NIPPON STEEL

EAST NIPPON WORKS KIMITSU AREA

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(2024.Sept.)

VEGETABLE OIL INK

NIPPON STEEL

EAST NIPPON WORKS KIMITSU AREA

NIPPON STEEL CORPORATION

Plant Layout

1 Ironmaking Area
In the ironmaking area, the raw materials yards to unload and store iron ore, coal and other ironmaking raw materials are located, and pig iron is produced using these raw materials.

2 Steelmaking Area
In the steelmaking area, steel is produced from pig iron.

3 Hot-rolling Area
In the hot-rolling area, sheets, plates, wire rods are produced.

4 Cold-rolling·Pipe Area
In the cold-rolling area, coated sheets and pipe/tubes are produced.

The steel industry's steelmaking process embodies the Eco Process, which achieves high energy efficiency

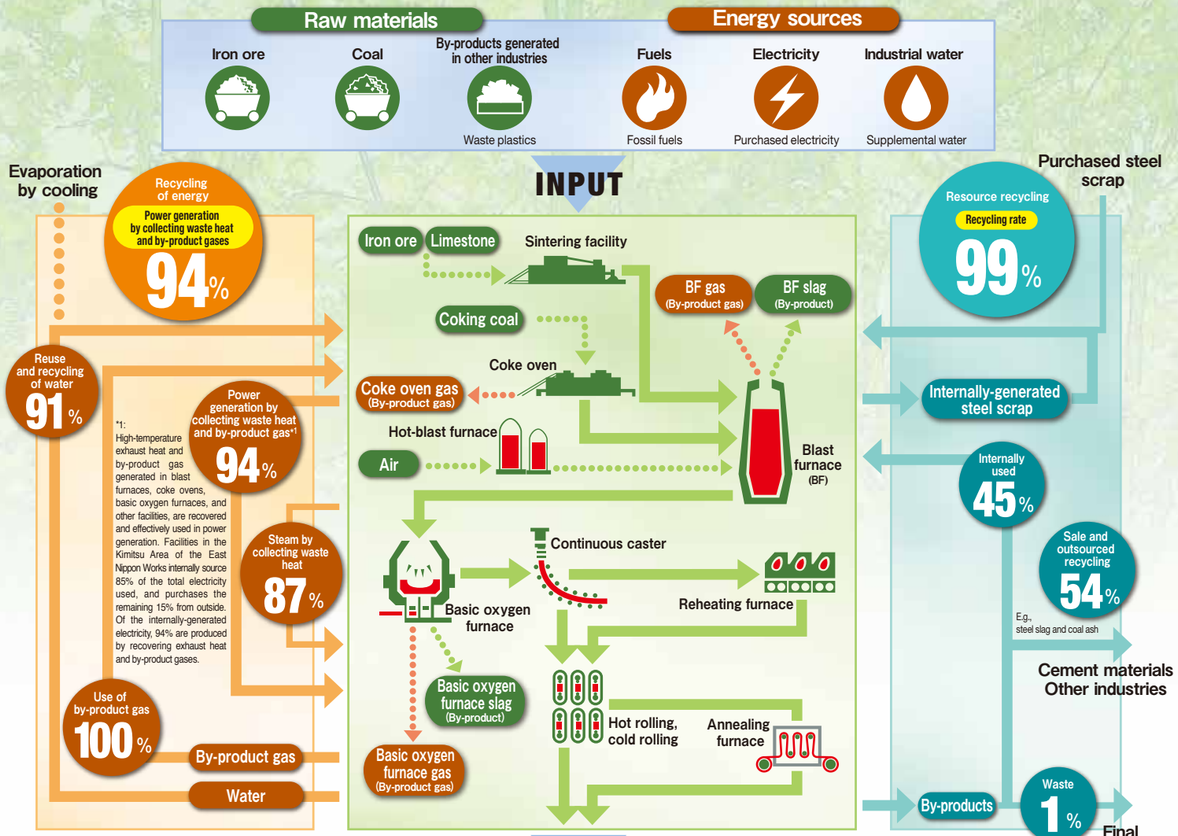
Nippon Steel produce steel products from iron ore mined overseas, coal that reduces iron ore, and steel scrap generated by society.

By-product gases, such as coke oven gas (generated in the coke manufacturing process by dry distillation of coal) and blast furnace gas (generated by blast furnaces), are fully utilized as fuel gas for heating steel and as an energy source for power generation plants on the premises of steelworks.

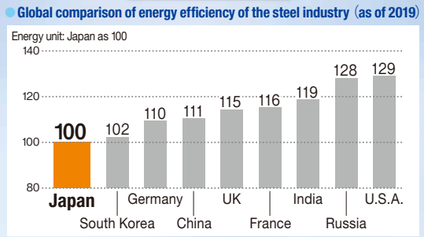
At least 90% of the water used for cooling and cleaning products and manufacturing facilities is reprocessed and repeatedly used.

