



http://www.nssmc.com/en/





In June 2016 NSSMC received the highest rating on "DBJ Environmentally Rated Loan Program" of Development Bank of Japan Inc. (DBJ) and recognized as "particularly innovative in its environmental efforts."

NIPPON STEEL & SUMITOMO METAL CORPORATION



Sustainability Report 2016



世界の鉄へ」しんにってつすみきん





Corporate Philosophy

Our Values

Nippon Steel & Sumitomo Metal Corporation Group will pursue world-leading technologies and manufacturing capabilities, and contribute to society by providing excellent products and services.

Management Principles

- 1. We continue to emphasize the importance of integrity and reliability in our actions.
- 2. We provide products and services that benefit society, and grow in partnership with our customers.
- 3. We pursue world-leading technologies and manufacturing capabilities.
- 4. We continually anticipate and address future changes, innovate from within, and pursue unending progress.
- 5. We develop and bring out the best in our people to make our Group rich with energy and enthusiasm.

Basic Environmental Policy (Established in October 2012)

Under the principle of "Ecological Management," NSSMC is committed to contributing to the creation of an environmental-preservation oriented society with lower environmental impact. For this purpose, the company will conduct business activities based on the viewpoint of environmental preservation in local communities, which includes the maintenance and improvement of good living environments and the promotion of reduction and recycling of waste. The company will also address challenges on a global scale including response to issues of global warming as well as the maintenance and improvement of biological diversity.

- 1. Reducing environmental impacts at every stage of operations (eco process) 오 pp. 10–19
- 2. Offering of environment-oriented products (eco products) > pp. 20-24
- 3. Proposing environmental preservation solutions from a global perspective (eco solution) **(**) pp. 25–29
- 4. Development of innovative technologies > pp. 30–31
- 5. Development of a rich environment **>** pp. 28–29
- 6. Promotion of environmental relations activities (> pp. 36–39



Editorial policy

This Sustainability Report is the 19th since the former Nippon Steel Corporation issued what is the first sustainability report by a Japanese steel manufacturer, in 1998. The report presents NSSMC's progress in ecological management and details of our various initiatives.

Period covered

The period covered in the report is fiscal year 2015 (from April 2015 to March 2016). For some activities, the period from April 2016 to June 2016 is included.

Scope of report

- · Environmental and social aspects: Activities of NSSMC and its group companies in Japan and overseas
- Economic aspects: The Annual Report 2016 (issued in July 2016) also covers the contents of the economic report.

Reference for guideline

- GRI (Global Reporting Initiative) "Sustainability Reporting Guidelines Version 4.0"
- "Environmental Reporting Guidelines," by the Ministry of the Environment

The role of steel in forming the future of the earth ·

Aiming to become the best steelmaker with world-leading capabilities, NSSMC has been dedicated to steelmaking with a particular emphasis on its contri-

Iron is believed to be one-third of the Earth's weight. While the majority of iron exists in the Earth's inner core, we have been fortunate to have an abundant resource of iron in the Earth's surface layer. Steelmaking technology has a history as long as 4,000 years, but it was the Industrial Revolution in the 18th century and subsequent technological innovations that have enabled steel to be mass produced and supplied at cheap prices. Since then, steel has been extensively used in goods for the daily life of people and the underlying infrastructure of the society, whereby the metal enriches people's lives to an extent beyond estimation. While steel demand is expected to keep growing, in good part due to improvement of living standards in emerging countries, we do not need to worry about a supply shortfall, given as there are ample reserves. Being recyclable, steel is a reliable material that will continue to be an essential part of our lives in the future. bution to preservation of energy and other resources, and steel-related reduction in environmental burden. We have also expanded our steelmaking technologies geographically, across the world. Going forward, we are intent on properly capturing increasing global demand and providing our outstanding steel products to users all over the world, for the betterment of people's lives.

Eco-friendly steel and steelmaking will form a great part of the future of the earth.



Structure of the Report

NSSMC's Businesses

We aim at becoming the world-leading steelmaker with comprehensive strengths.



Basic approach to NSSMC's environmental management

Through three ecos and the development of innovative technology, NSSMC is determined to help resolve challenges for a sustainable society. ${old PAGE}\,06$



How NSSMC's corporate management supports environmental management

We seek for ever-improving operational management, and to be trusted by society.

PAGE 32

Column

Top Kashima Works



Bottom Oita Works and Hometown Forest

NSSMC's Businesses

Based on the long accumulation of technology through steelmaking, the Nippon Steel & Sumitomo Metal Corporation (NSSMC) Group operates businesses in five areas: steelmaking, engineering, chemicals, new materials, and system solutions, with the core business being steelmaking.

FY2015

Sales composition

by business segment

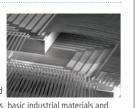
4,907.4

billion yen

New materials business 36.2 billion ven

Nippon Steel Sumikin Materials Co., Ltd., etc.

Based on materials expertise gained from steelmaking, Nippon Steel & Sumikin Materials provides original materials and components that are indispensable to leading-edge technology fields, with primary focus on the three areas of semiconductor and



electronics industry materials and components, basic industrial materials and components and environmental and energy-related materials and components.



Chemicals business 181.8 billion yen

Nippon Steel & Sumikin Chemical Co., Ltd., etc.

Nippon Steel & Sumikin Chemicals is developing demand for functional materials for electronic materials such as for displays, epoxy resins, circuit boards, and organic electroluminescence (OEL), on top of a variety of original coal-based products, including needle coke and various aromatic products.





System solutions business 218.9 billion yen NS Solutions Corporations, etc.

Through consultation concerning clients' information systems to solve their problems, NS Solutions provides comprehensive services from planning, proposal, design, and configuration services of a system to its managing and services, incorporating advanced technologies FinTech, IoT, and AI.



Steelmaking and steel fabrication business 4,283.9 billion yen Nippon Steel & Sumitomo Metal

Enhancing technological superiority, NSSMC provides a variety of high-grade steel products (i.e., steel plates; flat products; bar & wire rod; construction products; pipe & tube; railway, automotive & machinery parts; and titanium & specialty stainless steel) to many

customers in Japan and overseas.

Corporation, etc.

The NSSMC Group is steadily progressing in establishing a global business structure that enables it to capture overseas growth markets and to readily respond to customers' overseas expansion.

Topics





1 JCAPCPL (India) Established a joint venture company with Tata Steel Limited for manufacture and sale of automotive cold-rolled sheets. Began operation in May 2014.

2 VAM[®]BRN (Brunei) Established a company to provide threading services for connections of the oil country tubular goods (OCTG) pipes for oil and natural gas development. Plans to begin operation in October 2016.



Main Bases



Acquired this plan, formerly operated under ThyssenKrupp, with ArcelorMittal in 2014 to enhance supply of automotive steel sheets in the U.S.

 Usiminas (Brazil) Began operation in 1962 as an integrated steelworks with blast rolled steel sheet manufacturer

for all six categories.

:: Crude steel production volume (non-consolidated basis) (million tons) 50 45.67 44.96 43 55 42.92 30 20

20.00 0 2011 NSSMC/NSC¹ SMI²

100,000

80,000

60,000

40.000

NSSMC/NSC¹ SMI² 1 NSC: Nippon Steel Corporation 2 SMI: Sumitomo Metal Industries, Ltd.

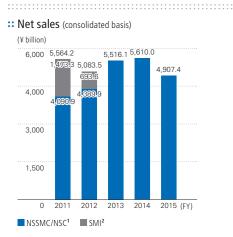
0 2011

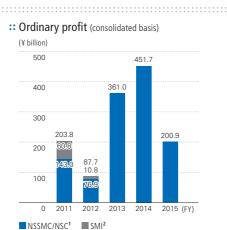
2012

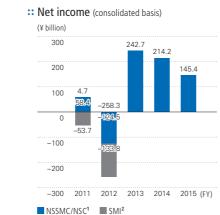
(Adjustment: Elimination 129.2 billion yen) **Engineering and construction business** 315.7 billion yen

Nippon Steel & Sumikin Engineering Co., Ltd., etc.

Based on long-accumulated steelmaking and other technologies, Nippon Steel & Sumikin Engineering undertakes many projects worldwide in six fields: steelmaking plants; environmental and energy-related solutions; offshore steel structures; building construction and steel structures; pipelines; and new business and new technology.







1 NSC: Nippon Steel Corporation 2 SMI: Sumitomo Metal Industries, Ltd.

02 :::::: NIPPON STEEL & SUMITOMO METAL CORPORATION Sustainability Report 2016

6 AM/NS Calvert (U.S.) furnace

SUS (Thailand)³ Began operation in 1998 as a cold- A company for manufacture and with NSSMC, its largest shareholder. Has received Thailand's Prime Minister's Industry Award



4 ICI (U.S.)

line in October 2015.

A joint-venture subsidiary for manufacture

and sale of forged crankshafts began com-

mercial operation of its No. 4 forging press



☐ 1888年六年任有限公司

3 BNA (China)

Established a joint venture company with Baoshan Iron & Steel for manufacture and 🧢 sale of automotive hot-dip galvanizing steel sheets and began operation in 2005. Began operation of a new galvanizing line in September 2015.

Sales composition by region



Overseas 39%

Regional composition Asia 64% North America 12% Latin America 9% Middle East 7% 5% Europe Africa 2% Pacific 1%





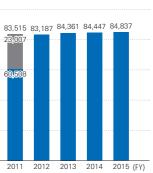
sale of welded pipes for pipe-

lines at the point of demand. Began operation in 1980.

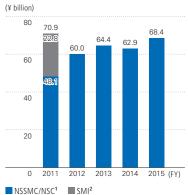
Sales and manufacturing of automotive steel sheet

- Sales and manufacturing of non-automotive steel sheet
- Sales and manufacturing of pipe & tube, and construction materials
- Sales and manufacturing of railway, automotive & machinery parts
- A Processing and services of bar & wire rod
- 3 SUS will integrate with NSGT in Thailand and change name to NS-SUS in September 2016

:: Number of employees (consolidated basis)



:: R&D expenditures (consolidated basis)



A Message from Top Management



Aiming to Be Ever More Trusted and Relied Upon by Society

Nippon Steel & Sumitomo Metal (NSSMC) is proud of playing its role in society through providing steel that is vital for daily life and society as a whole. But in order to optimize its contribution to the betterment of society, it is indispensable for NSSMC to be ever more trusted and relied upon by society, and this requires continuous improvement in compliance to laws and regulations, as well as of capability in areas such as safety, environmental activities, and disaster prevention.

Having identified environmental management as critical for corporate management, based on our Ecological Management Policy, we have been fulfilling our commitment to contribute to the creation of a society oriented toward environmental preservation and lower environmental impact. We have been actively engaged in various environmental issues, which encompass some at the local community level to others of global scale. They include efforts on behalf of the maintenance and improvement of good living environments, the promotion of reduction and recycling of waste, measures that address global warming, and the maintenance and improvement of biological diversity.

Regarding global climate change, the United Nations Framework Convention on Climate Change (UNFCCC), or COP21, was held in Paris in December 2015, and produced the Paris Agreement. By this, all the countries, including emerging countries, agreed on a framework to deal with greenhouse gas emissions mitigation. In Japan the government has compiled a plan to cut greenhouse gas emissions by 26% from the fiscal 2013 level by fiscal 2030 and I believe that we must make sincere efforts to achieve this Intended Nationally Determined Contribution. In 2016, the Plan for Global Warming Countermeasures was adopted by Japan as the basis for implementing its contribution. The Plan has identified the Initiatives for Achieving a Low Carbon Society, which was initially voluntarily prepared by Japan's industrial and business community, as a major plan for the private sector. The NSMMC Group will continue its ongoing efforts to achieve its targets for 2020 and further for fiscal 2030 to accelerate its efforts for reduction of CO₂ emission, by keeping foremost the three "ecos," namely eco process, eco products and eco solutions, and the "development of innovative technologies."

We keep reminding ourselves that environmental risk management, including prevention of unexpected events and accidents, is one of the critical challenges for our sustainable operations. We comply with laws and regulations, adapt to ordinances, bylaws, and standards, and carry out measures to reduce environmental burden with due consideration to the situation at each point of operations. We will keep addressing the issues of environmental preservation in terms of hard and soft aspects.

We also intend to continue to further enhance the quality of our ecological management by developing two-way communication with all stakeholders, i.e., local communities, customers, shareholders, investors, researchers, and environmental NGOs. Desiring to be ever more trusted and relied upon by society, we will fulfill our corporate social responsibility (CSR) to contribute to society by carrying out our corporate philosophy to "pursue world-leading technologies and manufacturing capabilities, and to contribute to society by providing excellent products and services."

This *Sustainability Report* introduces NSSMC's progress in ecological management and details of our various initiatives mentioned above. We hope that you take a look at it and let us learn from your candid opinions regarding our environmental and other activities.

> Kosei Shindo Representative Director and President

K. Shindo



NSSMC makes ecological innovations with the "three ecos and innovative technology development"



ECO PROCESS

The way we manufacture is "eco-friendly"

NSSMC uses world-leading resources and world-leading energy efficiency to manufacture steel products and aims to develop eco-friendly steelmaking processes by further improving efficiency.



ecos

ECO PRODUCTS

What we produce is "eco-friendly"

We produce and offer eco-friendly "products" using our world-leading technological capabilities, thus conserving resources and energy and thereby contributing towards building a sustainable society.



ECO SOLUTION

Sharing our "eco-solutions"

We contribute to the reduction of CO₂ emissions and other environmental burdens on a global scale by diffusing our Group's world-class environmental and energysaving technologies in Japan and overseas.

Based on the objective of offering to society technologies and prod-

ucts that contribute to the saving of resources and energy and the

reduction in environmental burden, we are developing innovative

advanced technologies from a medium- to long-term perspective.

