JFE Group CSR Report 2018
(Revised Version)

February 2019

Corporate Planning Department

JFE Holdings, Inc.

The following three topics have been added to the JFE Group CSR Report 2018, which was made available online in September 2018 and in printed version in October 2018:

1. Long-Term Vision for Climate-Change Mitigation
2. Goals and Progress of Our Environmental Protection Initiatives
3. Raw Materials Purchasing Policy

1. Long-Term Vision for Climate Change Mitigation

As previously disclosed, JFE Steel Corporation, a steel producer in the JFE Group, is participating in the Commitment to a Low Carbon Society initiatives of the Japan Iron and Steel Federation (JISF) to help mitigate climate change through 2030. The initiatives focus on the three “Ecos” (eco-process, eco-product, and eco-solution) and the development of revolutionary steelmaking processes, such as ferro coke and COURSE50.

JISF, after extensively discussing and reviewing steel industry practices, developed a long-term vision for climate-change mitigation over the long term, beyond 2030. Details of the vision are described below.

Medium term (to 2030)

- Promote and expand three Ecos initiatives
- Develop and implement innovative steelmaking processes

Long term (to 2050)

- Widely adopt innovative steelmaking processes
- Develop super-innovative technologies (including steelmaking processes and CCS/CCU)

Final (to 2100): Zero Carbon Steel

- Apply super-innovative technologies

Innovative steelmaking processes
1. Ferro coke
2. Hydrogen-reduction process in blast furnaces*
3. CO_2 separation and capture technology*

COURSE50 core technologies.

Super-innovative steelmaking processes
4. Hydrogen-reduction process in blast furnaces with external hydrogen (Super COURSE50)
5. Hydrogen-reduction process without using blast furnaces

CCS/CCU
6. Carbon dioxide capture and storage (CCS): separate and capture CO_2
7. Carbon dioxide capture and utilization (CCU): reuse CO_2 as a valuable resource

JFE Steel played a pivotal role in the development of the JISF long-term vision for climate-change mitigation. To help achieve the Paris Agreement's long-term goal of holding the average global temperature rise well below 2°C, the company continues to develop and adopt new technologies and remains committed to playing its part in mitigating climate change.

Table: Required Technologies and JFE Steel Products and Technologies

Required Technologies		Description	JFE Steel Products and Technologies (examples)
Three Ecos	Eco Process	Improve energy efficiency by taking full advantage of cutting-edge technologies	Radiant tube burners with effluent gas recirculation; two-stage jet burner for igniting sintering furnace; Super-SINTER® / Super-SINTER® OXY; AI; high-efficiency power generation
	Eco Solution	Reduce CO_2 emissions in developing countries through transfer and application of Japan’s world-leading, energy-saving process technologies	Basic oxygen furnace OG gas; sensible heat recovery technology; state-of-the-art energy-saving technologies
	Eco Product	Provide high-performance steel products for high-performance that reduce CO_2 emissions.	1.5 GPa-grade cold-rolled steel plate for automobiles; JNP™ Series Electrical Steel Sheet; crack arrest technology; slag products; materials for hydrogen stations and lid pressure vessels
Innovative steelmaking processes	Ferro Coke	Add metallic iron to coke as a raw material for blast furnaces to significantly reduce CO_2 emissions and save energy	Following production tests at 30t/d pilot plant in Keihin district and blast furnace test demonstrations, 300t/d midsized facilities now being built in Fukuyama
	COURSE50	Adopt blast furnace reaction processes that use hydrogen generated from coke-making process, CO_2 separation and capture technology	CO_2 separation and capture tests completed at pressure swing absorption (PSA) bench plant in Fukuyama
Super-innovative technologies	Super COURSE50	Reduce iron ore in blast furnaces using hydrogen generated from coke and external hydrogen.	Contribute to development of super-innovative technologies based on knowhow obtained from developing innovative steelmaking processes
	Hydrogen-reduction steelmaking	Non-blast furnace hydrogen reduction processes (use hydrogen in place of conventional coke-reducing agent to generate H_2O instead of CO_2)	
	CCS/CCU	Separate and capture CO_2, and reuse CO_2 as a valuable resource	