One ton of steelmaking produces about 600 kilograms of by-products. Among these, steel slag, dust, and sludge are reused in-house as raw materials or effectively recycled in society and other industries as cement raw materials and roadbed materials. Through these efforts, we have achieved a high recycling rate of 99%.

We have also been engaged in recycling various by-products generated in society and other industries by utilizing our high-temperature, high-pressure steelmaking process. In recent years, we have been actively recycling waste plastics and used tires.



Global comparison of energy efficiency of the steel industry (as of 2019)



Source: The Japan Iron and Steel Federation

Nippon Steel's products being actively used throughout the world

Nippon Steel produces a wide variety of high-grade products, satisfying global needs for a wide variety of products.

Nippon Steel's products, leveraged on its latest technology, support people's everyday lives in various scenes across the world. A number of products in use in the world include leading steel products for automobiles (high-tensile steel, electrical steel sheets, bars & wire rods, and wires for steel cords) and high-corrosion-resistance steel plates that have changed the norm in building oil tankers.

Bridges

Our high-performance steel products for bridges are used to support long, large suspension bridges being constructed in all parts of the world.

Railways

We are pursuing the development of safety and high-functionality products for railways, such as wheels, axles, and rails, in accordance with the circumstances of each country, which include needs for higher speed and efficiency in transportation and to accommodate an increase in transportation volume.

Transformers and motors

Electrical steel sheets are a high-performance material that efficiently converts energy between magnetism and electricity. They are used in transformers and motors of hybrid cars, refrigerators and air conditioners to greatly reduce power loss.

Automobiles

• High-tensile steel

High-tensile steel has solved two major themes—reduction of body weight, which leads to improved fuel efficiency in automobiles, and improvement of collision safety. It has been broadly adopted as automobile steel products in Japan and throughout the world.

• Steel cord

Steel cord is required to have high strength and flexibility as a reinforcement for tires, and its performance affects the fuel economy and safety of automobiles. Nippon Steel's technology for steel cord is utilized in one in four automobiles around the world.

Buildings

In all kinds of architecture, including industrial facilities, high-rise buildings, condominium housing, and leisure and cultural facilities, Nippon Steel's products are used as they excel in durability, architectural design, and corrosion resistance and contribute to a reduction in environmental impact.

Ships

We have developed steel plates that are about five times more corrosion resistant than conventional products and have no need for coating for corrosion resistance. The products contribute to improving the safety of ships and environmental preservation.

Overseas Business Development

Nippon Steel's strategy in the overseas steel business is to expand our integrated production framework and downstream bases in the centers of demand, in "markets where demand growth potential is assured" and"areas where its technology and product capacity can be utilized" to ensure that local demand is captured.
Our plan is to achieve a global crude steel production capacity of 100 million tons per year for the Nippon Steel Group, including mother mills in Japan and local mills located overseas.

(As of 2023)

Learn about how steel products are made from iron ore

1 Pretreatment of raw materials

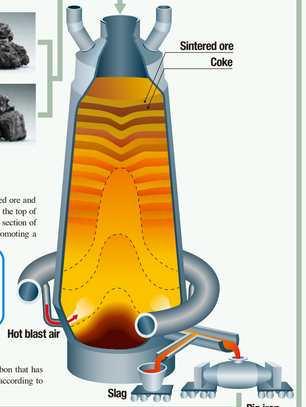
Sintered ore
A fine mixture of iron ore and limestone is sintered at a high temperature of about 1,400°C and becomes a uniform mass of about 5-25 mm in diameter.

Coke
Coke is a solid mass with a high carbon content and few impurities, made by heating coal. Coke is used as fuel and as a reducing agent in smelting iron ore in a blast furnace.

2 Iron making process

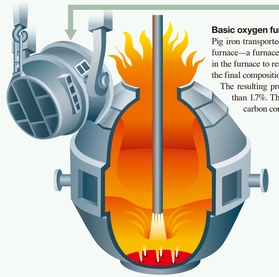
Blast furnace
Pig iron is produced in a blast furnace through a chemical reaction of sintered ore and coke. In a blast furnace, sintered ore and coke are continuously injected from the top of the furnace, while a hot blast of air of about 1200°C is blown into the lower section of the furnace to raise the temperature inside the furnace to over 2000°C, promoting a chemical reaction to reduce and separate steel from sintered ore. Various impurities contained in sintered ore are formed and produced as steel slag.

Materials needed to produce one ton of pig iron
- Iron ore ..... 1.5 tons
- Coke ..... 0.4 ton
- Fine coal ..... 0.1 ton
- Limestone ..... 0.2 ton



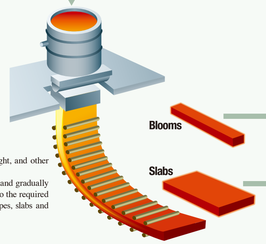
3 Steelmaking process

This is a process to remove the remaining impurities from pig iron and carbon that has been captured in the blast furnace, and to adjust the chemical composition according to the customers' requirements.