0

1960's Steel supported high economic growth

Enhanced dust collection measures Adopted dust collectors and significantly controlled generation of dust and soot

O p. 1 Introduced converter furnaces The milling process time was reduced from 3-4 hours to 30 minutes, raising productivity by 10 times

Introduced continuous casting machines Boosted energy

• Adoption of railway wheels and axles and powertrain equipment for the Tokaido Shinkansen trains (1964) Op. 21 Use of steel sheet for consumer durables. such as cars, coolers, and color TVs



Began production of oriented electrical steel sheets which is used in transmission/distribution transformers and reduces their energy loss



Supported the development of the automobile industry in Thailand, as one of the oldest Japanese companies to be active in Thailand

NSSMC developed corrosion-resistant

strong adaptability to match design specifications



The world's first forest was created by using the Miyawaki method. Opp. 28-29 Began operation of the first waste direct-melting and resource recovery system (1979)

 Introduced computer control of blast furnace operation (1968)

Tokyo Summer Olympics (1964)



• Japan World Exposition (Osaka Expo'70) (1970) • Sapporo Winter Olympics (1972) · Shift to the floating exchange rate regime (1973)

Nippon Steel & Sumitomo Metal Corporation (NSSMC) has strived to introduce new products to society, by always appropriately adjusting to the changing times and making advances in steelmaking technology so as to better satisfy the needs of customers. We are committed to contribute to the development of society by further improving our advanced technology.

1980's

Respond to the yen's sharp appreciation

 Dry desulfurizing and denitrating system using activated carbon \bigcirc p. Energy Center's introduction of timetable demand management of power and steam, and a power prediction system Began Pulverized Coal Injection (PCI) to a blast furnace Energy saving by more use of low-quality materials and cut in coke usage

1990's Support in the era of concern

for the global environment

Developed regenerative burners (1996)



A pair of burners alternately heat the air or absorb the heat in the heating furnace. achieving about 25% energy saving

• Resin film steel sheet (1994)

HIAREST steel (1996)

• High-tensile steel sheets for automobiles D p. 20 Began manufacturing and sales of titanium materials (1984) NSSMC began production and sales of outstanding corrosion-resistant, light, and strong titanium Steel tubes for automobile door impact beams (1987) High-strength wires and steel plates for the Akashi Kaikyo Bridge (1988)



Began technology transfer of Coke Dry Quenching (CDQ) (1985) Opp. 26-27 Cooperated in construction of Shanghai



Deng Xiaoping, China's Deputy Prime Minister, visited the Kimitsu Works in 1978

• TMCP (Thermo Mechanical Control Process for plate rolling) (1985) Realized the increased strength and productivity improvement by meticulous control of rolling and water-cooling

 Opening of the Tohoku and Joetsu Shinkansen Lines (1982) The Plaza Accord (1985)

Opening of the Seikan Submarine Tunnel (1988)

• Opening of the Great Seto Bridge (1988)

Introduction of 3% consumption tax (1989)

 The United Nations Conference on Environment and Development (UN Earth Summit) (1992) The Great Hanshin-Awaji Earthquake (1995)



1970's

(1976) 🔼 n

Turbine (TRT)

Energy saving challenge

Developed Cokes Dry Quenching (CDQ)

Developed the Top-pressure Recovery

The pressure of blast furnace gas is uti-

lized to generate power

Wires for steel tire

Enhanced strengths

enabled reduction in

cords (1978)

heat-resistance stainless steel with



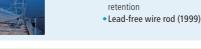


• Opening of the Meishin Expressway (1963) Opening of the Tokaido Shinkansen Line (1964) The first oil crisis (1973)

The second oil crisis (1978)









Participated in creation of a city under

the theme of harmonious existence in Kitakyushu City, Fukuoka Prefecture

I/N Tek (U.S.) began operation (1990)

• ICI (U.S.) began operation (1992) 📀 p. 3

The Smart Community Creation Project

of Kitakyushu City was launched (1994)

O D.

The International Exposition, Tsukuba, Japan (1985)



efficiency by continuous processing of mold-injection, heating, and rolling

• Oriented electrical steel sheets (1968)

2000's

- Support for customer's global expansion
- Advanced waste water risk management (i.e., installation of waste water closing gate) 🖸 p.
- Developed Rotary Hearth Furnace (2000) Recycled dust and sludge, generated in steelmaking process 🖸 p
- Highly-efficient GTCC power generation (2004)
- Generated more power than by conventional thermal means, using the same amount of fuel



- SuperDyma[®] (2000)
- Lead-free galvanized steel sheets for fuel tanks (2005)
- Stainless steel boiler tube (2007) Ultra-high-tensile steel sheet for automobiles
- Satisfied requirements for both collision safety and weight-reduction functionalities D p. 20



Toward becoming the world-leading steelmaker with comprehensive strengths

Expansion of usage of biomass resources (2010)

Utilize wood palette for packing, thinned wood, coffee grounds, and other resources as coal alternative fuel for power generation



Coffee around

- High-speed railway wheel for heavy freight
- Establishment of production and shipment system or 150 meter long rails (2014) 오 p. 2



- HRX19[™] stainless steel for highpressure hydrogen (2015) **pp.** 20, 24
- 7% Ni steel plate for LNG tanks Slashed the amount of nickel by about 20% but ensured the equivalent safety and strength to conventional levels
- Began waste plastic recycling Op. 14
- Creation of sea forests Beverly[™] Series (2004) 🖸 p. 29
- Japan-China Steel Industry Advanced Technology Exchange Meetings for
- EnvironmentalPreservation and Energy-
- saving (from 2005) 오 p. 25 Asia Pacific Partnership
- (APP; precursor of GSEP; 2006-2011)

 Global Superior Energy Performance Partnership (GSEP: from 2011) O p. 25 • Public and private collaborative meeting between the Japanese and Indian iron and steel industries (from 2011) Op. 25



- Public and private collaborative meeting between the Japanese and ASEAN iron and steel industries (from 2013) Onn 25 2
- Start development of CO₂ separation and recovery technologies (2005) • SCOPE21 (2008; Oita) 오 p. 31
- SCOPE21 (2013; Nagoya) 🔈 p. 31
- Completion of the first commercial model of CO₂ separation and recovery facility (2014: Muroran Works)
- COURSE50 (2015; construction of an experimental blast furnace) **D** p. 30

• FIFA World Cup Korea/Japan (2002) The 2005 World Exposition, Aichi, Japan (2005) Lehman Shock (Global Financial Crisis) (2008)

- The Great East-Japan Earthquake and Tsunami (2011)
- · Opening of the entire line of the Kyushu Shinkansen Line (2011)
- Opening of the Tokyo Skytree (2012)
- Consumption rate hike to 8% (2014)
- Opening of the Hokuriku Shinkansen Line (2015)
- Opening of the Hokkaido Shinkansen Line (2016)

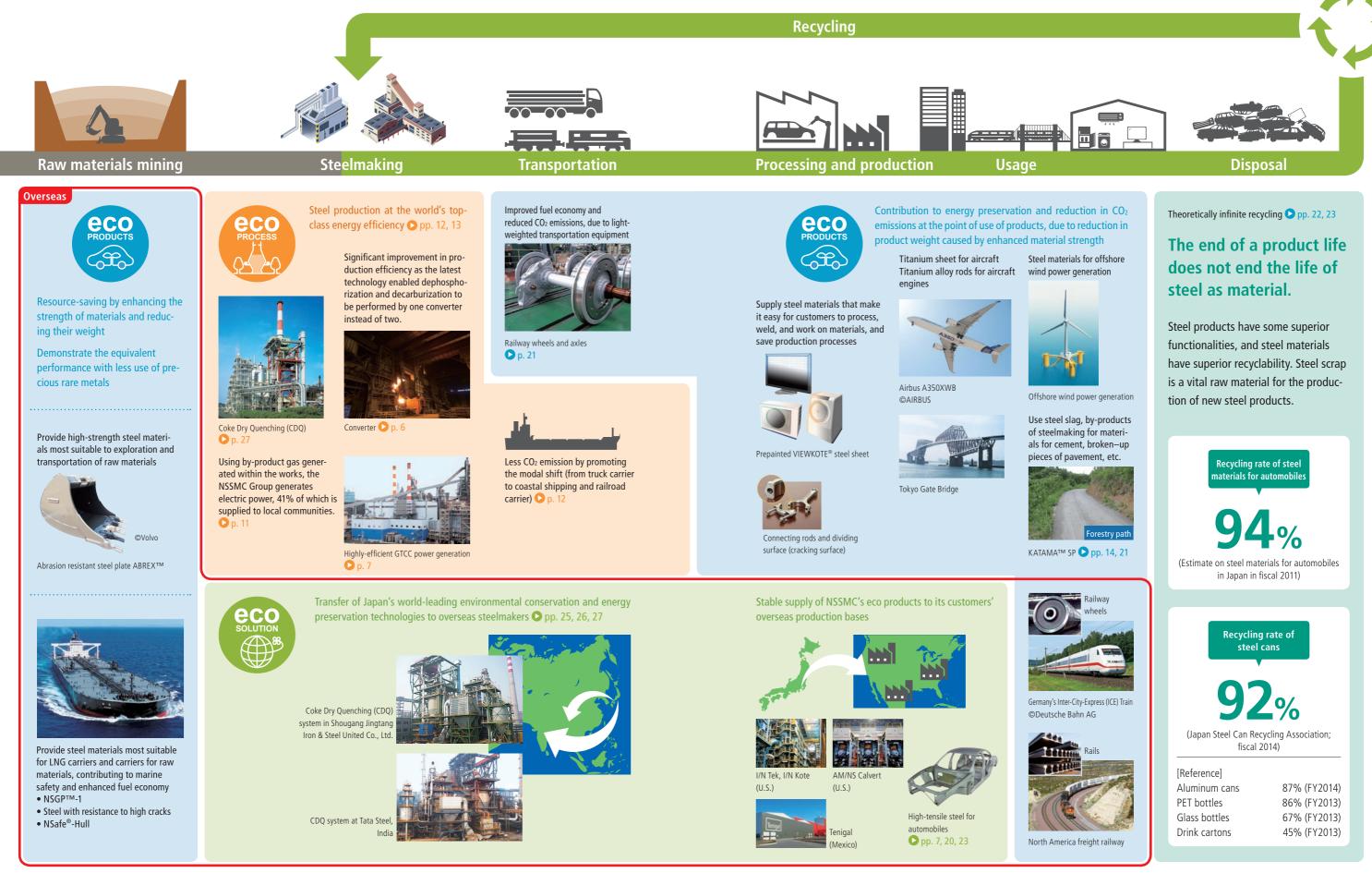
NSSMC makes

with the

"three

• NSSMC's value chain contributes to society with its "three ecos"

NSSMC creates value for society at every stage of the life cycle of steel with its "three ecos."



Recycling and environmental aspects of energy and natural resources

Nippon Steel & Sumitomo Metal Corporation (NSSMC) is committed to reduction of the environmental burden created by production activities and manufacturing processes.

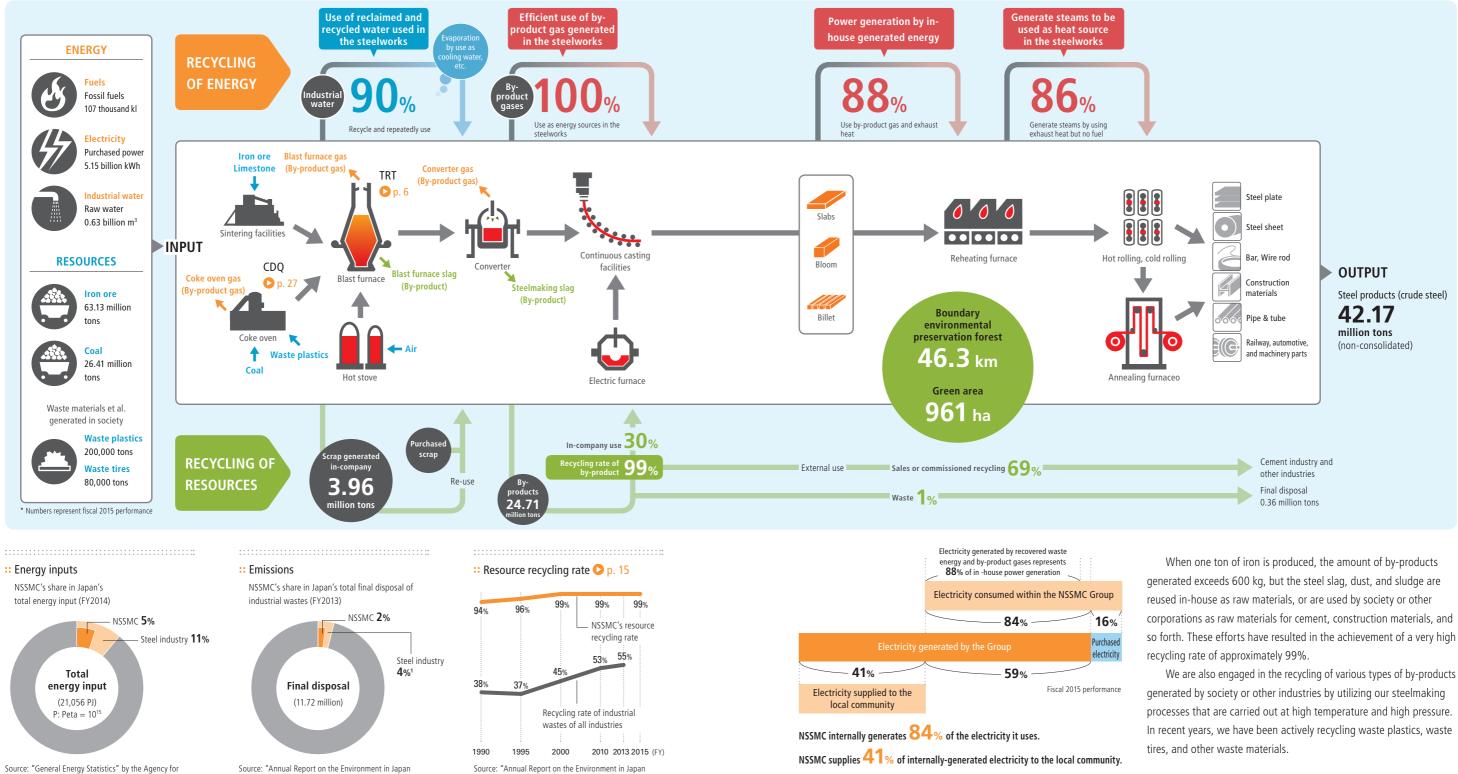
2016" by the Ministry of the Environment

1 Estimate

We make continuous efforts in all processes to not waste limited resources and energy.

