below.

Figure. 22 JFE Group Company Philosophy



(Source: JFE Group Report 2021)

The JFE Group believes that iron is important as a foundation for a variety of industries, and as a closed-loop recyclable resources, demand for it is expected to further expand along with future advances in decarbonization technology. The JFE Group aims to promote contributions to other industries through this value of iron in conjunction with the promotion of the decarbonization of the steelmaking process.

The recent preparation of the Green/Transition Bond Framework has been positioned as fundraising for the realization of the JFE Group Environmental Management Vision 2050, and it has also been positioned as an opportunity to disseminate the Company's efforts.

Based on the above, JCR confirmed that the use of proceeds set out in this framework is consistent with the long-term environmental goals and sustainable growth goals that the JFE Group aims for.

b. Selection criteria

The eligibility criteria for use of proceeds in this framework developed by JFE Holdings are described in Phase 1 of the Evaluation Report.

JCR evaluates that the above selection criteria are appropriate.

c. Process

<Selection process defined in this framework>

Each operating company under the JFE Holdings Group will select the eligible businesses stipulated above, and the final determination of eligible businesses will be made by the executive officer for finance at JFE Holdings. We comprehensively analyze and examine the appropriateness of our business through discussions based on eligibility criteria and other means. In the operation and implementation of projects, related departments are working to preserve the surrounding environment.

JCR assesses that the selection process is appropriate because it involves the operating companies responsible for each business within the JFE Group and the management of JFE Holdings.

As this framework is scheduled to be announced on JFE Holdings' website and other media, JCR evaluates it as being transparent to investors.

2. Appropriateness and transparency of cash management

2-1. JCR's Key Consideration in this factor

It is generally assumed that the management method of the proceeds varies by the issuer. JCR assesses whether proceeds procured through the Bonds are appropriated to the Green/Transition projects and whether a mechanism and internal system are in place to enable easy tracking and management of the appropriation of proceeds.

JCR also attaches importance to evaluating the management and operation of the unallocated proceeds as well as to confirming that the proceeds procured from the Bond will be allocated to the Green/Transition projects at early stage.

2-2. Current Situation of Evaluation Targets and JCR Evaluation

<Fund management methods stipulated in this framework>

JFE Holdings manages the appropriation of the proceeds from the issuance of the Green Bonds or Transition Bonds on a quarterly basis through the use of an internal control system by our Finance Department until the proceeds are fully appropriated. Procurement funds are managed in cash or cash equivalents until all proceeds of the Green Bonds or Transition Bonds have been allocated.

In addition to the above, JCR confirms the following matters.

- Funds raised by JFE Holdings shall be loaned to operating companies within the Group that operate each business selected in accordance with the selection process. Loans are originated with the approval of JFE Holdings' executive officer for finance.
- The management ledger of the appropriation of the proceeds is expected to be held until the redemption of the Green Bond or Transition Bond.
- In accordance with the Financial Instruments and Exchange Act, JFE Holdings organizes and operates internal control over financial reporting, such as business processes and the use and control of IT, and publishes an internal control report that evaluates them. Internal control audits are also conducted by auditing firms.

JCR believes that the fund management set forth in this framework is appropriate and transparent because the tracking and management system for the fund procurement under this framework has been properly established, and the tracking and management of the appropriated status and the internal control thereof have been properly planned and the method for managing the unallocated funds have been properly planned.

3. Reporting System

3-1. JCR's Key Consideration in this factor

This section evaluated whether the disclosure system for lenders, etc. before and after the procurement of the Loan is planned in detail and in an effective manner.

3-2. Current Situation of Evaluation Targets and JCR Evaluation

a. Reporting on the status of appropriation of funds

The status of proceeds under the Framework will be made available to the website on an annual basis until the proceeds are fully appropriated for projects that conform to eligibility criteria. The disclosures represent amounts appropriated for funding on a per-use category basis, the unallocated amount of funding and the amount of funding that was appropriated for existing expenditures.

JCR confirmed that the above funding appropriation reporting is scheduled to occur once a year.

b. Reporting on the Effectiveness of Environmental Improvements

JFE Holdings will update the following indicators and project overviews annually on its website, to the extent practicable, until the redemption of the Green Bond or Transition Bond:

Use of proceeds Candidates		Project Examples	Reporting items
1. Development of ultra-innovative steelmaking processes	Ultra-innovative steelmaking Process development	<ul style="list-style-type: none"> Funding for R&D on a carbon-recycling blast furnace, CCU, hydrogen ironmaking, and an electric furnace for high-grade steel production 	※
2. Energy conservation For higher efficiency Initiatives	Equipment investments and R&D targeting conversion of blast furnaces to AI and IoT	<ul style="list-style-type: none"> Expenditures on the development of DS technology that can reduce CO₂ through operation stabilization and detect the status of the operating system and predict anomalies (CAF) 	Estimated CO ₂ savings (t-CO ₂) for funded facilities
	Expanding the use of scrap	<ul style="list-style-type: none"> Expenditures for research & development and capital investment aimed at increasing scrap usage in converters (capital investment funds and R&D funds) 	
	improving coke furnaces	<ul style="list-style-type: none"> Cost of renovating coke ovens (improved combustion efficiency and reduced use amount by renovating aged coke ovens) 	