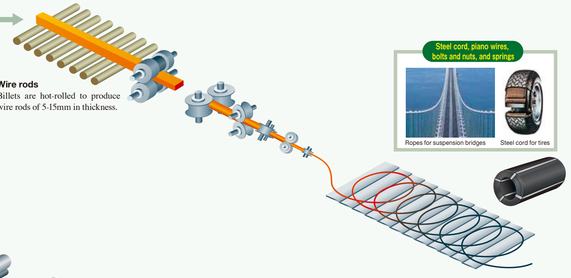
Basic oxygen furnace
Pig iron transported from a blast furnace and steel scrap are injected into a basic oxygen furnace—a furnace with a capacity of about 300 tons. High-pressure oxygen is then blown in the furnace to remove unnecessary carbon and other substances by oxidation. After this, the final composition is adjusted in a process called "secondary refining".
The resulting product is called steel. Steel refers to iron with a carbon content of less than 1.7%. The hardness of steel is determined by the carbon content: the higher the carbon content, the harder the steel.

Continuous casting
This is a process to solidify steel to a specific size according to the shape, weight, and other specifications of the end product.
The molten steel is continuously pumped into the mold at approximately 1,600°C and gradually cooled from the outside, then the solidified steel is pulled out in a roll to be cut into the required size. The resulting mass of steel is called billets, which are divided into two types, slabs and blooms, depending on the shape of the final product.



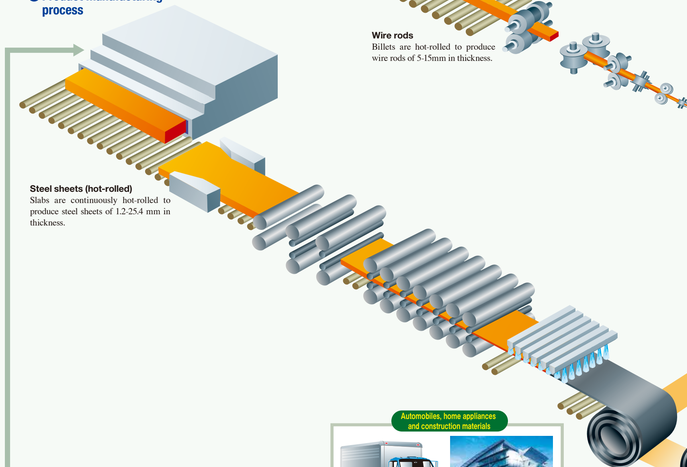
4 Product manufacturing process

Wire rods
Billets are hot-rolled to produce wire rods of 5-15mm in thickness.



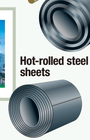
Steel cord, piano wires, bolts and nuts, and springs

Steel sheets (hot-rolled)
Slabs are continuously hot-rolled to produce steel sheets of 1.2-25.4 mm in thickness.

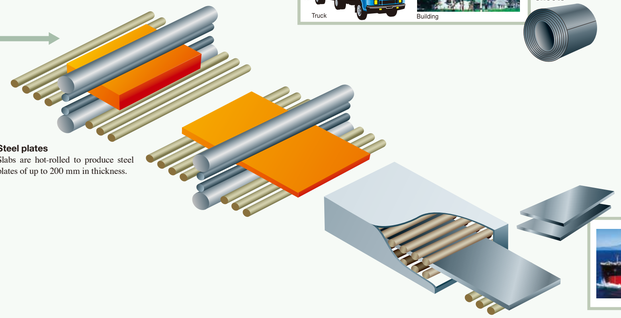


Automobiles, home appliances and construction materials

Hot-rolled steel sheets

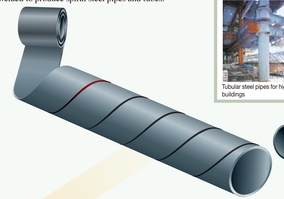


Steel plates
Slabs are hot-rolled to produce steel plates of up to 200 mm in thickness.



Ships, bridges and buildings

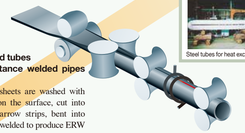
Steel pipes and tubes (spiral pipes and tubes)
Hot-rolled steel sheets are wound in a spiral shape and have their seams welded to produce spiral steel pipes and tubes.



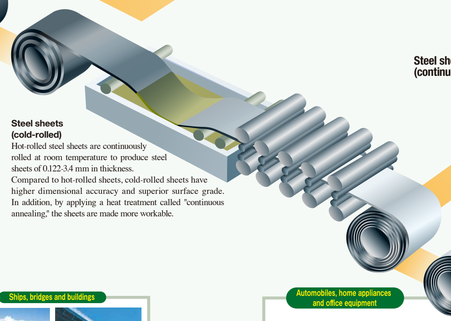
Foundation piles of buildings and bridges, and pipes for water and gas

Boiler tubes, automobiles and industrial machinery

Steel pipes and tubes (electric resistance welded pipes and tubes)
Hot-rolled steel sheets are washed with acid (pickling) on the surface, cut into longitudinally narrow strips, bent into tube shapes, and welded to produce ERW pipes and tubes.



