



JFE

Environmental Sustainability Report

**2007**

## Coordinating Corporate Growth, Environmental Conservation



Senior Vice President  
Eiji Hayashida

The JFE Group is dedicated to implementing effective strategies for protecting the natural environment. To date we have invested substantial time and energy into energy saving production processes, green technologies and products, and cooperation both regionally and internationally. We will maintain these efforts in the years to come, guided by corporate standards of business conduct and an environmental policy that emphasize coexistence with and enhancement of the global environment.

The Kyoto Protocol will soon enter its first commitment period. Indeed, 2008 is just around the corner. With this milestone firmly in mind, the JFE Group has been promoting reduction of greenhouse gas emissions through various measures, including

conservation of energy, reduced application of chemicals with substantial global warming coefficients, and introduction of new technologies. We are committed to assuming our social responsibility and achieving the reduction targets stipulated by the Japan Business Federation (Nippon Keidanren) in its voluntary action plan.

Development and maintenance of social infrastructure depends on JFE Group products and technologies such as steel products and energy/recycling technology. Determined to play an important role in supporting the global environment, JFE Group will continue to manufacture and innovate environmentally friendly products and technologies.

### Environmental Philosophy

The JFE Group considers the improvement of the global environment to be of utmost importance for management, and promotes business operations in harmony with the environment to create a prosperous society.

### Environmental Policy

1. To reduce environmental influence in all business operations
2. To make contributions through technologies and products
3. To make contributions through conservation of resources and energy
4. To promote communication with society
5. To promote international cooperation

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### Editorial Policy

"JFE Group Environmental Sustainability Report 2007" states environmental protection activities in the year ended March 2007, as well as results of those activities in the business operations of JFE Holdings, Inc., which is the holding company of the JFE Group, and its operating companies. This Report was edited/prepared in accordance with "Guidelines for Environmental Reports (FY 2003 ed.)" issued by Japan's Ministry of the Environment (MOE)

### CHAPTER II Reducing Environmental Loads through Products and Technologies

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and "Sustainability Reporting Guidelines 2006" issued by the Global Reporting Initiative (GRI). Please note that this Report is disclosed solely on the website. If you need (a) brochure(s), please print out this document.

For further company information, business descriptions, product information, and operation facilities, etc., please refer to JFE GROUP BUSINESS REPORT 2007 or our website at <http://www.jfe-holdings.co.jp/en/index.html>

# Priority Environmental Targets and Results

## Priority Environmental Targets and Results

(Year ended / ending March 31)

	2007 Priority Environmental Targets	2007 Results	2008 Priority Environmental Targets
JFE Steel	<b>Promote measures to prevent global warming</b> <ul style="list-style-type: none"> <li>Promote measures to prevent global warming based on Japan Iron and Steel Federation's Voluntary Action Plan. (Achieve a 10% reduction in energy consumption by the year ending March 2011, compared to the year ended March 1991 level.)</li> </ul>	<ul style="list-style-type: none"> <li>Reduced unit energy consumption by approximate 18% compared to the year ended March 1991 level.</li> <li>Implemented CDM. (In Philippines: obtained approval from the UN in May 2007.)</li> <li>Installed more CDO.</li> </ul>	<b>Promote measures to prevent global warming</b> <ul style="list-style-type: none"> <li>Promote measures to prevent global warming based on Japan Iron and Steel Federation's Voluntary Action Plan. (Achieve a 10% reduction in energy consumption amount during the period from the year ended 2009 to the year ending March 2013, compared to the year ended March 1991 level, and another 1.5% reduction (additional target) through effective usage of waste plastics, etc.)</li> </ul>
	<b>Promote byproduct recycling</b> <ul style="list-style-type: none"> <li>Look at developing and applying technologies for recycling dust and slag. (Maintain the year ended March 2006 target.)</li> <li>Reduce final disposal of waste bricks by 20% in a year-to-year comparison.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing development of technologies for recycling dust and slag. Dust treatment technology by Hi-QIP method. Recycling technology for stainless acid detergent.</li> <li>Final disposal rate of waste bricks: Achieved targets by sorting out and recycling bricks based on each usage and recovered almost all.</li> </ul>	<b>Promote byproduct recycling</b> <ul style="list-style-type: none"> <li>Continuously look at developing and applying technologies for recycling dust and slag.</li> <li>Reduce landfill of slag by 20%.</li> </ul>
	<b>Strive to reduce environmental risks</b> <ul style="list-style-type: none"> <li>Comply with new regulations.</li> <li>Promote voluntary environmental conservation activities.</li> </ul>	<ul style="list-style-type: none"> <li>Complied with new regulations.</li> <li>Promoted voluntary environmental conservation activities. Wastewater control activity by manufacturing line. Installation of monitoring sensors. Implementation of voluntary administrative activity to reduce VOC.</li> </ul>	<b>Continuously strive to reduce environmental risks</b> <ul style="list-style-type: none"> <li>Comply with new regulations.</li> <li>Promote voluntary environmental conservation activities.</li> </ul>
JFE Engineering	<b>Promote energy-saving activities in production divisions</b> <p>Tsurumi Engineering &amp; Manufacturing Center: 10% reduction compared to the year ended March 1998 level. Shimizu Works: 16% reduction compared to the year ended March 1998 level. Tsu Works: 16% reduction compared to the year ended March 1998 level.</p> <p>At Tsurumi, the target is calculated based on electricity usage per hour of operation. At Shimizu and Tsu, the target is calculated based on electricity usage per unit volume of production.</p>	<ul style="list-style-type: none"> <li>Targets were fulfilled at Tsurumi and Shimizu but not at Tsu.</li> <li>Tsurumi Engineering &amp; Manufacturing Center: 10% reduction compared to the year ended March 1998 level.</li> <li>Shimizu Works: 17% reduction compared to the year ended March 1998 level.</li> <li>Tsu Works: 10% reduction compared to the year ended March 1998 level.</li> </ul>	<b>Promote energy-saving activities in production divisions</b> <p>Tsurumi Engineering &amp; Manufacturing Center: 11% reduction compared to the year ended March 1998 level. Shimizu Works: 17% reduction compared to the year ended March 1998 level. Tsu Works: 11% reduction compared to the year ended March 1998 level.</p>
	<b>Promote reduction of construction site waste</b> <ul style="list-style-type: none"> <li>Reduce final disposal rate<sup>*1</sup> to 35% or less in three years ending March 2008.</li> </ul>	<ul style="list-style-type: none"> <li>The year ended March 2007 final disposal rate: 32.4%. (Total waste volume: 1,960 tons)</li> </ul>	<b>Promote reduction of construction site waste</b> <ul style="list-style-type: none"> <li>Reduce final disposal rate to 35% or less in three years ending March 2008.</li> </ul>
	<b>Promote resource-saving and environmentally friendly office activities</b> <ul style="list-style-type: none"> <li>4% increase in green procurement rate of office supplies compared to the year ended March 2005 level.</li> </ul>	<ul style="list-style-type: none"> <li>Targets were fulfilled at Tsurumi and Tsu but not at Shimizu.</li> <li>Tsurumi Engineering &amp; Manufacturing Center: Up 9.2%.</li> <li>Shimizu Works: Up 0.0%.</li> <li>Tsu Works: Up 4.0%.</li> </ul>	<b>Promote resource-saving and environmentally friendly office activities</b> <ul style="list-style-type: none"> <li>6% increase in green procurement rate of office supplies compared to the year ended March 2005 level.</li> </ul>
Kawasaki Microelectronics	<b>Promote measures to prevent global warming</b> <ul style="list-style-type: none"> <li>Energy saving rate: 1.0% or higher.</li> <li>Carry forward experiments to reduce PFC gas<sup>*2</sup> by 70%.</li> </ul>	<ul style="list-style-type: none"> <li>Energy saving rate: 0.78%.</li> <li>Completed basic evaluation on C2F6 (PFC gas) reduction and consideration on practical application of alternatives.</li> </ul>	<b>Promote measures to prevent global warming</b> <ul style="list-style-type: none"> <li>Energy saving rate: 1.0% or higher.</li> <li>Complete alternatives for C2F6 and commence specific reduction measures aiming at 10% reduction of PFC emissions compared to the year March 1996 level.</li> </ul>
	<b>Reduce chemical substances</b> <ul style="list-style-type: none"> <li>Reduce PRTR substances by one type.</li> <li>Reduce notification substances from two types to one type.</li> </ul>	<ul style="list-style-type: none"> <li>Terminated the use of acetic acid 2-ethoxyethyl.</li> <li>Reduced notification substances from two types to one type (hydrogen fluoride and its water-soluble salt).</li> </ul>	<b>Reduce consumption of chemical substances</b> <ul style="list-style-type: none"> <li>Reduce consumption of the notification substance.</li> </ul>
	<b>Reduce waste</b> <ul style="list-style-type: none"> <li>Reduce waste generation by 4% or more.</li> </ul>	<ul style="list-style-type: none"> <li>Achieved reduction of 4% or more.</li> </ul>	<b>Reduce industrial waste</b> <ul style="list-style-type: none"> <li>Reduce wastewater treatment-origin dehydrated sludge by 10%.</li> </ul>

\*1 Final disposal rate = (total waste volume - (volume recycled + volume reduced)) / total waste volume

\*2 PFC: Perfluorocarbon

# JFE Steel's Activities to Prevent Global Warming

– For Compliance with the Japan Iron and Steel Federation's Voluntary Action Program –

## Message from Senior Management

JFE Steel Corporation  
Vice President  
**Takashi Sekita**



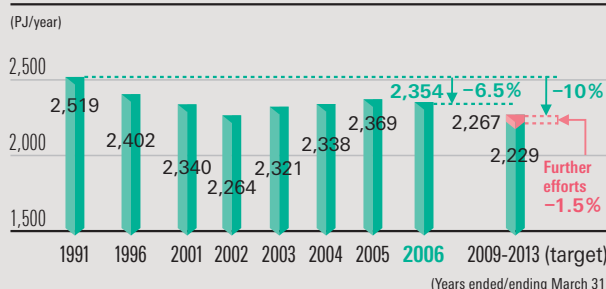
The year 2007 is a very important year as the first commitment period of the Kyoto Protocol starting 2008 is approaching. In light of expanding crude steel production in response to increasing customer needs for highly functional steel products and more energy consumption due to stricter environmental measures, goals of the Voluntary Action Program of the Japan Iron and Steel Federation (JISF) will not be easily attained. Nevertheless, we are determined to make all-out efforts to achieve those goals mainly by reducing CO<sub>2</sub> emissions through our technological measures, and partly by using the Kyoto Mechanisms as a complementary measure.

