

Steel Industry Initiatives

The Japan Iron and Steel Federation (JISF) Initiatives

Long-term Vision for Climate Change Mitigation

In addition to ongoing efforts to achieve the Commitment to a Low Carbon Society, JISF has formulated and announced the long-term vision for climate change mitigation in 2030 and beyond, which is intended to realize zero-carbon steel. JFE Steel played an important role in formulating this vision.

Mid-term (– 2030) Initiatives	<ul style="list-style-type: none"> Promotion and expansion of The Three Ecos Initiatives. Development and implementation of innovative new iron and steelmaking processes.
Long-term (– 2050) Initiatives	<ul style="list-style-type: none"> Promotion of innovative new iron and steelmaking processes. Development of super innovative iron and steelmaking processes and CCS/CCU technologies.
Final (– 2100) Vision	<ul style="list-style-type: none"> Realization of zero-carbon steel. Implementation of super innovative iron and steelmaking processes.

The Commitment to a Low Carbon Society

The Japan Iron and Steel Federation (JISF) is promoting its Commitment to a Low Carbon Society, which focuses on the Three Ecos initiatives and the development of innovative new iron and steelmaking processes. JFE Steel is actively implementing initiatives to help achieve the plan’s targets.

■ CO₂ Reduction Medium- to Long-term Targets (The Japan Iron and Steel Federation’s “Commitment to a Low Carbon Society”)

Three Ecos		Eco Processes	Eco Products	Eco Solutions
Goal		Further improve energy efficiency by taking full advantage of cutting-edge technologies	Provide high-performance steel materials that result in high performing end-products and thus reducing CO ₂ emissions	Reduce CO ₂ in developing countries through the transfer and application of world-leading, energy-saving Eco Process technologies
Targets	FY2020 (phase-I)	Reduce CO ₂ emissions by 5 million t-CO ₂ compared to the BAU benchmark <ul style="list-style-type: none"> Energy-saving: 3 million t-CO₂ Efficient use of waste plastics, etc.: 2 million t-CO₂ 	The use of major high-performance steel materials to contribute to a CO ₂ reduction of approximately 34.0 million t-CO ₂	Estimated CO ₂ reduction impact of 70 million t-CO ₂

(Continued from the previous page.)

Three Ecos		Eco Processes	Eco Products	Eco Solutions
Targets	FY2030 (phase-II)	Reduce CO ₂ emissions by 9 million t-CO ₂ compared to the BAU benchmark	The use of major high-performance steel materials to contribute to a CO ₂ reduction of approximately 42.0 million t-CO ₂	Estimated CO ₂ reduction impact of 80 million t-CO ₂
Status as of FY2018 year-end		Reduced 2.21 million t-CO ₂ emissions (energy conservation etc.), compared to the BAU benchmark	Domestic and international use contributed to a CO ₂ reduction of 31.06 million t-CO ₂	CO ₂ reduction impact of 65.53 million t-CO ₂

Source: Public data from the Japan Iron and Steel Federation (JISF)

Assessment of Commitment to a Low Carbon Society Results (JISF)

In FY2018 emissions by the Japanese steel industry decreased by 2.21 million t- CO₂ compared to the BAU emissions* benchmark. Various self-improvement efforts, such as raising the efficiency of coke ovens and generation facilities, are steadily contributing to this reduction. JFE Steel is actively working on these self-improvement efforts as well as investing in research and development for new energy-saving technologies.

* Business As Usual emissions: Estimated level of emissions in the absence of any special measure

Revolutionary Iron and Steelmaking Process Development

COURSE50

About 30% of CO₂ emissions can be reduced through hydrogen reduction along with separation and capture of CO₂ from blast furnace gases. The first facility is expected to come online by 2030, followed by other plants by 2050.

Ferro Coke

The Japanese steel industry intends to develop ferro coke that accelerates and lowers the temperatures of the reduction reaction in a blast furnace as well as its operational processes to conserve energy further and expand the use of low-rank materials. Currently, a medium-scale plant capable of producing 300 tonnes of ferro coke per day has been constructed in JFE Steel's West Japan Works (Fukuyama district) and test for practice use aimed for the FY2020 operation will be started.