Steel sheets (cold-rolled)
Hot-rolled steel sheets are continuously rolled at room temperature to produce steel sheets of 0.122-3.4 mm in thickness.
Compared to hot-rolled sheets, cold-rolled sheets have higher dimensional accuracy and superior surface grade. In addition, by applying a heat treatment called "continuous annealing," the sheets are made more workable.

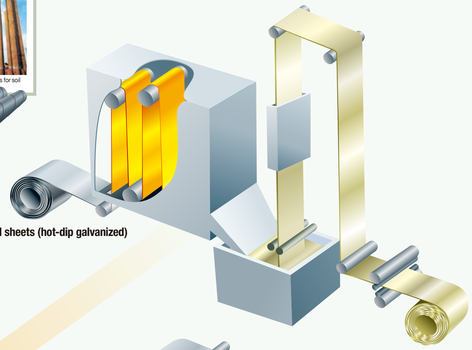


Automobiles, home appliances and office equipment

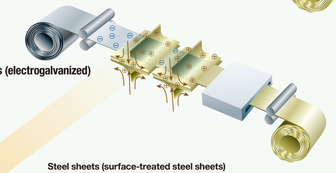
Cold-rolled steel sheets

Steel sheets (continuously annealed)

Steel sheets (hot-dip galvanized)

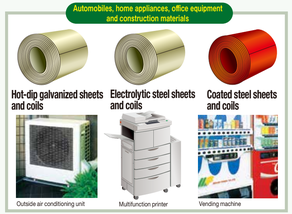


Steel sheets (electrogalvanized)



Steel sheets (surface-treated steel sheets)
The surface of cold-rolled steel sheets is coated with zinc and other products. This treatment improves the appearance and corrosion resistance of steel sheets.
There are two types of surface treatment: the method of adhering molten zinc to steel sheets (hot dip galvanizing) and the method of adhering zinc using an electrolytic reaction (electrolytic tinning).
Coated steel sheets, which are manufactured by coating the surface of the galvanized steel sheets, allow customers to skip the coating process.

Automobiles, home appliances, office equipment and construction materials



Steelworks closely engaged with the community

The Kimitsu Area of the East Nippon Works is contributing to the development of the local community through sports and festivals.

Proposal to create new community-based sport teams

In March 2003, the "Kazusa Citizens Cheering Team" was established with the cooperation of the four cities of Kimitsu, Kisarazu, Futtsu and Sodegaura, in order to make Nippon Steel's Kimitsu baseball team a community-based team. The team was then renamed Nippon Steel Kazusa Magic, a regional and civic team, which has grown into a strong team that has won the national championship and is loved in the community.
Nippon Steel in Kimitsu is also a sponsor of various other sports competitions, thereby promoting social friendship with the local community through sports.

Winning the 39th Japanese Baseball Championship (Non-Professional) on November 7, 2013

Cheering scene

Participation in local festivals

We co-sponsor the Kimitsu Citizen Fureai Festival, a major event in Kimitsu City, and also actively support the Futtsu City fireworks display, the Kisarazu Port Festival, and various other local festivals. Every year, many of our employees and their family members join the "Iyasaka Kimitsu Dance" of the Kimitsu Citizen Fureai Festival, the "Yassai Mossai Dance" of the Kisarazu Port Festival, and the "Parade of Samurai Warriors" of the Kururi-jo Castle Festival, helping to liven up these festivals.

The Kimitsu Citizen Fureai Festival

The Kisarazu City fireworks display

Clover Awards

The Clover Award is a social contribution prize sponsored by the Kimitsu District of the East Nippon Works to award individuals and organizations in the four cities of Kimitsu, Kisarazu, Futtsu and Sodegaura that have made a broad contribution to the local community through their non-profit activities. Established in March 1992, the Clover Award is given once a year to individuals and organizations that have been recommended by the four cities and selected by experts and related parties. We give award winners a stainless steel certificate and a grant for their activities at the Kimitsu Regional Lifelong Learning Tournament.

The Clover Award certificate

CO_2 emissions reduction from recycling of containers and packaging plastics (cumulative total from FY2000 to FY2023)

13.06million tons of CO_2

We have developed and implemented technologies to recycle 100% of containers and packaging plastics which are separately collected from ordinary homes by local governments. At present, Nippon Steel's four steel mills nationwide, including the mill in Kimitsu, are engaged in this recycling, which amounted to over 4.08 million tons on a cumulative basis by 2023. This has reduced the incineration amount and cut CO_2 emissions by approximately 13.06 million tons.

Plastics from used containers and packaging

Pretreatment for recycling of plastics

Coke oven

Raw materials for steel, chemical raw materials and energy sources for gas, etc.