### Efforts of Iron Industry (The JISF's Voluntary Action Program)

The JISF achieved a 6.5% reduction in energy consumption in the year ended March 2006 (6.9% reduction in CO<sub>2</sub> emissions) compared to the year ended March 1991 level. As a complementary measure, the JISF has made a purchase contract of the Kyoto Mechanisms (28 million tons).

### Transition in Energy Consumption by the Iron and Steel Industry in Japan

Source: The Japan Iron and Steel Federation



*The JISF's Voluntary Action Program*  
The JISF has set a 10% reduction in energy consumption as its goal for the year ending March 2011 compared to the year ended March 1991 level on the assumption that annual crude steel production would amount to the 100 million-ton level. It is also committed to effective use of waste plastics (equivalent to another 1.5% reduction).

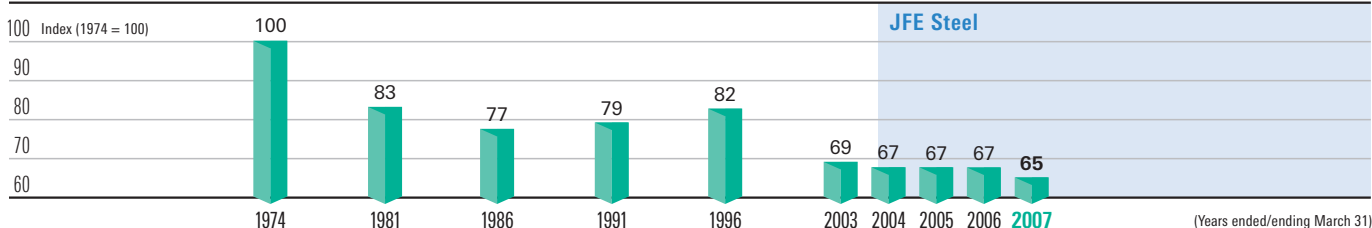
## Energy Saving Activities

Iron and steel manufacturing uses coke as a reducing agent during the process of reducing iron ore. The reducing process leads to CO<sub>2</sub> emissions. Since the 1970s, JFE Steel has been recovering gases generated from each stage of various processes in coke ovens and BF, etc., in order to use them as fuel gas or gas for power generation and meet fuel demand at respective steelworks. JFE has also been striving to effectively reuse flue gas and waste heat. As a result of these efforts, we have achieved a 35% reduction in unit energy consumption

from the year ended March 1974 level, realizing the world's top-class efficiency of energy consumption.

JFE Steel will implement further energy savings by promoting operational upgrades such as the addition of CDQ, cutting reducing agents, and using cold iron sources. We will also contribute to the international prevention of global warming and environmental conservation through the Meeting for Environmental Protection and Energy-saving by the CISA and JISF and the Asia-Pacific Partnership based on the cultivated technologies.

### Transition of Unit Energy Consumption Index at JFE Steel



1974-1990

1991-2007

2008-

#### History of Energy Saving Activities

##### Introduction of energy saving equipment

- Reduction of reheating furnace fuel
- Large-scale waste heat recovery equipment  
BF top pressure recovery turbine (TRT), sintering waste heat recovery, etc.
- Process continuation  
Continuous casting line, continuous annealing line, etc.

##### Further promotion of energy saving

- Waste plastics feeding into BF
- Introduction of regenerative burner
- Endless rolling
- City gas blowing technology for BF
- High efficiency oxygen plant

##### Global warming prevention measures by energy saving

- New construction of shaft furnace  
(operation start scheduled in August 2008)
- Augmentation of CDQ  
(operation start scheduled in March 2009)
- Broader introduction of regenerative burner
- Augmentation of high efficiency oxygen plant
- BOF gas sensible heat recovery



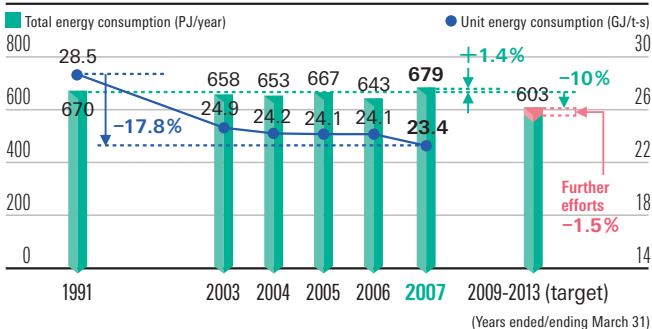
### Achievements in the Year Ended March 2007\*

In the wake of stronger demand for highly functional steel products from customers mainly in the automobile, electric appliance, and shipbuilding industries, JFE Steel has been increasing production to fulfill its supply responsibility. As a result, compared to the year ended March 1991 level, crude steel production increased 23% in the year ended March 2007.

Using the same comparison, energy consumption and CO<sub>2</sub> emissions recorded a 1.4% increase and a 0.9% increase, respectively. And yet, JFE Steel has substantially improved efficiency with an approximately 18% reduction in unit energy consumption and unit CO<sub>2</sub> emissions.

\* The non-consolidated base calculation does not include electric furnace steel companies in the JFE Steel Group.

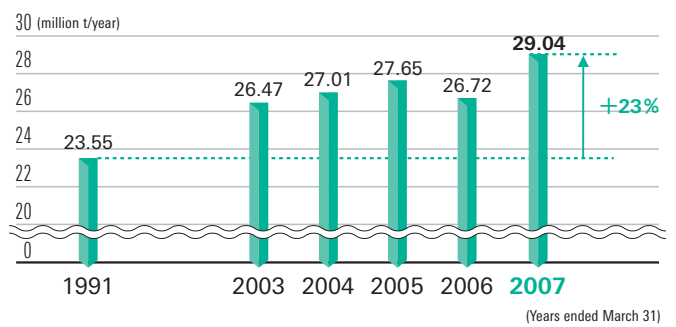
### Transition of Total Energy Consumption and Unit Energy Consumption at JFE Steel



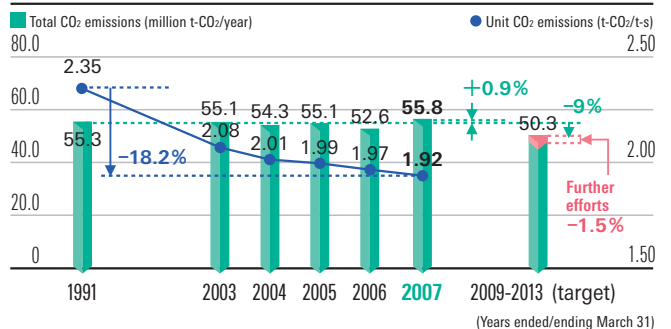
Unit energy consumption in comparison to the year ended March 1991

approx. **18% cut**

### Transition of Crude Steel Production at JFE Steel



### Transition of Total Energy Origin CO<sub>2</sub> Emissions and Unit CO<sub>2</sub> Emissions at JFE Steel (Estimation)



Unit CO<sub>2</sub> emissions in comparison to the year ended March 1991

approx. **18% cut**

## For Compliance with the Voluntary Action Program

JFE Steel is determined to prevent global warming by promoting further energy saving (reduction of CO<sub>2</sub> emissions) activities in order to achieve the JISF's Voluntary Action Program with certainty even though crude steel production is increasing.

We will make concrete efforts such as improving operational efficiency (cutting the reducing agent ratio and utilizing more iron scraps), energy savings by streamlining equipment, and technological innovations through R&D.

Broader introduction of waste heat recovery equipment	<ul style="list-style-type: none"> <li>• CDQ</li> <li>• Regenerative burner</li> <li>• BOF gas sensible heat recovery</li> </ul>
Broader application of high efficiency equipment	<ul style="list-style-type: none"> <li>• High efficiency oxygen equipment</li> <li>• High efficiency power generation equipment</li> <li>• High quality and high productivity sintering technology</li> </ul>
Active use of cold iron source	<ul style="list-style-type: none"> <li>• Shaft furnace</li> </ul>
Reduction of BF reducing agency rate	<ul style="list-style-type: none"> <li>• Containers and packaging plastics Pulverization plant</li> </ul>

CDQ equipment



CDQ (Coke Dry Quenching) is equipment to quench coke by exposing the dried/heated coke after the coke oven process to inert gas flowing in a cooling chamber. This equipment does not emit dust and realizes sensible heat recovery power generation, which contributes to energy saving. JFE Steel is now carrying forward broader utilization of CDQ into the Kurashiki area.

Installation status of regenerative burners



A regenerative burner alternately uses a pair of burners which are integrated with the thermal storage body, and thereby uses waste heat generated from one burner as preheat for the other burner's combustion air. This system excels in thermal efficiency and realizes substantial energy saving (CO<sub>2</sub> emission reduction) and NO<sub>x</sub> emission reduction.

## Use of the Kyoto Mechanisms

JFE Steel has been promoting the utilization of CO<sub>2</sub> emission rights according to the Kyoto Mechanisms as a complementary measure to reduce CO<sub>2</sub> emissions in addition to implementing technologies. This is being done so that we can achieve the goals of the Voluntary Action Program with certainty.

Implementation of CDM*	Power generation by PSC sintering waste heat recovery
Participation in funds	Japan Greenhouse Gas Reduction Fund The World Bank's Bio Carbon Fund
Purchase of CO <sub>2</sub> emission rights	Purchase of CO <sub>2</sub> emission rights approved by the United Nations

\* CDM (Clean Development Mechanism)

This system is introduced in the Kyoto Protocol and allows the developed nations to use the reduced emissions when counting their own achievements by offering technologies and funds to developing nations.

### CDM to PSC (Philippine Sinter Corporation)

In plants that manufacture sintered ore, which is used as a material for iron-making, steam is produced by utilizing waste heat diffused in the air and 18.6 kWh of power is generated. As a result, 62,000 tons of CO<sub>2</sub> are reduced per year. This project has been approved as CDM by the United Nations.



Panoramic view of PSC

Annual reduction in CO<sub>2</sub> emissions

**62,000**  
tons

### Energy Saving Measures at the Transportation Division

JFE Steel has been also striving to reduce the CO<sub>2</sub> and NO<sub>x</sub> emissions inherent in production transportation. The enhancement of transportation efficiency as well as the streamlining of operating cars and ships have also been carried forward to promote modal shifts\*<sup>1</sup>. The modal shift rate in production transportation has reached 95%, including JFE Steel.

JFE Steel's CO<sub>2</sub> emissions caused by transportation as a cargo owner were estimated at approximately 400,000 tons\*<sup>2</sup> in the year ended March 2007.

\*<sup>1</sup> Modal shift: Switching transportation measures from trucks to railways or ships to promote streamlining of transportation and reduce the environmental load.

