

## Realizing a Recycling-Oriented Society

### Basic Policy

Economic growth in emerging countries is intensifying the need to conserve non-renewable resources. Iron can easily be separated and is thus highly recyclable. It can be recycled and reused to make other steel products infinite times (closed-loop recycling). The JFE Group is leveraging each Group company's strengths to enhance resource recycling through recycling co-products from iron and steelmaking, reducing waste at construction sites, and promoting the global recycling of steel scrap. We continue to pursue efficient uses of resources in both the production and product/service phases of its businesses, through steel scrap recycling, biomass fuel production and waste-to-energy power generation.

The JFE Group uses large quantities of fresh water for cooling and cleansing products and facilities in its core business of steel manufacturing. For this reason, the efficient use of water resources with due consideration to the source of the water and stakeholders in the area is a key challenge. In response, we have established a system for reducing water intake by maximizing the use of recycled water at our steelworks.

### System

The JFE Group Environmental Committee, chaired by the president of JFE Holdings and operating under the JFE Group Sustainability Council, sets goals for environmental protection, monitors the progress of these initiatives and works to improve the Group's overall environmental performance. Key issues for corporate management such as climate change are deliberated at the Group Management Strategy Committee as well and reported to the Board of Directors. The board oversees environmental challenges by discussing the reported material. Additionally, specialized committees set up by JFE Group operating companies and affiliates implement specific activities.

▶ [Framework for Environmental Management](#) (P.46)

### Targets and Results

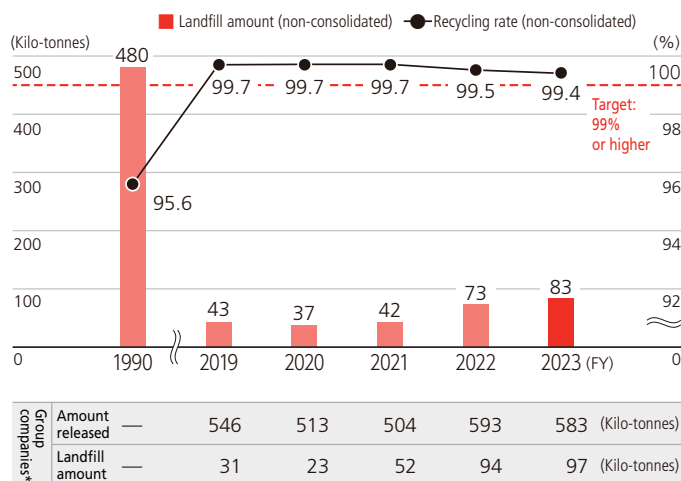
As we acknowledge that the efficient use of resources is a key environmental issue for manufacturers, we set high-level targets corresponding to the business of our Group companies and monitor the results. The Group companies have consistently fulfilled KPIs for material CSR issues every year up to FY2020 and established environmental practices. We continue to work on efficiently using resources toward the following high-level targets.

We also acknowledge the use of water resources as a key environmental issue for manufacturers. Because the JFE Group uses large quantities of water in its core business of steel manufacturing, the Group sets high goals for water resource recycling. We defined KPIs for material CSR issues and consistently met them every year up to FY2020. This effort helped us to establish environmental practices. We will maintain our efforts to reduce water consumption toward the following high-level targets.