Effective use of steel slag – Creation of sea forests

In recent years, a new environmental problem that has been identified is sea desertification, meaning that the sea becomes like a desert owing to the disappearance of seaweed from the water. The environment for the growth of marine life deteriorates when this happens, causing serious damage to coastal fisheries. It was found that a decline in iron, which has been carried from the forest areas to the sea in river water, is one of the causes of sea desertification.
To offset a part of the decline in the supply of iron from nature, Nippon Steel has developed iron supply units composed of humus, soil and steel slag, the latter being a by-product of the steelmaking process that is rich in iron. The Kimitsu Area of the East Nippon Works is supplying this product to coastal areas near the steelworks and promoting the regeneration of seaweed beds called the creation of sea forests.

Steel slag is a by-product that is mainly composed of lime (CaO) and silica (SiO_2), which exist in nature, and is produced in the steelmaking process.

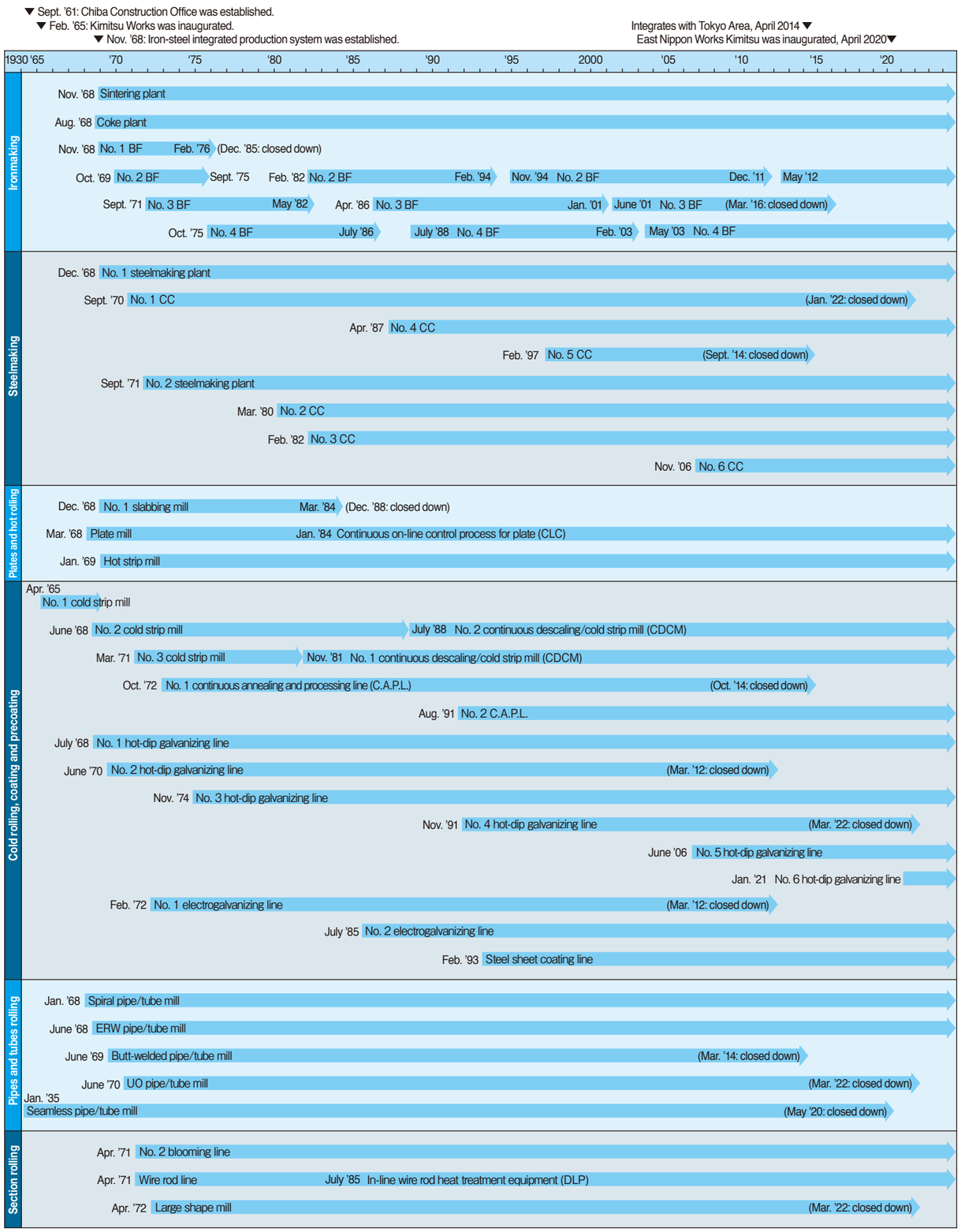
The Kimitsu Area of the East Nippon Works was established in 1965.

Wide area: over 6 kilometers from east to west and 2 kilometers from north to south, along the Tokyo Bay coast, the Kimitsu Area of the East Nippon Works is a major production base of Nippon Steel in the Greater Tokyo Area, the largest demand area in Japan. We are proud of having Japan's top-class quality, facilities, and production volume.

The Kimitsu Area of the East Nippon Works has been working on preserving the environment since its foundation. We have nurtured forests and flower fields while making steel.