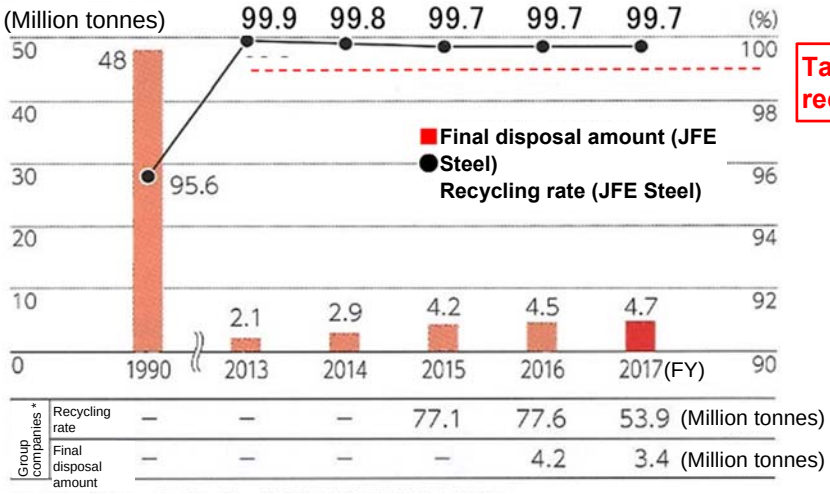
2. Goals and Progress of Our Environmental Protection Initiatives

JFE Steel has carried out a range of initiatives to achieve its targets for reducing environmental pollutants and using resources effectively. Previously, the company announced the results of its environmental-protection initiatives but this time, JFE Steel will disclose the targets as shown below.

Final Disposal Amount of Byproducts and Recycling Rates

JFE Steel carefully controls the occurrence and output of iron and steelmaking slag (steelmaking byproducts), iron dust from blast furnaces and converters, sludge from water treatment facilities and other byproducts, aiming to achieve a 99% or higher recycling rate. Dust and sludge with high iron content are fully recycled as raw materials for steelmaking. Iron and steelmaking slag is effectively recycled for reuse in cement and other construction materials and new applications as an environmental material (e.g. Marine Stones®, which provides a highly effective foundation for nurturing and growing sea organisms such as algae to facilitate the natural cleansing of seabeds and seawater) are being promoted. As a result of such efforts, the company achieved a 99.7% recycling rate for slag, dust and sludge in FY2017 and has continued to achieve a 99% or higher target recycling rate.

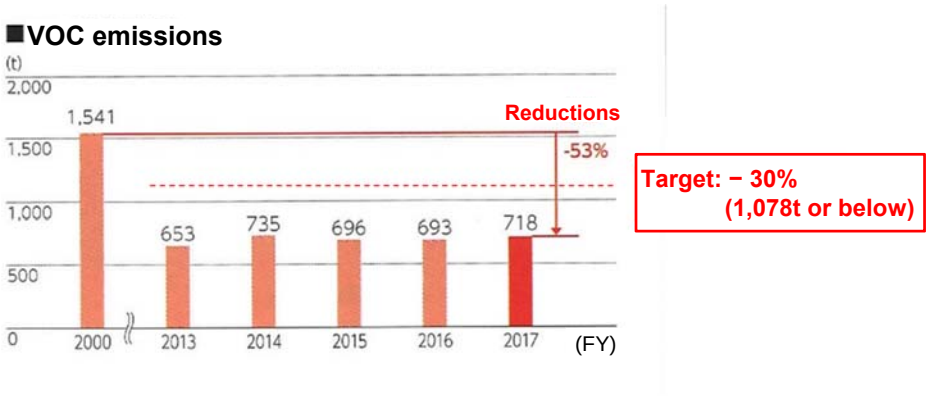
■Final Disposal Amount of Byproducts and Recycling Rates