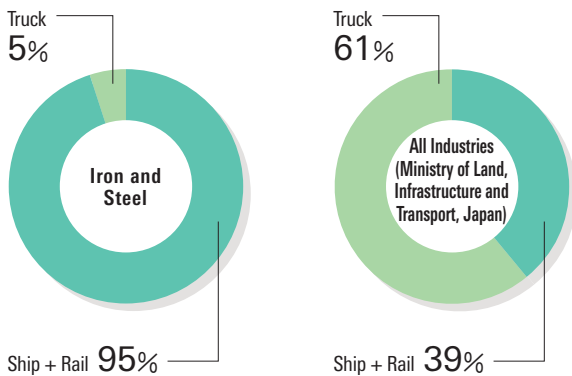
### Non-energy Origin CO<sub>2</sub> Emissions

Limestone and dolomite used in BF, converters and the like are kinds of non-energy origins of CO<sub>2</sub> emissions. Methane is emitted in the process of manufacturing coke, and N<sub>2</sub>O is emitted by fuel usage or from water treatment equipment and similar sources.

The total limestone/dolomite origin CO<sub>2</sub> and CO<sub>2</sub> equivalent of methane and N<sub>2</sub>O emitted by JFE Steel reached 3.2 million tons\*<sup>2</sup> in the year ended March 2007.

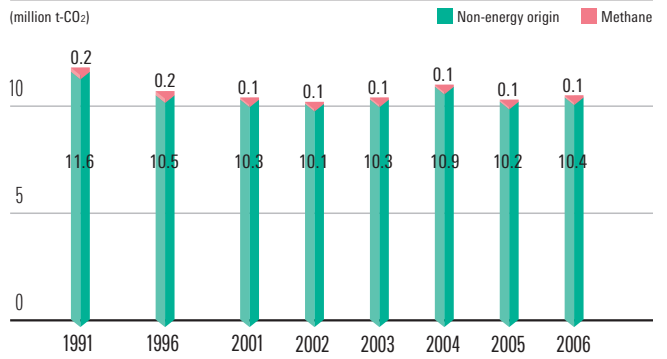
\*<sup>2</sup> We started aggregate calculations from the year ended March 2007 under the Energy-Saving Law and the Global Warming Solutions Act.

### Modal Shift Rate of the Iron and Steel Industry in Japan



Source: The Japan Iron and Steel Federation

### Transition of Non-energy Origin GHG Emissions by the Iron and Steel Industry in Japan



Source: The Japan Iron and Steel Federation

(Years ended March 31)

### Social Contribution through Steel Products

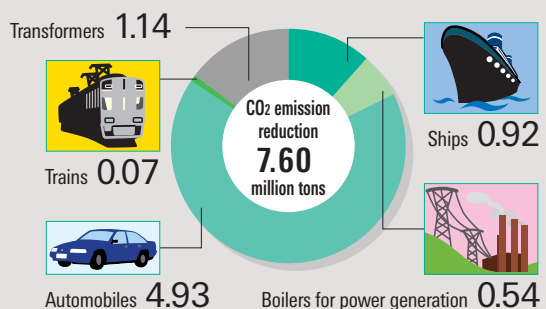
Steel manufacturers are actively promoting development of highly functional steel products with properties of light weight, high efficiency and longevity, etc.

These steel products substantially contribute to energy saving when finished goods such as automobiles are practically used in society. Typical highly functional steel products manufactured from the year ended March 1991 to the year ended March 2006 are estimated to have deterred CO<sub>2</sub> emissions of approx. 7.6 million tons as of the year ended March 2006, proving a significant contribution to society.

Estimated effect of highly functional steel products

approx. **7.6** million tons cut

### CO<sub>2</sub> Emission Reduction Effect at the Stage of Using Steel Products (As of the Year Ended March 2006)

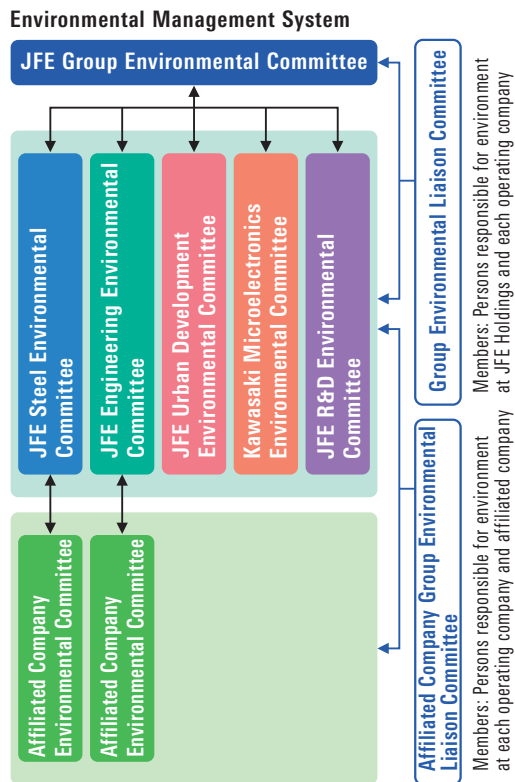


Source: The Japan Iron and Steel Federation

# Environmental Management

## Construction and Operation of Environmental Management System

Under the Group CSR Convention, the JFE Group has set up not only the Group Environmental Committee chaired by the President of JFE Holdings but also an Environmental Committee in each of the Group's operating companies and affiliated companies. With this multi-tiered committee system, JFE has been dealing with environment-related issues such as setting objectives for environmental protection activities, progress check of those activities, and evaluation on environmental performance as a whole group.



### JFE Group Environmental Committee

Chairman: President of JFE Holdings  
Members: Directors responsible for environmental matters at JFE Holdings and each operating company

### Environmental Committee (Operating Company)

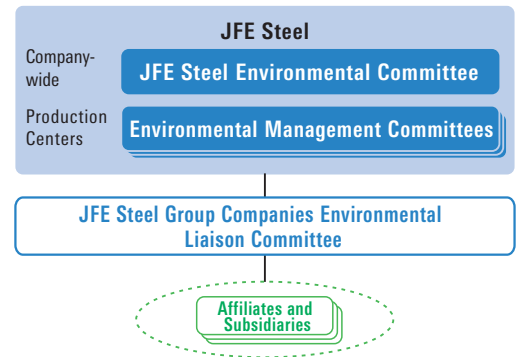
Chairman: President or director responsible for environmental matters at the operating company  
Members: Managers of related departments, persons responsible for environment at each works, center

### Environmental Committee (Affiliated Company)

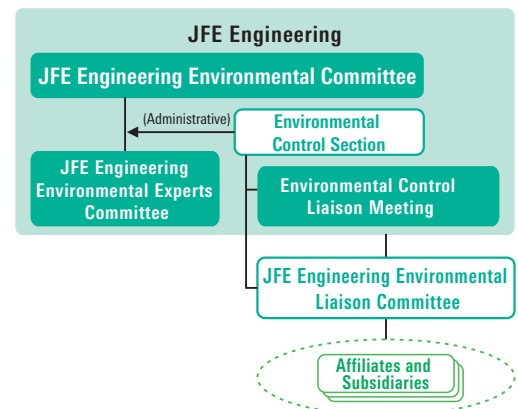
Chairman: Directors responsible for environmental matters  
Members: Managers of related departments

JFE has also established the Group Environmental Liaison Committee made up of persons responsible for environmental matters at JFE Holdings and the five operating companies in order to spread environmental activities within the Group evenly and improve the level of activities. In March 2007, "Environmental Management Guideline for preventing pollution by enterprises" was issued by the Ministry of Economy, Trade and Industry and the Ministry of the Environment. JFE aims to improve environment management system by evaluating our efforts based on the guideline.

## JFE Steel Environmental Management System



## JFE Engineering Environmental Management System



JFE Steel Group Companies Environmental Liaison Committee



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### Promotion to Receive ISO 14001

Each company in the JFE Group has been aiming to receive ISO 14001 certification in order to promote voluntary and continuous environmental activities. Three operating companies with production facilities have all received ISO 14001 certification, either for individual works or at the whole company level. In April 2007, Steel Research Laboratory of JFE Steel received ISO 14001 certification. Many affiliates of the operating companies have also been aiming to receive the certification, with four companies accredited for the first time in the year ended March 2007. The JFG Group will continuously extend the number of accredited companies/production facilities.

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### Environmental Auditing

At the JFE Group, the environmental auditing has been conducted on the basis of ISO 14001, and with the aim of enhancing environmental management quality. As for the environmental auditing on the basis of ISO 14001, external inspection is made by certification authorities, while internal auditing is conducted by qualified employees who not only have taken the auditor-training course offered by an external institution but also have experience in environment-related work.

As for the environmental auditing with the aim of enhancing environmental management quality, internal auditors of the head office's audit department and environmental experts of the head office's environmental management division conduct auditing on issues centering on the environmental management status and compliance system with environment-related regulation of each of the operation facilities and affiliated companies.

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### Environmental Education

The JFE Group conducts environmental education at all levels to deepen the understanding of each employee and encourage individual efforts to improve the environment as part of regular work. In each operating company, environmental education is incorporated in training programs for new employees and promotion, and also includes annual programs at each level, covering social trends related to environmental problems, the significance of the environment to JFE and measures being taken by the company, the responsibility of individual employees, and the importance of environmental management.

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### Status of Green Purchasing

In 2002, the JFE Group established a common group-wide set of "Green Purchasing Guidelines" for purchases of office supplies and parts/materials for production.

#### In outline, the Guidelines specify

- Adequate study of required quantities before purchase to minimize purchased amounts.
- Consideration of environmental loads over the entire life cycle of final products, in addition to price, quality, delivery schedules, etc.
- Requests for and cooperation with environmental protection efforts of suppliers on a daily basis.

#### Examples of green purchasing:

- Stationery, office equipment
- Recycled oil, solvent containers, packaging materials, electric/natural gas/hybrid vehicles, etc.

#### For further information

Profile of ISO 14001-certified companies is provided at the following website:

<http://www.jfe-holdings.co.jp/environment/>

# Environmental Accounting

Cumulative investment in energy saving since 1990

**362.0**  
billion yen

Cumulative investment in environmental measures since 1973

**506.7**  
billion yen

The year ended March 2007:  
Environmental investment

**13.5**  
billion yen

The year ended March 2007:  
Environmental cost

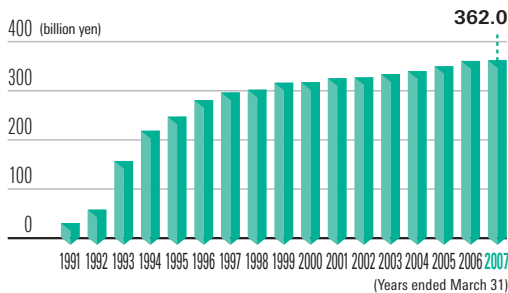
**74.8**  
billion yen

JFE GROUP  
ENVIRONMENTAL  
SUSTAINABILITY  
REPORT 2007

## Transition of Capital Investment

To promote energy saving and further reduce environmental loads, JFE has actively invested in plant and equipment based on R&D achievements in the Group's proprietary environmental technologies. Cumulative investment in energy saving since 1990 has reached ¥362.0 billion, enabling us to achieve energy efficiencies that rank among the highest in the world.