This healthy, rich natural place is where steel is being produced.

History



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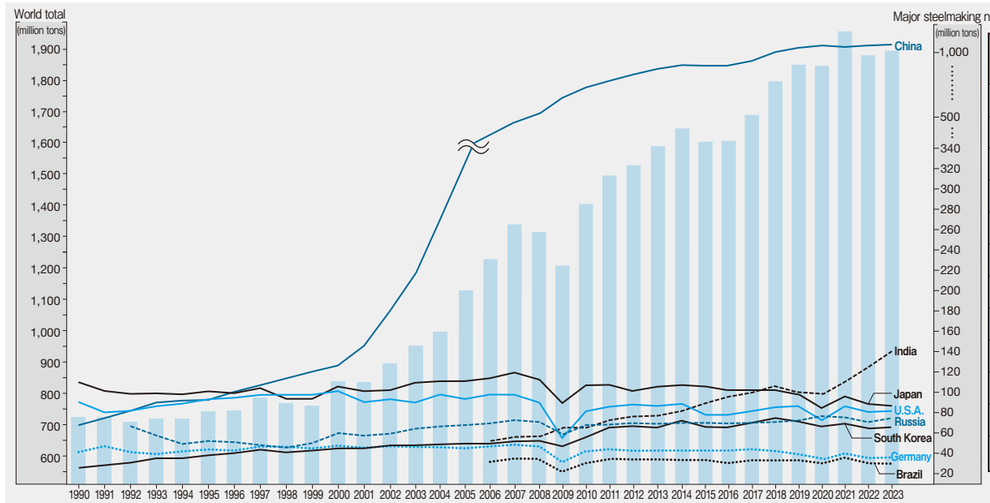
(2024.Sept.)

Facts in Graphs
Japan's Steel Industry and East Nippon Works Kimitsu Area

1. Japan's Steel Industry

Crude Steel Production in the World

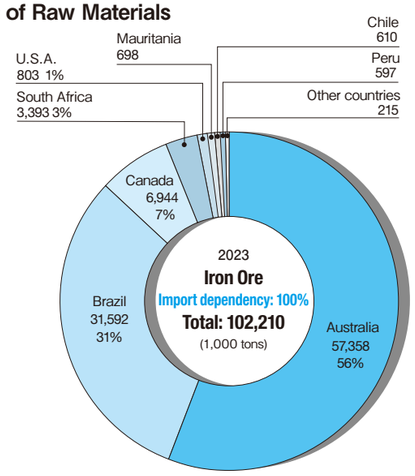


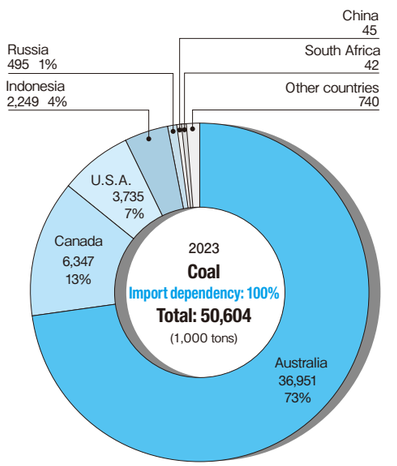
(2023, million tons)

Ranking	Country	Production
1	China	1,019.10
2	India	140.80
3	Japan	87.00
4	U.S.A.	81.40
5	Russia	76.00
6	South Korea	66.70
7	Germany	35.40
8	Turkey	33.70
9	Brazil	31.80
10	Iran	31.00
	Other countries	289.30
	Total	1,892.20