NSSMC uses iron ore mined overseas, coal as an iron ore reductant, and scrap generated by society as its main raw materials for steel production.

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



2016" by the Ministry of the Environment

Natural Resources and Energy JISF (Japan Iron

and Steel Federation)

In addition, NSSMC itself generates 84% of the electricity it uses at steelworks, 88% of which is from internally generated energy sources such as waste heat and by-product gases. 90% of water used for cooling and cleaning products and manufacturing equipment is repeatedly re-used.

corporations as raw materials for cement, construction materials, and so forth. These efforts have resulted in the achievement of a very high

processes that are carried out at high temperature and high pressure. In recent years, we have been actively recycling waste plastics, waste

Global warming countermeasures

Nippon Steel & Sumitomo Metal Corporation (NSSMC) promotes energy conservation and CO₂ emissions reduction throughout the entire supply chain: manufacturing, transportation, and final use of products. We also actively work at innovative technology development and transfer of established technology to our overseas operations, helping them to contribute to CO₂ reduction over the medium- and long-term.

Achieved the world's top-class energy efficiency

Japan's steel industry invested ¥3 trillion in plant and equipment in the 1970s and 1980s and realized 20% energy saving. From 1990 to 2012, ¥18 trillion was invested to achieve 10% energy saving.

• Continue CO₂ emission reduction by implementing the three ecos

Following the Voluntary Action Plans, the industry is now participating in the Action Plans for the Realization of a Low-Carbon Society.

• Work to achieve further CO₂ emission reduction through development of innovative technology



The industry aims at technological development for about 30% CO₂ emission reduction, by adoption of an innovative steelmaking process (COURSE50). **(**) p. 30

• Work to achieve further CO₂ emission reduction by raising efficiency in logistics

Maintain and further improve NSSMC's high modal shift ratio¹ of 95.8%; improve transportation efficiency by using larger vessels (changing from 700 tons to 1,500 ton vessels) in domestic coastal transport and taking other measures; and improve fuel economy by introducing energysaving timetable management, lightweight vehicles, etc.



Promote energy saving efforts in offices and at home

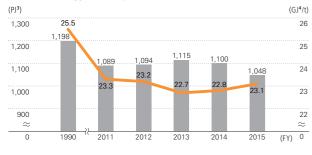
A policy of lights-out during lunch breaks, a business-casual dress code during summer, eco-no-working days, etc. has been implemented in offices. So as to encourage employees make energy-saving efforts

at home and actually reduce emissions, keeping records in a Household Energy Diary has been promoted.



https://www.kankyo-kakeibo.jp/ (only in Japanese)

:: NSSMC's energy consumption



Energy consumption (left scale) Energy consumption per ton of crude steel (right scale)

3 PJ indicates peta-joules (1015 joules).

A joule is a unit of energy, or amount of heat.

4 GJ indicates giga-joules (10⁹ joules)

والمام والمعمومة التلام والمعام والمعام

Logistics sector's to	on-kilomete	er achie	evements fo	or FY20	(Reference)
	Transportation 10,000 tons		Millior ton-kilomete		g-CO2/ ton- kilometers
Ship	1,837	(54%)	9,709	(87%)	39
Railway	5	(0%)	29	(0%)	25
Truck and trailer	1,551	(46%)	1,462	(13%)	211
Total	3,393	(100%)	11,200	(100%)	

1 Modal shift rate: A modal shift indicates the domestic freight transport shift from truck carrier to coastal shipping and railroad carrier as a countermeasure against global warming. A modal shift rate is a percentage of cargo volume transported over a distance of 500 km and more by rail or sea (including ferry) (as defined by the Ministry of Land, Infrastructure, Transport and Tourism).

2 ton-kilometer: Total sum of the weight of load (ton) transported multiplied by transport distance (km) The reference amounts (in grams) of CO2 emissions per ton kilometer travelled are the average for all industries (Ministry of Land, Infrastructure, Transport and Tourism)

:: NSSMC's energy-derived CO₂ emissions



CO₂ emissions related to energy sources (left scale) - CO2 emissions per ton of crude steel (right scale)

5 A provisional value based on the assumption that the CO₂ level in a unit of purchased electricity in FY2015 is the same as in FY2014

Achieved the world's top-class energy efficiency

From the time of the first oil crisis until around 1990, NSSMC intensively promoted continuous processing, exhaust heat recovery, and other measures, all to enable significant energy conservation. This has led to NSSMC and Japan's steel industry as a whole achieving the world's top-class energy efficiency. \rightarrow Graph A

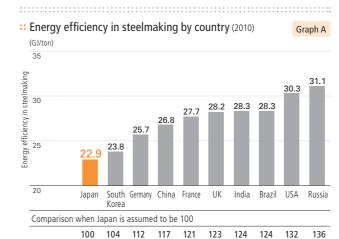
Continue CO₂ emission reduction by implementing the three ecos

Based on the 32.2 billion metric tons of CO₂ emissions from worldwide fossil fuel combustion in 2013, Japan's product emissions represent 3.8% of global CO₂ emissions from combustion of fossil fuels. Japan also accounts for 2.7% of worldwide greenhouse gas emission, according to estimates by the International Energy Agency in 2010.

According to the latest data available, Japan's CO2 emissions from fossil fuel combustion amounted to 11.9 billion metric tons in 2014 and the industrial segment accounted for roughly one-third of that. As a member of the Japan Iron and Steel Federation, NSSMC has been playing a part in CO₂ emission reduction of the industrial segment through implementing "eco processes," and introducing "eco products" and "eco solutions" in Japan and overseas. \rightarrow Graph B

In the Voluntary Action Plans up to fiscal 2012, energy consumption for fiscal 2008 through fiscal 2012 was reduced by 11.1% relative to the fiscal 1990 level (CO₂ emission in total was reduced by 11.2% in volume and CO₂ emission per ton of crude steel was reduced by 10.0%), achieving participants' goals.

From fiscal 2013 on, NSSMC has been participating in the Action Plans for the Realization of a Low-Carbon Society for further CO₂ reduction by means of the three ecos. The industry-wide efforts are made to achieve the Phase I goal of CO₂ reduction of 5 million tons by fiscal 2020 by fully implementing state-of-the-art technologies. → Graph C



Source: International Comparisons of Energy Efficiency (Sectors of Electricity Generation, Iron and steel, Cement), RITE, 2010 (The Japanese translation and numerical values were provided by the Japan Iron and Steel Federation.)

The most effective measure against global warming is energy conservation, and therefore NSSMC is striving to improve energy efficiency by using energy generated in steelmaking processes, including power generation through use of by-product gas or exhaust heat recovery, or by reusing waste plastics and discarded tires. As a result of these efforts, the NSSMC and affiliated electric furnace companies⁶ consumed 1,048 PJ of energy and emitted 91 million tons (preliminary)⁵ of CO₂ in fiscal 2015.

6 Affiliated electric furnace and other companies: Osaka Steel Co., Ltd., Godo Steel, Ltd., Nippon Steel & Sumikin Stainless Steel Corporation, Nippon Coke & Engineering Co., Ltd, 5 cooperative thermal power companies, and 2 sanso centers, and others

Promote innovative technology development

In addition to promoting the three ecos, the industry has worked at developing the innovative steelmaking process (COURSE50) from a medium- to long-term CO₂ emission reduction perspective. From 2023 onward, under the Action Plans for a Low-Carbon Society, the global warming countermeasures will be steadily implemented on the basis of the three ecos and COURSE50.

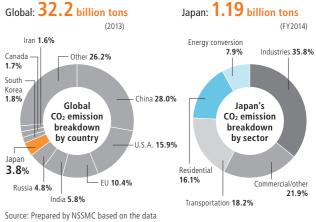
:: Japan Iron and Steel Federation's Action Plans for a Low-Carbon Society ("Three ecos and innovative technology development") Graph C

	Eco process	Eco products	Eco solution
CO ₂ emission reduction plans	Aim at improving energy efficiency	Contribute to emission reduction when steel materials are used in final products	Contribute to world- wide energy reduction by technology transfer and diffusion
Phase I FY2020	5 million tons ⁷	34 million tons	70 million tons
Phase II FY2030	9 million tons ⁷	42 million tons	80 million tons

Development of innovative steelmaking processes (COURSE50) 🕑 p. 30

7 The target reductions in CO₂ emission volume are based on a certain crude steel production assumption

:: Breakdown of CO₂ emissions from fossil fuel combustion Graph B



from the IEA

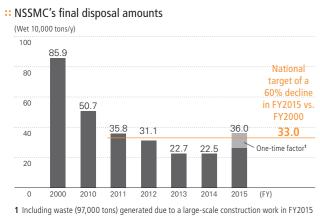
Source: Ministry of the Environment

Contributing to creation of a recycling-oriented society

Nippon Steel & Sumitomo Metal Corporation (NSSMC) not only works for the realization of zero emissions and low environmental impacts, and recycling of in-house by-products, but also is actively engaged in recycling of waste generated by society or other industries, by utilizing its iron-making process.

Promotion of in-house zero emissions

By-products generated and the amount finally disposed In the iron-making process, over 600 kg of by-products are generated for every ton of iron produced. In fiscal 2015, NSSMC produced 42.17 million tons of crude steel and generated 24.71 million tons of by-products. The majority of these by-products were recycled inside and outside the company. NSSMC's final disposal of industrial wastes amounted to approximately 360,000 tons but maintained a very high recycling rate of 99%.



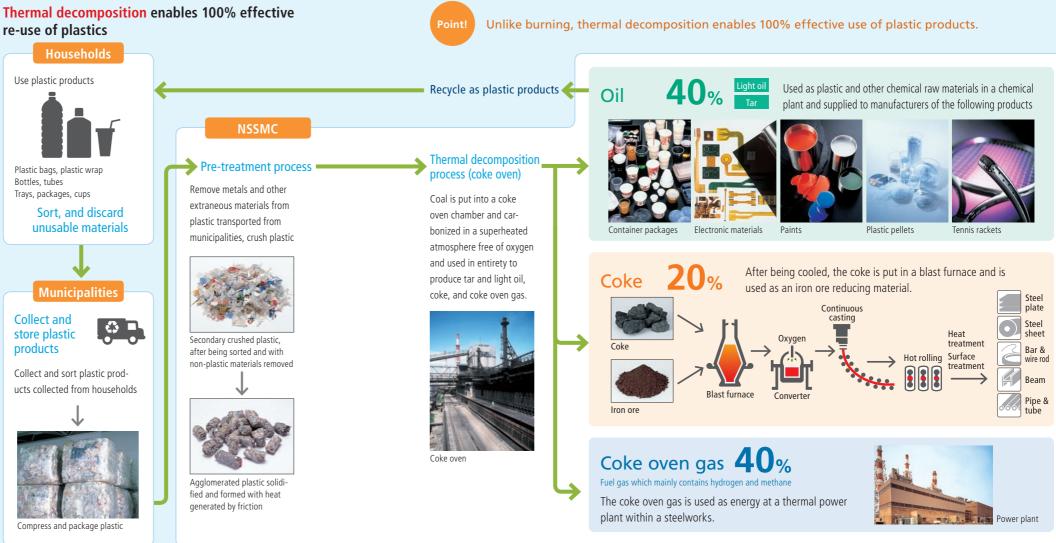
Recycling of steel slag

Steel slag is almost entirely utilized. Approximately 70% of blast furnace slag is used for cement, while steelmaking slag is used for materials for road bases, civil engineering work, fertilizer, soil improvement, etc. For example, Calcia modified soil, a mixture of steelmaking slag and dredged soil, has the beneficial effects of improving the strength and inhibiting the elution of phosphorus, the generation of hydrogen sulfide, etc. in dredged soil. It has also been used to improve the marine environment, including restoration of seaweed beds and creation of wetlands and tideland. NSSMC's pavement materials, KATAMA™ SP, taking advantage of characteristics of steel slag, are used for forest roads and farm roads, as well as for weed preventive pavement to be installed near mega-solar panel installations and other locations.

"Blast furnace cement," a mixture of pulverized blast furnace slag and ordinary Portland cement, contributes to a 40% reduction of CO2 emissions during manufacturing, since the cement-making process can be omitted. It also exhibits superior long-term strength and is registered as an Eco Mark product. Due to the effects of reduction in mining of natural crushed stone and less energy consumption in the cement making process, steel slug product are designated as a "designated procurement item" under the Green Purchasing Law, and included in the Common Specifications for Civil Engineering Work compiled by the Ministry of Land, Infrastructure, Transport and Tourism.

Recycling of dust and sludge

To recycle the dust and sludge generated in the iron manufacturing process to be used as raw materials, NSSMC operates a dust reduction kiln (RC: Resource circulating oven) at the Kashima Works and a rotary hearth reduction furnace (RHF) at the Kimitsu Works, the Hirohata



Works, and the Oita Works (Hikari Area)². This enables us to recycle all internally-generated dust. In March 2009, we obtained special approval for RHF under the Waste Disposal Act to carry out recycling of externally-generated dust as well.

2 Oita Works (Hikari Area): Transferred to Nippon Steel & Sumikin Stainless Steel Corporation.

:: By-products and recycling

By-product	Process of generation			Recycling application	Recyclin	ng rate
		FY2014	FY2015		FY2014	FY2015
Blast furnace slag	Components other than iron melted in blast furnace	13.46	12.65	Blast furnace cement, fine aggregate, road base, etc.	100%	100%
Steelmaking slag	Substances other than steel generated in the steelmaking process	6.28	5.65	Road base, civil engineering materials, fertilizer, etc.	99%	98%
Dust	Fine dust collected with a dust collector	3.38	3.41	Raw materials for use in-house and also zinc refining	100%	100%
Sludge	Water treatment sludge, residue from plating solution, road cleaning sludge	0.39	0.40	Raw materials for in-house use	90%	87%
Coal ash	Ash from coaled-fired power plants	0.53	0.51	Cement raw materials	100%	100%
Waste furnace materials	Refractories from steelmaking facilities and furnace facilities	0.28	0.28	Reuse, road base, etc.	71%	65%
Others	Scale, etc.	1.73	1.82	In-house use, others	96%	94%
	Total	26.05	24.71	Total recycling rate	99%	99%



Recycling of waste plastics and waste tires

NSSMC recycles 100% of plastic containers and packaging and all discarded tires by using them in the steelmaking processes.