* 25 JFE Steel consolidated subsidiaries in Japan

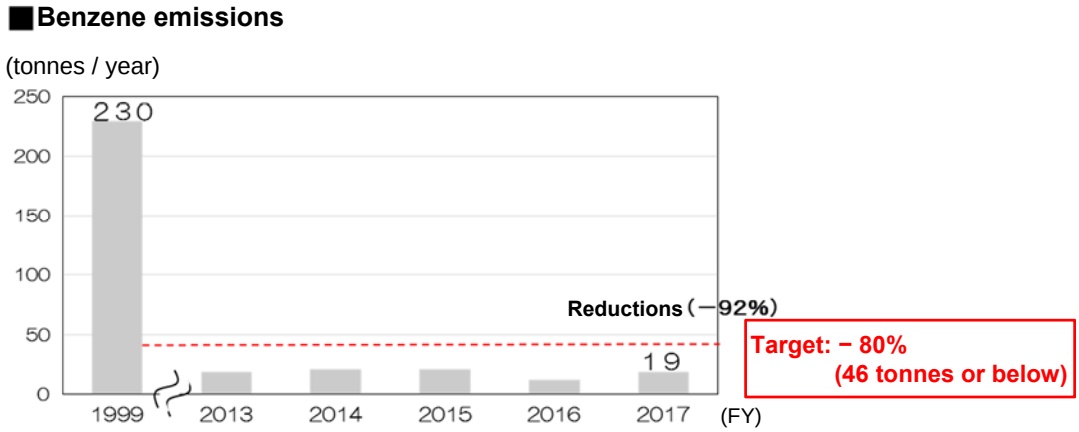
Volatile Organic Compound (VOC) emissions

In response to a voluntary action plan formulated by the Japan Iron and Steel Federation to reduce VOC emissions by 30% below FY2000 levels as of FY2010, JFE Steel has pursued efforts to reduce its VOC emissions to 1,078t or below per annum. Actual reductions were significantly better than the levels targeted for FY2020, resulting in VOC emissions reduction of more than 50%. Follow-up efforts are being implemented to prevent any increase in emissions.



Benzene emissions

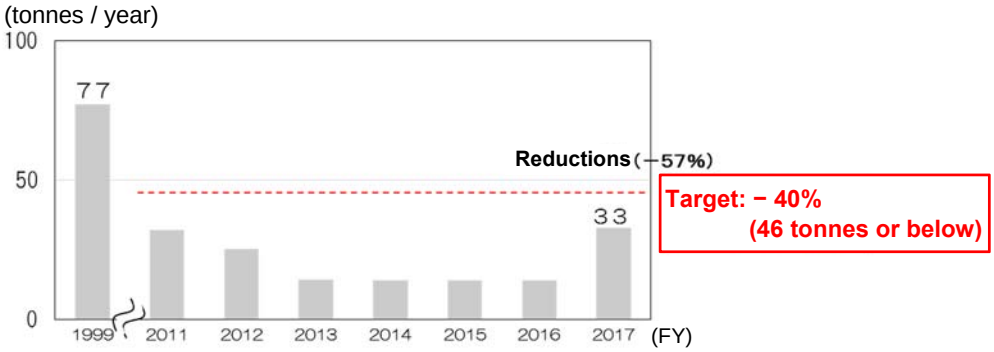
In response to a voluntary action plan formulated by the Japan Iron and Steel Federation to reduce benzene emissions by 80% below FY1999, JFE Steel has pursued efforts to reduce its benzene emissions to 46t or below per annum. Efforts have been focused on controlling the occurrence and emission of benzene, resulting in emissions reduction in line with the Federation's manuals and other guidelines. JFE Steel is proud to have successfully kept its benzene emissions below 20t per annum.



Dichloromethane emissions

As an activity for the voluntary action plan formulated of the Japan Iron and Steel Federation to reduce hazardous air pollutants by 40% below the FY1999 level, JFE Steel has reduced emissions of its major pollutant, dichloromethane, to 46 t or less per annum through reduction of use or application of capture technology. Although dichloromethane emissions increased to 33 t in FY2017, significant efforts for improvement are being applied.