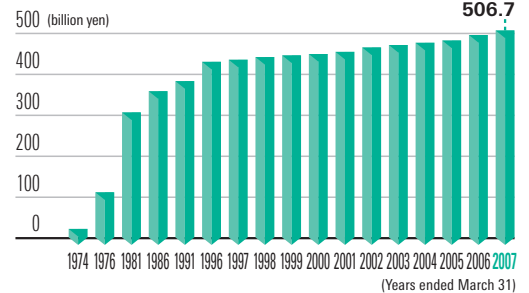
### Cumulative Investment in Energy Saving



We are planning further investment in plant and equipment to promote global warming prevention.

Meanwhile, cumulative investment in environmental protection since 1973 has reached ¥506.7 billion. We will continuously invest in measures to further reduce environmental loads.

### Cumulative Investment in Environmental Measures\*



\* Investment in environmental protection:  
Total investment in effective use of resources and environmental protection

## Environmental Accounting

In the year ended March 2007, environment-related capital investment totaled ¥13.5 billion and expenses amounted to ¥74.8 billion. The ratio of environment-related capital investment against total capital

investment is approximately 10%. As a result of activities during the year ended March 2007, the effects of energy conservation were valued at ¥1.4 billion by estimation.

### Environmental Protection Costs

			(billions of yen)	
Description			Amount of Investment	Amount of Expenses
Environmental investment & expenses related to JFE's own business	Management	Monitoring & measurement of environmental influence, EMS-related activities, environmental education & training, etc.	—	2.3
	Prevention of global warming	Energy conservation, effective use of energy, etc.	3.3	15.2
	Effective use of resources	Recirculation of industrial water, recycling of by-products & waste generated in-house, waste management, etc.	1.2	17.5
	Environmental protection	Prevention of air pollution, water pollution, soil contamination, noise, vibration, ground subsidence, etc.	9.0	33.0
	Miscellaneous	Fees/charges, etc.	—	1.7
Environmental investment & expenses related to customers and society	Research & development	Technology development for environment, energy, prevention of global warming	—	4.5
	Social activities	Protection of nature, support to forestation, information disclosure, exhibition, advertisement, etc.	—	0.6
<b>Total</b>			<b>13.5</b>	<b>74.8</b>

Environmental accounting data stated above were calculated on the basis of the following assumptions.

Period subject to accounting: April 1, 2006 to March 31, 2007

Scope of Compiled Data: For costs, data on environment-related investment and expenses at JFE's steelworks were gathered, but in the field of research & development, Group-wide data were collected.

The effects refer to "presumed effects"; "risk aversion effects," etc., are excluded from calculations.

Calculations do not include capital investments made primarily for purposes other than environmental protection, such as renovation of superannuated facilities, even if the process as a whole results in a net energy saving compared to the former process.

# Communication with Society Related to the Environment

## Environmental Abnormality Prevention System (Publication of Environmental Information)

JFE Steel has strived to drastically restructure the environmental management system since December 2004, when the water quality problems were recognized at its East Japan Works (Chiba). As part of these efforts, the environmental abnormality prevention system has been under the construction based on our accumulated expertise. Moreover, real-time information disclosure system on environment was completed in March 2007, and is now open to the general public.



Environmental abnormality prevention system

Location: Visitors' Center at JFE Steel's East Japan Works (Chiba)

- (1) Environmental initiatives: Presentation on JFE Steel's activities to cope with the environmental problems since the incidence
- (2) Environmental Data
  - 1 Measurement results of air environment NOx, SOx (12 stacks)
  - 2 Measurement results of wastewater quality COD, wastewater volume (7 wastewater treatment plants)



Example of disclosed data

## Open Tour for the Real-time Information Disclosure System

■ **Operating hours:**  
9:00 a.m. to 5:00 p.m.  
(excluding Saturdays and holidays)

■ **Contact/Application:**  
Environmental Management Department, East Japan Works (Chiba),  
JFE Steel Corporation  
Tel: +81-43-262-2371  
Fax: +81-43-262-2756

### For further information

About environmental problems concerning water quality, please refer to the following:

<http://www.jfe-steel.co.jp/works/east/chiba/environment2.html>

## Exchanges through Exhibitions

The JFE Group participates in various exhibitions on environmental themes to encourage information exchanges with a wide range of people. At Eco-Products 2006, which attracted approximately 150,000 visitors, we presented JFE's environmental initiatives as well as the Group's technologies/products that support society and life, and contribute to environmental protection.



JFE booth at Eco-Products 2006



"Let's See How to Make Steel" section

## Information through the Internet

The JFE Group actively offers information related to the environment through the Internet. On the JFE Group website, its environmental management policy, activities and results are introduced under the title of "Environmental Activities."

Moreover, JFE has been cooperating with an environmental website, where general knowledge on environmental issues is presented in an easily comprehensive way. Through this linkage, the Group introduces voices of "eco people," who are innovatively involved in environmental issues. This is one example of JFE's efforts to promote environmental awareness activities among the general public.

### For further information

JFE Holding's environmental initiative website at:

<http://www.jfe-holdings.co.jp/en/environment/index.html>



Environmental website "ecobeing" at:

<http://www.ecobeing.net/>



# Contribution to Biodiversity



General Affairs Division  
Tsurumi Engineering and  
Manufacturing Center  
JFE Engineering Corporation

We were surprised to find various living creatures including over nine kinds of dragonflies, water stick insects, and water boatmen inhabiting our premises. These findings have somehow reminded us of a sense of wonder. Through our forum activity, we not only rediscovered the importance of green space but also could interact with people from various fields. Such experiences have helped us boost our own motivation.

## Greening of Steelworks

JFE Steel's efforts to facilitate green premises at its steelworks have resulted in habitats for precious creatures. For example, little terns are breeding within the premises of JFE Steel's East Japan Works (Chiba). The breeding ground previously had been put at risk of being flooded because of precipitating water while the premises' wastewater pathways had been under maintenance. Yet it was eventually protected by absorbing the rain water through pumps. Another example is green space within the premises of the East Japan Works (Keihin), where good habitat conditions allow kingfishers to nest.



Fureai-no-ike (the pond in communion with nature) in Keihin

## Participation in "How Far Do Dragonflies Travel?" Forum

JFE Engineering's Tsurumi Engineering and Manufacturing Center has been a participant in studies on dragonfly populations since the first survey in 2003. We have provided a survey site within the company premises as well as helped to capture dragonflies. In 2006, it was decided to fill the premises' experimental tanks temporarily with saline water. Since these tanks were the habitat of dragonfly larvae, researchers carried out a "dragonfly rescue operation" over the weekend by capturing and transferring 100 dragonfly larvae to other tanks. In this way, we have conserved the regional biodiversity.



The experimental tanks where the "dragonfly rescue operation" was conducted

### For further information

ecobeing  
JFE Okukusatsu  
Holiday Village  
<http://www.ecobeing.net/ecopeople/peo30/index.html>



## Okukusatsu

JFE has been promoting forest conservation such as afforestation and thinning within the area of Kunimura, Agatsuma-gun, Gunma Prefecture. The area consists of a privately owned old open-pit iron mine site and surrounding national forests. As a result of longstanding efforts, forests have been recovered as a habitat for precious plants and animals. Part of this area has been designated as a Natural Holiday Village, where people can enjoy communion with nature.



JFE Okukusatsu  
Holiday Village

## Reefs for Coral and Seaweed

JFE has been developing restoration technologies for marine environments by utilizing steel slag, which is a byproduct of manufacturing. Porous Marine Block®, which is JFE's block product made from steel slag and CO<sub>2</sub> through a solidification reaction, has been adopted for coral reef restoration works in Sekisai-shoko on a trial basis. So far, good results have been observed. Marine Block® has also been used in rejuvenation experiments for seaweed reefs close to Japan because of its excellent performance as an implantation base for seaweed.



Coral growing on  
Marine Block

# Reducing Environmental Loads in Business Activities

By Utilizing the World's Most Advanced Technology for Reduction of Environmental Loads

• Energy/Material Flow in the Steelmaking Process -----	13
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• Reducing Environmental Loads in Business Activities at Kawasaki Microelectronics ---	21
• Reducing Environmental Loads in Business Activities at JFE Urban Development ---	22

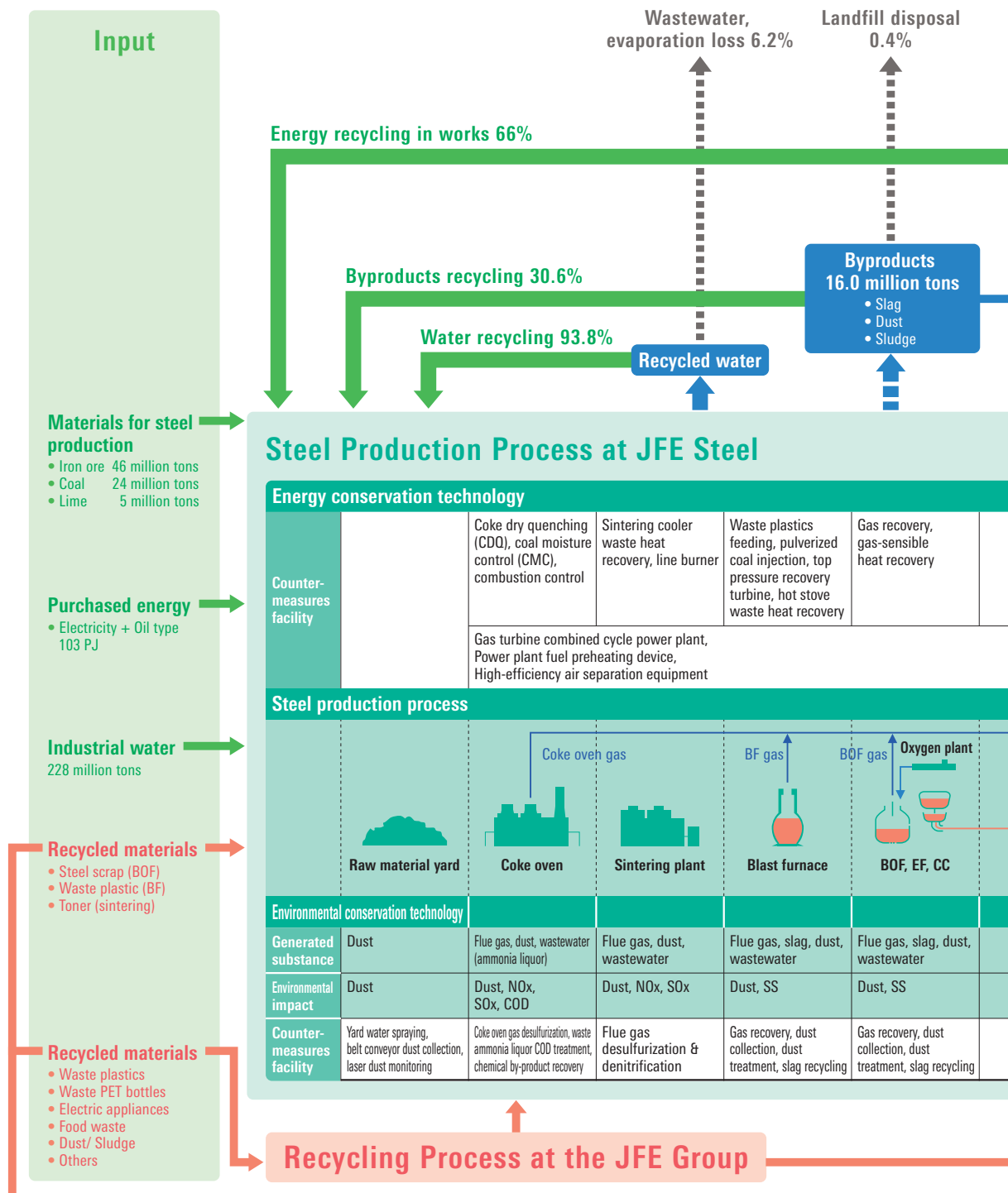
# Energy/Material Flow in the Steelmaking Process