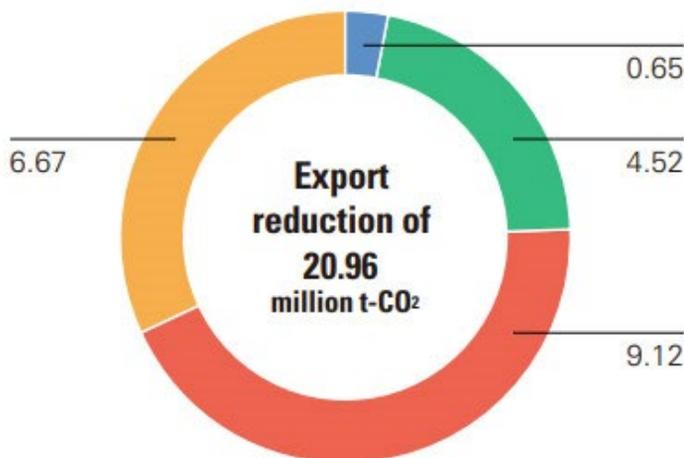
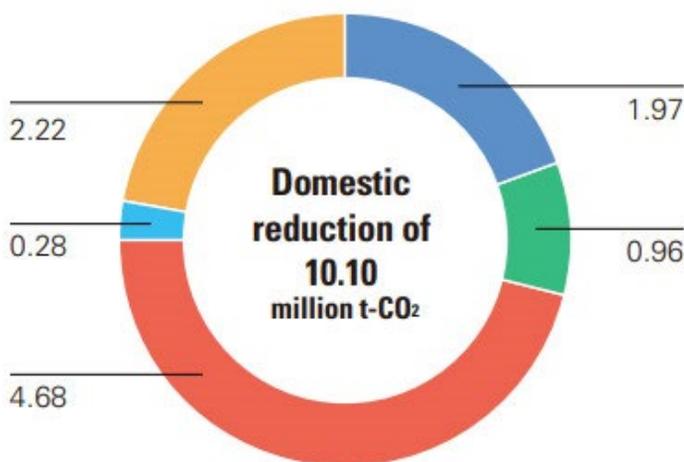
Reduced CO₂ Emissions through High-performance Steel Materials (Effects of Eco Products)

The Japan Iron and Steel Federation (JISF) expects the use of high-performance steel materials to reduce CO₂ emissions. It is estimated that the use of 5 major high-performance steel materials for cars, transformers, ships, power generator boilers, and trains in Japan and overseas (FY2018 production: 6.97 million tonnes, 6.8% of crude steel production) helped to reduce CO₂ emissions by 31.06 million tonnes (10.10 million tonnes in Japan, 20.96 million tonnes overseas) in FY2018.

- Estimates created by the Institute of Energy Economics, Japan
- Materials included are steel sheets for automobiles, directional electrical steel sheets, thick steel sheets for shipbuilding, steel tubes for boilers, stainless steel sheets.
- For the domestic figures, the calculation includes data from FY1990 onward. For the export figures, the calculation includes data from FY2003 onward for automobile and shipbuilding, from FY1998 onward for steel pipes for boilers and from FY1996 onward for electrical steel sheets.

CO₂ Reduction Resulting from the Use of Five Highperformance Steel Materials in Japan and Abroad (FY2018)

■ Ships ■ Power-generator boilers ■ Cars ■ Trains ■ Transformers



Global Scale Initiatives

Addressing Global Warming

ISO 14404 is an international standard proposed by the Japan Iron and Steel Foundation (JISF) to the International Organization for Standardization (ISO) as a methodology for the globally unified calculation of CO₂ intensity from iron and steel production, ultimately to assess the energy efficiency of steelworks. The Japanese steel industry is addressing global warming through international public-private collaborations, including ISO 14404-based assessment of steelworks in developing countries and recommending specific technologies best suited to India and ASEAN countries. It is continuing this effort together with the Ministry of Economy, Trade and Industry (METI) in order to enhance ISO 14404 so that it can be applied to steel manufacturing facilities with more complex structures.