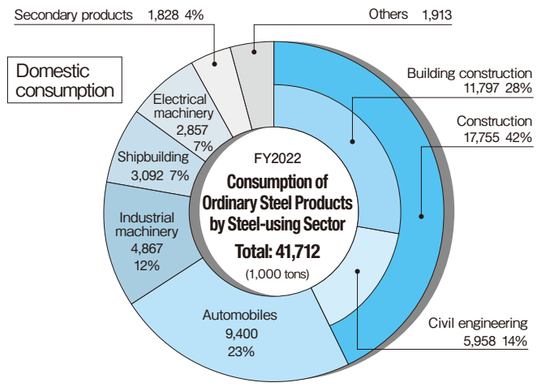
Source: WSA

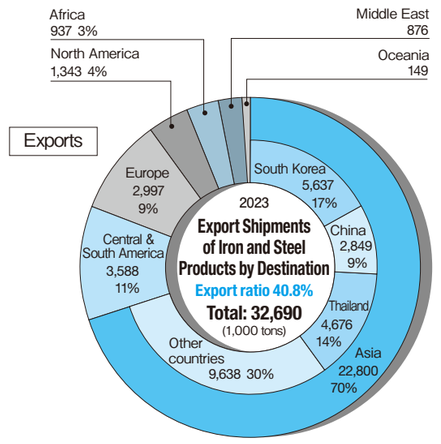
Imports of Raw Materials





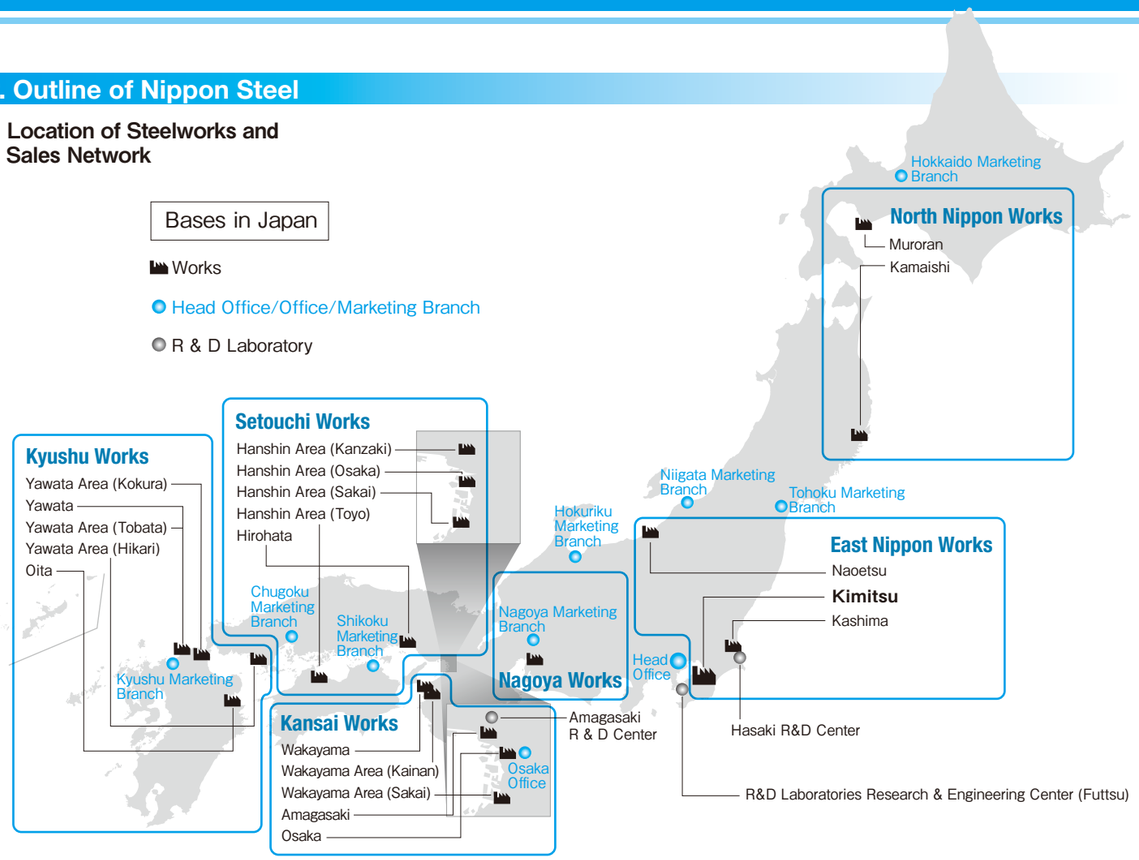
Consumption and Exports of Steel Products