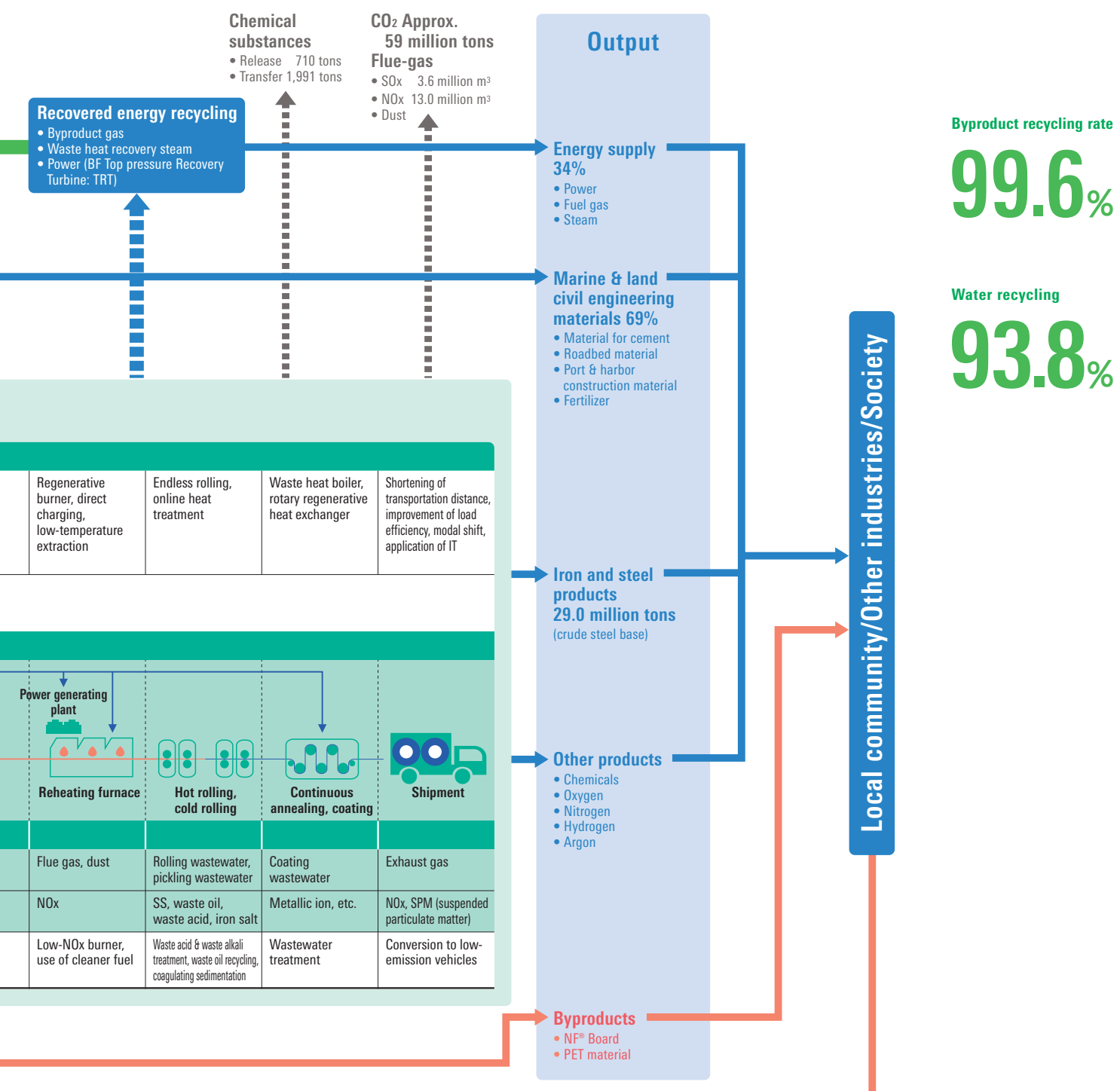
JFE Steel Corporation has endeavored to reduce environmental loads through R&D on energy saving and environmental protection technologies and aggressive investment in facilities. As a result, our steel production processes now boast the world's

highest energy efficiency and recycling rates. Far from becoming complacent with its achievements, JFE Steel still continues to conduct R&D and introduce equipment to further reduce environmental loads in each steel production process.

Energy recycling in works

66%





## Reducing Environmental Loads in Business Activities at JFE Steel

For the corporate profile

JFE Steel

<http://www.jfe-steel.co.jp/en/index.html>

### Air Quality Preservation

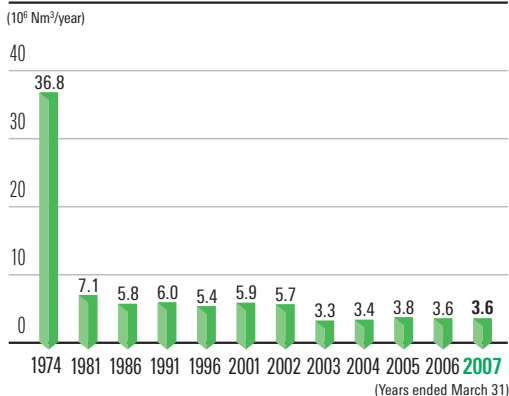
#### ■ Reducing Sulfur Oxide (SO<sub>x</sub>) and Nitrogen Oxide (NO<sub>x</sub>) Emissions

JFE Steel has implemented active measures to reduce emissions of SO<sub>x</sub> and NO<sub>x</sub>. In these actions as well as R&D, particular emphasis has been placed on sintering furnaces, of which emissions of SO<sub>x</sub> and NO<sub>x</sub> are especially large in the steel production process. Flue gas desulfurization equipment has been installed at all the company's sintering furnaces. Flue gas denitrification equipment has also been installed at all sintering furnaces of East Japan Works (Chiba and Keihin).

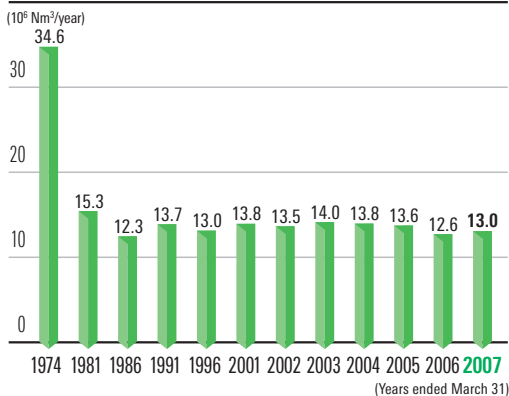
#### ■ Reducing Dust

Since dust is generated from various sources in the steel production process, JFE Steel has been promoting appropriate reduction measures by identifying individual sources and designing specific measures for each source. As for dust generated during combustion, the optimum dust removal equipment has been installed to fit with the dust's properties. Similarly, to reduce other dust in terms of its generation as well as release, JFE Steel has been developing technologies and upgrading processes.

#### Transition of SO<sub>x</sub> Emissions



#### Transition of NO<sub>x</sub> Emissions



Dust-proof fence at West Japan Works (Fukuyama)



Dust collector at West Japan Works (Fukuyama)

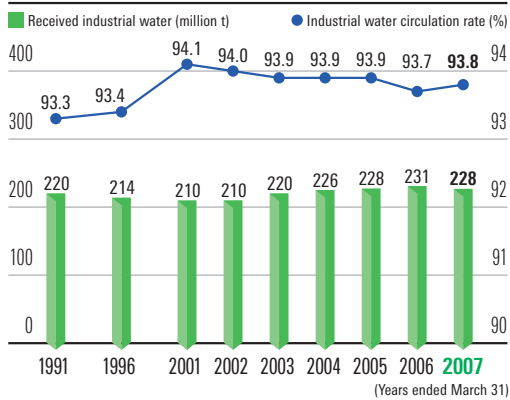


### Water Quality Preservation

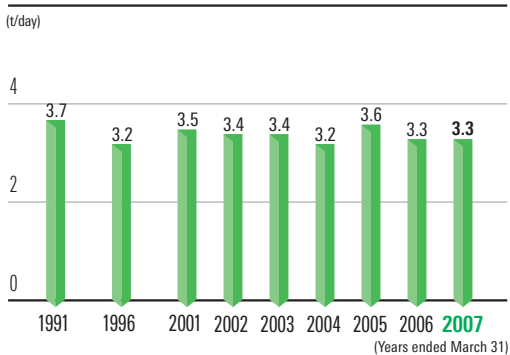
JFE Steel has been earnestly promoting circulation/recycling of industrial water consumed in the steel production process, with its industrial water circulation rate\* maintained at as a high level as about 93.8%. For release into public waters, wastewater is given appropriate purification treatment so that its pollution loads can be reduced.