Promotion of environmental risk management

NSSMC is promoting management of environmental risk with the aim of continually enhancing preservation of the environment in various regions, with due consideration of environmental risks, which differ by each steelworks and factory, and with due consideration to compliance with Japan's Air Pollution Control Act and other regulations. We are also engaged in reducing environmental risk throughout the Group.

Activities for reducing environmental risks

Atmospheric risk management

In order to reduce emissions of sulfur oxides (SOx) and nitrogen oxides (NOx), NSSMC is taking measures such as using low-sulfur fuel, adopting low NOx generating burners and installing effective equipment, including equipment that reduces SOx and NOx emissions. To curb emissions of soot and dust generated from factories and raw material yard, we try to enhance their collection by installing dust collectors and prevent scattering of particles by installing windscreens and sprinklers, based on air pollution risk analysis through scientific simulation. We also conduct constant monitoring and regular patrols to ensure that no abnormal emissions are released outside.

Water quality risk management

NSSMC uses approximately 6 billion m³ of freshwater a year at all of our steelworks and factories combined. Approximately 90% of this is re-circulated or reused. We try not to waste precious water resources, and to control wastewater discharge. To achieve this, we make daily efforts to maintain and improve the performance of wastewater treatment equipment, and the inspection and control of wastewater quality.

In consideration of the importance of preventing water pollution, we have installed devices such as detectors, control valves, and emergency water storage pits. We also strive to check, repair, and maintain equipment in order to prevent water pollution, and to train our personnel in methods of checking of operations and controlling work procedures.

Soil risk management

We are taking appropriate measures in compliance with the Soil Contamination Countermeasures Act, guidelines issued by the Ministry of the Environment, local government ordinances, and so on. We report to the local government when performing landform modification work such as excavation which is required to be reported. We conduct pollution surveys when needed.

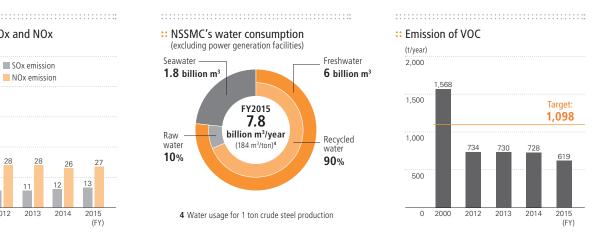
Chemical substances discharge control

Comprehensive control of discharge

NSSMC appropriately manages and tries to improve the production, handling, and discharge or disposal of chemical substances in accordance with the PRTR Act¹, Chemical Substance Control Law², Volatile Organic Compounds (VOC)³ voluntary management, and other laws concerning the management of chemical substances as well as following the voluntary management procedures set by the Japan Iron and Steel Federation (JISF) and NSSMC.

NSSMC also took the lead to promote use of alternatives to steelmaking materials and equipment that contain hazardous materials such as asbestos and polychlorinated biphenyl (PCB). We have been replacing or disposing of possibly risky parts and materials, according to handling standards that ensure safety.

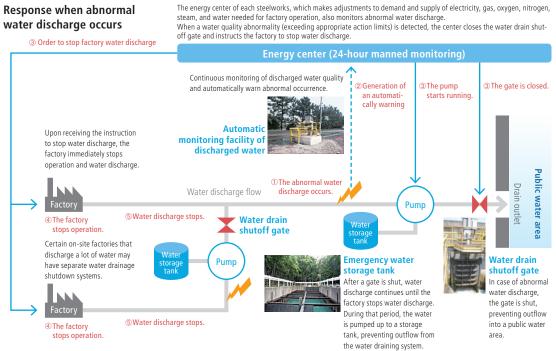
- 1 PRTR Act: An abbreviated name of the Act on Confirmation, etc., of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof. PRTR stands for Pollutant Release and Transfer Register.
- 2 Chemical Substance Control Law: An abbreviation of the Law Concerning the Examination and Regulation of Manufacture of Chemical Substances.
- 3 Volatile organic compounds (VOC): Organic chemical compounds emitted into the atmosphere in the form of gases, which are considered to be the source of undesirable airborne particles and photochemical oxidants, which became subject to control under the Air Pollution Control Act of 2004, as amended.



Examples of Environmental Initiatives at Steelworks ~

Precautions for mitigating the risk of abnormal water discharge

NSSMC has implemented measures on facilities to prevent abnormal water discharge to outflow from steelworks in case of operational trouble.



Development and commercialization of technology for zero emissions in the integrated steelworks (Nagoya Works)

In the iron-making process, over 600 kg of by-products are generated for every ton of iron produced. These by-products include steel slag, dust, and sludge¹, the majority of which are recycled in and out of the company. Sludge, however, was conventionally disposed in landfill as it was difficult to recycle. Its low recycling rate was a bottleneck in promoting zero emissions. This led NSSMC's Nagoya Works to make progress in development and commercialization of comprehensive recycling (see the table below) and has realized zero emissions, contributing to reduction in the disposal volume and less usage of natural resources by utilizing iron content of sludge.

This project received the Ministry of Economy, Trade and Industry Minister's Award for Resources Recirculation Technologies and Systems in 2015.

1 Muddy by-product sludge collected from industrial wastewater

	Conventional treatment	
1. Cold-rolled wastewater treatment sludge to be fully recycled	The sludge contains metals other than iron and is difficult to recycle.	Fully recycle metals. Resi tion is optim
2. Wastewater treatment sludge in coal-fired thermal plants to be halved in volume and recycled into raw materials	The sludge in coal-fired thermal plants con- tains substantial fluorine and is difficult to be recycled.	Generation and sludge i
3. Oil-contained wastewater treatment sludge to be fully used as fuel	Some oil-contained sludge generated in the cold heading process is incinerated by outside vendors.	Oil-containe blending wit

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2013

:: Emission of SOx and NOx

SOx emission

(10⁶Nm³

100

80

60

40

20

0 1973 1975 2012



Column

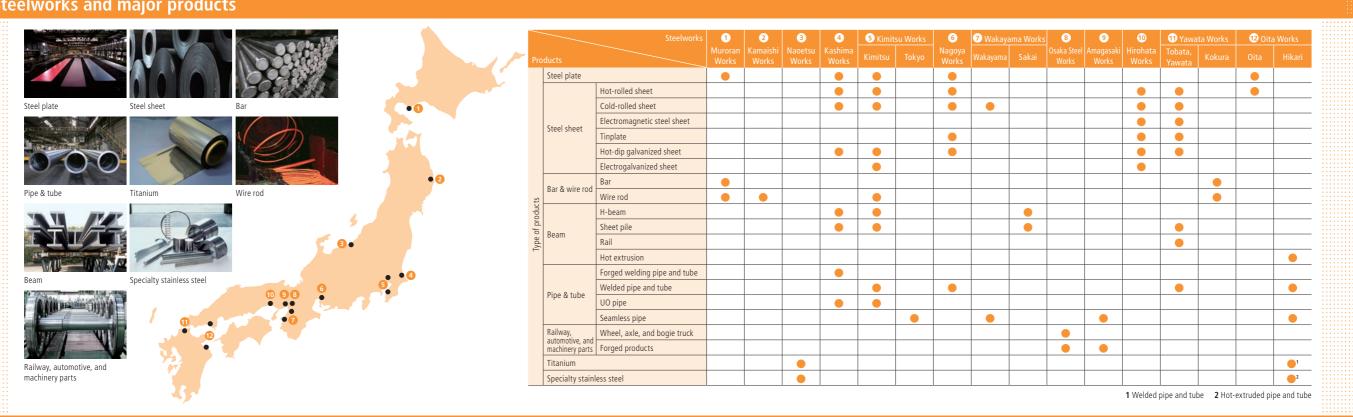
ed. The wastewater separation prevents mixing of iron with other idue water is reduced due to enhanced dewatering and the composi nized for sludge to be recycled as an iron source.

of fluorine and other residues is restrained. Less sludge is generated is recycled as an iron source.

ned sludge is shaken and dewatered, and fully reused as fuel by ith other waste oil with high heat potential

NSSMC's envi

Steelworks and major products



Environmental measures at steelworks



17



ECO PROCESS (The way We acture is "eco-friendly")

NSSMC's

NSSMC's eco-friendly products help reduce environmental burden

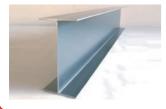
Titanium foil for fuel cell stack

Titanium foil is adopted in parts for vehicular fuel cells, which emit only water and no CO2. It has excellent anti-corrosion performance even inside the highly corrosive fuel cells. Being lightweight, it also contributes to improved fuel efficiency



SMart BEAM[™], a lightweight welded H-beam

SMart BEAM[™] is a lightweight welded H-beam manufactured from hot-rolled steel. Due to its strength and light weight, it has been adopted for use inas beams for prefabricated houses as well as wooden houses. The high levels of its dimensional precision and durability have been highly acclaimed.



High-tensile-strength steel materials

High-tensile-strength steel materials for automobiles help overcome two challenges: improvement in fuel efficiency by reduction of vehicle body weight, and ensuring the safety of passengers at the time of a collision. These materials are also superior in workability.



HRX19[™], stainless steel designed for high-pressure hydrogen environments HRX19[™], the stainless steel designed for highpressure hydrogen environments, has excellent resistance to hydrogen gas embrittlement, strength of roughly twice that of conventional steel, and excellent weldability. The material, by being used for high-pressure hydrogen stations and fuel cellpowered vehicles, contributes to the realization of a hydrogen-oriented society. **>** p. 24



Left: Conventional SUS316L stainless steel pipe Middle and right: HRX19™ stainless steel pipe

Tough Guard[™] Mild, smooth-surfaced high-corrosion resistant coated wires

Tough Guard[™] Mild are coated wires that have roughly five times the corrosion resistance than conventional Zn-Al alloy coatings. Excelling in corrosion resistance when bent and welded for use, the wires can contribute to longer service lives of social infrastructure, such as when used for wire mesh and other products.



Tinplate for beverage and food cans

Tinplate for beverage and food cans can be recycled many times. Moreover, it helps protect food safety due to its strength, and ts thinness minimizes container weight, thereby contributing to improving transportation energy and efficiency.



Our Group's products have advanced functions and reliability, which are based on our superior technological capabilities, and are used in diverse areas including energy, transportation and construction equipment, and household products. They typically help our customers become more efficient while making their products lighter or lengthening product life. That translates into the saving of resources and energy, and into a reduction in CO₂ emissions at the point of use at our customers, thereby contributing to lessening the environmental burden.



instead of three times. The material contributes to the reduced use of paint, and is thereby friendly to the environment. Particularly in high-chloride content environments, CORSPACE™ shows performance superior to that of conventional steel

CORSPACE™



The world's longest 150-meter railway rails

Rails for railways are ordinarily cut into 25-meter standard lengths for shipment to customers. The 150-meter rails reduce the number of joints between rails, which are one of the causes of noise and vibration that affect the comfort of passengers. It also reduces requirements for welding.



NSSMC's 150-meter railway rails are adopted for the Hokkaido Shinkansen (bullet train) Courtesy of Hokkaido Railway Company







Corrosion Resistance Steel for Painting Cycle Extension,

CORSPACE[™] has a superior corrosion resistance property and effectively reduces the need to repaint a bridge to once every 100 years

NSafe[™]-Hull, a highly ductile steel plate for shipbuilding

NSafe[™]-Hull has excellent ductility and substantially improves a ship's collision safety by absorbing more energy and having a higher anti-rupturing performance than conventional steel. It contributes to protecting cargo and preventing oil leakage that could otherwise result in severe environmental pollution



KATAMA[™] SP (special), a fastcuring roadbed material

KATAMA[™] SP, with its enhanced compaction properties derived from mixing steelmaking slag with water, is a fastcuring roadbed material. It prevents weed growth, helps maintain the generation efficiency of mega-solar power stations, and reduces mowing requirements of idle lands and median strips.



ECO PRODUCTS (What we

produce is "eco-friendly")

Steel can be reborn many times in whatever form

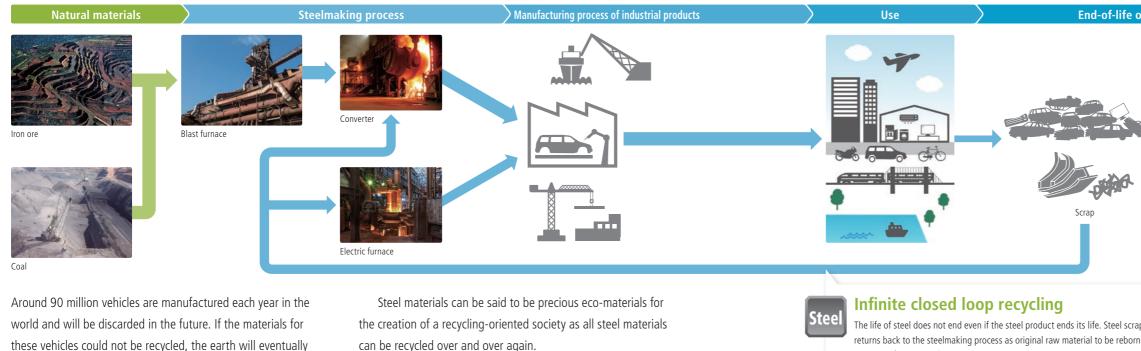
Automobiles, electric appliances, buildings, bridges, and various other industrial products made of steel support our living.

Each such industrial product has its service life. After they fulfill their lives, many of the non-steel materials are discarded, due to

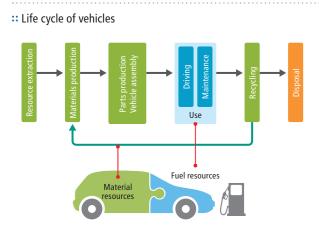
problems in quality or economic efficiency, or recycled in a limited way. In contrast, steel materials are recycled as scrap and reborn as new steel products. This type of recycling is called "closed loop recycling." While converter furnace steel materials are mainly made of iron

ore, which is a natural resource, and scrap, the sole main material for almost all electric furnace steel materials, is scrap

Some people tend to mistakenly think that electric furnace steel material is recycled material, whereas the converter furnace steel

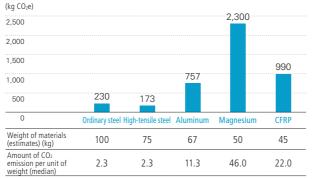


Car making according to LCA-based environmental specifications



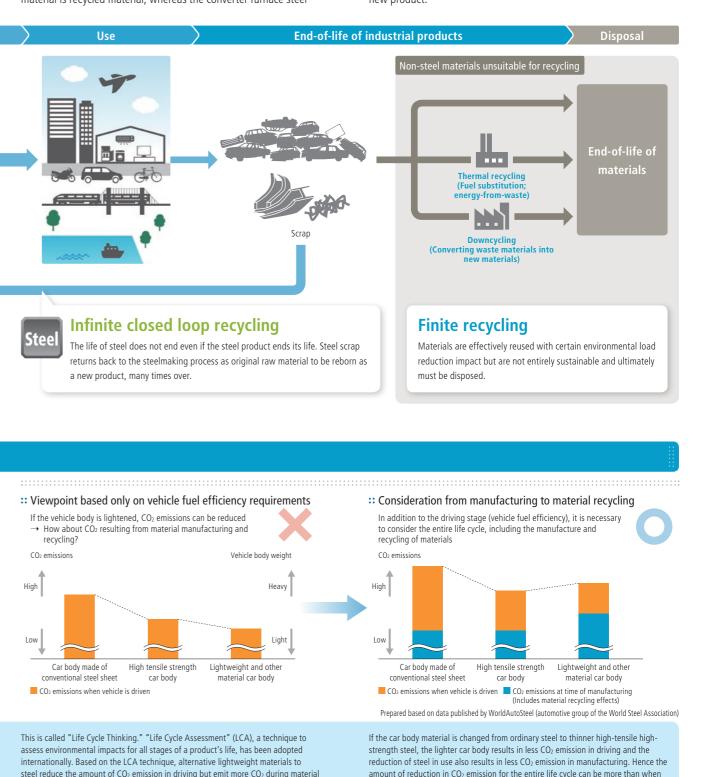
Automakers aim to reduce environment burden by improving fuel efficiency of vehicles. In addition to powertrain technology for enhanced efficiency of engines and automotive electrification, weight reduction of the car body is an important measure. In pursuit of enhanced safety and improved performance of electrical components, automobiles tend to become heavier. In order to satisfy various needs and requirements, weight reduction of car bodies is desired more and more.

:: Comparison of the amount of CO₂ emission in manufacturing of materials or ordinary steel and equivalent automotive materials (for car bodies)



Prepared based on data published by WorldAutoSteel (automotive group of the World Steel Association)

In recent years, aluminum, plastic, carbon fiber reinforced plastic (CFRP) and other materials which are lighter than steel have been adopted for car bodies for the improvement of fuel efficiency (reduction of greenhouse gas emission while driving). However, materials for vehicles need to be evaluated not only in terms of the level of CO₂ emission reduction by higher fuel efficiency. The amount of CO2 emission for the entire life of a vehicle, namely from material manufacturing to disposal of the vehicle, needs to be considered.



steel reduce the amount of CO2 emission in driving but emit more CO2 during material manufacturing

be overloaded with unutilized waste.

material is not. In fact, scrap is also used in the converter furnace steel material. Steel products, including both of those materials, are recyclable resources to be collected as scrap and to be reborn as a new product.

other lightweight alternative materials are used.

NSSMC's envi

Contributing to a Hydrogen-Based Society

The NSSMC Group provides advanced materials for the realization of a Hydrogen-Based Society

Advanced materials for fuel cell vehicles

The commercial launch of fuel cell vehicles (FCV) which run on hydrogen instead of gasoline, and construction of the first hydrogen stations for fueling FCVs, began in the year under review. Progress has been made recently toward the realization of a Hydrogen Society.

In this, use of titanium, that has outstanding lightness, strength, and corrosion resistance, is of great importance. NSSMC has developed a method of manufacturing special rolled titanium foil, which has been adopted for fuel cell parts (the parts that make up the cells inside the fuel-cell stack) of the Mirai FCV produced by Toyota Motor Corporation.

Just like an electric vehicle or a hybrid vehicle, a fuel cell vehicle is powered by a motor, a device that converts electrical power to motive force. NSSMC's electromagnetic steel sheet is made for use in motor cores and contributes to world-class efficiency of this part, and has been adopted for the Mirai car as well.

Other NSSMC materials too are used in FCVs. They include hightensile high-strength steel sheets which help reduce automobile weight while ensuring collision safety performance.



Toyota Motor Mirai fuel-cell vehicle Image provided by Toyota Motor Corporation



Fuel-cell stack Image provided by Toyota Motor Corporation

Image provided by Toyota Motor Corporation

Stainless steel for high-pressure hydrogen environments, HRX19[™]—a revolutionary product for a Hydrogen-Based Society

For eco-friendly fuel-cell vehicles to become used in significant numbers requires certain infrastructure, including hydrogen stations, to be established. NSSMC and Nippon Steel & Sumikin Stainless Steel Pipe Co., Ltd. (NSSMC's fully-owned subsidiary), have jointly developed a stainless steel for high-pressure hydrogen environments, HRX19™, that has already been used for pipes, joints, and valves in the highpressure hydrogen environments of hydrogen stations.

Nippon Steel & Sumikin Pipeline & Engineering in the NSSMC Group has entered the hydrogen station construction business. Its first hydrogen station using HRX19 was constructed in Shiomi, Tokyo in March 2016.



Hydrogen Station (Shiomi, Tokyo)

As hydrogen is a small molecule, it can be introduced into the metal but there it can cause brittleness and a tendency for fracture to occur. By blending additives to stainless steel and developing a new heat treatment method during manufacturing, HRX19[™] overcomes the problem of embrittlement and both made a longer product life possible and improved the safety of pipes for hydrogen stations.

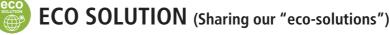
Moreover, HRX19[™] is approximately twice as strong as conventional SUS316L stainless steel, enabling the design of thinner pipe walls even for high-pressure hydrogen environments, and for pipes to be made with greater inside diameters, resulting in larger capacity and shorter hydrogen filling times. Furthermore, it is lightweight and provides the

additional merit of reducing CO₂ emission while transported.

Moreover, welding can be done to HRX19[™], without requiring joints, whereby a contribution is made to reduction of construction and maintenance costs. **D** p. 39



Left: Conventional SUS316L stainless steel pipe Middle and right: HRX19[™] stainless steel pipe



Technical cooperation and technology transfer promoted on a worldwide scale

With the understanding that the transfer of Japan's advanced energy-saving technologies overseas can be one of the most effective ways to globally reduce CO₂ emissions, Nippon Steel & Sumitomo Metal Corporation (NSSMC) is participating in many energy-saving and environmental initiatives in Japan and overseas. For example, we work with the World Steel Association, the Global Superior Energy Performance Partnership (GSEP), and directly with countries such as China and India.

Contribute to reduction of CO₂ emission on a worldwide scale

Japan's steel industry, including NSSMC, plays a leading role in the Global Sectoral Approach¹, a worldwide initiative to preserve the environment and conserve energy based on technologies accumulated in the steelworking industry. Japan's steel industry can contribute to reduction of CO₂ emission on a worldwide scale by transferring its advanced energy-saving technologies to emerging countries where there is the potential to improve energy efficiency. The reduction effects of CO2 emission by transfer of Japanese steelmakers' energysaving technologies have amounted to around 50 million tons per year in total. This is equivalent to 4% reduction in Japan's annual CO2 emission. Japan's steel industry, including NSSMC, is working on various projects to introduce Japan's advanced technology in this area to other countries.

Multinational and bilateral collaboration

As a member of the Japan Iron and Steel Federation, NSSMC is participating in multinational and bilateral projects for energy saving, in cooperation with the Japanese government.



hailand - Japan Public and Private Collaborative Workshop

Country/region	Year of launch	Λ
China	2005	Exchange between experts on advanced technolo The seventh exchange meeting was held in Beijing
India	2011	Exchange among public and private steel-related Prepared the List of Energy-Saving Technologies s NSSMC's briefing on the comparison of CO ₂ emiss
U.S., EU, China, India, and South Korea	2011	GSEP's Steel Section Working Group (with Japan a Discussion on steelworks energy issues with publi The last meeting as GSEP was held in Tokyo in Feb
ASEAN	2013	Exchange among public and private steel-related Prepared the List of Energy-Saving Technologies s Assessment of steelworks in Thailand and Malays

1 Global Sectoral Approach is a method to help solve global warming problems by seeking CO2 reduction potential based on sector-specific technologies and adopting the world's best energy-saving technologies

Standardization of methods to calculate CO₂ emission

NSSMC also participates in the Climate Action Program of the World Steel Association, which uses universal methods to calculate and report on the CO₂ emitted by steelworks. We have been selected as a Climate Action member. Recently, quite a few customers have sought confirmation that their steelmakers are Climate Action members. Efforts to standardize these calculation methods as ISO have been spearheaded by the Japanese steel industry. This had resulted in international standardization of the procedure as ISO14404 "Calculation method of carbon dioxide emission intensity from iron and steel production" in March 2013. It has enabled steelworks not participating in the World Steel Association to calculate CO2 intensity using universal methods. This marked the first step forward in greatly facilitating the global sectoral approach sought by the steel industry. NSSMC is promoting diffusion of ISO14404 through the initiatives taken by Japan and India, Japan and Southeast Asia, and other relations.

4 5 5 0 C A T O N	Nippon Steel & Sumitomo Metal Corporation
CLIMATE ACTION Member	In recognition of your participation in the worldsteel CO ₂ data
worldsteel	collection programme 2015-2016.
	Edwin Basson Wolfgang Eder Director General worldsteel Chairman

Climate Action member certificate

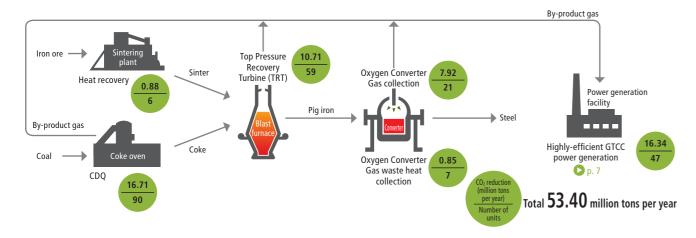
ogies for energy saving and environmental preservation g in October 2015. parties suitable for India sions in India and Japan was held in Tokyo in February 2016. as the chair) lic and private participants of various countries bruary 2016. parties uitable for ASEAN sia was conducted

Overseas steel industry's CO₂ emission reduction effects by introducing Japan's energy-saving equipment (accumulated up to fiscal 2014, JISF)

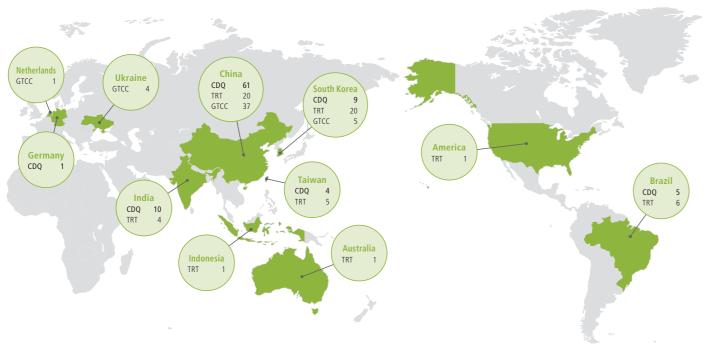
The NSSMC Group's technologies significantly contribute to overcome the environmental challenges of many countries throughout the world.

We are cooperating in energy-saving and other environmental initiatives in China, India, and elsewhere in the world, in the belief that the international technical transfer of our superior energy-saving

technologies is highly effective in reducing CO2 emissions and in other environmental countermeasures undertaken on a global scale. In India, especially, we are participating in a feasibility study for project that would be part of the joint crediting mechanism (JCM), an international technology-centered program initiated by the Japanese government.



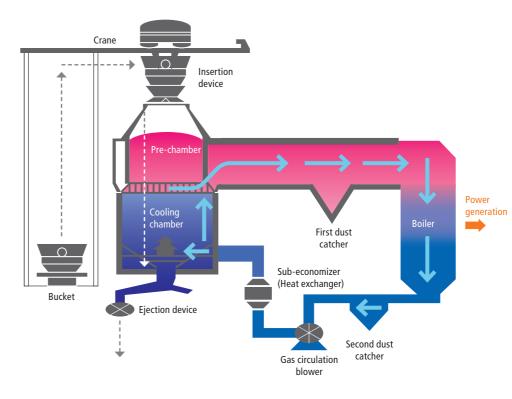
Japanese steel industry's energy-saving technologies are spreading globally (units installed in numbers)



* All 90 CDQ units were installed by the NSSMC Group (such as Nippon Steel & Sumikin Engineering)

Coke Dry Quenching (CDQ): system and features

Hot coke made in the coke oven is transported in a bucket to the CDQ equipment where it is injected from its top part down to the chamber. The coke is guenched with inert gas, while the hot gas (approx. 950°C) from the exhaust heat is collected, and transferred to the boiler where it generates steam for power generation. The hot gas



VOICE



Secretary General, SEAISI (South East Asia Iron and Steel Institute)

Supported by robust economic growth in each member country, ASEAN members' steel consumption has been increasing year after year. At the same time, with the growing globalization of the steel industry, there is a greater awareness among the steelmakers in the region of the need to ensure the sustainable development of the industry in all aspects. It is in recognition of the above that the ASEAN-Japan Steel Initiative (AJSI) was launched in 2013 to promote cooperation with regard to energy-saving and environmental protection. As part of this initiative, steel plant diagnoses were conducted by experts from NSSMC and other Japanese steelmakers at 11 electric furnace plants in the ASEAN region. On each occasion, the respective steel plants received advice on operational improvements and technology recommendations from the Japanese experts. Following that, some steel plants are now considering the adoption of the Japanese advanced energy-efficient technologies.

Additionally, in March 2016, the South East Asia Iron and Steel Institute (SEAISI) welcomed lecturers from NSSMC at its annual Traveling Seminar held in five member countries of SEAISI. These lecturers contributed towards the development of human resources and knowledge in the member companies of SEAISI.

The above are some examples of how the AJSI can contribute to enhance the ASEAN steel industry's competitiveness through cost reduction by the adoption of energy-saving measures. As the ASEAN steel industry is being increasingly urged to do more in the areas of energy saving and environmental preservation, we hope that the NSSMC Group will continue to extend its cooperation to SEAISI.

can be fully recycled by being quenched and circulated back to the chamber. By not using water as a cooling medium, the CDQ method raises the strength of the coke and contributes to stable operation of the blast furnace, an increase in tapping quantity, and reduction in consumption of the reducing agent.





ECO SOLUTION (Sharing our "eco-solutions")

Initiatives on conservation of biodiversity

As a member of Nippon Keidanren (Japan Business Federation), NSSMC participated in preparing the "Declaration on Biodiversity by Nippon Keidanren," published in March 2009, and has taken initiatives according to its declaration and action policy. Among them, interesting programs thus far are "Creation of Hometown Forests" and "Creation of Sea Forests," the world-leading pioneer projects.



"Creation of Hometown Forests"

Reproducing a forest similar to a nearby grove of the village shrine in steelworks

We have carried out the "Creation of Hometown Forests" projects at our steelworks and factories in Japan under the guidance of Dr. Akira Miyawaki, Director of the Japanese Center for International Studies in Ecology (professor emeritus of Yokohama National University), with the aim of facilitating harmonious coexistence between nature and humans. This project comprises research on the natural vegetation inherent to a certain area in a nearby

grove associated with a historical shrine, careful selection of suitable trees, growth of their saplings in pots, and planting them in designated places by local residents and our employees.



Free-planting by new employee

This was the first project by a private company in Japan to create a forest that harmonizes with the local scene and is based on an ecologi-

cal approach. This is one way we try to raise the awareness of our employees regarding the environment. At present, our forests in aggregate have grown to total around 960 hectares (about the size of 200 Yankee Stadiums).

Conserving biodiversity and sequestering CO₂

Wild birds such as bulbuls and eagles gather and animals such as Ezo red fox and deer visit the forests we make and maintain at our steelworks sites across Japan. Wild birds and animals inherent to the land return to the forests. Thus, the "Creation of Hometown Forests" helps conserve biodiversity, and sequester CO₂.

Creation of a forest by each steelworks

Mainly by "Creation of a Hometown Forest" based on the natural vegetation inherent to the region where the steelworks is, each steelworks has been making its own forest.

The Kimitsu Works and the Muroran Works have an annually treeplanting event organized for new employees. They plant seedlings grown from seedbeds made within their steelworks.

Some other works are also engaged in creation of forest in cooperation with their local community. The Amagasaki Works has participated in the Amagasaki 21st Century Forest Project co-sponsored by the City and Hyogo Prefecture and has contributed to establishing roadside greenery on a large scale. The Wakayama Works joined Wakayama Prefecture's "Corporate Forest" project. The Nagoya Works has taken biodiversity-friendly actions including installation of birdhouses and animal pathways and has also hosted greenery-observation tours.





Amagasaki 21st Century Forest Project

"Creation of Sea Forests"

Implemented in 37 spots in Japan to improve sea desertification

Sea desertification, a problem of the sea bed losing ability to support life due to a decline in kelp, brown seaweed, and other varieties of seaweed, is happening along about 5,000 km of the sea shore in various parts of Japan. To offset a part of the decline in the supply of iron from nature, which is said to be one of the causes for sea desertification, NSSMC has developed "Beverly[®] Series," iron supply units composed of steel slug, humus, and soil and steel slag and has been promoting regeneration of seaweed beds by use of these units.



Deserted sea bed





By mixing with humus, the iron eluted from steel slug is prone to be absorbed by plants without becoming oxidized

NSSMC's e

ECO SOLUTION (Sharing our

"eco-solutions"

After one year, kelp is flourishing at Mashike Town in Hokkaido

R&D efforts for nurturing living creatures

NSSMC's Advanced Technology Research Laboratories has a division called the Environment Research Lab, located in Futtsu City, Chiba Prefecture. The lab has installed a marine environment simulator called Sea Lab (photo on the right) and



has been engaged in scientifically ascertaining the effectiveness and safety of utilizing steel slag for creating sea forests. In addition, the lab is striving to develop resin and oil by using seaweed, which has proliferated as a result of sea forest creation, another of our initiatives.

As it has also been known that not only seaweed but also steel slag can be useful to help grow rice and other agricultural products, research to use steel slag as fertilizer on farmland is also under progress.



With the aim of preventing global warming, Nippon Steel & Sumitomo Metal Corporation (NSSMC) is taking on a challenge in the form of the "CO₂ Ultimate Reduction in Steelmaking Process by Innovative Technology Project," in addition to making efforts to reduce CO₂ by further improving its world's highest energy efficiency.

Environmentally harmonized steelmaking process technology development "COURSE 50"

Since fiscal 2008, four blast furnace steelmakers including us, and Nippon Steel & Sumikin Engineering, have been working on the "CO2 Ultimate Reduction in Steelmaking Process by Innovative Technology for Cool Earth 50 (COURSE 50) Project" which is aimed at developing dramatically new CO₂ reduction technology. Its goal is to develop technology to reduce CO₂ emissions in the steelmaking process by 30% through technology that reduces iron ore using hydrogen amplified coke oven gas to curb CO2 emissions from blast furnaces as well as technology that uses hitherto-unused exhaust heat to separate and recover CO₂ from blast furnace gas.

Regarding iron ore hydrogen reduction technology, by fiscal 2012, we comprehended hydrogen reduction characteristics at a laboratory bench level, participated property eluicidation and performance qualification tests of the hydrogen reduction process at a test blast furnace in Sweden, and conducted verification tests of hydrogen amplification of coke oven gas at the Kimitsu Works. With regard to CO₂ separation

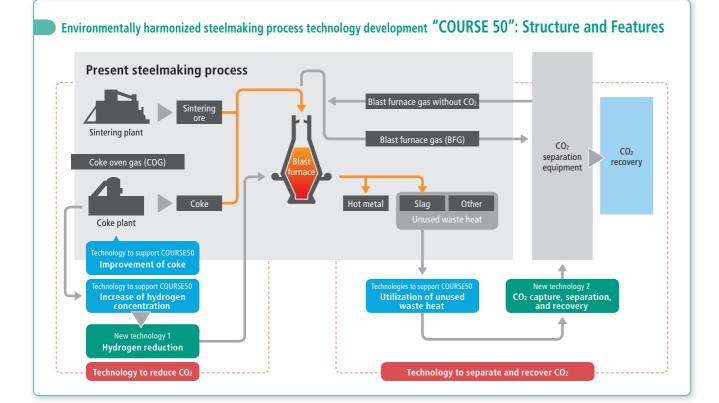
and recovery technologies, verification tests of CO2 separation and recovery from blast furnace gas were conducted at the Kimitsu Works, while low-temperature exhaust heat recovery verification tests were conducted at Kashima Works, among others. These tests played a substantial part in obtaining desired research results of Phase 1.

In Phase 2 (fiscal 2013–2017), our main focus is to verify technologies to reduce CO₂ emissions from a blast furnace in a comprehensive manner. A 12 m² test blast furnace was constructed within the Kimitsu Works and completed two hot trial operations. Starting in fiscal 2016, we are committed to R&D efforts, mainly in the following research areas: test blast furnace research with the aim of establishing a blowing-in

technology that maximizes effects of hydrogen reduction; additional verification tests that target optimal hydrogen amplification of coke oven gas (Muroran Works); a project to enhance efficiency of CO₂ separation and recovery processes; and a project to develop highly-efficient heat exchanges.



COURSE 50 pilot blast furnace



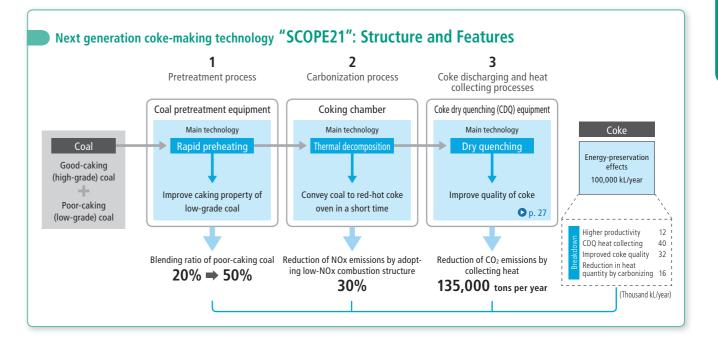
Next-generation coke-making technology "SCOPE 21"

800 researchers

Coke, which is thermally decomposed in the absence of oxygen (carbonized), is indispensable in production of steel materials. As raw materials for coke, high-quality caking coal has long been used. However, for this type of caking coal used in steelmaking there are very low reserves and they are in limited areas of the world, compared to general coal used as fuel. Thus, we are facing a credible threat of a surge in price of the coal.

"SCOPE 21" is the next-generation coke-making technology developed as a national project to better address resource problems and open up great potential. For the first time in the world, this technology has enabled the raising of the blending ratio of poor-caking coal up from 20% as in the conventional method to 50%. This is a promising innovative technology that can contribute to the stable supply of energy in the future.

There are three basic processes in the SCOPE21 technology: coal pretreatment, carbonization (destructive distillation of coal by



Blast furnaces are huge reactors

Iron ore and coal are the main raw materials fed into a blast furnace. Iron ore is melted in a huge furnace (height, about 100 meters) and steel is reduced and extracted, but what kind of role does coal play? The main ingredient of coal is carbon, but before it is fed into a blast furnace, it is thermally decomposed in the absence of oxygen (carbonized), effective ingredients such as hydrocarbon oil and gas are separately extracted, and it is turned into coke with high strength and high carbon purity. However, the iron included in iron ore is present as iron oxides. In the blast furnace, a chemical reaction called reduction, which removes oxygen from these iron oxides, occurs, and the carbon in the coke functions as a reducing agent. Coal is not a fuel but rather the ingredient used to cause the chemical reaction.

Approximately **25,000** patents issued in around 70 countries

blocking oxygen down), and heat collection. During the coal preheatment process, the rapid preheating enables to improve coke quality, shorten coke-making time, achieve high energy-saving effects, and ultimately contribute to CO2 reduction. NOx (nitrogen oxides) in the exhaust gas in the coke oven can also be reduced by 30%, further improving environmental conditions.

We began operation of the first commercial model that fully embodies the innovative environmental technology "SCOPE 21" at

the Oita Works in May 2008. Based on this experience, the second commercial model began operation at the Nagoya Works in June 2013. Both models have been operating smoothly up to the present.



SCOPE 21 (Nagoya No.5 coke oven)

Column

At present, as there is no reducing agent to replace coal in the industrial production of steel, the generation of CO₂ resulting from the reduction reaction caused by carbon cannot be avoided (iron oxide + carbon \rightarrow iron + CO₂).

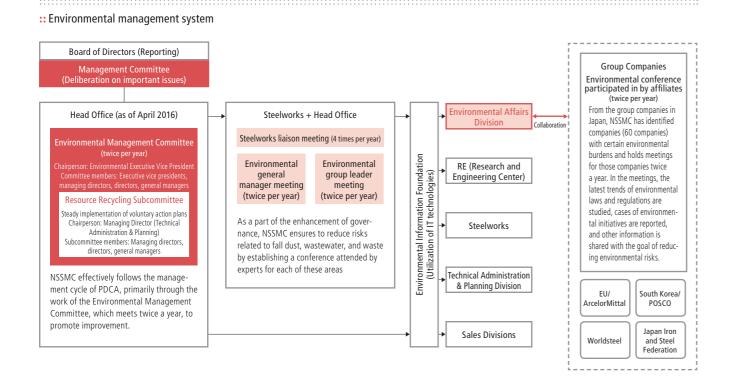
Nevertheless, as the Japanese steel industry, including NSSMC, has promoted energy-saving measures such as making effective use of the by-product gases and heat generated in the steelmaking process, it has realized the highest energy efficiency in the global steel industry and at the same time is controlling the CO₂ emissions.

Furthermore, for the above-mentioned COURSE50, we are engaged in R&D activities aimed at using hydrogen as a reducing agent partially replacing coal in industrial production (iron oxide + hydrogen \rightarrow iron + water).

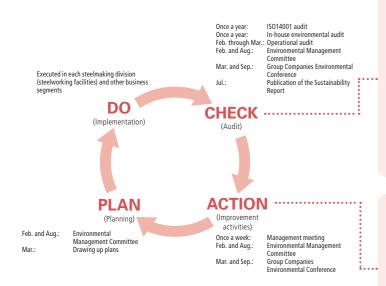
• Environmental Governance

Promotion of environmental management

Nippon Steel & Sumitomo Metal Corporation (NSSMC) has built an environmental management system that includes not only its own steelworks and factories, but also its group companies in Japan and abroad. Activities to reduce environmental risks are promoted by combining internal and external audits and following the plan-do-check-act (PDCA) cycle.



:: Annual environmental management cycle



In accordance with the international standard ISO 14001, NSSMC has built an environmental management system, with each steelwork general manager serving as the responsible person. Each year, in addition to an internal auditing of each steelworks and a management review by its general manager, each steelworks is audited by the Head Office Environment Department.

Environment officers of other steelworks and facilities also participate in these audits to cross-check. In addition, periodical reviews are conducted by the ISO certification agency.

For the group companies including those overseas, a direct interview is conducted by a member of the Head Office Environment Department to improve management levels. This is part of the corporate governance conducted by the Head Office Internal Control/Audit Department.

NSSMC regards environmental management as an important basis for our business and continuously provides environmental education to each rank of new employees, mid-career engineers, and managers on the subject of basic environmental policies, medium-term environmental management plans, environmental compliance, etc. In addition, seminars on the environment are led by the general manager of the Head Office Environment Department at all steelworks. We encourage our employees to acquire national qualifications, such as those of pollution prevention managers and energy managers, as well as to take ISO 14001 internal auditor training.

Environmental accounting

Philosophy of environmental accounting

NSSMC has adopted environmental accounting to be used as guidelines for corporate activities, and to accurately track the environmental costs and effects. The iron and steel industry is an equipment-intensive industry. We have achieved environmental preservation and energy conservation by installing environmental-friendly equipment such as dust collectors and improving the efficiency of production equipment. Costs of environmental preservation are quantified by adding the costs of capital investment associated with environmental measures, energy-saving measures, and recycling measures to expenses incurred to preserve the environment.