2. Outline of Nippon Steel

Location of Steelworks and Sales Network



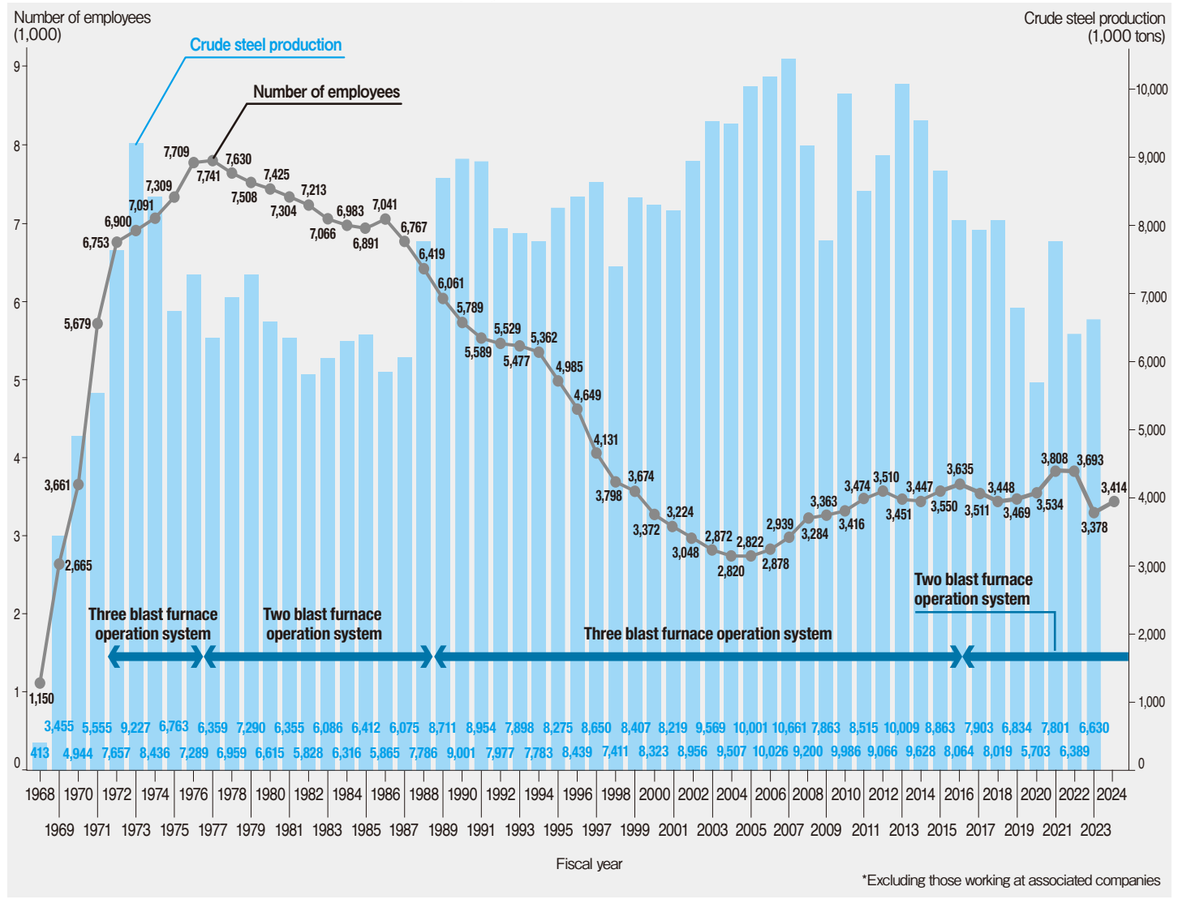
Outline of Steelworks

Steelworks	Site*1 (10,000 m²)	Crude steel output in FY 2023 (1,000 tons)	No. of BFs in operation	Major productions												
				Plates	Hot-rolled sheets	Cold-rolled sheets	Hot-dip galvanized sheets	Electro-galvanized sheets	Tinplate	Other coated sheets	Pipes and tubes	Bars and wire rods	Shapes	Electrical steel	Wheel Paddle Wheel	Forging
East Nippon	2,190	13,059	4	○	○	○	○	○	–	○	○	○	○	–	–	–
Kimitsu	1,211	6,631	2	○	○	○	○	○	–	○	○	○	–	–	–	–
Kashima	949	6,428	2	○	○	○	○	–	–	–	○	–	○	–	–	–
Naoetsu	30	–	–	–	–	○	–	–	–	–	–	–	○	–	–	–
North Nippon	1,118	1,212	1	–	–	–	–	–	–	–	–	○	–	–	–	–
Muroran	785	1,212	1	–	–	–	–	–	–	–	–	○	–	–	–	–
Kamaishi	333	–	–	–	–	–	–	–	–	–	–	○	–	–	–	–
Nagoya	649	5,533	2	–	○	○	○	–	○	○	○	–	–	–	–	–
Kansai	776	2,429	1	–	–	○	–	–	–	–	○	–	○	–	○	○
Wakayama	671	2,394	1	–	–	○	–	–	–	–	○	–	○	–	–	–
Amagasaki	52	–	–	–	–	–	–	–	–	–	○	–	–	–	–	○
Seikosho	53	35	–	–	–	–	–	–	–	–	–	–	–	–	○	○
Setouchi	755	412	–	–	○	○	○	○	○	○	–	–	–	○	–	–
Hirohata	617	412	–	–	○	○	○	○	○	–	–	–	–	○	–	–
Hanshin	138	–	–	–	–	○	○	○	–	○	–	–	–	–	–	–
Kyushu	2,359	12,343	3	○	○	○	○	–	○	○	○	○	○	○	–	–
Yawata	1,571	3,723	1	–	○	○	○	–	○	○	○	○	○	○	–	–
Oita	788	8,620	2	○	○	–	–	–	–	–	○	–	–	–	–	–
Total	**7,847**	**34,988**	**11**													

*1: Including the site for employee welfare facilities

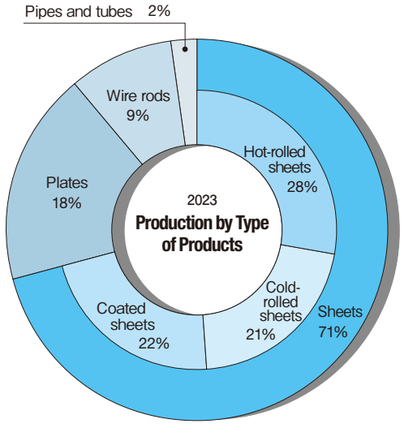
3. Outline of East Nippon Works Kimitsu Area

Crude Steel Production and Number of Employees



*Excluding those working at associated companies

Production and Shipments



Note: Excluding semi-finished products for outside sales