		<ul style="list-style-type: none"> Expenditures for replacement of heat furnaces, boilers, power generation facilities, and air separators 	
	equipment investments targeting recovery and effective use of waste heat, byproduct gas	<ul style="list-style-type: none"> Expenditures for the effective use of waste heat and by-product gas generated at steelworks (capital investment funds) 	
	Resource conservation	<ul style="list-style-type: none"> Expenditures aimed at the reduction effect of reducing materials used in the BF (capital investment fund) 	
3. Manufacturing eco-friendly products	Manufacture of high value-added electrical steel sheets	<ul style="list-style-type: none"> Equipment investments and R&D targeting the manufacture of electromagnetic steel sheets, etc. 	Expected CO ₂ reduction *through the introduction of magnetic sheets (t-CO ₂)
4. Renewable energy	Initiatives related to renewable energy (biomass, geothermal, and solar power generation)	<ul style="list-style-type: none"> Expenditures related to initiatives (EPC and operation) for the Renewable Energy business (capital expenditures, working capital) 	Business Overview and Capacity of Renewable Energy Business (MW) Amount of electricity generated (kWh), expected CO ₂ reduction (t-CO ₂)

※With regard to technological development, the JFE Group plan to report the impact when it becomes available for disclosure.

JCR assesses that the contents assumed by JFE Holdings as the reporting on the status of appropriation of funds and the effectiveness of environmental improvements are appropriate.

4. Organizational Efforts for the Environment

4-1. JCR's Key Consideration in this Factors

This section assesses whether the issuer's management considers environmental issues to be of high priority in management, whether the transition finance procurement policy and process, criteria for selecting Green/Transition Projects, etc. are clearly positioned by establishing a department that specializes in the environmental field or through collaboration with external organizations, etc.

4-2. Current Situation of Evaluation Targets and JCR Evaluation

The JFE Group's actions related to management issues are based on identifying materiality and setting KPIs to minimize negative societal impact and maximize societal value by investing JFE Group's resources from the standpoint of meeting stakeholder needs.¹⁵

In FY2021, we formulated the Seventh Medium-Term Business Plan, recognizing that ensuring environmental and social sustainability (helping to solve critical issues) and establishing economic sustainability (stable earnings power) are key to the JFE Group's sustainable development. Accordingly, we reorganized our materiality by adding economic issues to our existing CSR issues to identify all our material issues of corporate management. The following are the 13 most important management issues.

- | | |
|--|--|
| <ul style="list-style-type: none"> • Reduce the JFE Group's CO₂ emissions • Contribute to reduction of CO₂ emissions across the society • Prevent workplace accidents • Ensure the health of employees and their families • Pursue diversity and inclusion • Strengthen human resources development • Create workplaces that motivate employees | <ul style="list-style-type: none"> • Increase efficiency and enhance cost competitiveness in production and engineering • Raise quality of products and services and ensure reliable supply • Expand business by increasing value added in products and services with advanced technologies • Sales strategies for realizing sustainable growth • Ensure adherence to corporate ethics and compliance • Respect human rights throughout the supply chain |
|--|--|

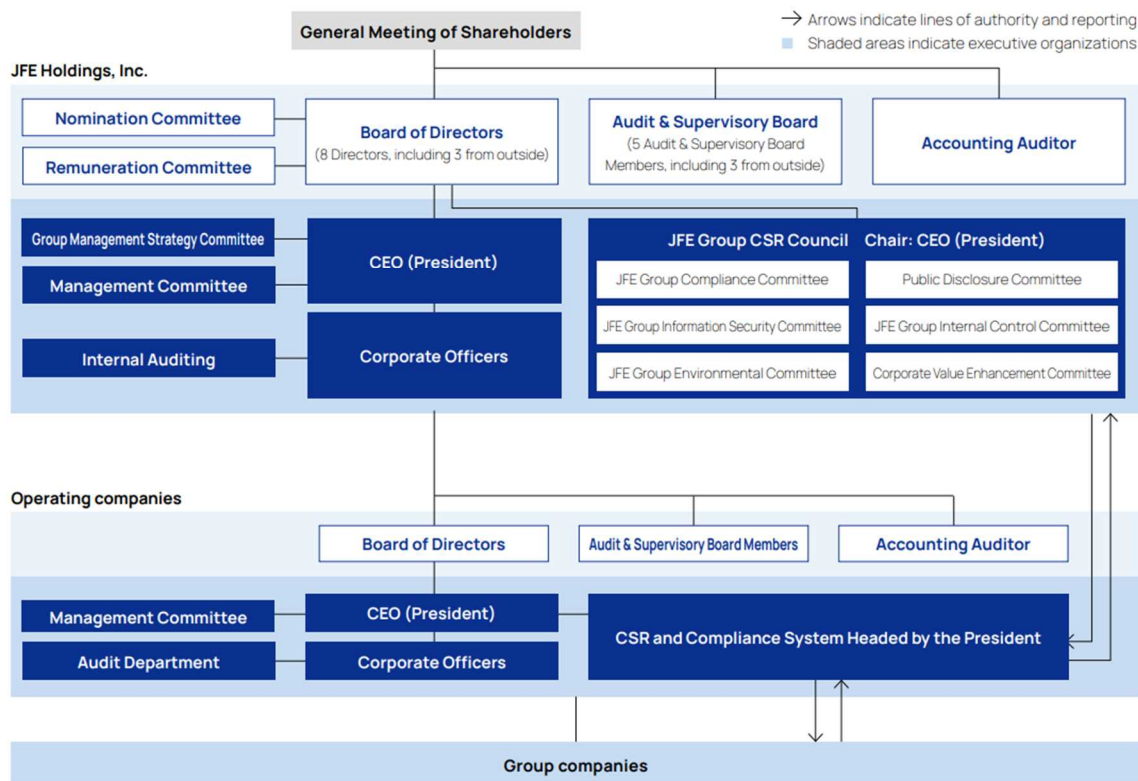
KPIs for material issues of corporate management identified in FY2021 were determined following consideration by each operating company, discussions by the Management Committee, and deliberation by the Group Management Strategy Committee and Board of Directors.