\* Industrial water circulation rate  
Industrial water circulation rate = (Total consumption – Received industrial water) / Total consumption

#### Transition of Received Industrial Water and Circulation Rate



#### Transition of COD (Chemical Oxygen Demand)

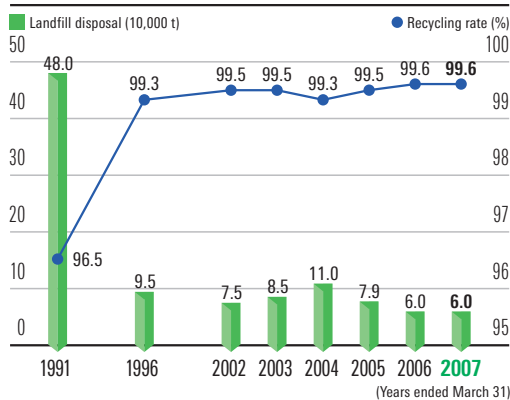


### Effective Utilization of Byproducts

JFE Steel has been recycling byproducts (i.e., iron and steel slag<sup>\*1</sup>, dust, and sludge<sup>\*2</sup>) in the steel production process in the works as raw materials for steel manufacturing and has been promoting effective utilization of byproducts as resources. Moreover, JFE Steel has been actively expanding applications and markets for steel slag products such as Road Cool®. Among such efforts, application developments of environmental restoration materials such as Marine Block® and Marine Base® have been conducted through industry-government-academia collaboration.

\*1 Iron and steel slag:  
Material consisting of non-iron rock components in iron ore and lime, etc. It separates from and floats on the molten metal. Slag is mainly used as material for cement.  
\*2 Sludge:  
Material remaining after dewatering of the mud-like substance separated and removed by circulating water/wastewater treatment equipment.

#### Transition of Landfill Disposal and Recycling Rate of Byproducts



Industrial water circulation rate

93.8%

Byproduct recycling rate

99.6%



Water treatment facility at East Japan Works (Chiba)



Sorted waste bricks for recycling at East Japan Works (Keihin)

## Waste Recycling in Steel Production Process

JFE Steel effectively recycles a wide range of waste in various processes at steelworks, and thereby supports sustainable societies.

To give a specific example, JFE Steel developed a unique process to effectively utilize carbon and hydrogen components contained in plastics as reducing agents by injection waste plastics instead of cokes into a blast furnace (BF). Actually, the company has become the world's first practical user of this integrated process, which not only effectively uses plastics but also contributes to reduction of CO<sub>2</sub> emissions by reducing consumption of coke in the steel production process.

Moreover, JFE Steel has been successively developing and putting into practical use various recycling technologies, including technology to dechlorinate vinyl chloride into BF feed and other technology to pulverize waste plastics into

BF feed. Recovered hydrochloric acid (separated and refined) from the process of dechlorinating vinyl chloride is recycled in the acid pickling process. Aluminum recovered from waste fluorescents is also recycled as a refining agent in the steel production process. To sum up, steelworks have become important bases for recycling resources.



Plant for pulverizing waste plastics



**Hiroyuki Tobo**

Senior Researcher  
Slag & Refractories  
Research Dept.  
Steel Research Laboratory  
JFE Steel Corporation

We are promoting R&D to turn steel slag into socially useful materials.

## Advanced Applications for Iron and Steel Slag

## ■ "Road Tough®" Temporary Road Material

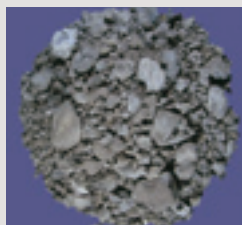
Temporary road material made from steel slag. Road Tough has an excellent compaction property, so that roads using the material can be opened to traffic immediately after construction, even if the roads are constructed on soft ground. It also has a good wear resistance.



Construction of road using Road Tough

## ■ "Marine Stone®" Submerged Embankment

Submerged embankment/breakwater material using steelmaking slag. It has a similar appearance to natural stone and can be used for construction same method as natural stone. Marine Stone® is superior as a habitat for life.



Marine Stone

<http://www.jfe-steel.co.jp/products/slag/slag.html>

## ■ "Marine Base®" Sand-capping Material

A sand-capping material which is made from granulated blast furnace slag. It suppresses elution of phosphorus and nitrogen, which cause eutrophication, from sea bottom mud. It is suitable for bottom-dwelling organism habitats.



Marine Base

## ■ "Marine Rock®": Artificial Stone (Steel Slag Hydrated Block: Ferro-Foam)

Artificial stone made by mixing of steel slag, ground granulated blast furnace slag and other additives. It is now utilized mainly as a material for port and harbor construction.

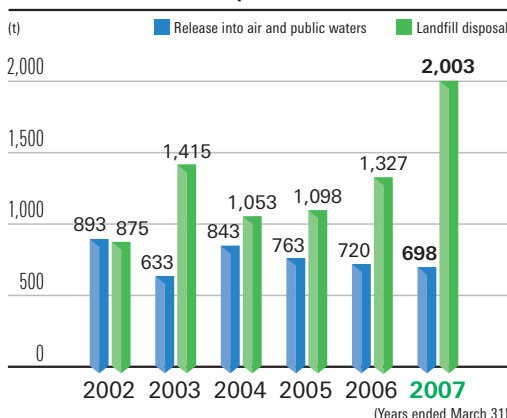


Marine Rock

### Control/Release Reduction of Chemical Substances

JFE Steel has been promoting voluntarily release reduction program, which gives the first priority to chemical substances having higher toxicity and larger release amounts. Since the year ended March 2002, total release into air and public waters has been reduced. In the year ended March 2007, landfill disposal increased due to the production increase of crude steel.

### Release and Landfill Disposal



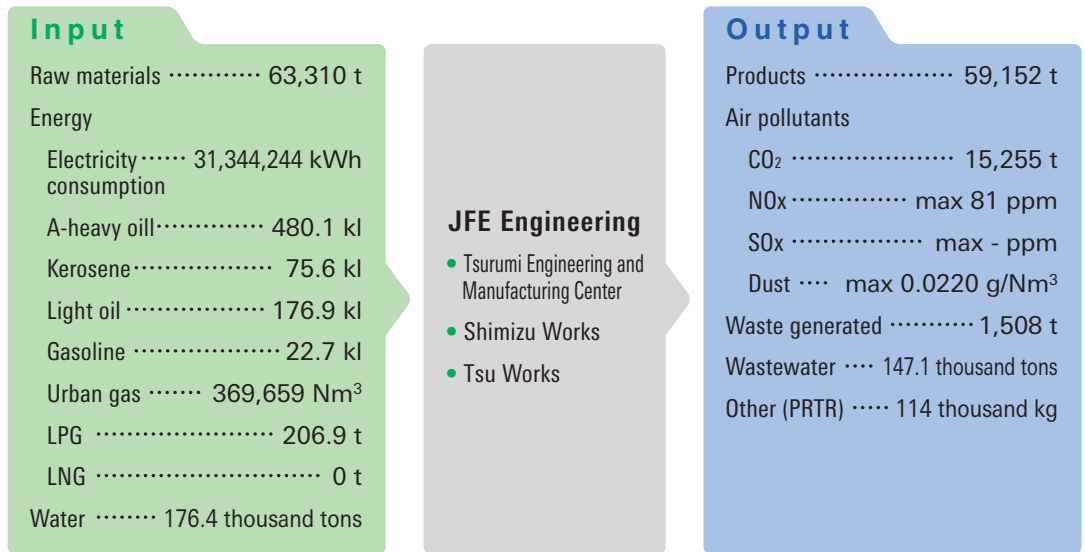
### Substances Reported under PRTR (The Year Ended March 2007)

(Unit: tons; dioxins: g-TEQ)

No.	Substance	Release				Transfer	
		Air	Public waters	Soil on-site	Landfill on-site	Sewerage	Off-site
1	Zinc compounds (water-soluble)	0	5.5	0	0	0	0
16	2-aminoethanol	0	2.6	0	0	0	0
25	Antimony and its compounds	0	3.1	0	0	0	20
26	Asbestos	0	0	0	0	0	39
30	Bisphenol A type epoxy resin (liquid)	0.7	0	0	0	0	0
40	Ethylbenzene	38	0	0	0	0	0.5
43	Ethylene glycol	0.1	0.3	0	0	0	7.1
63	Xylene	285	0	0	0	0	4.3
68	Chromium and chromium (III) compounds	0.02	0.9	0	2.1	0	914
69	Chromium (VI) compounds	0	0	0	0	0	1.3
85	HCFC-22	0	0	0	0	0	3.5
99	Vanadium pentoxide	0	1.7	0	0	0	0
100	Cobalt and compounds	0	0.04	0	0	0	0
132	HCFC-141b	67	0	0	0	0	0
144	HCFC-225	12	0	0	0	0	0
145	Dichloromethane	15	0	0	0	0	0
177	Styrene	0.3	0	0	0	0	0
178	Selenium and its compounds	0	0.04	0	0	0	1.8
179	Dioxins	8.9	0.00004	0	0	0	0
198	Hexamethylenetetramine	0	0.06	0	0	0	0
200	Tetrachloroethylene	24	0	0	0	0	0
207	Copper water-soluble salts	0	0	0	0	0	0
224	1,3,5-Trimethylbenzene	11	0	0	0	0	0.06
227	Toluene	77	0	0	0	0	3.5
230	Lead and its compounds	0	0	0	0	0	190
231	Nickel	0	0	0	0	0	65
232	Nickel compounds	0.009	0.7	0	0	0	70
253	Hydrazine	0	0.05	0	0	0	0
266	Phenol	1.1	0.03	0	0	0	0.003
283	Hydrogen fluoride and its water-soluble salts	0	40	0	0	0	28
299	Benzene	70	0	0	0	0	0
304	Boron and its compounds	0	13	0	0	0	4.4
307	Poly (oxyethylene) alkyl ether	0	0	0	0	0	0
309	Poly (oxyethylene) nonylphenyl ether	0	3.4	0	0	0	1.5
310	Formaldehyde	0.02	0	0	0	0	0
311	Manganese and its compounds	0.04	18	0	9.3	0	634
345	Mercaptoacetic acid	0.002	0	0	0	0	0.003
346	Molybdenum and its compounds	0	7.7	0	0.9	0	3.4
353	Tris (dimethylphenyl) phosphate	0	0	0	0	0	0
<b>Total</b>		<b>601</b>	<b>97</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>1,991</b>
		<b>Total release 710</b>				<b>Total transfer 1,991</b>	

# Reducing Environmental Loads in Business Activities at JFE Engineering

## Material Balance



CO<sub>2</sub> reduction from the year ended March 1991

Down **8.9%**

CO<sub>2</sub> reduction from the year ended March 1998

Down **18.6%**

## Preventing Global Warming

The Japan Society of Industrial Machinery Manufacturers formulated a "Voluntary Action Plan for the Environment by the Industrial Machinery Industry" in 1997. The Plan aims for a 12.2% reduction in CO<sub>2</sub> emissions from the year ended March 1998 levels by the year ending March 2011.

Under such circumstances, JFE Engineering Corporation has implemented Environmental Management Systems suited to functions and business attributes at each of its works and endeavors to prevent global warming.