Environmental preservation costs

Capital expenditures for environmental preservation amounted 18.9 billion yen in total for fiscal 2015: 9.2 billion yen for investment in equipment for environmental measures and 9.7 billion yen for investment in energy-saving equipment. The aggregate amount accounted for approximately 4% of the total cost of equipment investment.

As environmental measures, we invested in preventive measures for dust emissions, visible smoke emitted from steelworks stacks, abnormal water discharge from drain outlets, and leakage of water from the revetments and quay walls at steelworks.

For saving of energy, measures were taken to improve the efficiency of heating furnaces as well as overall energy-saving measures in each manufacturing process.

:: Environmental preservation costs

(billion yen)							
	ltem	Definition		FY2			
			Capital ir	ivestment	estment Expense		
Pollution Prevention Costs	Countermeasures against air pollution	Dust collection equipment running costs, maintenance costs, exhaust gas desulfurization and denitration treatment, raw materials yard dust preventive measures costs, etc.	6.9	Total	43	43.4	
Politicion Prevention Costs	Countermeasures against water pollution	Electricity charges incurred for treatment of waste water discharged from steelworks, chemical costs, maintenance costs, working expenses (excluding expenses required for treatment of circulated water)		9.2	11	11.6	
Global Warming Prevention Costs	Energy saving measures	Running costs and maintenance costs of energy-saving facilities	9	.7	3	.2	
Casta of Denseling December	Treatment of by-products and industrial waste	Expenses incurred in landfill work, incineration, and treatment of by-products and industrial waste commissioned to third parties		-	8	.3	
Costs of Recycling Resources	Treatment of general waste from business activities	Expenses incurred in the treatment of general waste from business activities		-	0	.8	
	Construction of EMS and acquisition of ISO14001 certification	Expenses required for the construction and maintenance of EMS		-	0.	03	
Environmental Management Activities Cost	Monitoring and measurement of environmental loads	Expenses required for monitoring air, water, etc., at steelworks	-	-	1	.0	
	Personnel expenditures related to environmental measures	Personnel expenditures for employees in charge of environmental matters		-	2	.7	
Research and Development	Development of eco products	R&D costs (including personnel costs) for environment-friendly steel products		-	4.0	Total	
Costs	Development of products which have low environmental impact during manufacture	Development costs (including personnel costs) required for measures for by-products and energy conservation technology during manufacture		-	6.3	10.3	
Social Activity Costs	Greening, supporting environmental organizations, and advertising	Expenses required for creating green areas at steelworks, environmental publicity, and participation in exhibition		-	2	.6	
Other Environmental Costs	SOx levy	Payments to health damage prevention businesses specified by the Law Concerning Pollution-Related Health Damage Compensation and Other Measures		-	3	.8	
Total			18	3.9	87	.7	
		Reference: Net income (consolidated basis)		145	5.4		

In fiscal 2015, the environmental preservation costs totaled 87.7 billion yen, including 43.4 billion yen in atmospheric pollution prevention costs, 11.6 billion yen in water pollution prevention costs, and 10.3 billion yen in environmental R&D costs.

Among the environmental preservation costs, atmospheric prevention costs including measures to prevent scattering of dust generated at steelworks accounted for the largest share. We also promote in-house recycling to reduce expenses on waste disposal.

Effects of environmental preservation

It is difficult to quantify environmental preservation effects in monetary terms, since such calculation would require many assumptions. Therefore, environmental preservation performance is reported as effects vs. costs of taking environmental measures in this report and on our website.

For example, reduction in energy consumption is shown under "promotion of measures against global warming." Water consumption volume and reductions in water consumption and various resources spent are shown under "water quality risk management" and "energy and material balance," respectively. For atmospheric substances, SOx and NOx emissions are shown; for water quality and soil, individual performance indicators are used; for hazardous chemical substances, actual reduction volume of substances such as dioxins, benzene, and VOCs are stated; and for waste products, reduction in final disposal volume is stated.

NSSMC will continue efforts to improve accuracy in environmental accounting and use it as a management benchmark to effectively invest in equipment and attempt to further preserve the environment and conserve energy.

Targets and achievements in fiscal 2015

After achieving goals of its voluntary action plan (fiscal 2008 to fiscal 2012) on measures against global warming, Nippon Steel & Sumitomo Metal Corporation (NSSMC) are committed to continue working on energy saving to achieve the goals in the context of action plans for a low-carbon society.

With the aim of creating a recycling-oriented society, we maintained a high recycline ratio of 99% by reducing the volume of final disposal through increased recycling of by-products. With regard to environmental risk management, the management cycle is efficiently implemented with the Environmental Management Committee at the core of its efforts, raising the level of environment management of the entire group. Eco products and eco solutions were successfully developed and offered to the market in an active manner.

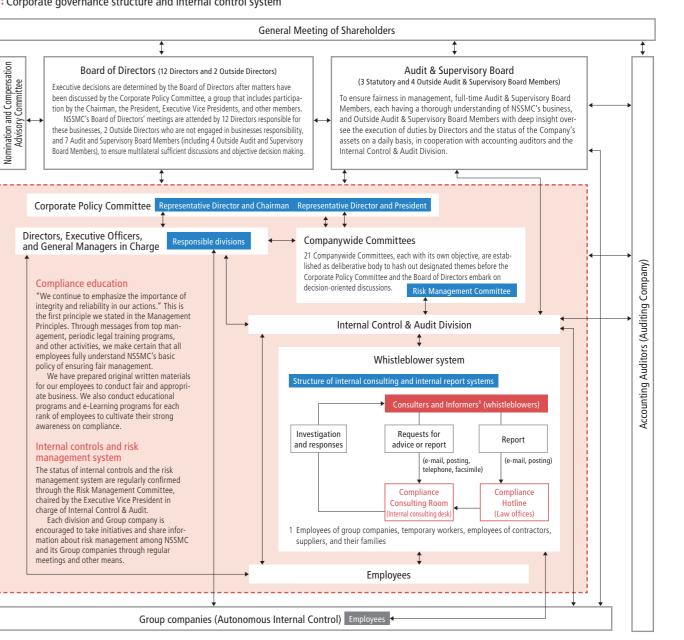
[Eva	aluation	legend]	0:0	Overach	ieved,	0:	Largel	y ach	ieved,	\triangle :	Not	achie	Ve

			[Evaluation legend] \odot : Overachieved, \bigcirc : Largely achieved	ved, △:N	lot achieved
	Medium-Tern	n Environmental Management Plan	Achievements in FY2015 (by NSSMC and some group companies)	Evalua- tion	Pages or website
t and nviron- ement	Enhance and pro system	mote an environmental management	•Thoroughly implemented the NSSMC Group Guidelines on atmospheric air, water, and waste materials •Regularly held meetings of groupwide issue-based working groups	0	16, 32
Enhancement and promotion of environ- mental management	Conduct environ with group comp	mental management in coordination panies	 Regularly held the environmental conference of group companies to enhance their ability to respond to environmental risks Sequentially conducted hearings on environmental issues to group companies in Japan and overseas 	0	32
En prorr men	Renew ISO 1400	11 certification	•Kashima, Kimitsu, Wakayama, Amagasaki, and Oita Works had respective certifications renewed	0	32
Ð	1) Eco process: enh	ance efficiency of natural resources and energy	•¥9.7 billion invested in energy saving	0	33
Promotion of global warming countermeasures	2) Eco products:	Develop products that help preserve rces and energy	 Expansion of a new lineup of "Small Diameter Wire Rods" with a diameter of 5.0 mm Developed and expanded commercial utilization of high-tensile steel sheet with improved fatigue characteristics and workability 	0	WEB
tion of global wa countermeasures		Internationally contribute through over- of CO ₂ reduction technologies	 Participated in a national research project for transfer of energy conservation technology to India and ASEAN countries and contributed to the development of a master plan for feasible technology transfer 	0	25
Promo		lopment of innovative technologies for on a longer-term basis	 Construction of the 12 m³ experimental blast furnace and the subsequent test operation will be completed as planned during the development period of up to FY2017 	0	30
ed		disposal volume of by-products by	 Recycled 99% of the 24.71 million tons of the by-products generated 	0	10, 15
'articipation in creating a recycling-oriented society	330,000 tons by	2015	• The final disposal volume continues to be on a decreasing but increased to 360,000 tons/y and did not achieve the target in FY2015 due to a one-off factor.	\triangle	11, 14
Participat a recyc s		tive use of waste plastics and discarded tires ts of recycling and CO_2 emission reduction	 About 200,000 tons of waste plastics were recycled (corresponding to about 30% of the nationwide recycling level) About 80,000 tons of discarded tires were recycled (corresponding to about 10% of the nationwide recycling level) 	0	10, 14, 15
	Reduce environn	nental risks of the air, water, soil, etc.	•¥9.2 billion capital expenditures as environmental measures	0	33
of s	Maintain and en environment	hance preservation of the local	• Each steelworks cooperates with local governments and the Maritime Safety Agency.	0	32
Initiatives for prevention of environmental accidents	tary managemer	ary reduction based on national volun- nt plan (168 tons/y)	Achieved the self-management target for emissions (99 tons/y).	0	WEB
r preve ntal ac	Steel Federation	ry reduction based on Japan Iron and guidelines (16.1 g-TEQ/y)	Achieved the voluntary target (5.1 g-TEQ/y) set by the Japan Iron and Steel Federation	0	WEB
iitiatives for pre environmental	Promote control accordance with	of specified chemical substances in the PRTR Act	•The amounts discharged were 440 tons/y to the atmosphere and 39 tons/y to public waters; the amount transferred outside the worksites was 7,153 tons/y	0	WEB
tiati nvir	VOC: Voluntary	reduction (1,098 tons/y)	 Continuously achieved the voluntary emission target (619 tons/y) 	0	16
e Ini		nagement jointly with group companies	•Sequentially conducted hearings on environmental issues to group companies in Japan and overseas	0	32
	deal with it	trend of law revision and appropriately	•Dealt with the revision of the Basic Plan for Proper Treatment of PCB Waste and the Act for Rationalized Use and Proper Management of Flurocarbons	0	16
rgy	Environmental contribution	Engineering and construction business	the facility began operation.	0	WEB
ene	through busi- ness in each		•Nippon Steel & Sumikin Pipeline & Engineering: Completed the first commercial-use hydrogen station.	0	24
Development of environmental and energy solution business	sector	Chemical business	 Developed ESPANEX[®] flexible printed circuit board material that satisfied environmental regulations (lead-free, no-halogen, and no-phosphorus) 	0	WEB
nent			Ricoh's Multifunction Printers using recycled plastics utilized NSSMC's plastic improvement technology		
onn Sud		System solutions business	•Contributed to energy saving by expansion of cloud business with the latest data center as its core	0	WEB
ivi i	Contribute to motio	New materials business	 Introduced the repair and reinforcement construction method using the carbon fiber sheet in Japan and overseas Promote use of the non-frame method in Japan and overseas 	0	WEB
nt of environmenta solution business	with consideration	nal resilience and infrastructure development to the natural environment and the scenery	1	0	WEB
opmer		oution to the environment and energy sav- sing the Group's advanced technologies	 Continuously received orders for 1 CDQ unit in China and 2 in India (90 units on an accumulated basis for orders from overseas) 	0	26, 27
evel			Received the Global Partner Award from Royal Dutch Shell	0	39
ă	of steel slag and	cycling of resources by expanding use other steel by-products	Developed KATAMA™ SP, a fast-curing roadbed material	0	9, 14, 21
tal	tion and actively	d timely disclose environmental informa- communicate to be trusted in society	•Further improved the Environment & CSR section of NSSMC's corporate website	0	WEB
onmen ties	through exchang	e environmental relation activities ges and dialogues with stakeholders	 Participated in Eco Products 2015 and presented NSSMC's three eco-friendly initiatives and other initiatives. 	0	37
f envir activi	restoring seaweed	forests by planting trees and sea forests by beds as for contributing to local communities	 Each steelworks continued to work on its "Creation of a Homeland Forest" initiative. In the "Creation of Sea Forests," spread efforts to restore seaweed beds across the country (37 locations) 	0	28, 29
Promotion of environmental relation activities	awareness of en	of environmental staff and thorough vironmental compliance for each career ers in steelworks to managers	Conducted environmental education tailored to the local community's conditions at respective steelworks and other plants Provided an education program based on the booklet of easy-to-understand case examples on	0	WEB
Pro			 Addressed to the ISO14001: 2015 Revision. 	<u> </u>	

Corporate governance structure

The NSSMC Group aims to respond to confidence and trust extended by shareholders, business partners, and all other stakeholders, and to achieve healthy sustainable growth and medium- to long-term improvement in corporate value. For that purposes, the Group has established a corporate governance structure appropriate for its businesses. NSSMC, with its core business being steelmaking, has adopted a structure in which a Board of Directors, mainly comprised of Directors with a thorough understanding of NSSMC's business, makes decisions on basic management policy and important business activities, while Audit and Supervisory Board Members, who hold strong legal authority, oversee from independent positions the execution of duties by Directors. Believing that this structure ensures efficiency and fairness in management and is effective for the Company, NSSMC has adopted the company system form of organization with an audit and supervisory board. In addition, the Company has Outside Directors, who have vast experience in fields such as corporate management, to enhance decision making from diverse perspectives at the Board of Directors' meetings and through oversight of management. The Company's notifications of all Outside Director and Outside Audit and Supervisory Board Member appointments have been submitted to each of the stock exchanges in Japan.







• Social Report

Nippon Steel & Sumitomo Metal Group and its stakeholders

The NSSMC Group treasures its partnership with all its stakeholders and aims to improve its corporate value by enhancing its relationships with them through better exchanges and communication.

We hope to help all stakeholders understand the importance of "*monozukuri* (product manufacturing)" and our various initiatives on environmental issues and through that understanding to be a company trusted by them all the time. For those objectives, we seek to offer sufficient opportunities for constructive communication, ensure timely disclosure of information, and continue to make social contribution activities that are closely tied to local communities. We also strive to create workplaces in which employees can work with pride and enthusiasm, and fulfill our corporate social responsibilities as a member of society.

addressed at all levels of our supply chain

from procurement and production to sales.

Promoting women's active participation Establishing its first in-house daycare center NSSMC hires many women for many departments, including manufacturing workplaces. As a way to

workplaces. As a way to support early return from maternity and infant care leave, an in-house daycare center was established in the Oita Works.



Training program for teachers in the private sector



NSSMC participates in a training program organized by Japan Institute for Social and Economic Affairs and gives instruction to teachers every summer, to facilitate their understanding of the steel industry's role in the society and the attractiveness of *monozukuri* (manufacturing).

We pursue various personnel policies, based on fair treatment of personnel, to ensure that our employees work consistently with pride, motivation and vitality. We are implementing various health and safety measures so that employees of our company, group companies, and business partners can do their jobs in safe and secure workplaces.

Automobiles
 Energy and natural resources
 Electric, shipbuilding, and aircraft
 Construction and civil engineering
 Industrial machinery and railway
 Can manufacturing, etc.

Local

ommunitie

Shareholder

and

investors

Customers

Steel Products

We carry out environmental protection

Employees

activities which match the needs and characteristics of local communities, and engage in environmental activities with various stakeholders in our local communities.

In our Investor Relations (IR) activities we strive for timely disclosure of information, to improve our IR briefings, dialogues, and other opportunities to interact with our shareholders and investors.

Approx. 500,000 shareholders in total

We invite shareholders to take tours of our steelworks in various locations and attend IR briefings in major cities in Japan, so that they can better understand our business.

Overseas social contribution

SBE, a fully owned subsidiary of Nippon Steel & Sumikin Engineering, was awarded the Low Carbon Model Company of the Year 2015 in China. SBE's reduction of greenhouse gas by use of its waste-toenergy power generation facility was commended.



SUS, NSSMC's 67%-owned subsidiary in Thailand, received the "Eco For Life 2014" award, for its support to local residents for their new business proposal (i.e., provision of waste materials and a processing workplace for making furniture from waste materials.)

Partner awards

The partner awards were established to extend our appreciation to our suppliers' efforts in quality and cost improvement in procurement of materials and equipment. We also wish to encourage them to make proposals more actively in the future.

Risk Taikan (Experience-based) Education Program

In keeping with the corporate philosophy that "safety and health are the most valuable factors that take precedence over all other things and they are the basis that supports business development," we have been working hard at making safe and secure workplaces. As a part of its efforts, our Taikan program enables employees to experience risk through simulation.

Collaboration with an NPO, "*Mori wa Umi no Koibito*"

Since1989, Mr. Shigeatsu Hatakeyama, a fisherman cultivating oysters and scallops in Kesennuma City, Miyagi Prefecture, and the Chairman of the NPO, "*Mori wa Umi no Koibito*" (which literally means "The forest is longing for the sea, the sea is longing for the forest"), along with his fellow fishermen, commenced "*Mori wa Umi no Koibito*" campaign to plant trees in the vicinity of the upper reaches of the Okawa River, which flows into Kesennuma Bay. In June 2016, approximately 1,500 students and others, including employees of our Group, joined their tree-planting festival.

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36 ······ NIPPON STEEL & SUMITOMO METAL CORPORATION Sustainability Report 2016

NSSMC Group

Contribute to build a sustainable

innovative technological development

society with its three ecos and



Awards from external organizations

NSSMC's technological advances and response to needs of our customers have been highly evaluated and we have received various awards from many organizations.

Contribute to society through materializing a sustainable corporate activities

Diverse communication activities

Participation in Eco-Products 2015

In December 2015, NSSMC exhibited products and technologies at Eco-Products 2015, the largest ecological exhibition in Japan, which was held at Tokyo Big Sight (Tokyo International Exhibition Center). Our presentations showed how we addressed environmental and energy issues through our focus on three ecos, and attracted the attention of many visitors.

Mecenat Kioi Hall

The Nippon Steel & Sumitomo Metal Arts Foundation operates the Kioi Hall (in Chiyoda-ku, Tokyo), where it holds classical concerts by Kioi Sinfonietta Tokyo. The foundation also helps popularize traditional Japanese music by using

the Kioi Hall's small hall exclusive for Japanese music performance, a rare type of hall even in Japan.

Environmental conservation in local communities

Local volunteer clean-up activities

In 2015 the Kashima Works and the Naoetsu Works received the "Excellent Contribution to Maritime Affairs" award from the Minister of Land, Infrastructure, Transport and Tourism, as their long-term clean-up activities for areas around the steelworks and nearby beach were highly appreciated.

Social Report

Third-party opinion



Yuko Sakita Iournalist and environmental counsellor

Overall report

The current year, 2016, is becoming an important year as more people and companies have begun to focus on the future of the earth and think about their roles and responsibilities. This is because at the United Nations Framework Convention on Climate Change (UNFCCC), or COP21, held in Paris in December 2015, all countries, including emerging countries, have agreed on a framework to deal with greenhouse gas emissions mitigation.

The opening column "The role of steel in forming the future of the earth" states that, while steel demand is expected to grow in line with factors including improvement of living standards in emerging countries, NSSMC is committed to make progress in the steelmaking technologies, which has a history of 4,000 years, continue to strive to conserve energy and other natural resources, and contribute to the future of the planet by providing high-grade steel products. I was impressed with NSSMC's determination to "be dedicated to steel."

As mentioned in "A Message from Top Management," Japan's industry and business community have been making voluntary initiatives as a part of the government's Plan for Global Warming Countermeasures to cut greenhouse gas emissions by 26% from their 2013 level by 2030 (fiscal year base). This is stated in Japan's Intended Nationally Determined Contribution. As a major company, NSSMC has made its position clear, based on its "Ecological Management" policy, and is continuously reducing burden on the environment across the life cycle of steel by keeping foremost the "three 'ecos,' namely eco process, eco products and eco solutions, and the development of innovative technologies." I have high respect for NSSMC's viewpoint concerning those activities.

At the same time, many households and smaller businesses have continued to increase CO₂ emissions. Here is a serious challenge to society. The Japanese government is thus promoting the new national movement called Cool Choice, encouraging the public to make smart choices by selecting environmentally friendly products and services, and in daily life. I hope that the NSSMC's Sustainability Report is given attention by society at large, including shareholders, and investors, and the company's over 84,000 employees and their families, who are expected to take a lead in practicing environmental actions.

Environmental report

During the G7 Ise-Shima Summit held in Japan in May 2016, the realization of a recycling-oriented society with highly efficient use of resources

was identified as one of the global critical issues, since the global demand for natural resources is projected to double by 2050. In case of steel, however, its overall life cycle has already been controlled and a closed recycling loop has been formed. I was amazed to learn NSSMC's in-house recycling rate of resources is 98% and the domestic recycling of steel materials for automobiles is 94%. In my view, it is important to properly announce this type of information. By the way, relining of a coke oven has resulted in need for NSSMC to dispose of fire bricks, which are unusual in that they cannot be recycled. As a result, the amount of their final disposal turned out to be the only reported environmental item which showed a slight increase. I believe that such information disclosure too is helping to make the entire data more reliable.

Regarding leading-edge initiatives of eco products, advanced materials for fuel cells and steel for high-pressure hydrogen environments (that would improve the safety of hydrogen stations) are mentioned. I found this information is particularly important as we yet have little accurate information that responds to needs of safety in the hydrogenoriented society, despite some major moves to promote realizing such society, ahead of the 2020 Tokyo Olympic and Paralympic Games.

In the areas of eco solutions for solving issues in global cooperation, NSSMC has been promoting transfer of superior energy-saving technologies of Japan's steel industry. Its proactive initiatives, such sending lecturers to the South East Asia Iron and Steel Institute (SEAISI), shows another important direction.

The section on the environmental risk management explained the comprehensive control of chemical substance discharge, which unfortunately did not mention about the issues related to mercury. Japan is aiming to take a world-leading initiative in action based on the Minamata Convention on Mercury. While steelmaking facilities are not considered as "mercury-emitting facilities" that are covered under the air pollution regulations, they also emit the similar, relatively significant amounts of mercury. That is why some of those facilities voluntarily strive to restrain emissions and discussions have been made. I would like to urge NSSMC to continue proper monitoring in this regard.

Social initiatives

Last year when I first read NSSMC's Sustainability Report, I wrote that I would like to see mentioned such subjects as the passing on of technology to the next generation and the establishment of a good working environment for women. This year, I was very pleased to find such information, including the establishment of an in-house daycare center and the award system, which proves that the PDCA cycle is being effectively implemented.

NSSMC is making consistent efforts at the "Creation of Hometown Forests" and the "Creation of Sea Forests," both of which are intended to utilize inherent ecosystems in the surrounding areas of 16 steelworks around the nation. They are wonderful initiatives. Over time, some endangered animals may become established in some of those areas. I hope that NSSMC will continue those initiatives concerning biological diversity, working closely with local residents.

Awards received in FY2015 (in chronological order)

Award name	Sponsor	
Partner Award	NHK Spring Co., Ltd.	Contribution to de R&D division to res
The New Applications Award in the category of "The Best New Technology"	International Stainless Steel Forum (ISSF)	Contribution to the ter-proof stainless airport facilities (N
Low Carbon Model Company of the Year 2015	China	Reduction of greer its waste gas treat
Good Design Award 2015	Japan Institute of Design Promotion	Restoration Public I a site owned by NS ing advantage of st to interact and then
Prime Minister's Industry Award [Quality Management Division]	Thailand	Achievement in con development, etc., l
Global Partner Award	Royal Dutch Shell plc	Excellent capabiliti pipe and tube com
Excellent Partners Meeting 2015 ECO-VC Gold Award (6th consecutive year)	Panasonic Corporation	Contributed to Par design processes f
Sixth Monodzukuri Nippon Grand Award, METI Minister's Award	Ministry of Economy, Trade and Industry (METI)	Development of N stainless steel and
Top 100 Global Innovator in 2015 (4th con- secutive year)	Thomson Reuters	Innovative R&D ac
Nikkei Excellent Products & Services Award 2015 "Award for Excellence, Nikkei Sangyo Shimbun Award"	Nikkei Inc.	HRX, stainless stee construction cost a realization of a hyd
Japan Institute of Energy Frontier Award 2015 (Technical Division)	Japan Institute of Energy	7% nickel steel, th Senboku Terminal
2016 Commendation by the Minister of Education, Culture, Sports, Science and Technology (Development Category for Science and Technology) (10th consecutive year)	Ministry of Education, Culture, Sports, Science and Technology	Development of a (continuous proces previously) (NSSM
2016 Business of the Year Award	Georgetown-Scott County Chamber of Commerce, Kentucky, U.S.	Contribution of Int
62nd Okochi Memorial Production Special Prize	Okochi Memorial Foundation	Development of ca tion process (Nipp
2015 Excellence in Value	American Honda Motor	International Cranl in quality, delivery,

Corporate profile

Company name	Nippon Steel & Sumitomo Metal Corporation			
Head office	2-6-1, Marunouchi, Chiyoda-ku, Tokyo 100-8071, Japan Phone: +81-3-6867-4111			
Date of Establishment	March 31, 1970			
Chairman	Shoji Muneoka			
President	Kosei Shindo			
Capital	¥419.524 billion (Total number of shareholders: 499,195)			
Stock listings	Tokyo, Osaka, Nagoya, Fukuoka, and Sapporo			
Number of employees	84,837 (consolidated basis)			
Group companies	339 consolidated subsidiaries and 103 equity-method affiliates			

Nippon Steel & Sumitomo Metal Corporation Sustainability Report 2016

2-6-1, Marunouchi, Chiyoda-ku, Tokyo 100-8071, Japan Phone: +81-3-6867-2566 Fax: +81-3-6867-4999 http://www.nssmc.com/en/

evelopment and commercialization of new materials under cooperation with the company's espond to needs for hollow and lightweight stabilizers for automobiles (NSSMC)

he first large-scale application of the film lining construction method with NSSC270, seawasteel having excellent corrosion resistance and Life Cycle Cost ("LCC") evaluation, used at Nippon Steel & Sumikin Stainless Steel Corporation)

enhouse gas by use of its core technology for waste-to-energy power generation facility and tment system (SBE, a fully owned subsidiary of Nippon Steel & Sumikin Engineering Co., Ltd.) Housing [Kamaishi-city Kaminakajima Restoration Public Housing, Phase 2] was completed at SSMC in Kamaishi City, Iwate Prefecture, in a short construction period and at low cost by taksteel's properties and new methods. A creative design facilitates residents and other neighbors ereby helps to regenerate the communities. (NSSMC, Nippon Steel Kowa Real Estate Co., Ltd.) tinuous enhancement efforts in safety, sales, production, quality management, human resource , based on the company-wide total productive maintenance activities (Siam United Steel)

ities in product supply, product development, and making value-added proposals (the only mpany so recognized) (NSSMC)

nasonic's first attempt to reduce the number of molds, sheet thickness, and number of for the under-frame component of LCD TVs (NSSMC)

VSSC2120, the world's first high-performance dual phase stainless plate that consumes less l is useful for social infrastructure (Nippon Steel & Sumikin Stainless Steel Corporation) ctivities and outstanding intellectual property activities for many years (NSSMC)

eel designed for high-pressure hydrogen environments, for its contribution to reduction in and enhanced maintainability and safety of hydrogen stations, which are essential for the drogen-oriented society (NSSMC)

hat requires less nickel than before, for LNG storage tanks; to be adopted at the No. 1 l of Osaka Gas in Sakai (NSSMC)

multi-function integrated converter method to realize mass production of eco products essing of dephosphorization, slag-off, and decarburization by one converter instead of two (DN

ternational Crankshaft Inc., U.S. to the community since its operation began in 1992

cast-method non-adhesive type Copper Clad Laminate (2-layer CCL) and enhanced producon Steel & Sumikin Chemical Co., 1td.)

kshaft Inc. in the U.S. was selected as one of 27 suppliers with outstanding contributions and value out of around 650 suppliers



NSSMC's Logotype

The central triangle in the logo represents a blast furnace and the people who create steel. It symbolizes steel, indispensable to the advancement of civilization, brightening all corners of the world. The center point can be viewed as a summit, reflecting our strong will to become the world's leading steelmaker. It can also be viewed as depth, with the vanishing point representing the unlimited future potential of steel as a material. The cobalt blue and sky blue color palette represents innovation and reliability.

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