The JFE Group has established the Group CSR Conference, which is chaired by the president of JFE Holdings and comprised of the executive vice president (director), executive officers, full-time corporate auditors, and the presidents of each operating company, as a system to supervise and provide guidance on group-wide CSR initiatives, including risk management, from the viewpoint of preventing the impairment of and enhancing the corporate value of the Group as a whole. As subordinate organizations to the Group CSR Council, committees have been established for compliance, environment, internal control, information security, disclosure, and corporate value enhancement, to discuss policies for the Group, supervise the status of penetration of policies, and share information on issues and problems that have arisen, and examples of how to address them. The Group CSR Committee regularly reports to the Board of Directors for deliberation on matters such as the Group's basic policies, action plans, content of important measures, and responses in the event of an important situation, and receives instructions and supervision.

In addition, each operating company has established a conference in collaboration with the Group CSR Council to foster the awareness of the Group's basic policies and CSR.

¹⁵ JRE Group Report 2021

Figure. 23 CSR Promotion Framework of JFE Holdings and Each Operating Company



(Source: JFE Group Report 2021)

The JFE Group exchanges opinions with various stakeholders, including shareholders, investors, customers, business partners, and employees. In addition, the Group is advancing initiatives to address social issues that should be contributed by the Group throughout the value chain.

Based on the above, JCR confirmed that the JFE Group's management positions global environmental issues, including the prevention of global warming, as a high priority issue for management. In addition, JCR confirmed that it has identified important issues in the three areas of ESG and has established expert committees and other committees to address issues. JCR has also confirmed that specialized departments and committees that measure contribution to carbon neutrality and decarbonization in other industries have been established in each operating company, and when addressing environmental issues, they are collaborating with external organizations to formulate a vision and investment plan for long-term carbon neutrality.

■Result of evaluation

Based on the JCR Green Finance Evaluation Methodology, JCR assigned "gt1(F)" for the “Green/Transition Evaluation” and "m1(F)" for the "Management, Operation, and Transparency Evaluation." Consequently, JCR assigned "Green 1(T)(F)" for the "JCR Climate Transition Finance Evaluation" of the Framework. The Framework is considered to meet the standards for items required by “Green Bond Principles”, “CTFH”, “Basic Guidelines for Climate Transition Finance”, and “Green Bond Guidelines”.

[JCR Climate Transition Finance Evaluation Matrix]

		Management, Operation, and Transparency Evaluation				
		m1 (F)	m2 (F)	m3 (F)	m4 (F)	m5 (F)
Green/Transition Evaluation	gt1 (F)	Green 1 (T) (F)	Green 2 (T) (F)	Green 3 (T) (F)	Green 4 (T) (F)	Green 5 (T) (F)
	gt2 (F)	Green 2 (T) (F)	Green 2 (T) (F)	Green 3 (T) (F)	Green 4 (T) (F)	Green 5 (T) (F)
	gt3 (F)	Green 3 (T) (F)	Green 3 (T) (F)	Green 4 (T) (F)	Green 5 (T) (F)	Not qualified
	gt4 (F)	Green 4 (T) (F)	Green 4 (T) (F)	Green 5 (T) (F)	Not qualified	Not qualified
	gt5 (F)	Green 5 (T) (F)	Green 5 (T) (F)	Not qualified	Not qualified	Not qualified

(Responsible analysts for this evaluation) Atsuko Kajiwara and Takahiro Yamauchi

Important explanation of the Climate Transition Finance evaluation

1. Assumptions, Significance, and Limitations of JCR Climate Transition Finance Evaluation

JCR Climate Transition Finance Evaluation, which is assigned and provided by the Japan Credit Rating Agency (JCR), represents JCR's overall opinion at the present time as to the extent to which funds procured from the Transition Financing, which are subject to evaluation, are appropriated for the Green/Transition Projects as defined by JCR, and the extent to which JCR's efforts to manage, operate and ensure transparency of such Transition Financing, etc., and does not fully represent the extent of management, operations and transparency efforts related to the appropriation of funds procured from the Transition Financing and the use of proceeds, etc.

JCR Climate Transition Finance evaluation evaluates plans or circumstances, such as the appropriation of funds at the time of funding plans or at the time of funding of the Transition Financing, and there is no guarantee that funds will be appropriated or otherwise in the future. In addition, JCR Climate Transition Finance Evaluation does not demonstrate the effect of Transition Finance on the environment and is not responsible for its effect on the environment. JCR confirms that the effects of the funds procured from transition Finance on the environment are measured quantitatively and qualitatively by the issuer or by a third party requested by the issuer, but in principle it does not directly measure the effects.

2. Methods used in the conduct of this evaluation

The methods used in this evaluation are listed on JCR website (Sustainable Finance & ESG in <https://www.jcr.co.jp/en>) as JCR Green Finance Evaluation Methodology.