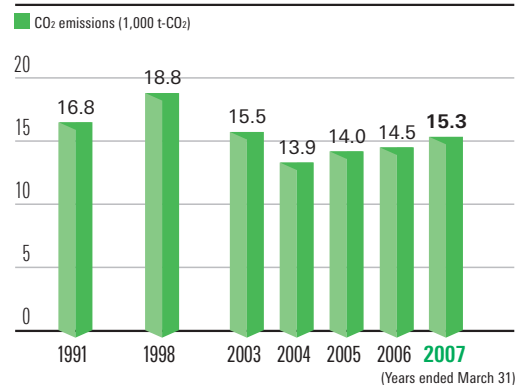
The office division has been promoting various energy saving activities, including adoption of the high-efficient Clathrate Hydrate Slurry (CHS) Latent Heat Air-conditioning System and power conservation such as turning off lights during the lunch break and turning off personal computers when not in use. Meanwhile, the production division has implemented power-saving on lighting at factories during sunny daytime, more efficient use of compressed air, and energy-saving check patrols.

Combined CO<sub>2</sub> emissions in the year ended March 2007 from the production division and the

office division amounted to 15.3 thousand tons or an 8.9% reduction from 16.8 thousand tons in the year ended March 1991 and an 18.6% reduction from the level of the year ended March 1998.

JFE Engineering has also been striving to determine CO<sub>2</sub> emissions in site construction works since August 2004. In addition, CO<sub>2</sub> reduction activities such as a "stop idling" campaign have been implemented at construction sites since the year ended March 2007 on a trial basis.

## Transition of CO<sub>2</sub> Emissions



### Reducing Generation/Discharge of Waste

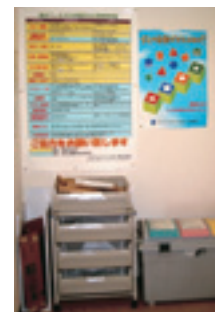
JFE Engineering strives to reduce generation and discharge of waste.

To give concrete examples, the office division has carried out educational activities through on-site broadcasting and posters, etc., as well as more segmented sorting for the purpose of reducing the landfill disposal rate of office waste. At both Tsurumi Engineering and Manufacturing Center (hereinafter "Tsurumi Center") and Shimizu Works, the office division achieved the reduction targets for landfill disposal rates. Meanwhile, the office division at Tsu Works has been working on waste reduction together with the production division.

The production division has endeavored to reduce unit waste discharge per hour. Both the centers and works have worked on thorough sorting, complete sorting and effective use of recyclable waste, and industrial waste patrol to check sorting conditions. Shimizu Works achieved its reduction target, while Tsurumi Center and Tsu Works could not reach their targets due to changes in operations and other factors.

In site construction works, JFE Engineering has been promoting activities to reduce the landfill disposal rate, including sorted collection of rubble,

waste pipes, waste metals, waste plastics, and waste wood, etc., efforts toward smaller bulk, and a recycling campaign. As a result of these activities, the landfill disposal rate at site construction works came to 32.4%, achieving the target of 35% or less ahead of the deadline of the year ending March 2008. The planning and designing division has been also making environment-friendly plans and designs by adopting recycling materials or selecting energy-saving equipment, etc.



Educational poster to reduce office waste

At the office division in Tsurumi Center, JFE Engineering has increased the number of sorted office waste items from 4 items to 14 items since the year ended March 2006 in order to further promote recycling efforts. In the year ended March 2007, generation of office waste in Tsurumi Center increased by 27% year to year mainly due to transfer of some headquarters functions to Tsurumi area, while the recycling efforts resulted in a 37% increase in recycled volume.

#### Reduction of Waste (The Year Ended March 2007)

Reduction of waste in office division		
Landfill disposal of office waste	Target	Actual
Tsurumi Center (%)	25	17.3
Shimizu Works (%)	35	34.8
Tsu Works (%)	—	—

Reduction of waste in the production division		
Unit waste discharge	Target	Actual
Tsurumi Center (t/1000 hrs)	0.99	1.150
Shimizu Works (t/1000 hrs)	0.96	0.710
Tsu Works (t/1000 hrs)	0.086	0.124

Reduction of waste at site construction works		
Landfill disposal rate of site construction waste	Target	Actual
Construction work sites (%)	35	32.4

### Control and Reduction of Chemical Substances

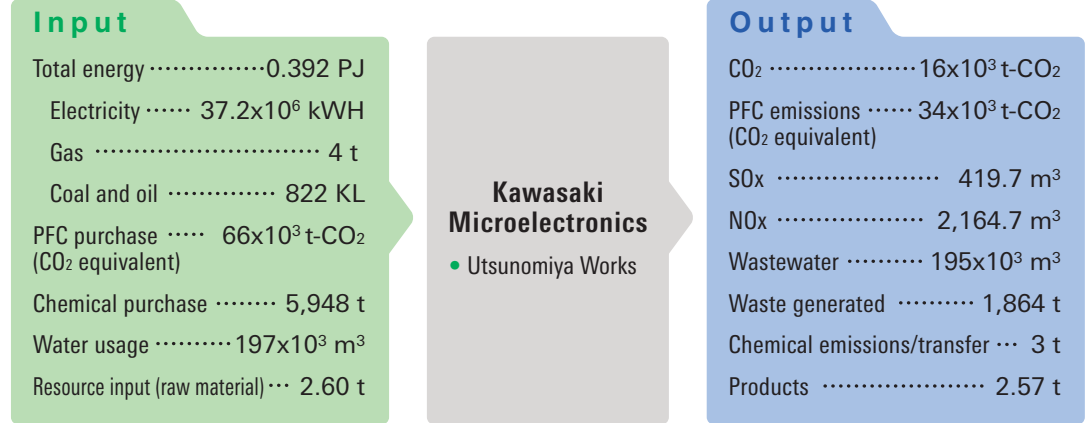
In compliance with the Pollutant Release and Transfer Register (PRTR) Law, JFE Engineering controls release and transfer volumes of the designated chemical substances and reports those figures to the national government through local governing bodies. The company has been promoting activities to reduce the controlled substances including paints, solvent, and gasoline. Moreover, its reduction efforts go beyond such PRTR substances and include gases, CO<sub>2</sub> and propane, etc., to make its business activities environment-friendly.

#### Substances Reported under PRTR (The Year Ended March 2007)

No.	Substance	Release				Transfer		(kg)
		Air	Public waters	Soil on-site	Landfill on-site	Sewerage	Off-site	
1	Zinc compounds (water-soluble)	0.0	0.0	0.0	0.0	0.0	1,340.7	
30	Bisphenol A type epoxy resin	0.0	0.0	0.0	0.0	0.0	2,266.2	
40	Ethylbenzene	15,526.6	0.0	0.0	0.0	0.0	2,191.5	
63	Xylene	43,303.8	0.0	0.0	0.0	0.0	5,978.9	
227	Toluene	25,538.9	0.0	0.0	0.0	0.0	6,053.9	
230	Lead and its compounds	0.0	0.0	0.0	0.0	0.0	1,844.0	
232	Nickel compounds	0.0	0.0	0.0	0.0	0.0	162.0	
311	Manganese and its compounds	0.0	0.0	0.0	0.0	0.0	9,736.0	
Total		84,369.3	0.0	0.0	0.0	0.0	29,573.2	
		84,369.3				29,573.2		
		113,942.5						

# Reducing Environmental Loads in Business Activities at Kawasaki Microelectronics

## Material Balance



### Energy saving rate

**0.78%**  
achieved

### Replacing PRTR substances by substitutes resulted in

**1** item reduction

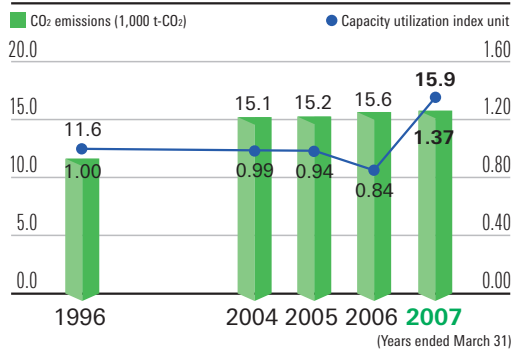
## Preventing Global Warming

In the year ended March 2007, energy-origin unit CO<sub>2</sub> emissions per capacity utilization increased, while the energy saving rate\* reached 0.78% as a result of introduction of inverter control for compressors and other measures.

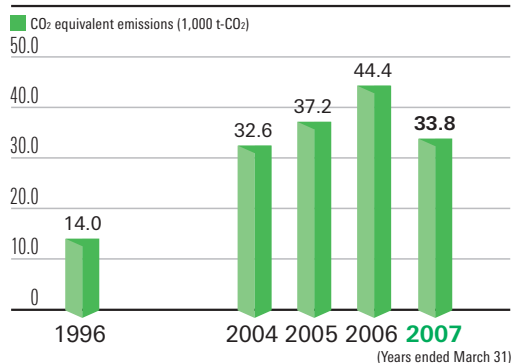
As part of efforts to reduce emissions of PFC gases, Kawasaki Microelectronics, Inc. has implemented an experiment to replace C<sub>2</sub>F<sub>6</sub> gas (accounting for approximately 70% of total emissions of PFC gases) by

substitutes since the year ended March 2006. The basic assessment and consideration for practical use was completed in the year ended March 2007. Accordingly, the company is determined to work on such shifting in the year ending March 2008.

### Energy-Origin CO<sub>2</sub> Emissions



### CO<sub>2</sub> Equivalent Emissions of PFC, HFC and SF<sub>6</sub> Gases



## Reducing Generation/Discharge of Waste

Kawasaki Microelectronics succeeded in recycling plastic packaging materials as valuable substances in the year ended March 2007, after having achieved such recycling of non-ferrous metals in the year ended March 2005 and semiconductor containers in the year ended March 2006.

## Control and Reduction of Chemical Substances

Kawasaki Microelectronics succeeded in replacing acetic acid 2-etoxyethyl with substitutes in the year ended March 2007, following the replacement of N, N-dimethylformamide in the year ended March 2006. In addition, the company reduced emissions of catechol by improving its use conditions. As a result, only one substance is now subject to PRTR reporting requirements.