JFE Steel is also addressing global warming by participating in international activities, such as the Japan India Public and Private Collaborative Meeting, the Japan-ASEAN Steel Initiative and the Japan-China Steel Industries Exchange. In addition, JFE Steel is involved as a member of World Steel Association (WSA)'s Climate Action Program, which uses ISO 14404 as the standard for measurement and calculation.



Contribution to the Development of Calculation in LCA

In order to accurately evaluate the environmental impact of products, assessment and quantification is required over their entire life cycles, from raw resource mining to material production, product manufacture, use and final disposal. Life Cycle Assessment (LCA) is one method for conducting this evaluation.

After final products such as automobiles and buildings finish their mission in society, all of their steel components can be recycled and reused. This closed loop recycling ability is an excellent characteristic of steel materials. If LCA is conducted and this characteristic is taken into account, steel can be viewed as having extremely low environmental impact compared to other materials.

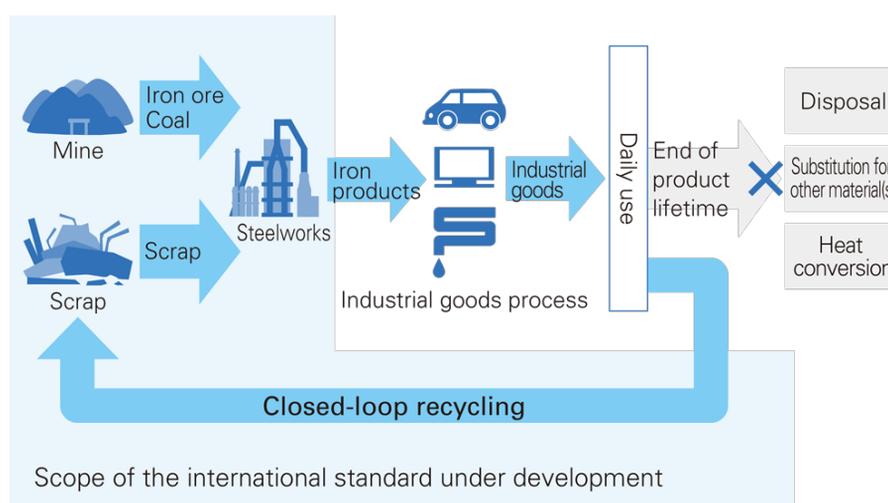
(Continued from the previous page.)

The standard for appropriately considering this ability of steel products to undergo closed-loop recycling was published in November 2018. ISO 20915 (life cycle inventory calculation methodology for steel products) was developed by The Japan Iron and Steel Foundation (JISF) with JFE Steel playing a major role, and provides a life cycle inventory (LCI) calculation method specific to steel products that takes into account the effects of recycling.

In addition, the Japan domestic version of this standard, JIS Q 20915 (life cycle inventory calculation methodology for steel products), was published in June 2019.

Notes: JFE Steel, together with the WSA (World Steel Association, comprising of approximately 170 steel manufacturers and steel related organizations) and the Japan Iron and Steel Foundation (JISF), is working to establish LCA as an international standard methodology for calculating LCI for steel materials.

■ Life Cycle of Steel Materials



Related Links

- [The Japan Iron and Steel Federation \(JISF\) website:Climate Change Policy page](https://www.jisf.or.jp/en/activity/climate/index.html)
(<https://www.jisf.or.jp/en/activity/climate/index.html>)
- [The Japan Iron and Steel Federation \(JISF\) website:LCA of Steel Products page](https://www.jisf.or.jp/en/activity/lca/index.html)
(<https://www.jisf.or.jp/en/activity/lca/index.html>)
- [The Japan Iron and Steel Federation \(JISF\) website:Publication of ISO 20915](https://www.jisf.or.jp/en/activity/lca/iso/index.html)
(<https://www.jisf.or.jp/en/activity/lca/iso/index.html>)
- [The Japan Iron and Steel Federation \(JISF\) website:Publication of 2JIS Q 20915](https://www.jisf.or.jp/en/activity/lca/iso/index.html)
(<https://www.jisf.or.jp/en/activity/lca/iso/index.html>)