■ Target and Result for FY2023 and Target for FY2024

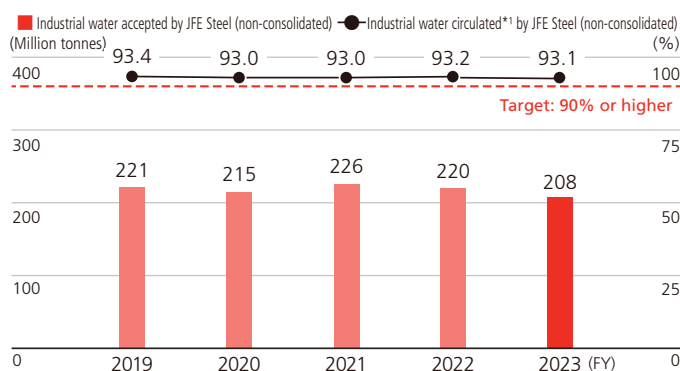
Operating Company	FY2023 Targets	FY2023 Results and Initiatives	FY2024 Targets
JFE Steel	Recycling rate of co-products: 99% or higher	Recycling rate: 99.4%	Continue efforts to prevent and reduce the generation of dust and sludge in the recycling of co-products, to maintain the recycling rate of co-products at 90% or higher
	Maintain efficient use of water Recirculated water usage rate: 90% or higher	Recirculated usage rate: 93.1%	Continue the water resource recycling effort to maintain the recirculated usage rate at 90% or higher
JFE Engineering	Recycling rate at construction sites <ul style="list-style-type: none"> <li>Recycling rate of rubble: 99.5% or higher</li> <li>Recycling rate of sludge: 95.0% or higher</li> <li>Recycling rate of industrial waste: 85.0% or higher</li> </ul>	Recycling rate at construction sites <ul style="list-style-type: none"> <li>Recycling rate of rubble: 97.8%</li> <li>Recycling rate of sludge: 99.3%</li> <li>Recycling rate of industrial waste: 87.1%</li> </ul>	Recycling rate at construction sites <ul style="list-style-type: none"> <li>Recycling rate of rubble: 99.5% or higher</li> <li>Recycling rate of sludge: 95.0% or higher</li> <li>Recycling rate of industrial waste: 85.0% or higher</li> </ul>
	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher	Recycling rate of office recyclable waste (Yokohama head office): 97.7%	Recycling rate of office recyclable waste (Yokohama head office): 98.0% or higher
JFE Shoji	Global recycling of steel scrap <ul style="list-style-type: none"> <li>Exceed FY2020 scrap trade volume (FY2024 target: +5% from FY2020)</li> </ul>	-5% from FY2020  While domestic trade volume increased, overseas sales decreased as a result of an overall decline in the export of scrap from Japan.	Global recycling of steel scrap: +5% from FY2020  Enhance domestic and overseas distribution network for scrap and increase the sales thereof to JFE Group companies and others that need it and outside the country toward achieving the target

■ Landfill of Co-Products and Recycling Rates



\*22 JFE Steel consolidated subsidiaries in Japan.

### Industrial Water Accepted/Circulated



#### JFE Steel

	2019	2020	2021	2022	2023	(Million tonnes)
Total amount	3,323	3,066	3,207	3,242	3,053	(Million tonnes)
Industrial water accepted	221	215	226	220	208	(Million tonnes)

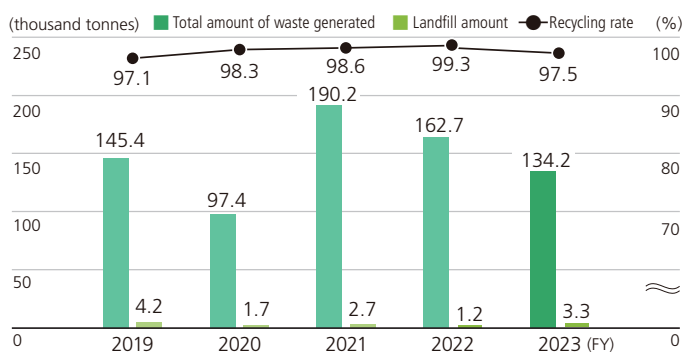
#### Group companies\*2

	2019	2020	2021	2022	2023	(Million tonnes)
Total amount	293	265	235	233	207	(Million tonnes)
Industrial water accepted	20	21	19	18	16	(Million tonnes)

\*1 Industrial water circulated (%) = (Total amount used – industrial water accepted)/total amount used ×100

\*2 22 JFE Steel consolidated subsidiaries in Japan.

### Waste Generated at Construction Sites



For more on waste generated at the steelworks, please refer to the following information.

▶ [Environmental Data](#) (P.235)

## Initiatives

### Resource Recycling Solutions

The JFE Group is involved in establishing a recycling-oriented society through a variety of initiatives. Steelworks promote the efficient use of raw materials, water, and other resources in the process of iron and steelmaking in addition to encouraging the application of recycled resources such as used plastics for blast furnaces. Moreover, we are striving to more efficiently use

co-products generated in the iron and steelmaking process through initiatives such as the international recycling of steel scrap. By leveraging the highly recyclable quality of steel, we are also developing product that contribute to addressing the issue of plastic waste.

In the engineering field, we produce biomass fuel from food waste and sewage sludge, constructing plants, and other infrastructures for Waste-to-energy power generation and offer resource recycling solutions by operating these facilities directly or under contract. In addition, we are pursuing a circular economy by developing PET bottles and a plastics recycling business as well as an energy supplying business.

For JFE Steel and JFE Engineering's recycling businesses, please refer to the following information.

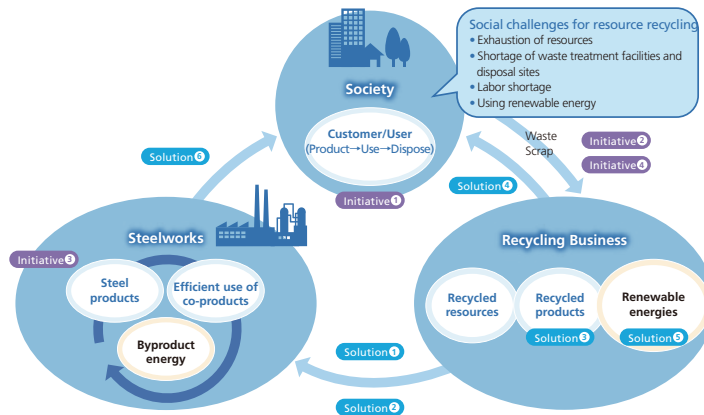
► **List of JFE Group's recycling businesses**

(<https://www.jfe-holdings.co.jp/en/common/pdf/sustainability/environment/resource/resource01.pdf>)

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

► **Development and Provision of Eco-Friendly Processes and Products (P.38)**

► **Stakeholder Engagement (P.135)**



### Initiatives for Resource Recycling Solutions

**Solution 1**  
**Promoting the use of recycled resources**

- Technology to inject plastic in blast furnaces

Accumulated amount recovered at JFE Bars & Shapes: 50 thousand tonnes!

**Solution 2**  
**Recycling resources**

- Recycling used batteries through an electric arc furnace to separate metals such as iron, manganese, and zinc

Accumulated amount recovered at JFE Bars & Shapes: 100 thousand tonnes!

**Solution 3**  
**Offering recycled products**

- Recycled plastic products such as pallets and NF boards

**Solution 4**  
**Recycling**

- Recycling fluorescent lights, batteries, home electronic appliances, etc. (treating hazardous materials for recycling)
- Recycling PET bottles to produce resins

Recycling fluorescent lights 14 million tubes!  
Recycling home electronic appliances 0.8 million units!

**Solution 5**  
**Using renewable energy sources**

- Waste power generation, biomass power generation
- Recycling food waste, biogas generation from sludge

**Solution 6**  
**Efficient use of co-products**

- For cement material, etc.

### Initiatives for Realizing a Recycling-oriented Society

**Initiative 1**  
**Improving the iron and steelmaking process**

In the iron and steelmaking process, promote the efficient use of raw materials and water resources, reduced generation and emission of co-products and reuse of co-products, and use of recycled resources and recycling of resources.

On-site recycling rate of industrial waste: 99%!

**Initiative 2**  
**Recycling/power generation business**

Engaging in a power generation business using heat and gas produced when treating wastes.

**Initiative 3**  
**Improving the iron and steelmaking process**

In the iron and steelmaking process, promote the efficient use of raw materials and water resources, reduced generation and emission of co-products and reuse of co-products, and use of recycled resources and recycling of resources.

Water recycling rate: 93%!  
Rate of efficient use of co-products: 99%!

**Initiative 4**  
**Global circulation of scrap**

Contributing to the expansion of a recycling-oriented society at a global scale by efficiently recovering and transporting iron scrap.

**Shared Initiatives**

**Develop resource recycling technologies and products**

Develop technologies and products that efficiently use co-products generated in the Group's production process as well as wastes generated during social activities.

**Collaboration with administrative entities**

Established a new local-based power company in collaboration with an administration to promote local generation and local consumption of electricity through waste power generation, etc.

**JFE Steel**

## Reducing Generation and Emission of Co-Products and Reusing Co-Products

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, the company accomplished a 99.4% recycling rate for slag, dust, and sludge in FY2023, fulfilling the target of 90% or higher, and it is committed to consistently achieving the target.

For more quantitative data related to co-products, please refer to the following information.

▶ [Environmental Data](#) (P.235)

**JFE Engineering**

## Promoting Recycling

Most of JFE Engineering's waste is either rubble and sludge discharged from construction sites or industrial waste discharged by the Tsurumi and Tsu works and the Kasaoka monopile manufacturing plant. The company is seeking to reduce industrial waste while also resource recycling through various measures, such as setting environmental goals for recycling rates and properly separating waste on-site before sending it to disposal companies known for achieving high recycling rates. It also complies with the Plastics Resource Circulation Act, enforced in Japan in April 2022, by including initiatives for plastics recycling in its environmental target.

The Yokohama head office sets target recycling rates for office recyclable waste and maintains its efforts to reduce waste (encouraging double-sided copying), reuse (setting up collection boxes for plastic folders and plastic business card cases and recovering label printer cartridges), and recycle (thoroughly separating waste). The JFE Engineering Group is also helping to realize a recycling-oriented society through its PET bottle and food waste recycling initiatives.

For more on waste generated at the steelworks, please refer to the following information.

▶ [Environmental Data](#) (P.235)

## Efficient Use of Water Resources

**JFE Steel**

### Goal-Setting for Recycling Use of Water

All of JFE Steel's seven production sites in Japan developed a water management plan 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 FY2023 maintained a high level of 93.1%.

**JFE Engineering**

### Efficient Use of Water Resources

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 the following information.

▶ [Environmental Data](#) (P.235)

## Key Initiatives in FY2023

JFE Steel

### Reducing Plastic Waste by Manufacturing Cups from Highly Recyclable Steel

Under the logo Steelish™, a combination of “steel” and “stylish,” JFE Steel is engaged in an initiative to expand the use of stylish, recyclable steel products that would introduce a change in daily lifestyles and help propel the global effort to tackle plastic pollution. For instance, JFE Steel proposes single-use steel cups as an alternative to disposable plastic cups. Steel cups are light and sturdy, with a thin rim that feels smooth against the lips, and they are able to keep drinks hot or cold for a long time, as well as being infinitely recyclable into other steel items and easier to recycle than plastic.

To this end, JFE Steel in 2021 launched the project BETTER RECYCLE Shonan and has since been involving customers in the development of disposable steel cups, the first time the company has adopted this approach. The project team, made up of members from IBLC Co., Ltd. and Shonan Style (a magazine published by EDITORS, Inc.) as well as JFE Steel, sought advice and cooperation from local governments and plastic disposable suppliers in the Shonan area and created a prototype for an eco-friendly disposable steel cup. The prototype and the Steelish™ initiative were presented at Carnival Shonan 2022, an event held at the Kanagawa Municipal Tsujido Kaihin Park in November 2022 to explore turning the Shonan beaches into the first zero-waste beaches in Japan.

In March 2023, steel cups were used at Nakame Challenge Cup 2023, an event hosted by Asahi YOU. US, Ltd. and the Nakame Area Management Association to eliminate disposable plastic bottles discarded by people viewing cherry blossoms in Nakameguro and raise awareness of plastic pollution, food loss, and other sustainability issues.

JFE Steel is committed to playing its part in fostering public awareness about climate change and plastic pollution issues and to achieving the SDGs by developing steel solutions that meet the needs of customers and society as a whole.



The Steelish™ logo



The recyclable steel cup

- ▶ [Website on recyclable steel cups \(Japanese Only\)](https://www.jfe-steel.co.jp/products/can/use/scene09.html) (https://www.jfe-steel.co.jp/products/can/use/scene09.html)
- ▶ [BETTER RECYCLE Shonan \(Japanese Only\)](https://www.jfe-steel.co.jp/products/can/pr/better_recycle_shonan.html) (https://www.jfe-steel.co.jp/products/can/pr/better\_recycle\_shonan.html)

## Products and Technologies (Realizing a Recycling-Oriented Society)

The JFE Group is determined to both efficiently use resources in its business activities and deliver products and technologies that will help realize a recycling-oriented society.

Apart from eco-friendly products and processes designed to reduce environmental impact, the steel business is developing technologies and products for the efficient use of co-products from manufacturing processes and waste from social activities. The engineering business is conducting research and development for new technologies and eagerly advancing its Waste-to-energy power generation and plastic recycling projects.

For more on products and technologies aimed at realizing a recycle-oriented society, please refer to the following information.

▶ [Development and Provision of Eco-Friendly Processes and Products](#) (P.135)