3. Relationship with Acts Related to Credit Rating Business

JCR Climate Transition Finance Evaluation is determined and provided by JCR as an ancillary business, which is different from the activities related to the credit rating business.

4. Relationship with Credit Ratings

The Evaluation differs from credit ratings and does not promise to provide or make available for inspection a predetermined credit rating.

5. Third Party character of JCR

There is no conflict of interest related to capital or human resources relationships between the subject of this evaluation and JCR.

Disclaimers

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■Glossary

JCR Climate Transition Finance Evaluation: The evaluation assesses the extent to which funds raised through transition financing will be allocated to green/transition projects as defined by JCR, as well as the degree of management, operations, and transparency initiatives related to the use of such transition financing, etc. The evaluation is on a five-point scale, from top to top, and is displayed using the rating symbols Green1 (T), Green2 (T), Green3 (T), Green4 (T), and Green5 (T).

■Status of registration as an external assessor of green finance

- Ministry of the Environment's external green bond reviewer registration
- ICMA (registered as an observer with the International Capital Markets Association)
- Members of UNEP FI Positive Impact Financial Principles Working Groups
- Climate Bonds Initiative Approved Verifier (Climate Change Initiative Accreditation Verification Organization)

■Status of registration as a credit rating agency, etc.

- Credit Rating Agency: the Commissioner of the Financial Services Agency (Rating) No.1
- EU Certified Credit Rating Agency
- NRSRO: JCR has registered with the following four of the five credit rating classes of the Securities and Exchange Commission's NRSRO(Nationally Recognized Statistical Rating Organization. (1)Financial institutions, broker dealers, (2) insurance companies, (3) general business corporations, and (4) government and local governments. If the disclosure is subject to Section 17g-7(a) of the Securities and Exchange Commission Rule, such disclosure is attached to the news releases posted on the JCR website (<https://www.jcr.co.jp/en/>).

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<Reference>

Check Sheet for Consistency with Basic Guidelines on Climate Transition Finance

Initial Release: February 28, 2022

Correction: May 10, 2022

Japan Credit Rating Agency, Ltd.

Companies to be evaluated: JFE Holdings, Inc.

The following are the check results of the consistency of the Finance with respect to the items recommended in the Basic Guidelines on Climate Transition Finance (the "Guidelines") published by the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment.

The Guidelines use three expressions: "should," "recommended," and "be considered/possible." These expressions are used in the following context:

- Items described with the word "should" are basic elements that financial instruments labeled as transition finance are expected to have.
- Items described with the word "recommended" are elements that financial instruments labeled as transition finance are optimally recommended to have under the Guidelines although instruments which do not have these items can also be labeled as transition finance.
- Items described with the word "be considered" or "possible" are elements that they are not considered problematic even if financial instruments labeled as transition finance do not have them.

Element 1: Fundraiser's Climate Transition Strategy and Governance

a) Financing through transition finance **should** aim to implement or incentivize the achievement of transition strategies. Such strategies **should** incorporate a long-term target to align with the goals of the Paris Agreement, relevant interim targets on the trajectory towards the long-term goal, disclosure on the levers towards decarbonization, and fundraiser's strategic planning.

Consistency: ✓

In the "Roadmap toward Carbon Neutral" within the "JFE Group Environmental Vision 2050," the company has set the 2050 Carbon Neutral Targets and its short-and medium-term targets of a reduction of at least 30% from the fiscal 2013 level by the end of fiscal 2030, and a reduction target of 18% from the fiscal 2013 level by the end of fiscal 2024. (On February 8, 2022, JFE Holdings announced its fiscal 2030 CO2-reduction target.)

The JFE Group has established two scenarios for climate change that have a major impact on its business in order to use them in formulating future business strategies. Both scenarios are based on scenarios published by the International Energy Agency (IEA). In addition, it endorses the "Challenge Zero" Declaration, which is an initiative of the Keidanren (Japan Business Federation)

and the Japanese government toward the realization of a "decarbonized society," for which the Paris Agreement is positioned as a long-term goal, and is taking on the challenge of various innovations.

b) A transition strategy **should** serve to explicitly communicate the implementation of an issuer's strategy to transform the business model in a way which effectively addresses climate-related risks and contributes to achieving the goals of the Paris Agreement. Transformation of a business model is not limited to initiatives as an extension of existing businesses but **can** also be transformation based on various other perspectives. It includes fuel conversion that achieves significant carbon and GHG reduction benefits, introduction of innovative technologies, improvement of / changes in manufacturing processes and products, and development and provision of products and services in new fields.

Consistency: ✓

In May 2019, it announced its endorsement with TCFD to develop scenarios based on scenarios published by the IEA. The scenarios identify potential climate-related risks and opportunities.

As a business transformation related to the transition strategy for carbon neutrality in 2050, the company aims to realize carbon neutrality through the following initiatives.

1. Pursue super-innovative technologies mainly for carbon-recycling blast furnace and CCU (developing hydrogen-based ironmaking (direct reduction) technology, maximize use of electric arc furnace technology, etc.)
2. Expand contributions to CO₂ emissions reduction in society
 - Engineering Business: Expand and develop renewable - energy power generation and carbon - recycling technologies.
 - Steel business: Develop and market eco - products and eco - solutions
 - Trading business: Increase trading in biomass fuels, steel scrap, etc., and strengthen business in supply chain management (SCM) for eco products.
3. Offshore wind-power generation business

c) The implementation of a transition strategy assumes cases where it affects society and environment other than climate change, such as employment or stable provision of products and services, through transformation of a business model. In such cases, it is **recommended** that the fundraiser also takes into consideration the impact of business innovations to society and environment other than climate change.

Consistency: ✓

Based on its corporate vision of "Contributing to society with the world's most innovative technology," the JFE Group develops and provides processes and products for solving climate change issues and reducing environmental impact.

In addition to the JFE Group's efforts to reduce CO₂ emissions and expand contributions to reducing CO₂ for society as a whole, announced in the JFE Group Environmental Vision 2050, the JFE Group aims to improve corporate value and realize a sustainable society by developing and providing various processes and products related to global environmental conservation.

As part of the initiatives described above, it develops major environmentally conscious products and technologies by business. It is taking environmental considerations that are not limited to climate change, such as improving water quality, resource recycling, and biodiversity conservation, from energy conservation and CO₂ emissions reductions.

d) Climate change-related scenarios¹¹ **should** be referenced in developing transition strategies. The pathway to transition **should** be planned for respective sector and regions of individual fundraiser, who may generally be placed in a different starting point and pathway to transition.

Consistency: ✓

Identified possible climate-related risks and opportunities. The transition risk scenarios are described in "Sustainable Development Scenario (SDS)," "2°C Scenario (2DS)" by the International Energy Agency (IEA). The 4°C Scenario is described in "New Policy Scenario (NPS)" and "Reference Technology Scenario (RTS)". The physical risk scenarios are analyzed with reference to the climate change projection scenario "Representative Concentration Pathways (RCP) Scenario" by IPCC.

e) Transition strategies and plans must be highly credible in terms of their effectiveness. Therefore, it is **recommended** that a transition strategy and plan are linked to management strategy and business plan, including Medium-term Business Plans.

Consistency: ✓

The Seventh Medium-term Business Plan sets a target of reducing CO₂ emissions by 18% from the fiscal 2013 level by the end of fiscal 2024 as a short-to medium-term target for achieving 2050 carbon neutrality formulated in the newly formulated JFE Group Environmental Vision 2050.

f) However, because such strategies and plans run for a long period of time, it is **possible** that the content may be modified or adjusted in the event of a major change in the assumed external environment and so on.

Consistency: ✓

The CO₂ emission reduction target for 2030 that is a reduction of at least 20% compared to fiscal 2013, which had been previously to be revised during the Seventh Medium-Term Management Plan period, was revised in February 2022 to a reduction of at least 30% compared to fiscal 2013.

g) In the initial phase of developing a transition strategy by the fundraiser, it is **considered** as an option for the fundraiser to indicate a plan for future implementation of items described with the words "recommended" and "be considered/possible" in these Guidelines.

Consistency: ✓

All matters that are considered "should" in the Basic Guidelines satisfy their requirements. In addition, almost all items identified as "desirable" and "considered/possible" have met their requirements or are expected to be implemented in the future.

h) In order to secure the effectiveness of the transition strategy, the fundraiser **should** establish an organizational structure for the board of directors and/or other such committee to oversee the activities addressing climate change and for management to play a role in assessing and managing such climate-related activities.

Consistency: ✓

Under the JFE Group CSR Council, the JFE Group Environmental Committee chaired by the CEO has been established to set environmental targets, check the status of achievement, improve the environmental performance of the Group as a whole, and resolve various other environmental issues.

Issues of particular importance to management, including climate change issues, are also discussed by the Group Management Committee and further reported to the Board of Directors. The Board of Directors oversees the reported environmental issues through discussions. In addition, each operating company and group company has also established expert committees to promote the activities of each corporate unit.

i) While a transition strategy shall be basically developed by a company in need of finance, it is **possible** for entities to utilize the strategy of companies that are wholly or partially responsible for the initiatives to establish or explain their own strategy, given that the finance supports GHG emissions reduction initiatives of not just a single company but its supply chain.

Consistency: ✓

In the "JFE Group Value Chain," the company is identifying the risks and opportunities that should be addressed in business operations in response to social issues that the Group should contribute to resolving, and is advancing initiatives to address these issues.

In addition, in supply chain management, we believe it is important for not only our own group but also the entire supply chain to tackle global corporate issues in order to realize a sustainable society. We will continue to promote initiatives while gaining the understanding of our business partners, including our customers.

j) Transition strategies **should** be disclosed in advance in a company's integrated report, sustainability report, statutory documents and other materials for investors (including such disclosures on the website). This also applies to the other three elements.

Consistency: ✓

The Transition Strategy has been announced in the Integrated Report, "JFE GROUP REPORT 2021," "the JFE Group CSR Report 2021," and "the Seventh Medium-term Business Plan."

k) It is **possible** to disclose transition strategies and elements concerning the governance guaranteeing that the execution of transition strategies is in alignment with the reporting frameworks such as the Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD; Final Report).

Consistency: ✓

It analyzes the impacts of climate change issues, and discusses, decides, or reports on the following at the Board of Directors meeting.

- Representation of endorsement of the purpose of TCFD Final Report
- Disclosure in line with TCFD recommendations (e.g., scenario-based analysis)
- Formulation of the JFE Group Environmental Vision 2050, The Seventh Medium-term

Business Plan

l) If the implementation of a transition strategy assumes impacts on society and environment other than climate change, it is **recommended** that the fundraiser explain the view underlying its approach¹⁴, etc. to address such impacts and disclose how the strategy on the whole contributes to achieving the Sustainable Development Goals (SDGs) so that the effects can be appropriately evaluated by the financier.

Consistency: ✓

In addition to contributing to the resolution of climate change issues as a contribution to achieving SDGs, it is also promoting initiatives by identifying the securing of occupational health and safety, securing and developing diverse human resources, strengthening production and engineering capabilities (realizing global-class profitability by promoting DX, etc.), and enhancing the competitiveness of products and services (promoting a growth strategy through the provision of high-value-added solutions) as fields of issues.

m) Considering the length of application and other factors, there may be instances when a transition strategy and plan will need to be modified due to major changes in the external environment and relevant conditions that were assumed at a planning phase. In this case, the contents of the modification **should** be disclosed together with the underlying reason in a timely manner.

Consistency: ✓

The CO2 emission reduction target for 2030 that is a reduction of at least 20% compared to fiscal 2013, which had been previously to be revised during the Seventh Medium-Term Management Plan period, was revised in February 2022 to a reduction of at least 30% compared to fiscal 2013.

n) In terms of governance, it is **recommended** that disclosures include an organizational structure for overseeing the implementation of a transition strategy and for assessing and managing related initiatives. It is also **recommended** that disclosures include the specific roles of the constituent organizations and the management and the process by which the content of deliberations is reflected in management.

Consistency: ✓

The Group Environmental Committee chaired by the president of JFE Holdings has been established to set environmental targets, check the status of achievement, and improve the environmental performance of the Group as a whole. The Group Management Strategy Committee also deliberates on climate change issues and further reports to the Board of Directors. The Board of Directors oversees the reported environmental issues through discussions.

o) In cases where the fundraiser determines the need for an objective assessment regarding the transition strategy, it is **recommended** that a review, assurance and verification by an external organization for its transition strategy.

Consistency: ✓

Review by Japan Credit Rating Agency, Ltd. (JCR) is assumed.

p) It is **recognized** useful to obtain a review particularly concerning the following in connection with the transition strategy:

- Alignment of short-term, mid-term and long-term targets (for targets, refer to Element 3) with the overall scenario
- Credibility of the fundraiser's strategy to reach the targets
- Appropriateness of the management process and governance for the transition strategy

Consistency: ✓

JCR confirmed the above three items and provides this evaluation report.

Element 2: Environmental Materiality (Priority) in Business Models

a) Initiatives for achieving the transition strategy **should** be such that contribute to transforming core business activities that are environmentally material parts today and in the future.

Consistency: ✓

Steelmaking using blast furnaces in the steel business, which accounts for the majority of the Group's emissions and is positioned as a core business, is a process that cannot avoid CO2 emissions at present. Transition initiatives aim to achieve an 18% reduction in emissions at JFE Steel, which is responsible for the core business.

In terms of initiatives for transition, the company will promote technological innovation in the core steel business, in particular, such as expanding the use of ferrocoke and converter scrap, as well as low-carbon energy transition.

b) When identifying business activities that are environmentally material parts, it is **recommended** that the fundraiser consider multiple climate change-related scenarios that may possibly impact its judgment on the identification.

Consistency: ✓

Identified possible climate-related risks and opportunities. The transition risk scenarios are analyzed by referring to the "Sustainable Development Scenario (SDS)" and "2°C Scenario (2DS)" by the International Energy Agency (IEA), the "New Policy Scenario (NPS)" and the "Reference Technology Scenario (RTS)" for the 4°C Scenario, and to the climate change scenario "Representative Concentration Pathways (RCP) Scenario" by IPCC for the physical risk scenarios.

c) In terms of considering materiality, it is **possible** to apply existing guidance provided by an organization that creates standard criteria concerning sustainability reporting.

Consistency: ✓

It is promoting the low carbon society action plan that was formulated by the Japan Iron and Steel Federation, of which it is a member, and that focuses on the three ecos initiatives and the development of innovative new iron and steelmaking processes. It is working toward the plan's target of 2030 (Phase II).

d) The fundraiser **should** indicate that climate change is an environmentally material part of business activities.

Consistency: ✓

In The Seventh Medium-term Business Plan, the challenge to climate change was positioned as the most important issue, and the JFE Group Environmental Vision 2050 was formulated with the aim of realizing carbon neutrality.

e) It is **recommended** that disclosures include the contents of climate change-related scenarios used in identifying business activities that are environmentally material parts along with the underlying reasons (e.g., regional and industrial characteristics) for selecting such scenarios.

Consistency: ✓

Identified possible climate-related risks and opportunities. The transition risk scenarios are analyzed by referring to the "Sustainable Development Scenario (SDS)" and "2°C Scenario (2DS)" by the International Energy Agency (IEA), the "New Policy Scenario (NPS)" and the "Reference Technology Scenario (RTS)" for the 4°C Scenario, and to the climate change scenario "Representative Concentration Pathways (RCP) Scenario" by IPCC for the physical risk scenarios.

Element 3: Scientifically Rationalized Climate Transition Strategies (Including Targets and Channels)

a) The fundraiser **should** reference science-based targets in developing its transition strategies.

Consistency: ✓

Identified possible climate-related risks and opportunities. The transition risk scenarios are analyzed by referring to the "Sustainable Development Scenario (SDS)," "2°C Scenario (2DS)" by the International Energy Agency (IEA), the "New Policy Scenario (NPS)" and the "Reference Technology Scenario (RTS)" for the 4°C Scenario, and to the climate change scenario "Representative Concentration Pathways (RCP) Scenario" by IPCC for the physical risk scenarios.

b) This **should** include mid-term targets (short- to mid-term targets) in addition to long-term targets for 2050 and be quantitatively measurable based on a measurement methodology which is consistent over a long period of time.

Consistency: ✓

Aiming to achieve carbon neutrality by 2050 and aiming to reduce CO₂ emissions by 18% from 2013 levels by the end of fiscal 2024 and by 30% or more from fiscal 2013 levels by fiscal 2030 as short-and medium-term targets. (On February 8, 2022, JFE Holdings announced its fiscal 2030 CO₂-reduction target.)

c) In addition, it is recommended that GHG reduction targets, which could be formulated either in intensity and absolute terms, **should** consider environmental materiality and cover Scopes 1 through 3 of GHG Protocol, the international standard on supply-chain emissions.

It is **recommended** that targets covering Scope 3 be set using a practical calculation method when it could be subject to significant reduction in the fundraiser's business model.

It is also **possible** to disclose the avoided emissions as necessary.

Consistency: ✓

Targets are set for high-emission Scope 1 and 2. For the downstream of the JFE Group's value chain, targets are being set for the contribution of its products to CO₂ reduction. With regard to emissions, CO₂ emissions for Scope 1, 2, and 3 are calculated and announced.

d) Science-based targets are GHG reduction targets required for achieving the goals of the Paris Agreement and **should** be set while taking into account differences in regional characteristics and industries. In so doing, it is **possible** to refer to the following trajectories.

- Scenarios widely recognized in the international community (Examples include the Sustainable Development Scenario (SDS) outlined by the International Energy Agency (IEA))
- Objectives verified under the Science Based Targets Initiative (SBTi) and such like
- Nationally Determined Contributions (NDC) of countries aligned with the goals of the Paris Agreement, roadmaps by industry sector, industries set out plans that are science-based achieving the Paris Agreement and so on.

Consistency: ✓

Identified possible climate-related risks and opportunities. The transition risk scenarios are analyzed by referring to the "Sustainable Development Scenario (SDS)" and "2°C Scenario (2DS)" by the International Energy Agency (IEA), the "New Policy Scenario (NPS)" and the "Reference Technology Scenario (RTS)" for the 4°C Scenario, and to the climate change scenario "Representative Concentration Pathways (RCP) Scenario" by IPCC for the physical risk scenarios.

e) Short- to mid-term targets (with a term of three to fifteen years) **should** be set by referencing the aforesaid trajectories or on the pathway toward the long-term targets planned as benchmarks.

Consistency: ✓

In the "Roadmap toward Carbon Neutral" within the "JFE Group Environmental Vision for 2050," the company has set the 2050 Carbon Neutral Targets and its short-and medium-term targets of a reduction of more than 30% from the fiscal 2013 level by the end of fiscal 2030, and a reduction target of 18% from the fiscal 2013 level by the end of fiscal 2024. (On February 8, 2022, JFE Holdings announced its fiscal 2030 CO₂-reduction target.)

f) In doing so, since short- to mid-term targets will likely be set in consideration of various factors (including the starting point and track records of the issuer, timing of capital investments, economic rationality, cost-benefit analysis, and availability of technology necessary to achieve the targets), it is **possible** that the pathway may not necessarily be linear with the same slope at all times but may be nonlinear.

Consistency: ✓

Targets have been set taking into account a variety of factors in addition to a road map for decarbonization, such as investment plans and the resulting returns. As a result, it is assumed that it is not a linear path of the same slope.

g) The fundraiser **should** disclose the short- to mid-term and long-term targets they have set, including the base years etc.

Consistency: ✓

The target of reducing CO₂ emissions by 18% by fiscal 2024 and by 30% by fiscal 2030, which are the short- to and long-term targets, has been set as the base year for fiscal 2013. (On February 8, 2022, JFE Holdings announced its fiscal 2030 CO₂-reduction target.)

h) In order to show that long-term targets are science-based, disclosures **should** explain the methodology or trajectory used to define target, including the underlying reasons (e.g., characteristics specific to a region or industry). In particular, when reference is made to plans and industry roadmaps established by an industry, etc., the explanation **should** include that they are grounded in scientific basis.

Consistency: ✓

The Japan Iron and Steel Federation (JISF) conducts a scenario analysis based on the calculation of the assumed future per capita steel accumulation from the United Nations' World Population Prospects 2017 and its long-term global warming mitigation scenario of steel industry in its challenge to "Zero-Carbon Steel," the long-term vision for climate change mitigation of JISF.

i) It is **possible** that disclosures explain the pathway toward a long-term target and the alignment between the short- to mid-term targets on the pathway and the transition strategy, based on the investment plan (refer to Element 4) and other plans.

Consistency: ✓

Over the next four years, the company plans to invest JPY 160 billion in the steel business, JPY 130 billion in the engineering business, and JPY 50 billion in the trading business as a total of JPY 340 billion in GX investments (green transformation investments).

j) Concerning targets and trajectories, obtaining expert reviews on the following is **considered** to be particularly useful:

- Whether the long-term target is aligned with science-based targets
 - > Whether the disclosed information explains the alignment with the Paris Agreement
- Whether the short- to mid-term targets are determined using a GHG emissions forecast calculated based on a climate change scenario analysis
 - > Whether scenarios, etc. widely recognized in the international community are used or referenced
- Whether the actual values of the indicators used for the targets are quantitatively measured using consistent measurement methods

-> Whether a specific GHG emissions reduction measure has been developed to achieve short- to mid-term targets aligned with long-term goals

Consistency: ✓

JCR has confirmed that all of the above items have been met in this Report.

Element 4: Transparency of Implementation

a) In implementing transition strategies, the fundraiser **should** provide transparency of the basic investment plan to the extent practicable.

Consistency: ✓

Over the next four years, the company plans to invest JPY 160 billion in the steel business, JPY 130 billion in the engineering business, and JPY 50 billion in the trading business as a total of JPY 340 billion in GX investments (green transformation investments).

b) The investment plan includes not only capital expenditure (Capex) but also capital and operational expenditure (Opex). Therefore, costs related to research and development, M&A, and dismantling and removal of facilities are also subject to the investment plan. In other words, it is **recommended** that the investment plan incorporate, to the extent possible, expenditure and investment necessary for implementing the transition strategy.

Consistency: ✓

The investment plan includes not only capital investment but also research and development expenses, etc.

c) It is **recommended** that the investment plan outline the assumed climate-related outcomes and impacts in a quantitative fashion where possible, along with the calculation methods and prerequisites. If quantification is difficult, the use of external certification systems **can** be considered as a substitute for qualitative assessment.

Consistency: ✓

The Company plans to update the indicators and project summary on its website once a year for the expected outcomes and impact of the investment to the extent practicable. Quantitative indicators, such as CO₂ reductions, are used as much as possible for the indicators, and the impact of technological developments is scheduled to be reported when it becomes available for disclosure.

d) In particular, when outlining the assumed climate-related outcomes and impacts, it is **recommended** that the disclosure include not only GHG emission reduction and other initiatives to ease climate change but also report how consideration of a "just transition" is incorporated into the transition strategy.

Consistency: Not applicable

There are no points that require consideration for a just transition in JFE Holdings' implementation of the transition strategy.

e) If implementing the transition strategy has the potential of having a negative impact on employment or the environment and communities other than climate change, it is **recommended** that any expenditures to mitigate such negative impacts be added to the plan.

Consistency: ✓

There is no fear that the implementation of JFE Holdings' transition strategy will have a major impact on the current status of employment. In terms of the environment, appropriate measures have been taken, such as controlling air emissions, preventing water pollution, management of chemical substances and emission control, and biodiversity preservation.

f) Moreover, the outcomes arising from investments included in the investment plan **should** align with the targets.

Consistency: ✓

Efforts will be made to realize carbon neutrality by 2050 through an investment of 340 billion yen in GX investment (Green Transformation Investment), which is the current plan.

g) Transition finance is a means to financially support the implementation of a transition strategy, and it is **recommended** that financing be provided for new initiatives. However, in the case of transition finance in the format of Use of Proceeds instruments, refinancing for a reasonably set lookback period (the period during which refinancing is to be applied for projects that have already started) is **considered** to be eligible.

Consistency: ✓

The proceeds are expected to be used for new investments and refinancing with a lookback period of two years.

h) It is **recommended** that investment plans be disclosed by linking the outcomes and impacts with the expenditures to the extent practicable.

Consistency:

The amount of investment targets, outcomes and impact of this financing are tied together and disclosed in the framework. For the overall transition strategy, each investment target and the total amount of investment are clarified, but it is difficult to link the results and impact individually at this time, and therefore the information is not disclosed. It will be disclosed as soon as specific individual plans are finalized.

i) It is **recommended** that the fundraiser, after securing financing, reports any deviations between the initial plan and the actual expenditure, outcomes and impacts. For any deviations, it is **recommended** that the underlying reasons be explained.

Consistency: ✓

The difference between the original plan and the actual expenditures, results and impact of this financing will be disclosed in the impact reporting that is expected to be conducted periodically after the issuance of the bonds.

j) In cases where the Use of Proceeds bonds include refinancing, the fundraiser **should** provide an explanation on the lookback period set under the framework or other relevant methods along with the underlying reasons and factors.

Consistency: ✓

JFE Holdings disclosed in the framework that it plans to use the proceeds to refinance existing investments with a lookback period of two years and to fund new investments.

k) While there are differences in business practices, such as the fact that loans are traditionally made based on the bilateral relationship between a borrower and a lender, it is **recommended** that disclosure on the above be made to the extent possible in order to ensure transparency and credibility of transition finance. However, if it is difficult to disclose such information to the public from the standpoint of confidentiality and competition, it is **possible** to report such information only to lenders or external evaluation organizations without disclosing it to the public.

Consistency: Not applicable

Currently, the issuance of bonds is assumed.

l) Similarly, in cases where the fundraiser is a small-to-medium-sized enterprise and it is difficult to disclose to the public the same content as that reported to the financier or an external evaluation institution, it is **possible** for the fundraiser to simplify the content of disclosure, for example, by limiting disclosure to a summary of h) to j) of this section.

Consistency: Not applicable

Although it does not fall under the category of SMEs, it is under consideration to disclose the content of the report to the extent practicable by the project.