### Substances Reported under PRTR (The Year Ended March 2007) (kg)

No.	Substance	Release				Transfer	
		Air	Public waters	Soil on-site	Landfill on-site	Sewerage	Off-site
283	Hydrogen fluoride and its water-soluble salts	135	1,199	0	0	0	1,254
<b>Total</b>		<b>1,334</b>				<b>1,254</b>	

\* Energy saving rate:  
Percentage of energy saving effect for the fiscal year relative to power consumption in the works as a whole

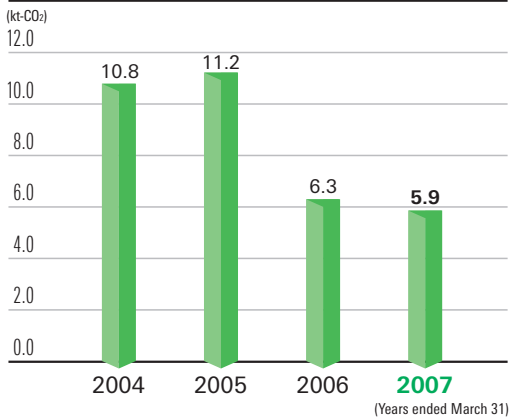
## Reducing Environmental Loads in Business Activities at JFE Urban Development

### Preventing Global Warming

The Real Estate Companies Association of Japan puts emphasis on global warming prevention as a focal issue and stresses measures including to reduce greenhouse gases such as CO<sub>2</sub> in its "Environmental Voluntary Action Plan in the Real Estate Business (4th edition)."

Orto Yokohama, a real estate complex owned by JFE Urban Development Corporation, among others, has reduced energy consumption by introducing a cogeneration system which uses low-CO<sub>2</sub> emission natural gas. At THINK (Techno Hub Innovation Kawasaki), the third science park in Kawasaki City, energy saving work has been carried out to improve energy efficiency of equipment used on the premises.

### CO<sub>2</sub> Emissions at THINK



Figures for the year ended March 2006 or later exclude energy management data under the authority of tenants, subject to the revision of the Energy Saving Law.

### Reducing Generation/Discharge of Waste

Orto Yokohama sorts out waste discharged from activities related to its building management into recyclable paper such as newspaper, magazines and OA paper, cans, bottles, and garbage, etc. While grasping the amount of the discharged waste by category, Orto Yokohama has been promoting reduction and recycling of waste.

### Introduction of an Energy Saving System

Keihin Building, a core facility of THINK, introduced the Air-Conditioning System Using Clathrate Hydrate Slurry developed by JFE engineering in the year ended March 2006 and achieved energy consumption reduction of 21.8% in the year ended March 2007 compared with achievement of electricity and vapor consumption before the introduction of the system (mean from the year ended March 2002 to the year ended March 2004).



Air-Conditioning System Using Clathrate Hydrate Slurry

### Providing Green and Affluent Open Space

Grand Scena Tamagawa, a condominium which JFE Urban Development developed in the year ended March 2007, has a rooftop skydeck where you can enjoy ravishing views of the sedately flowing Tama River and spacious Tamagawa Green Space. This rooftop space is equipped with a wood deck, benches and affluent green planting so that it can serve as a communication spot for residents while at the same time contributing to mitigation of the heat island effect.



Rooftop greening at Grand Scena Tamagawa

For further information

The latest information on newly built condominiums is provided in JFE-style at

<http://www.jfe-style.com>



For further information

THINK (Techno Hub INnovation Kawasaki)

<http://www.techno-hub-innovation.com/>



# II

## Reducing Environmental Loads through Products and Technologies

Providing Society with Steel Products, Engineering Technologies, and Recycling Businesses, All of Which Contribute to Global Environmental Protection

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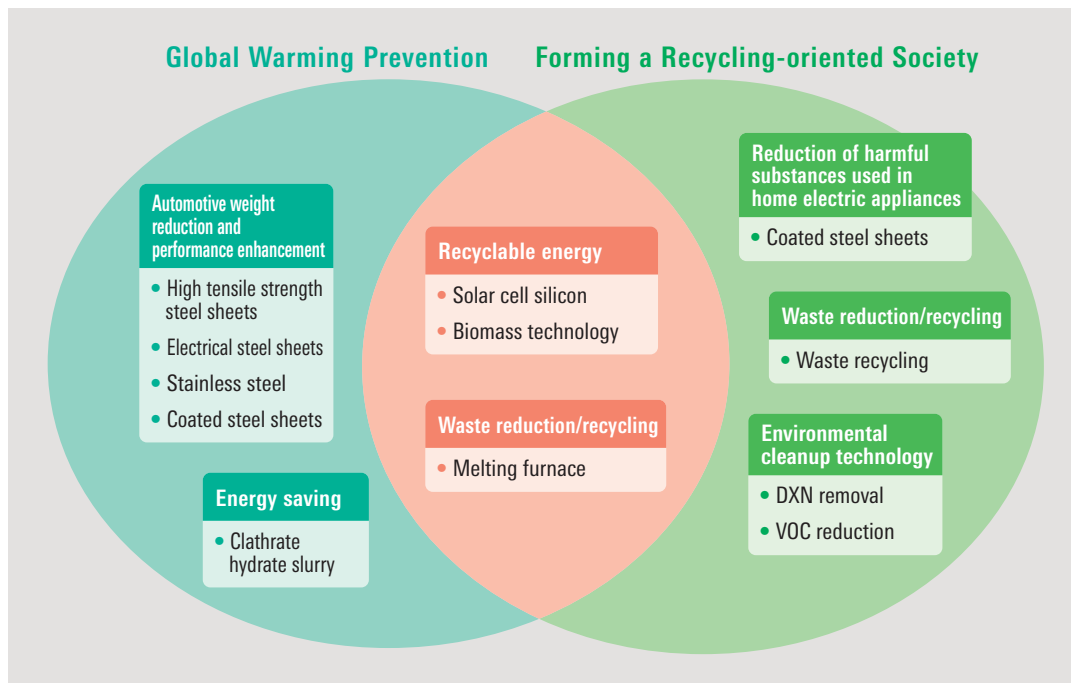
# JFE's Products/Technologies Which Contribute to Global Environmental Protection

The JFE Group has been promoting the contribution to a society in harmony with the environment by developing and providing environment-friendly products/technologies.

With regard to steel products, JFE has developed and supplied high-end steel products under the full recognition that these products should bear responsibility as basic material to support society. A typical example is high tensile strength steel sheet (HITEN), which meets the environmental needs of users and contributes to low CO<sub>2</sub> emissions by reducing automotive weight. JFE has also been taking active measures to save energy and reduce carbon materials used in the steel production process. These steel materials, when used, enable automobiles and home electric appliances to reduce their lifecycle CO<sub>2</sub> emissions.

In engineering technology, the Group offers environmental plant technologies related to waste disposal or recyclable energy, and contributes technologies to make social infrastructure, such as natural gas pipe line, harmonious with the environment.

In addition, JFE has been engaged in recycling businesses which blend steelmaking infrastructure and waste disposal technologies. This business segment handles various kinds of trash from fluorescent tubes, PET bottles and waste wood building materials to industrial plastic waste, recovers them as recycling materials or energy, and ultimately contributes to a recycling-oriented society. In this manner, the JFE Group promotes the development of "Only One/Number One" technologies to make a social contribution and provides the technologies to society.



# Contributing through Steel Technologies/Products



**Michitaka Sakurai**  
Chief Staff Member at the Product Technology Division West Japan Works

We are contributing to prevention of global warming through weight reduction of auto body by HITEN, efficiency improvement of hybrid automotive motors by electrical steel sheets, and so on.

## In the Automotive Field

### ■ HITEN

High tensile strength steel sheets (HITEN) are used in various parts of automobiles and extremely effective for automotive weight reduction. SFG HITEN was the first steel sheet used in auto side panels, while 980 MPa HITEN sheets are used in the center pillar and various reinforcing members, achieving a 5-10% weight reduction in an entire auto body.

### ■ Highly Lubricant GA Steel Sheet: "JAZ" (JFE Advanced Zinc)"

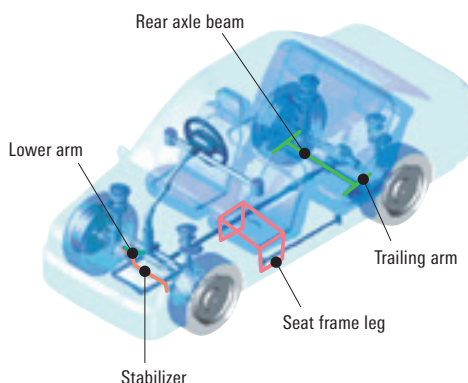
As an environment-friendly product, "JAZ" does not contain phosphate or heavy metal elements which used to be contained in conventional highly-lubricated GA steel sheets. In this unique product, a surface reforming layer with nano-level thickness is formed on a zinc coated layer. JAZ<sup>®</sup> has been adopted in automotive outer plates or inner plates which are otherwise difficult to be formed. More specifically, it is used in side panels, fenders, doors, and wheelhouses, etc.



1,200 t actual press test (Fender model)

### ■ Automotive Steel Tubes

High performance electric resistance welded steel tubes known as "HISTORY (high speed tube welding and optimum reducing technology) steel tubes" contribute to automotive weight reduction by realizing hollow tubes and properties of high strength and high formability.



Center pillar of 980 MPa grade HITEN steel sheet

### ■ Automotive Stainless Steel Sheet

An exhaust manifold material, JFE-WX1 is the only ferritic stainless steel in the world, which can be used at ultra-high temperature. It improves auto fuel economy, reduces CO<sub>2</sub> emissions, and contributes to exhaust gas purification.



### ■ Electrical Steel Sheets for Hybrid Cars

Highly efficient and non-oriented electrical steel sheets, when adopted in driving motor cores, improve automotive fuel economy and contribute to downsizing/weight reduction of auto bodies. Meanwhile, highly efficient and silent electrical steel sheets containing 6.5% Si (known as "Super Core") are adopted in reactor cores for pressor systems.



Reactor core-block core type



## In the Life and Energy Fields

### ■ Chromate-free

Chromate-free coated steel sheet is an environment-friendly product, since it contains no chrome (VI). A uniquely designed composite film consisting of a special organic resin and inorganic substance secures as much corrosion resistance as conventional products. It is now used in internal panels of home electric appliances and vending machines, internal components of OA equipment, chassis of audio-visual equipment, and other parts.



### ■ Universal Bright F (Awarded the Technology Prize by the Surface Finishing Society of Japan in 2005)

This award-winning steel sheet product enables can manufacturers to skip coating and printing processes, and thereby eliminates harmful substances and reduces CO<sub>2</sub> emissions.



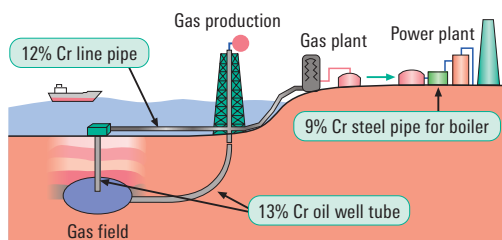
**Kazuya Ihara**

Chief Staff Member at the  
Product Technology Division  
West Japan Works

We are contributing to sales expansion of environment-friendly products through development of the chromate-free coated steel sheet, which contains no chrome (VI).

### ■ Martensitic Stainless Steel Tubes/Threaded Joints

13% