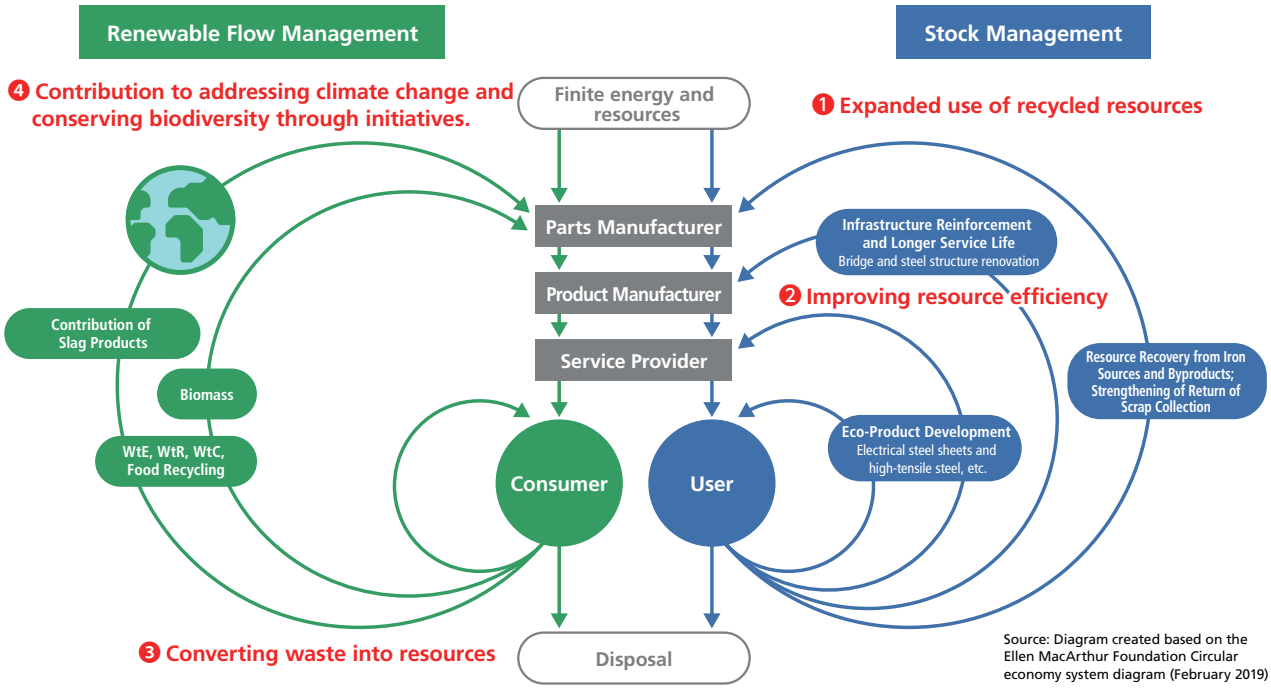
Initiatives to Transition to a Circular Economy

Basic Policy

The JFE Group views transition to a circular economy as indispensable for realizing a sustainable society, and we are taking action to shift the overall economic system of society from a conventional linear economy to a circular economy. In these efforts, we are using digital technologies and collaborating with government, municipalities, and customers throughout the value chain, extending beyond the Group's framework. We will focus on reducing resource use, improving resource-use efficiency, and reducing waste while also strengthening our activities from three perspectives: converting byproducts and waste into resources, developing eco-product/eco-solution technologies with high resource efficiency, and expanding the use and sales of recycled resources. These activities will also contribute to addressing environmental issues such as climate change and biodiversity conservation.

Circular Economy Concept and Initiatives



Source: Diagram created based on the Ellen MacArthur Foundation Circular economy system diagram (February 2019)

Iron is easily recovered, highly recyclable, and can be infinitely recycled as raw material for the same steel products. The JFE Group is also recovering and using steel scrap as well as developing initiatives for transitioning to a circular economy.

Our steel business is promoting the use of recycled resources by effectively using byproduct resources such as dust, sludge, and slag generated in the steelmaking process and using waste plastics as blast furnace raw materials. We are also improving resource efficiency by providing high-quality, high-performance steel products.

Our engineering business is delivering solutions for resource circulation by constructing plant and infrastructure facilities such as biomass fuel plants for food waste and sewage sludge, and waste-to-energy plants, as well as operating and managing these facilities on consignment. In addition, we are promoting a circular economy through recycling businesses for PET bottles and plastics, and energy supply businesses.

Our trading business is procuring environmentally sound materials such as biomass fuel by drawing upon our supply chain management network.

In addition, all of the JFE Group's major production sites in Japan, comprising seven JFE Steel sites and three JFE Engineering sites, have established water management plans and monitor water intake and discharge volumes and recycling volumes in order to manage water resources and reduce environmental impact. Since the steelmaking process consumes large volumes of fresh water for cooling and cleaning products and facilities, the efficient use of water resources, taking into account the impact on water sources and surrounding stakeholders, is a key issue. In response, we are reducing water intake by building systems to purify and recycle used water as much as possible at steelworks. We are also raising employee awareness of water conservation and continuously minimizing environmental impact through reduced and more efficient water use.

Furthermore, we place priority on maintaining a safe and sanitary water environment in the areas surrounding our manufacturing sites, implementing measures to protect water quality to have the least possible impact on local water resources, and actively preserving the living environment of local residents.

For details on the recycling businesses of JFE Steel and JFE Engineering, please see:

› **List of JFE Group Recycling Businesses in Japan** (https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/environment/resource/resource01.pdf)

Endorsing and Participating in External Initiatives

To accelerate the transition to a circular economy, JFE Holdings participates in the Japan Partnership for Circular Economy (J4CE), established by the Ministry of the Environment, the Ministry of Economy, Trade and Industry, and the Japan Business Federation. J4CE is a public-private platform through which companies, industry associations, municipalities, government agencies, and other organizations collaborate to foster understanding of the circular economy, share best practices, and promote collaboration among businesses.

Within the JFE Group, J&T Recycling Corporation, a member of the JFE Engineering Group, also participates in J4CE and is advancing initiatives to promote a circular economy, drawing on its expertise in waste treatment and resource circulation. Through its participation in J4CE, the JFE Group will apply its knowledge of domestic and international policy and technology trends and best practices related to resource circulation, communicate its recycling and resource-circulation initiatives, and contribute to building a recycling-oriented society through collaboration with diverse stakeholders.



› **Japan Partnership for Circular Economy** (https://j4ce.env.go.jp/en)

JFE Group Strategy for Transition to a Circular Economy

To accelerate the transition to a circular economy, we believe it is important to establish mechanisms that optimize resource circulation across society by linking arterial industries that supply materials and products with venous industries responsible for collection and recycling. This will require not only collaboration among companies but also the development of rules, infrastructure, and market conditions involving government agencies and municipalities. The JFE Group will advance initiatives to enhance resource circulation through dialogue and collaboration with relevant stakeholders.

The JFE Group also views the circular economy as more than merely an effort to reduce waste and use resources efficiently; it represents a growth opportunity for creating new value from recycled materials and circular resources. Expanding the use of recycled resources and enhancing their functionality will increase the environmental and GX value generated through resource circulation while contributing to the creation of sustainable materials and product markets.

In addition, amid rising geopolitical risks and growing demand for critical minerals, resource circulation is becoming increasingly important not only for addressing environmental issues but also from the perspective of economic security. By effectively using recycled resources and developing resource-circulation networks, the JFE Group will contribute to reducing dependence on natural resources and securing stable supplies of resources, thereby supporting the development of resilient social infrastructure.

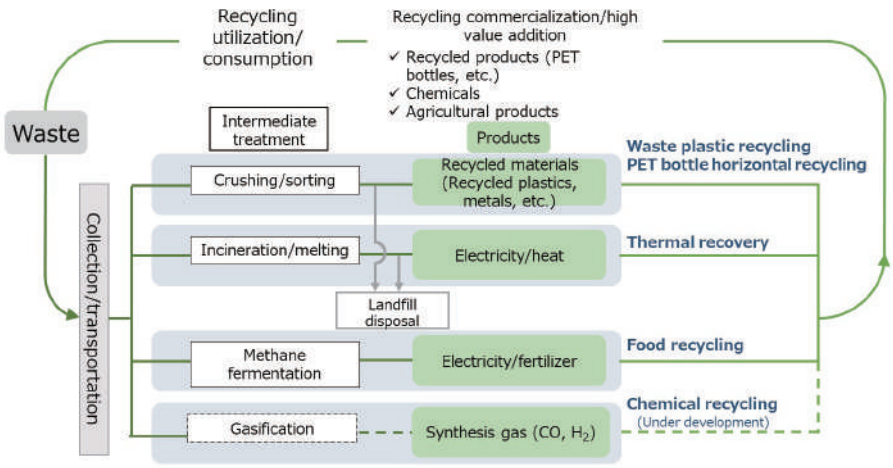
Conversion of Byproducts and Waste into Resources

The JFE Group incorporates the circular economy concept into its business activities to ensure the responsible use of limited resources, reduce environmental impact, and realize a sustainable society. In particular, we are reusing byproducts and waste as new resources as ways to circulate resources and minimize waste.

EN Building a Recycling Value Chain

As one of Japan's leading companies capable of providing one-stop solutions from the collection and transportation of waste to the intermediate treatment and recycling of recovered products, JFE Engineering is striving to establish a recycling value chain, including collaboration with partner companies and municipalities.

Recycling Value Chain



We are engaged in waste-plastic recycling, horizontal recycling of PET bottles, thermal recovery, food recycling, and chemical recycling.

We also support new regional power companies that locally produce and consume energy derived from waste, including electricity generated from waste-to-energy facilities and biogas power generation through food recycling (P. 72). For JFE Engineering, this is an important initiative for the circular economy as well as carbon neutrality.

EN Promoting Plastic Recycling

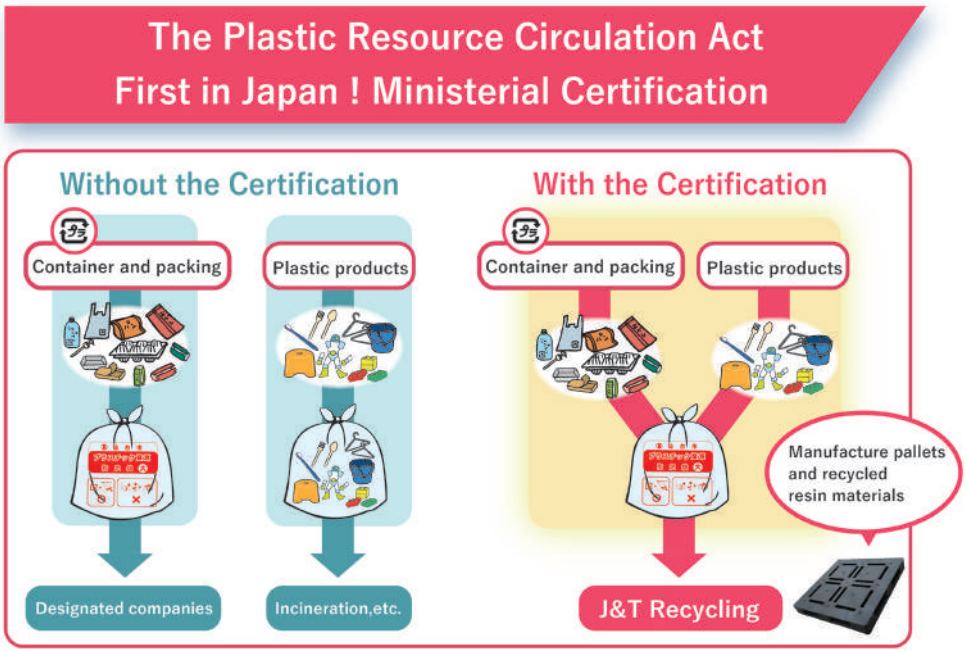
J&T Recycling Corporation joined the recycling plan formulated by Sendai City under the Plastic Resource Circulation Act in September 2022 and, for the first time in Japan, obtained certification from both the Minister of the Environment and the Minister of Economy, Trade and Industry. Following this, in April 2023, the company launched the integrated collection of plastic products. In Sendai, product plastics that had previously been incinerated can now be collected with plastic containers and packaging for more efficient recycling.

In July 2023, J&T Recycling Corporation and the JR East Group jointly established J Circular System Corporation in Kawasaki, Kanagawa Prefecture to promote plastic recycling in Japan. This facility, one of the largest in Japan, can process 200 tonnes of used plastics per day and is set up to handle the entire process, from sorting to recycling into new products. The plant began full-scale operation in April 2025 and can directly accept unsorted used plastics collected by municipalities and businesses. This makes it possible to recycle used plastics that had previously been incinerated because they were difficult to sort. The collected used plastics are subjected to advanced sorting and, depending on their characteristics, are recycled through material recycling or chemical recycling in collaboration with nearby recycling businesses, thereby enhancing resource circulation.

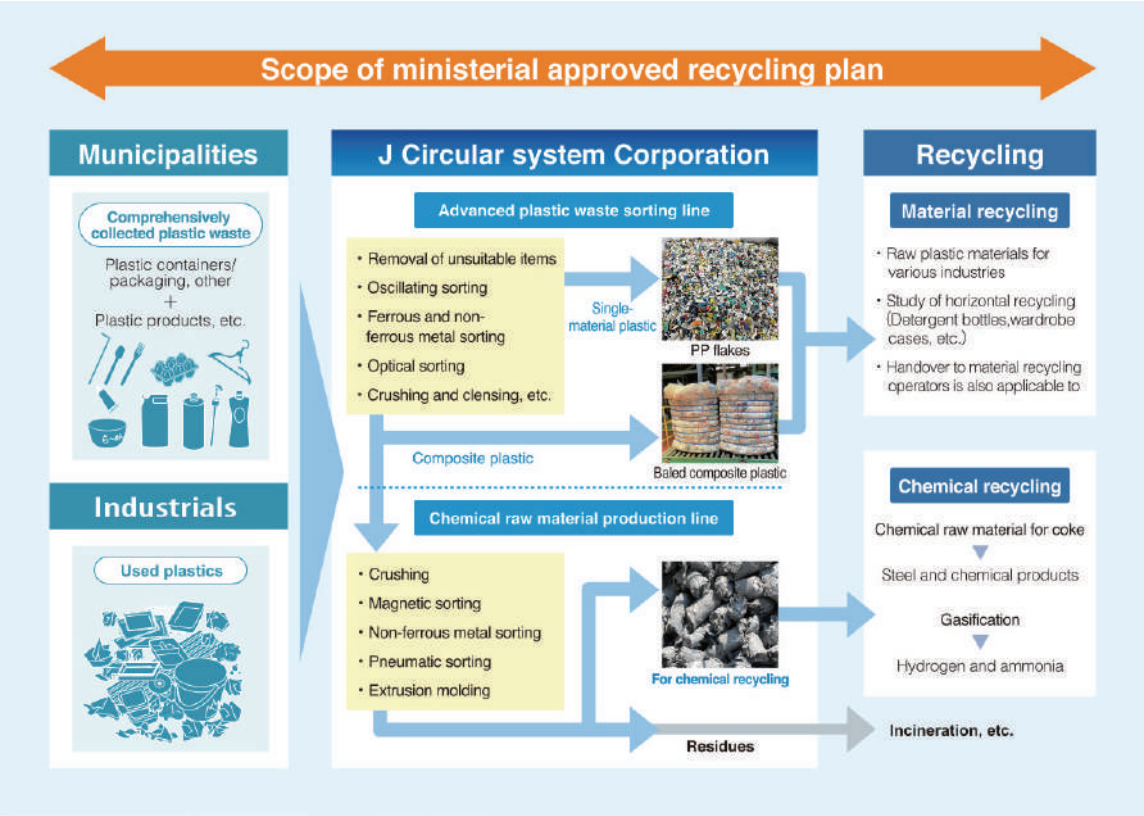
At present, recycling plans formulated under the Plastic Resource Circulation Act by Kawasaki City, Fujisawa City, Yokosuka City, and Ota Ward have received ministerial certification, and this is the first case in Japan where certification has been obtained through the collaboration of multiple municipalities and recycling businesses. With this certification, a large portion of the used plastics separated and collected as household waste from municipalities and citizens can now be recycled at this facility.

With its unprecedented recycling system, J Circular Systems aspires to become a forerunner in advanced plastic resource circulation and in promoting decarbonization while contributing to the realization of a sustainable, recycling-oriented society.

Ministerial Certification of the Recycling Plan in Sendai City



Scope of Municipal Recycling Plans Related to J Circular Systems





J Circular Systems Kawasaki Super Sorting Center

- **Japan's First! J&T Recycling Corporation Participates in Sendai City's Plastic Waste Recycling Project**
  (https://www.jt-kankyo.co.jp/en/topics/2022/10/20221003.html)
- **Full-Scale Operation Begins at J Circular Systems, One of Japan's Largest Plastic Recycling Facilities, Recycling Used Plastics from Residents of Three Municipalities in the Tokyo Metropolitan Area (Japanese only)**
  (https://www.jfe-eng.co.jp/news/2025/20250313.html)

EN Horizontal Recycling of PET Bottles

Kyoei J&T Recycling Corporation*1, a subsidiary of J&T Recycling Corporation, launched its flake manufacturing plant in October 2021 and completed its pellet production line in April 2022 to begin full-scale commercial operation. Its bottle-to-bottle (B-to-B) technology facilitates repeated recycling (closed-loop/horizontal recycling) an unlimited number of times, achieving a 63% reduction in CO_2 compared to the production of PET bottles from crude oil (calculated by Mitsubishi UFJ Research and Consulting Co., Ltd.), and was included as an example*2 of addressing resource and environmental constraints in the White Paper on Manufacturing Industries (Monozukuri) 2010, published by the Ministry of Economy, Trade and Industry.

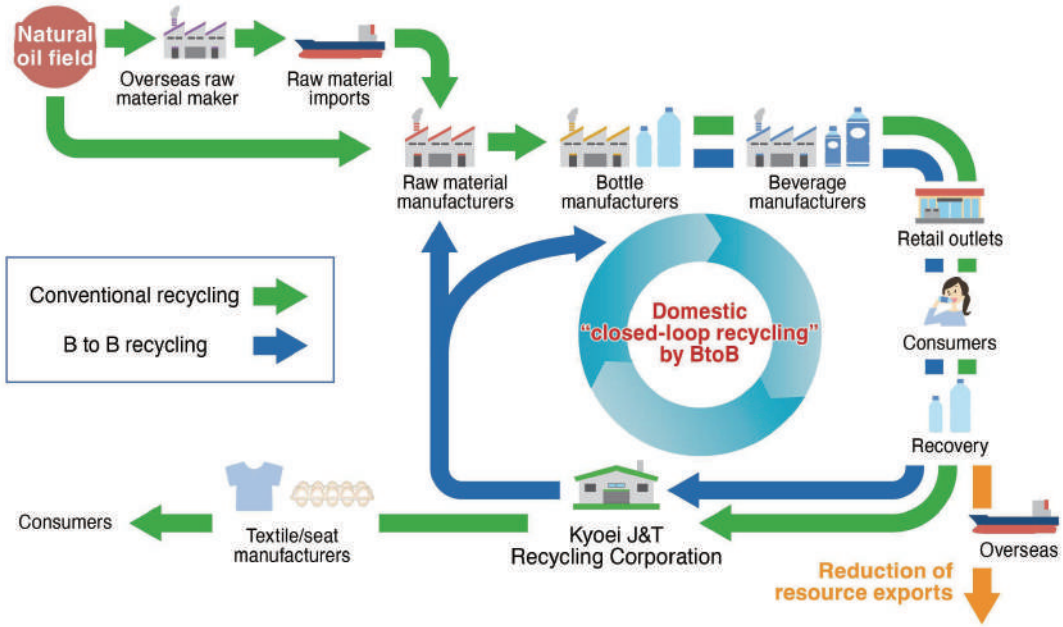
Beverage manufacturers and retailers are pursuing a variety of ways to boost the recycling rate of PET bottles (B-to-B). In response to these needs, the B-to-B business of Kyoei J&T Recycling significantly contributes to realizing a circular economy and reducing CO_2 emissions by curbing the use of natural resources.

*1 A joint venture of J&T Recycling Corporation and Kyoei Sangyo Co., Ltd.
*2 By Kyoei Sangyo Co., Ltd.



Exterior of the West Japan PET Bottle MR Center

Horizontal Recycling Flow of PET Bottles



> **Kyoei J&T Recycling Corporation's West Japan PET Bottle MR Center Begins Full Commercial Operations**
(https://www.jt-kankyo.co.jp/en/topics/2022/04/20220421.html)

> **Establishment of Joint Venture between J&T Recycling Corporation and Kyoei Sangyo Co., Ltd. — Construction of Japan's Largest PET Bottle Recycling Resin Plant Contributing to the Shift to B-to-B (Japanese only)**
(https://www.jfe-eng.co.jp/news/2020/20200507.html)

EN Construction and Operation of Waste-to-Energy Plants Overseas (Thermal Recovery)

JFE Engineering and the Thuan Thanh Environment Joint Stock Company*1 (TT) jointly established T&J Green Energy Company Limited (T&J) to conduct a waste-to-energy business in Bac Ninh Province, Vietnam.