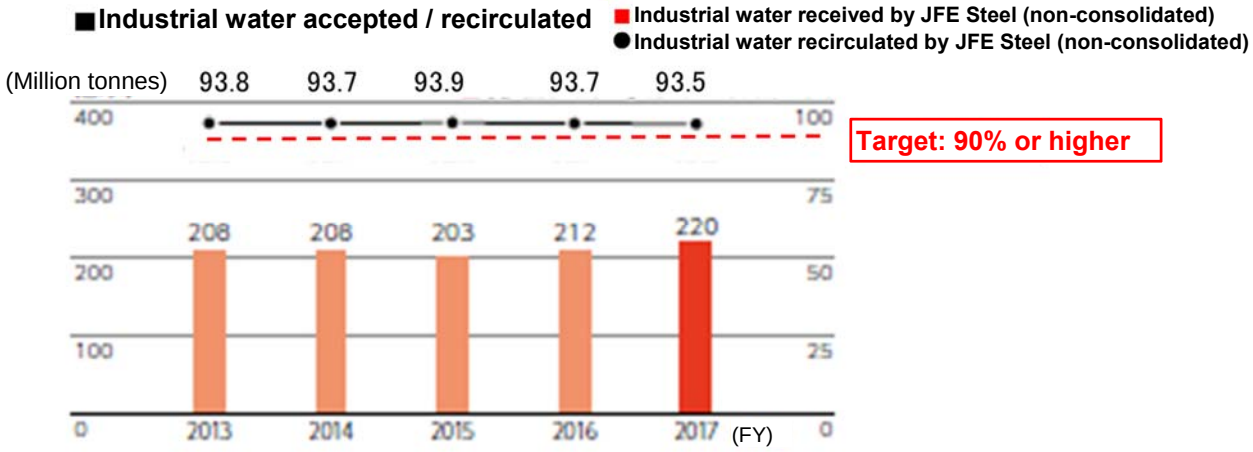
■ **Dichloromethane emissions**



Water recirculation rate

JFE Steel's recirculation target for water used in steelmaking to cool facilities and process products is 90% or above. Given the amount of evaporation that occurs, this is an extremely high figure. For strengthened recirculation, wastewater is now thoroughly purified, both biologically and chemically. JFE Steel continued to achieve its target and, in FY2017, achieved a high industrial water recirculation rate of 93.5%.

■ **Industrial water accepted / recirculated**



3. Raw Materials Purchasing Policy

JFE Steel's recently adopted raw materials purchasing policy, is as follows.

Raw Materials Purchasing Policy

JFE Steel Corporation has developed and operates a sustainable procurement system for sourcing raw materials based on the company's commitment to respecting human rights, complying with all laws and regulations, and protecting the environment. To ensure observance of these principles, the company requests that suppliers adhere to the following Business Conduct Guidelines. JFE Steel appreciates the cooperation of suppliers in agreeing to, accepting and implementing these guidelines.

Business Conduct Guidelines

1. Respect for human rights
   - We recognize the diverse values of individuals, and both respect and support every individual's human rights pursuant to international laws.
   - We reject child labor, forced labor, and human trafficking. We do not tolerate inhumane treatment. We do not purchase conflict minerals.
   - We strive to prevent work-related accidents and related incidents, and create safe and healthy work environments.

2. Legal compliance
   - We comply with all applicable laws and regulations and social conventions in the countries and regions in which we operate. We do not participate in bribery of governments or public officials and we strive to prevent corruption and bribery.
   - We engage in fair and free competition and provide stable supplies of high-quality products and services.

3. Environmental protection
   - We strive to reduce our CO2 emissions and implement other measures to prevent climate change.
   - We work to prevent air, marine, water, and soil pollution.
   - We promote resource recycling and energy conservation for the sustainable use of the earth's limited resources.