After the establishment of T&J, JFE Engineering was responsible for plant design, construction, and operation, while TT handled the obtaining of permits and approvals, securing the plant site, collecting and transporting waste for incineration, and treating incineration ash. The waste-to-energy plant incinerates 500 tonnes per day of municipal and industrial waste and has a power output of 11.6 MW. Electricity generated, excluding power consumed on site, is sold to Vietnam Electricity Corporation under the feed-in tariff (FIT) system.

Funding for the construction and operation of the T&J plant was provided through the equipment subsidy program under the Japanese government's Joint Crediting Mechanism (JCM), together with loans from the International Finance Corporation (IFC) of the World Bank Group and the Finland–IFC Blended Finance for Climate Program.*2

This financing package was based on recognizing the project's proper waste treatment and an expected reduction of approximately 600,000 tonnes of GHG emissions over 15 years. The project was implemented in cooperation between the governments of Vietnam and Japan. Both companies plan to use this project as a starting point for launching similar efforts.

Drawing from the JFE Engineering Group's experience in the construction and operation of waste treatment plants, we will continue to contribute to the realization of a resource-recycling society by promoting business planning, construction, and operation in this field in Japan and overseas.

*1 A major recycling company in Vietnam is comprehensively engaged in waste incineration and other recycling businesses.
*2 Refinanced by a local bank at present.



Waste-to-energy facility in Bac Ninh Province, Vietnam

EN Recycling Food Waste

J&T Recycling Corporation aims to create locally produced and locally consumed resource-circulation systems and operates food recycling power generation businesses* at six locations nationwide.

Recycling rates tend to decline further downstream in food distribution. One reason is that food waste generated by downstream industries often contains foreign materials such as containers, disposable chopsticks, and toothpicks. The food-recycling systems promoted by J&T Recycling can process food waste containing such materials, which was previously considered difficult to recycle, thereby helping to raise the recycling rate of the industry as a whole.

The basic treatment flow is common to each plant: food waste is converted into methane through microbial action, and the resulting biogas is used as fuel to generate electricity with gas engines. We have used this system to establish two recycling loops, one for electricity and one for agriculture.

The electricity recycling loop returns electricity generated from food waste to waste generators. Under a power purchase agreement between waste generators and Urban Energy Corporation (UEC), JFE Engineering's electricity-retailing subsidiary, waste generators receive renewable energy equivalent to the electricity generated from their food waste. They can also use Soudenwari™, a service that provides a discount on electricity charges equivalent to the electricity generated based on the volume of waste accepted.

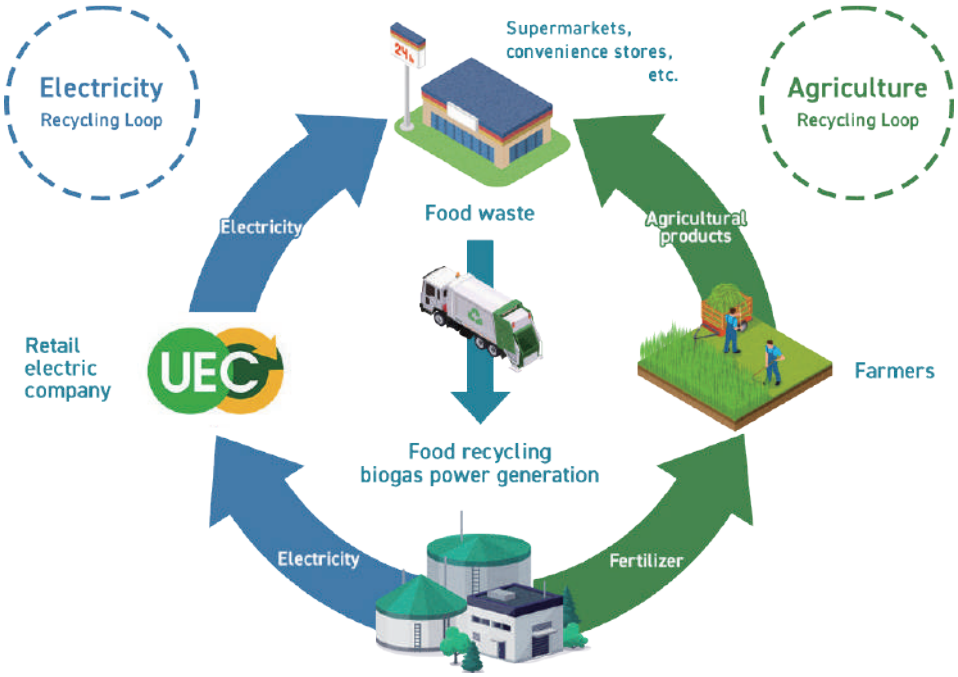
In the agricultural recycling loop, farmers use the residue generated during fermentation as fertilizer, and the crops grown with that fertilizer are in turn used by the waste generators. Food waste generated by those businesses is subsequently treated again by J&T Recycling, completing the cycle.

J&T Recycling aims to realize a Regional Circular and Ecological Sphere by promoting a double recycling loop that combines the electricity recycling and the agricultural recycling loops.

The JFE Engineering Group will continue to work with local communities to promote improved food recycling rates and local production and consumption of renewable energy, contributing to the realization of a recycling-based society.

› ***Food recycling business of the J&T Recycling Group** (https://www.jt-kankyo.co.jp/en/business/#sec03)

Double Recycling Loop: Creating Renewable Energy and Fertilizer from Food Waste





Food recycling power generation plant (J Bio Food Recycling)

EN Development of a Waste Chemical Recycling Technology (C-PhoeniX Process™) through the Use of the Green Innovation Fund

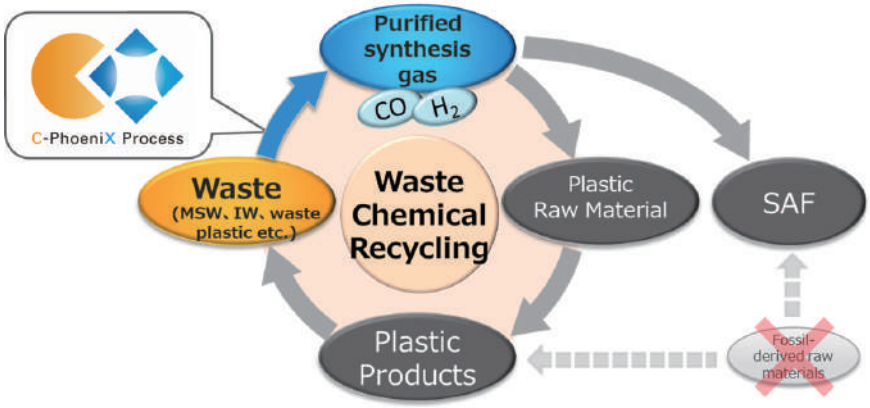
In February 2024, JFE Engineering was selected as an implementing organization for NEDO's Green Innovation Fund Project, "Achieving Carbon Neutrality in the Waste and Resource Circulation Sector."*1 Following more than two decades of trial and error, JFE Engineering established a technology to gasify a wide range of waste, including municipal waste. The company has the world's only long-term operational record for this technology. It is currently developing a new gasification technology, C-PhoeniX Process™ (or CX Process™), to further improve the technology toward achieving carbon neutrality. The C-PhoeniX Process™, based on the company's accumulated technological expertise, maintains the ability to process waste reliably while enhancing its capability to stably produce high-quality, purified synthesis gases, consisting primarily of hydrogen and carbon monoxide, from a wide range of waste materials. Once established, this technology will be applicable to the waste-to-chemical (WtC) process, enabling many types of waste to be recycled for different purposes, including the production of plastic, sustainable aviation fuel (SAF), and hydrogen.

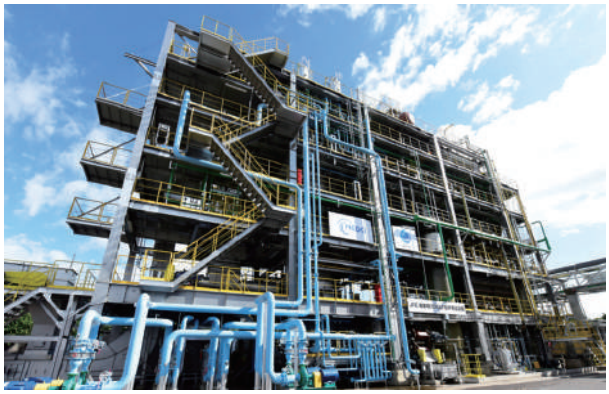
Under this Green Innovation Fund project, demonstration testing using a small-scale furnace (20 tonnes/day) began in December 2025,*2 and steady progress has been made with the new gasification technology. Building on the results of this demonstration, we plan to conduct a large-scale demonstration combining technology for producing purified synthesis gas from waste with technology for producing high-value-added chemicals from the gas. With government support, we will further accelerate development and social implementation of the entire WtC process in addition to the C-PhoeniX Process™. JFE Engineering aims to complete the development by FY2030 and deploy it in Japan as well as overseas, thereby contributing to the achievement of carbon neutrality by 2050.

› ***1 NEDO launches its Green Innovation Fund Projects to Achieve Carbon Neutrality in the Waste and Resource Circulation (Japanese only)** (https://www.nedo.go.jp/news/press/AA5_101724.html)

› ***2 Demonstration Testing Begins to Convert Waste into Chemical Feedstock Using an Innovative Gasification and Reforming Process** (https://green-innovation.nedo.go.jp/en/article/resource-circulation/)

Overview of Waste Chemical Recycling





Small-scale demonstration facility

› **Developing the Advanced Waste-to-Chemical Gasification Process, the "C-PhoeniX Process™" Towards Practical Use in Society** (https://www.jfe-eng.co.jp/en/news/2024/20240207.html)

ST Utilization of Byproducts Generated in the Steelmaking Process (Dust, Sludge, Slag)

JFE Steel carefully controls the generation and emission of iron and steelmaking slag (a co-product), iron dust from blast furnaces and converters, sludge from water treatment facilities, and other co-products by setting targets to improve recycling rates. Dust and sludge with high iron content are recycled as raw materials for steelmaking. Iron and steelmaking slag is effectively recycled for reuse in cement and other construction materials. The company is also promoting its use as environment recovery material such as Marine Stone™, which works effectively as a base for the adhesion of organisms and for improving the marine environment. As a result of these efforts, it achieved a 99.6% recycling rate for dust, sludge, and slag in FY2025, fulfilling the target of at least 99%, and it remains committed to consistently achieving the target.

For more quantitative data related to co-products, please refer to:
› **Environmental Data** (P. 273)

Contribution of Steel Slag Products

Many steel slag products are designated as specified procurement items (products that contribute to the reduction of environmental impact) for public works under the Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Act on Promoting Green Procurement), which came into force in 2001 to protect the natural environment.

To realize a circular economy, JFE Steel has set a target under the Eighth Medium-term Business Plan (FY2025–FY2027) for using a cumulative total of 320,000 tonnes of steel slag products for marine applications, in order to contribute further to the conservation of natural resources (sand and stone). We will further expand this effort. Actual usage was 78,000 tonnes in FY2025.

● Calcia Improvement Material

Calcia improvement material is a slag product that uses converter-type steelmaking slag as raw material and is manufactured by controlling the composition and adjusting particle size. Dredged soil mixed with calcia improvement material is called calcia improved soil, which is stronger than the original weak dredged soil and is therefore able to prevent dredged soil from dissipating into the surrounding area and having a negative environmental impact when placed in water. As a construction material for infrastructure development, it can be applied to landfill materials and other uses, enabling the effective use of dredged soil. Calcia improved soil has been used as material for a mid-section submerged breakwater*1 (Shin Honmoku Pier, Port of Yokohama), backfill material for earthquake-resistant quay walls (Fukuyama Port Minooki district quay wall construction project), and soil for bank protection (Tokyo new landfill site development project).

Calcia-improved soil can also be used for creating shallow waters and tidal flats and backfilling deep excavated holes, as a technology that can restore marine environments.*2

*1 An embankment built under the water surface on the inside of a perimeter wall to divide the land into sections for reclamation.

› ***2 Biodiversity Conservation and Nature Positive** (P. 154)

Calcia Improvement Material and Calcia Improved Soil





Example of calcia improvement soil application (landfill material)

Steel Slag Hydrated Matrix

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

There are many examples of blocks and artificial stones made from steel slag hydrated matrix being used as a substitute for concrete blocks and natural stones in harbor works, apart from the expected application for scour-prevention at the growing number of offshore wind-power stations to be constructed in the near future. In addition, we are conducting on-site monitoring in the Katsunan Central Zone of Chiba Port with the help of a local fishing association and have confirmed benefits for biodiversity.



Block made from Steel Slag Hydrated Matrix (wave-dissipating and foot protection block)

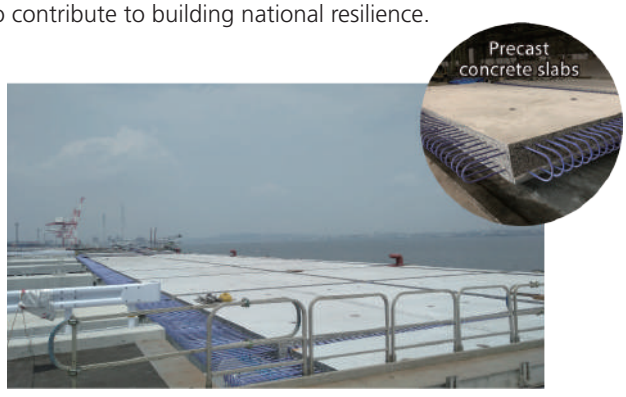


Artificial stones made from steel slag hydrated matrix

Precast Concrete Products Mixed with Blast Furnace Slag Fine Aggregate

Blast furnace slag fine aggregate, which hardens like cement, can be used in concrete. This type of concrete exhibits significantly higher durability under harsh conditions such as applications in sewers and exposure to anti-freeze agents. Its effectiveness in reducing environmental impact is widely understood, although there has recently been growing interest in its practical applications for concrete constructions that require higher durability.

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



Precast concrete slabs mixed with blast furnace slag fine aggregate installed in piers

Granulated Blast Furnace Slag

Granulated blast furnace slag, when ground to a fine powder and used to replace part of ordinary Portland cement, reduces the amount of limestone, crushed stone, and sand used, saves energy, and can also reduce CO_2 generated in cement production. For example, blast furnace cement made by replacing 45% of ordinary Portland cement with granulated blast furnace slag reduces CO_2 emissions per tonne of cement produced by 42%. In FY2025, JFE Steel supplied approximately 5.72 million tonnes of granulated blast furnace slag to cement production, equivalent to a reduction of about 4.05 million tonnes of CO_2 emissions.

CO_2 Emissions for Producing 1 Tonne of Cement (Unit: kg- CO_2/tonne)

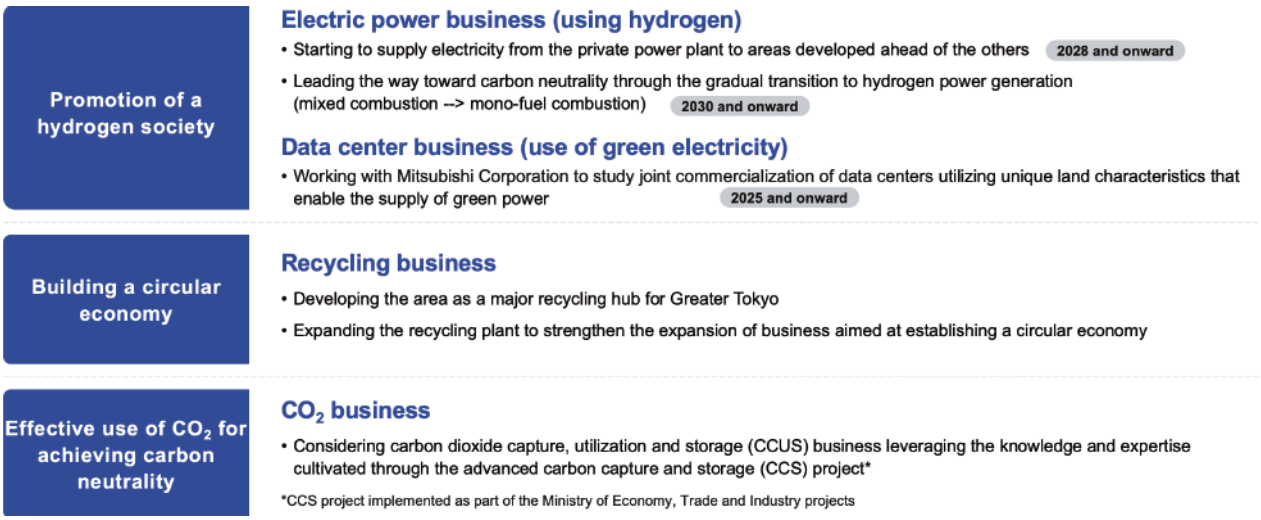
CO_2 Emissions Source	Ordinary Portland Cement	Blast Furnace Slag Cement
Limestone	476	270
Electricity/energy	283	170
Total	759	440

Source: Data published by the Japan Cement Association in 2022, and "Environmental Materials" published by the Nippon Slag Association

Initiatives for Realizing a Circular Economy in the Keihin Waterfront Area

Taking advantage of its proximity to Tokyo, the Mizue district is collaborating with Kawasaki City in expansion and development to create a major recycling hub for the metropolitan area. J&T Recycling Corporation, a group company of JFE Engineering, partnered with JR East and others to establish J Circular System Corporation in a pioneering project to construct the J Circular Systems Kawasaki Super Sorting Center as one of the largest plastic recycling facilities in Japan. Full-scale operations commenced in April 2025. Going forward, we will continue to promote businesses toward realizing a circular economy through the expansion and development of the recycling area.

Keihin District Land Business Utilization (from Materials of the Eighth Medium-term Business Plan)



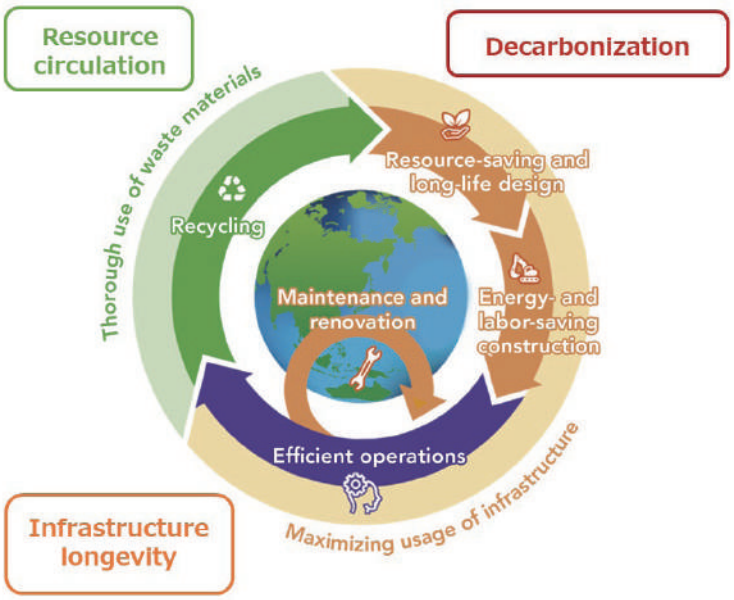
Development of Resource-Efficient Eco-Products and Eco-Solutions

The JFE Group is developing and providing resource-efficient products and services to support the realization of a circular economy. We are deploying eco-products designed from the perspective of the entire life cycle and eco-solutions that create circular value to reduce environmental impact and effectively use resources.

EN Infrastructure Reinforcement and Longer Service Life

JFE Engineering is leveraging its diverse business portfolio to promote multifaceted efforts for transitioning to a circular economy. In the infrastructure field, we are helping to realize a sustainable society through projects that maximize the useful life of infrastructure through resource-saving and long-life design, energy- and labor-saving construction, and efficient operation through maintenance and renovation.

JFE Engineering Circular Economy



Toward Realizing Bridges with Longer Service Life

Japan's stock of social infrastructure is expected to age rapidly in the coming years. At the same time, declining birth rates, an aging society, and population decline are reducing the available labor force, making it increasingly difficult to secure engineers for infrastructure maintenance. To address this, JFE Engineering is working to lessen the burden of maintenance by using highly durable materials to construct bridges with longer service life.

Technology Allowing for Bridges with Longer Service Life

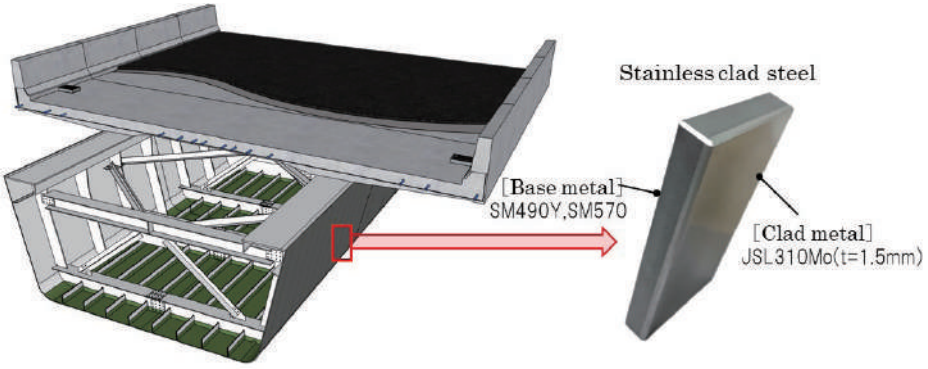
Conventional steel bridges suppress corrosion by using coatings such as paint that must be periodically reapplied. Using highly durable materials that do not need to be coated eliminates the need for reapplications, significantly reducing maintenance tasks associated with ordering, design, construction, and management. Moreover, these bridges demonstrate superior cost savings over a 100-year life cycle compared to painted bridges. We have thus pioneered the use of stainless clad steel for constructing a road bridge.

Stainless clad steel is a steel plate with a two-layer structure, combining ordinary steel (carbon steel) and stainless steel. Stainless steel is placed on the outer surface, which is susceptible to salt damage, while painted carbon steel (base material) is used on the inner surface, which is less susceptible to corrosion. A stainless clad steel bridge is more economical than bridges made entirely of stainless steel and more durable than those made entirely of carbon steel, thereby combining economy and durability.

The clad steel selected for this project uses JSL310Mo, a stainless steel with extremely high corrosion resistance, to extend service life. This seawater-resistant stainless steel was uniquely developed by JFE Steel as a material for clad steel, and JFE Engineering is a pioneer in fabrication and construction technology for steel structures using clad steel. This one-of-a-kind long-life bridge was possible through the combined strengths of the entire JFE Group.

The bridge is currently under construction as part of the replacement work for the Tedori River Bridge on the Hokuriku Expressway, commissioned by Central Nippon Expressway Company Limited.

Bridge Using Stainless Clad Steel



ST Contributing to Extending the Service Life of Steel Structures through FLExB™ Welding, Which Improves Fatigue Resistance

A new welding method developed by JFE Steel to improve the fatigue resistance of steel structures, FLExB™ Welding*1, has been adopted for the first time in the National Route 8 Miyukibashi Bridge Superstructure Widening Project of the Kinki Regional Development Bureau, being constructed by Komaihaltec Inc. FLExB™ Welding is registered with the Ministry of Land, Infrastructure, Transport and Tourism's New Technology Information System (NETIS) (CB-230007-A).

Steel structures used over long periods require lower maintenance and renewal costs as they age. Bridges in particular are repeatedly subjected to traffic loads from automobiles and other vehicles, creating a risk of fatigue damage in the form of fatigue cracks at welded joints. To address this issue, JFE Steel developed a new welding method that improves resistance to fatigue damage at welded joints in bridges and other steel structures. Applying the method to wrap-around welds, such as those on the short sides of gusset plates (reinforcing steel plates), where fatigue cracks tend to occur, improves durability against fatigue damage and contributes to extending structural service life.

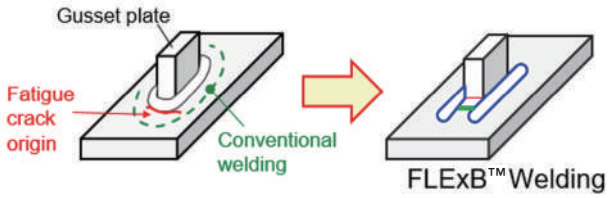
In this project, FLExB™ Welding was applied to gusset plates for lateral bracing*2, where improved fatigue strength is required in steel bridges. This eliminates post-welding surface-treatment processes that were conventionally required to improve fatigue strength and also contributes to lower construction costs.

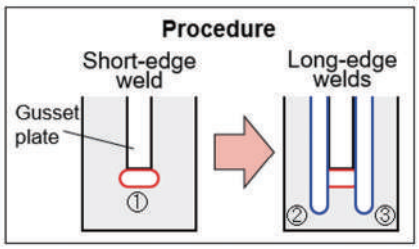
*1 Abbreviation for "fatigue life extended bead welding," a welding method designed to improve resistance to fatigue damage.

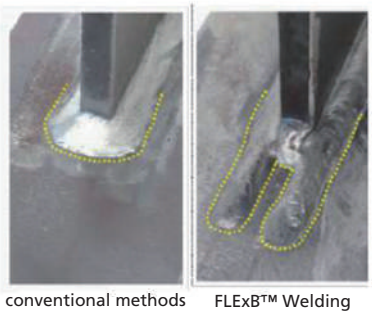
› **FLExB™ Welding Improves Fatigue Resistance of Steel Structures** (https://www.jfe-steel.co.jp/en/products/solution/plates/01-flexb.html)

› **Development of New "FLExB Welding" Method to Improve Fatigue Resistance of Steel Structures (Japanese only)** (https://www.jfe-steel.co.jp/release/2023/07/230724.html)

*2 A member arranged in a horizontal plane to connect main girders or main trusses and primarily resist lateral loads.







conventional methods FLExB™ Welding

ST Electrical Steel Sheets Contributing to Improved Resource-Use Efficiency

Electrical steel sheets* are popularly used as core materials for electrical equipment such as motors and transformers and therefore play a key role in determining their performance. JFE Steel contributes to global energy conservation and consequently to reducing CO_2 emissions by supplying high-performance electrical steel sheets.

*Electrical steel sheets are obtained by adding silicon to iron and are widely used as iron core materials in equipment such as motors and transformers.

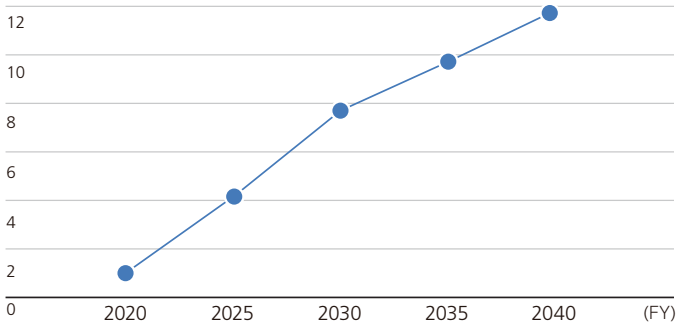
Expansion of Domestic Production Capacity for Non-Oriented Electrical Steel Sheets to Support an Electrified Society

Transitioning to a carbon-neutral society requires a major transformation of the social structure, from fossil-fuel-based energy to primarily carbon-free sources. Highly efficient motors, constructed from high-performance, non-oriented electrical steel sheets, will be essential for transitioning to a society in which mobility depends on electric vehicles (xEVs) and zero-emission electricity is the primary source of energy.

JFE Steel's high-grade non-oriented electrical steel sheets contribute to higher performance xEV drive motors through the improved efficiency of excellent low-iron-loss magnetic properties and reduced size made possible by high magnetic flux density. Recognizing the value of these characteristics has led many automobile manufacturers to incorporate these materials into their products, and demand for high-grade non-oriented electrical steel sheets is projected to expand going forward. To keep pace with this demand, Phase I expansion work to increase capacity for electrical steel sheet production at the West Japan Works (Kurashiki district) was completed as planned in July 2024, and line production began in September. The start-up of this facility has approximately doubled JFE Steel's production capacity for high-grade non-oriented electrical steel sheets (NO).

Demand for high-grade non-oriented electrical steel sheets essential for xEV drive motors is expected to increase further. Phase II expansion work is now underway. This plan is projected to triple production capacity for top-grade non-oriented electrical steel sheets for main xEV motors by FY2026 compared to pre-Phase I levels.

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



Expansion of Grain-Oriented Electrical Steel Sheet Production Capacity in India to Improve Resource Efficiency by Supporting High-Efficiency Transformers

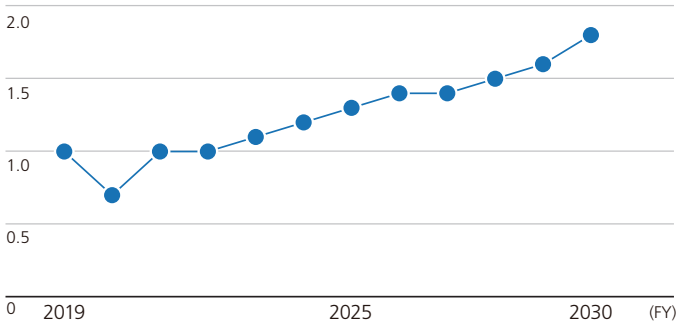
The global demand for grain-oriented electrical steel sheets in transformers is expected to increase due to continuously growing demand for electric power and the expanding adoption of renewable energy. The demand for these steel sheets, particularly in India, is expected to increase to 1.8 times the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

JFE Steel and its strategic alliance partner in India, JSW Steel Limited (JSW), have therefore decided to substantially expand the production capacity of JSW JFE Electrical Steel Private Limited (J2ES Vijayanagar), established in 2023 as a 50:50 joint venture for the manufacture and sale of grain-oriented electrical steel sheets, and JSW JFE Electrical Steel Nashik Private Limited (formerly thyssenkrupp Electrical Steel India Private Limited; J2ES Nashik).

In this expansion plan, we will double the manufacturing capacity of the J2ES Vijayanagar site from the initial plan to 100,000 tonnes per year and increase the current manufacturing capacity of the J2ES Nashik site fivefold, from 50,000 tonnes per year to 250,000 tonnes per year. The manufacturing capacity of the J2ES Vijayanagar site and the J2ES Nashik site will be significantly increased to a total of 350,000 tonnes per year. In India, which has the largest population in the world, the

demand for GOES is rapidly increasing due to rising power demand linked to economic growth, expansion of renewable energy use, improvements in transformer efficiency, and an increase in the number of data centers. The market is expected to expand substantially. The J2ES Vijayanagar site is scheduled to start full production during FY2027, as planned. The expansion of the J2ES Nashik site will be carried out gradually starting in FY2028, with completion expected in FY2030. Through this manufacturing capacity expansion, we will secure a dominant position as the number one GOES supplier in India.

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



Resource-Efficient Si-Gradient Magnetic Material Contributing to Energy Savings in Electrical Equipment

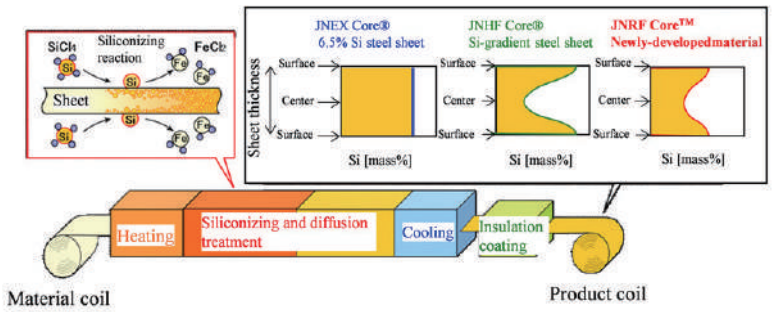
The recent trend toward increasing driving frequency due to the downsizing of electrical equipment has intensified the need to reduce iron loss* in the high-frequency range for electrical steel sheets, widely used as iron core material for electrical equipment such as motors and transformers. Meeting this demand depends upon increasing the concentration of silicon (Si), an element that strengthens electrical resistance. However, increasing concentration also causes magnetic flux density to decrease at the same time.

To overcome this, JFE Steel developed JNHF™, JNSF™, and JNRF™ using its proprietary chemical vapor deposition (CVD) continuous siliconizing process technology for controlling Si concentration distribution. These steel sheets offer low iron loss and high magnetic flux density in the high-frequency range, significantly contributing to higher efficiency and downsizing of electrical equipment. They are used as core materials for solar power reactors and high-speed motors.

In recognition of the positive social impact of this development, we received the 2022 Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology under the development category of the science and technology field. JFE Steel will continue to contribute to improving electrical equipment by raising efficiency, reducing size, and saving energy by providing high-performance, high-grade electrical steel sheets.

*The loss of energy, primarily as heat, that occurs when the iron core is excited by an alternating current. The lower the iron loss, the higher the efficiency of electrical equipment.

CVD Continuous Siliconizing Process and Si Concentration Distribution Control



› Received the 2022 Award for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology for the science and technology field (development category). (Japanese only)
(https://www.jfe-steel.co.jp/release/2022/04/220408.html)

SH Further Expanding the Global Supply Chain for the Electrical Steel Sheets Business

As global demand for electricity continues to grow, reducing power losses at each stage is essential for cutting CO_2 emissions. Motors used in power plants, factories, homes, and other settings account for 40% to 50% of global electricity consumption, while in Japan motors used in residential, commercial, and industrial applications account for approximately 55% of annual electricity consumption. It is estimated that improving motor efficiency in Japan by 1% would produce energy savings equivalent to the output of one large 1,000 MW-class power plant, making higher motor efficiency an important initiative for reducing CO_2 emissions.

JFE Shoji has established a global supply chain for electrical steel sheets used as core materials in motors and transformers. In addition to trading the materials, it has set up a system for adding value through processing tailored to customer needs. Most recently, it established a new motor-core processing base in Serbia to serve the energy-conscious European market, and the plant has begun operations. JFE Shoji's mission is to meet customer needs through its global supply chain, and it will continue contributing to reductions in CO_2 emissions by strengthening its supply network.



Exterior of the Electrical Steel Sheet Processing Plant in Serbia

ST Powder-Core Technology Contributing to Thinner, Lighter Motors with Complex Shapes and Improved Recyclability

In a joint project with JFE Techno-Research Corporation and ARMIS CORPORATION, a venture company launched by Shizuoka University, JFE Steel designed and prototyped a motor using Denjirou™, the company's insulated pure-iron powder, and demonstrated the feasibility of producing motors 48% thinner and 40% lighter than conventional models while maintaining the same output.

Demand continues to rise for smaller but higher-performing electric motors for industrial equipment and vehicles. Axial-gap motors, which are thinner than general radial-gap motors, can deliver high power (Figure 1). Unlike radial-gap motors, however, axial-gap motors pose a significant manufacturing challenge by requiring a three-dimensional magnetic core that cannot easily be made by laminating electrical steel sheets. In contrast, powder cores formed by pressing insulation-coated magnetic powder possess uniform three-dimensional magnetic properties, can accommodate complex shapes, and provide flexibility in design. Furthermore, because these cores are easily crushed, copper wire can be readily separated and recovered from motors, improving recyclability. Efforts are underway to remanufacture crushed powder cores by reforming them for reuse. JFE Steel has developed and launched the insulation-coated pure iron powder Denjirou™ for powder cores. In this project, an axial gap motor incorporating powder cores made with Denjirou™ was designed, prototyped, and evaluated for performance (Figure 2). The results showed a 48% reduction in height and a 40% reduction in weight, compared to conventional motors, at equal or greater efficiency (Table, Figure 3). Based on these results, JFE Steel and JFE Techno-Research Corporation have begun supporting customer design of components using powder cores while also supplying large powder compacts for machining and prototype powder cores processed into designed shapes to promote the use of powder cores for motors.

Going forward, JFE Steel will continue to develop products that meet customer needs while also encouraging technical exchanges, such as proposing the application of technologies and supporting prototype evaluation. These efforts will expand the supply of eco-products that contribute to a circular society and help realize a sustainable society.

Figure 1: Types of motors

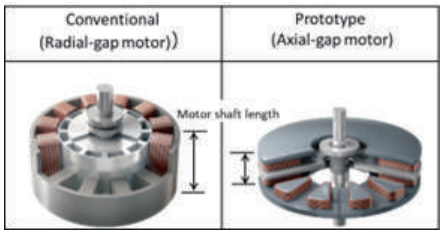
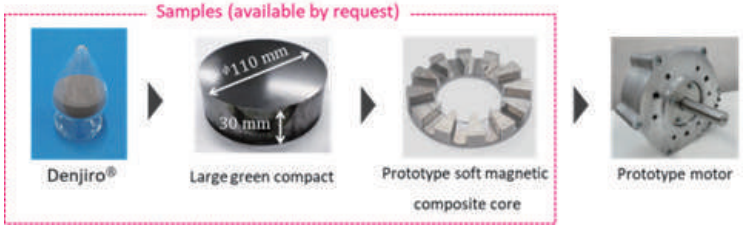


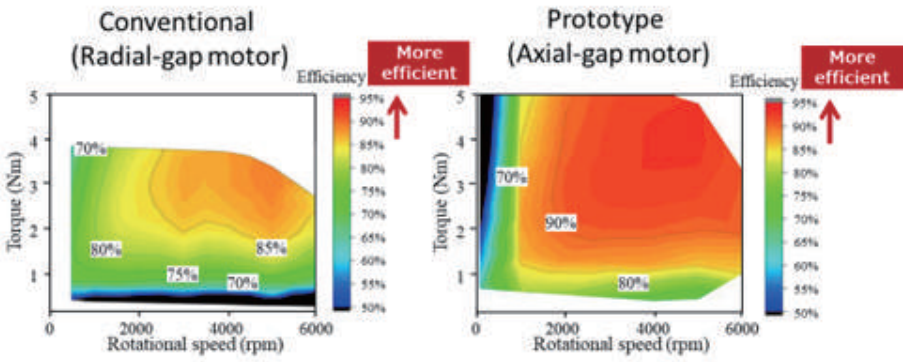
Figure 2: From powder to prototypes



Conventional vs. Prototype Motor (Test Results)

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

Figure 3: Efficiency of conventional vs. prototype motor



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

ST High-Tensile-Strength Steel Sheets (HITEN) for Automobiles, Contributing to Improved Resource Efficiency through Vehicle Weight Reduction

Applying high-tensile-strength steel sheets (HITEN) to automobile components helps reduce weight while maintaining crash safety performance. JFE Steel contributes to improved fuel efficiency and ultimately reducing CO_2 emissions by supplying customers with ultra-high-tensile-strength steel sheets that meet the need for lighter car bodies. In addition to developing and producing these steel sheets for automobiles, JFE Steel develops application technologies. These include techniques for applying body design and forming or assembly technologies, which have been systematized to offer comprehensive solutions as JESOLVA™ (JFE Excellent SOLution for Vehicle Application), JFE Steel's unique suite of application technologies for automotive steel sheets. To provide these solutions, JFE Steel is actively promoting early vendor involvement (EVI) activities, in which it collaborates with customers from the early stages of automobile development. By improving car body performance and reducing weight, JFE Steel is contributing to the development of next-generation automobiles and the realization of a sustainable society.

Expansion of Ultra-High-Tensile-Strength Steel Sheet Supply Capacity Supporting Wider Adoption of Lightweight, High-Strength Vehicle Bodies (Construction of a Hot-Dip Galvanizing Line at West Japan Works (Fukuyama District))

The automotive industry is producing lighter and stronger car bodies to meet increasingly stringent environmental regulations and collision safety standards around the world, and demand is expected to grow for ultra-high-tensile sheets* with excellent processability. JFE Steel has therefore decided to construct a new hot-dip galvanizing line (CGL) at the West Japan Works (Fukuyama district), with an annual production capacity of 360,000 tonnes. The investment will total approximately 70 billion yen, with operations scheduled to commence in October 2028. The new line will enable JFE Steel to increase its production capacity for such sheets, including its JEFORMA™ series, to meet growing demand in the foreseeable future and respond to subsequent needs for even higher strength and functionality.

*High-tensile-strength steel sheets with a tensile strength of ≥980 MPa (megapascals)

Development of Application Technologies (Press Forming Methods for Ultra-High-Tensile-Strength Steel Sheets) Contributing to Lightweight, High-Strength Vehicle Bodies

While contributing to vehicle weight reduction, ultra-high tensile steel sheets are susceptible to press wrinkles, die damage, and shape variation, and all these issues are more likely to occur with thinner, stronger steel sheets, a factor that has inhibited the wider application of ultra-high tensile steel sheets.

Ultra-high-tensile-strength steel sheets exhibit greater springback after forming than ordinary steel sheets, and mass-produced materials also tend to show greater variation in strength. The Stress Reverse Forming™ Method is designed to reduce variation in the scale of springback (or variation in dimensional accuracies), which increases as ultra-high tensile steel sheets have higher levels of strength. This method uses the Bauschinger Effect, or the mechanical phenomenon in which deformation stress in steel sheets decreases immediately after the direction of the deformation is reversed. The Wall Bending and Restrike Method provides a solution for reducing springback by applying stress that counteracts the stress causing springback, particularly through the optimization of the shape formed in the preceding press-forming stage. These methods are expected to contribute to the stable production of press-formed parts even when material strength varies.

When ultra-high-tensile-strength steel sheets are press-formed into curved component shapes, it is necessary to address both press wrinkles that form in curved areas during forming and springback, in which the material tends to return toward its original shape after forming. The inflow control method reduces wrinkles, particularly those occurring in flange areas, by optimizing material inflow across multiple press-forming processes.

In addition to providing materials, JFE Steel actively promotes early vendor involvement (EVI) activities, in which it collaborates with customers from the early stages of automobile development to offer solutions that enable customers to develop products and improve product performance. The company has developed and systematized a range of application technologies as JESOLVA™ (JFE Excellent SOLution for Vehicle Application), which is JFE Steel's unique suite of application technologies for automotive steel sheets, to offer comprehensive solutions. Going forward, JFE Steel will continue to support the expanded application of ultra-high-tensile-strength steel sheets in automotive components, improve vehicle-body performance, and reduce weight, thereby contributing to the realization of a sustainable society.

Welding Technologies for HITEN Supporting Improved Resource Efficiency (Ultra-High-Tensile-Strength Steel Sheet Welding Stabilization Technologies: "Intelligent Spot Welding Technology" and "LME Crack Suppression Welding Technology"*1)

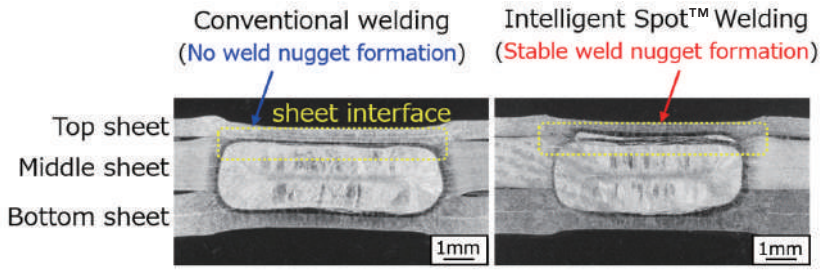
Spot welding technologies for automotive steel sheets developed by JFE Steel have now been adopted for components supplied to a Japanese automaker. JFE Steel provides a wide range of materials and application technologies to meet the increasingly advanced requirements of next-generation vehicle-body design.

Spot welding requires stable weld quality despite increasingly complex combinations of steel sheets, and customers have sought technologies that enable the use of more challenging sheet combinations and the wider use of HITEN. Through collaboration with customers, the following technologies have been adopted for vehicles for the Japanese market and production has begun. Intelligent Spot Welding Technology forms stable weld nuggets in stacks of three or more sheets with a large sheet-thickness ratio.*2 Conventionally, heat generation tended to concentrate on the thick-sheet side, making it difficult to form a sufficient weld between the thick and thin sheets. Two-stage control of the current pattern and electrode force stabilizes weld quality.

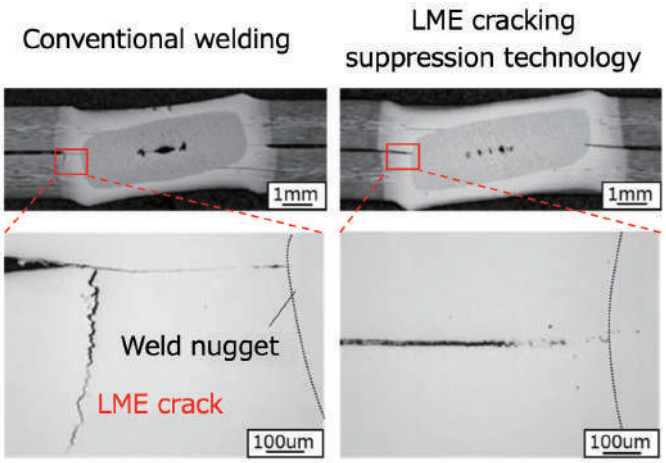
LME Crack Suppression Welding Technology suppresses LME cracking that can occur when welding high-strength coated steel sheets. JFE Steel developed a welding process that promotes cooling and solidification of the coating, thereby improving the stability of weld quality in ultra-high-tensile-strength steel sheets. Alongside the application of this technology, JFE Steel's ultra-high-tensile-strength steel sheets have begun to be adopted in domestically produced vehicle models. Application technologies, including Intelligent Spot Welding Technology and LME Crack Suppression Welding Technology, have been organized under the JESOLVA™ brand to provide comprehensive solutions.

*1 Abbreviation for "liquid metal embrittlement."
*2 Total sheet thickness divided by the thickness of the thinnest sheet. A larger value makes welding of the thin sheet less stable.

Intelligent Spot™ Welding



LME cracking suppression technology



Highly Formable HITEN "JEFORMA™" Contributing to Improved Resource Efficiency and Reduced CO_2 Emissions

JFE Steel has developed a 980 MPa-class highly formable galvannealed (GA) high-tensile-strength steel sheet with unprecedented formability and collision-energy absorption characteristics, contributing to vehicle weight reduction and improved crash safety.

In the automotive industry, demand for GA high-tensile-strength steel sheets is increasing to reduce vehicle weight for improved energy efficiency and lower CO_2 emissions during driving, while improving corrosion resistance to extend vehicle service life. However, as strength increases, these steel sheets tend to lose formability and to fracture in collisions, creating a need for improved press formability and sufficient collision-energy absorption.

To address these issues, JFE Steel developed a surface-control technology that utilizes silicon (Si), which is effective in improving steel-sheet ductility, by controlling the atmosphere inside the CGL furnace to retain Si as oxides within the steel sheet. In addition, JFE Steel achieved both high formability and excellent collision-energy absorption performance by applying proprietary heating and cooling heat-pattern control in the CGL annealing process.

The newly developed steel uses resources more efficiently by reducing vehicle weight and lowers CO_2 emissions by decreasing energy consumption during driving. Its excellent corrosion resistance also extends vehicle service life, reducing environmental impact across the entire life cycle. Expanded application is also expected in energy-absorbing components and components around batteries for electrified vehicles.

JFE Steel is expanding the JEFORMA™ series of highly formable high-tensile-strength steel sheets incorporating this technology while developing and proposing application technologies tailored to customer needs. Through these initiatives, we will realize lighter, higher-performance, safer, and longer-lasting automobiles and at the same time support the development of a circular society and the achievement of a carbon-neutral society.

This technology received the 72nd Okochi Memorial Technology Prize (FY2025) in recognition of its originality and contribution to industry.

> **Received the 72nd Okochi Memorial Technology Prize—Development of Highly Formable, High-Strength Galvannealed Steel Sheet Contributing to Automobile Weight Reduction— (Japanese only)** (https://www.jfe-steel.co.jp/release/2026/02/260218.html)

Cold-Press Forming Technology for Integrated Auto-Frame Component to Improve Resource Efficiency

As a component integration solution using ultra-high-tensile-strength steel sheets and cold-press forming, JFE Steel has developed a technology for reducing the number of components in automobile body structures, targeting the rear member*1.

Automakers have recently focused on, from the standpoint of improving productivity and reducing manufacturing costs, large-scale component integration technologies such as giga casting, which uses aluminum casting technology, and medium-scale integration technologies such as hot stamping, which involves heating steel prior to press forming and simultaneously cooling and quenching in the die to achieve both formability and component strength. This technology falls into the same category of component integration technologies.

Component integration by cold-pressing presents challenges in formability. However, by utilizing JESOLVA™, JFE Steel's unique systematized solution technology for automotive steel sheets, we have made it possible to form large components using ultra-high-tensile-strength steel sheets in grades up to 1,470 MPa. Furthermore, to integrate components with different strengths, we applied Tailor Welded Blank (TWB)*2 and our proprietary Cold Patchwork Method*3, enabling designs with strength variations within a single component. The result is a reduced number of components, even for small-scale integrations, thereby increasing productivity and reducing the cost of auto-frame production.

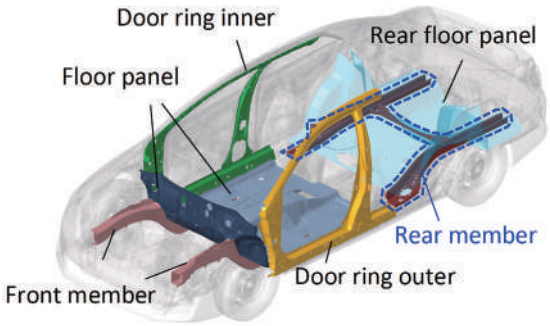
Challenges arise as integrated components become larger, such as higher logistics costs and greater burdens on end users when damage requires extensive repairs. Limiting integration to appropriate ranges using this technology ensures portability and reduces repair burdens.

The rear member is a large part that protects the body from rear collisions and is composed of 11 spot-welded components. With this technology, the number of components can be reduced to as few as three while maintaining rear collision performance, thereby improving productivity and reducing costs in automobile body manufacturing.

As part of these initiatives, JFE Steel exhibited for the first time at Automotive Engineering Exposition 2026 YOKOHAMA and Automotive Engineering Exposition 2026 NAGOYA. These comprehensive exhibitions feature cutting-edge mobility technologies, and JFE Steel primarily showcased products and technologies related to vehicle-body manufacturing.

*1 A structural component that supports a vehicle's rear suspension and drivetrain and connects them to the body
*2 A processing technology that uses laser welding to join steel sheets of different thicknesses and strengths into a single sheet
*3 A technology for stacking and spot-welding together steel sheets for simultaneous press forming

Cold-press integration target and rear member



Prototype rear member



ST Certification under the SuMPO Environmental Label Program SuMPO EPD

JFE Steel acquired SuMPO EPD certification for 36 product types under the SuMPO Environmental Label Program operated by the Sustainable Management Promotion Organization (SuMPO). These certifications cover three types of steel sheets for cans, nine flat steel products, nine construction steel products, three types of steel plates, four steel pipe products, and eight bar and wire rod products.

Environmental Product Declarations (EPDs) quantify environmental information for each product using the LCA (life cycle assessment) methodology under ISO 14044, and only product information that has passed third-party verification in accordance with ISO 14025 is disclosed as valid information on the EPD program website.

SuMPO EPD is an environmental label for quantitatively disclosing the environmental impact of products and services throughout their life cycle, from raw material procurement to disposal and recycling in accordance with ISO 14025:2006 (environmental labels and declarations, Type III Environmental Declarations, Principles and Procedures). The environmental impact of our products is presented as data to increase transparency. The disclosure of environmental impact data with fairness and reliability assured by third-party review and verification enables customers to quantitatively and objectively evaluate the environmental impact of the products they use.

Going forward, JFE Steel will actively promote the acquisition and publication of SuMPO EPD for its products.

› **SuMPO Environmental Labeling Program** (https://ecoleaf-label.jp/en/)

Expansion of the Use and Sales of Recycled Resources

The JFE Group is actively promoting the use of recycled resources to help realize a circular economy and is expanding its market application through products and services that leverage these materials. By combining resource efficiency with waste reduction, we contribute to reducing environmental impact and achieving sustainable growth.

SH Initiatives to Strengthen the Handling of Environmentally Beneficial Products

Our trading business has strengthened the handling of environmentally beneficial products by setting KPIs for the handling volume of fuels for biomass power plants and steel scrap. In FY2025, as part of expanding our lineup of environmentally beneficial products, we began handling aluminum and recycled zinc. We will continue advancing efforts toward realizing a circular economy.

Expanding Business in Biomass Fuels

JFE Shoji imports palm kernel shells (PKS) from Malaysia and Indonesia. We also source wood pellets from Southeast Asian countries to supply biomass fuel to power plants in Japan.

PKS and wood pellets are made from materials such as byproducts and wood residues generated during palm oil production and wood processing. Using these as fuel reduces waste and promotes effective resource use. These initiatives also contribute to realizing a circular economy. Using these as fuel reduces waste and promotes effective resource use. These initiatives also contribute to realizing a circular economy.

Since these biomass fuels absorb CO_2 during their growth process, they are regarded as carbon-neutral fuels, offsetting the CO_2 emitted when burned. Furthermore, replanting and recultivating the trees and crops used as raw materials after harvesting supports the development of a sustainable supply chain.

To promote carbon neutrality in power-generation fuels, JFE Shoji is also developing and supplying alternative biomass fuels toward reducing environmental impact and advancing the energy transition.



PKS



Wood pellets

Expansion of Scrap Trading to Support the Development of a Recycling-Oriented Society

JFE Shoji engages in a recycling business for steel and aluminum scrap. Demand for steel scrap is particularly expected to grow in Japan and overseas as the global community advances toward carbon neutrality. JFE Shoji will contribute to building a recycling-oriented society by increasing scrap recycling across the globe.

ST Initiatives to Expand Scrap Collection and Use

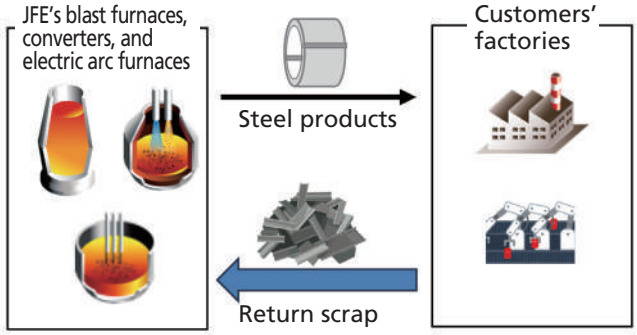
Steel is highly recyclable because it can be separated and collected using magnetic force. Its recycling rate of 93.7% is extremely high compared to other materials. In addition, many of the additive elements (alloys) contained in recovered steel scrap can be separated and removed during refining through gasification or oxidation, meaning that recycling is less likely to result in a decline in quality. This characteristic allows for closed-loop recycling, in which steel can be reborn repeatedly as high-quality, high-functionality products. This helps reduce consumption of newly extracted natural resources, emissions of environmentally harmful substances, and waste, thereby significantly contributing to reducing environmental impact across the entire life cycle.

Closed-Loop Recycling Concept



Source: The Japan Iron and Steel Federation

JFE Steel uses steel scrap as raw material in blast furnaces, converters, and electric arc furnaces. We have traditionally collected and used "return scrap," a term for scrap generated during production that is sold back by customers and Group factories. Under the Eighth Medium-term Business Plan, we have set a KPI for the expansion of this volume with associated action plans. For FY2026, we expect to achieve our target of increasing the volume of collected and used return scrap to 2.5 times the average during the Seventh Medium-term Business Plan period. By expanding the collection and use of scrap toward the realization of a circular society, we will also contribute to addressing climate change.



Resource Recovery and Recycling Targets and Results

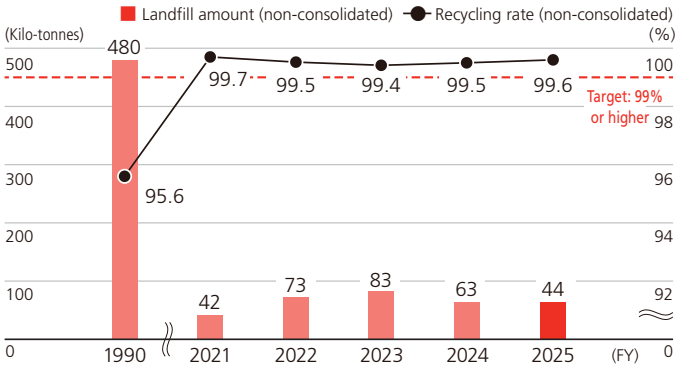
Recognizing that the efficient use of resources is a key environmental issue for the manufacturing industry, the JFE Group sets and manages progress against ambitious targets tailored to the respective business characteristics of Group companies. We will continue to pursue the following targets and advance initiatives that contribute to the transition to a circular economy.

The responsible use of water resources is also an important environmental concern for the manufacturing industry. Since the steel business consumes large volumes of water, we set ambitious targets for water recycling rates, manage progress, and strive to reduce water usage.

Targets and Results for FY2025 and Targets for FY2026

Operating Company	FY2025 Targets	FY2025 Results and Initiatives	FY2026 Targets
JFE Steel	Recycling rate of co-products: 99% or higher	Resource recovery rate: 99.6%	Continue efforts to prevent and reduce the generation of dust and sludge and recycle co-products, to maintain the recycling rate of co-products at 99% or higher
	Maintain efficient use of water Recirculated water usage rate: 90% or higher	Recirculated usage rate: 92.2%	Continue the water resource recycling effort to reduce water usage and maintain the recirculated usage rate at 90% or higher
JFE Engineering	Recycling rate at construction sites • Recycling rate of rubble: 99.5% or higher • Recycling rate of sludge: 95.0% or higher • Recycling rate of industrial waste: 85.0% or higher	Recycling rate at construction sites • Recycling rate of rubble: 97.7% • Recycling rate of sludge: 99.4% • Recycling rate of industrial waste: 66.8%	Recycling rate at construction sites • Recycling rate of rubble: 99.5% or higher • Recycling rate of sludge: 95.0% or higher • Recycling rate of industrial waste: 85.0% or higher
	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher	Recycling rate of office recyclable waste (Yokohama head office): 98.9%	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher
JFE Shoji	Global recycling of steel scrap • Scrap trade volume exceeds FY2020 level by 10%	From FY2020: –3% Overseas sales increased, but domestic sales decreased partly due to lower crude steel production, and the target was not achieved	Global recycling of steel scrap: +10% from FY2020 Strengthen domestic and overseas procurement networks and expand sales to JFE Group and domestic and overseas customers

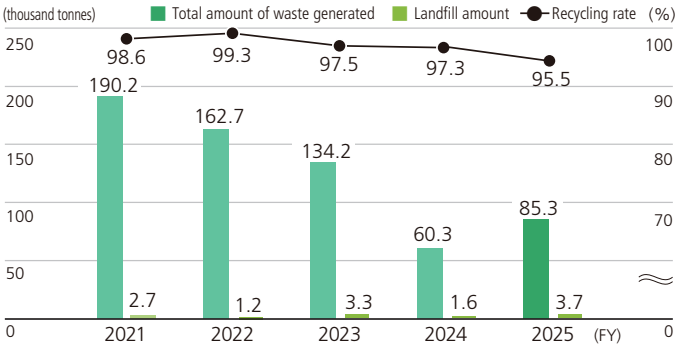
JFE Steel Landfill of Co-Products and Recycling Rates



		1990	2021	2022	2023	2024	2025	
Group companies*	Amount released	—	504	593	583	640	620	(Kilo-tonnes)
	Landfill amount	—	52	94	97	83	50	(Kilo-tonnes)

*Twenty-two JFE Steel consolidated subsidiaries in Japan

JFE Engineering Waste Generated at Construction Sites



For more quantitative data on industrial waste generated at the manufacturing plants, please refer to:

› **Environmental Data** (P. 273)

Efficient Use of Water Resources

The JFE Group recognizes water resources as important natural capital that supports its business activities. At the same time, issues surrounding water resources are becoming increasingly serious around the world due to such factors as advancing climate change, population growth, and expanding industrial activity, and companies are expected to use water resources sustainably.

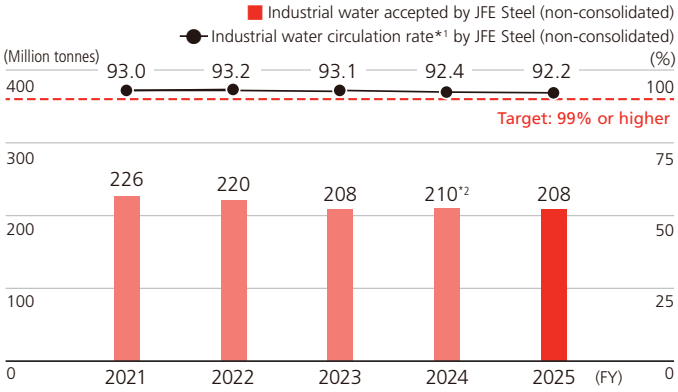
The JFE Group works to use water resources efficiently and conserve local water environments by reducing water intake in its business activities, promoting water recirculation, and appropriately managing water quality. We will also contribute to realizing a sustainable society while appropriately managing water-related risks and opportunities, taking into account their relationship with the transition to a circular economy and our efforts for conserving biodiversity and nature positivity.

Furthermore, we will continue to promote water-resource management tailored to the characteristics of each business, use water more efficiently, and reduce environmental impact, working toward the sustainable use of water resources.

ST Setting Targets for Water Recirculation and Implementing Them in the Steel Business

All of JFE Steel's seven production sites in Japan have developed water management plans and monitored water usage in seeking to increase the recirculation rate of water in order to reduce the volume of water intake and drainage and efficiently use water resources. The target water recycling rate at JFE Steel, which uses a large volume of water for cooling and other processes, is 90% or more, which is extremely high considering the amount evaporated when water is used. We are striving to improve the recycling rate by adopting purification processes such as biological and chemical wastewater treatments, and we have been successfully achieving the target. Our recycling rate of industrial water in FY2025 maintained a high level of 92.2%.

JFE Steel Industrial Water Accepted and Circulated



JFE Steel

Total amount	3,207	3,242	3,053	2,748*2	2,672	(Million tonnes)
Industrial water accepted	226	220	208	210	208	(Million tonnes)

Group companies*3

Total amount	235	233	207	226	218	(Million tonnes)
Industrial water accepted	19	18	16	16	17	(Million tonnes)

*1 Industrial water circulation rate (%) = (Total amount used – industrial water accepted) / total amount used × 100
*2 Figures have been revised retroactively
*3 Scope: Twenty-two JFE Steel consolidated subsidiaries in Japan

EN Efficient Use of Water Resources in the Engineering Business

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

For more on quantitative data related to water, please refer to:
› Environmental Data (P. 273)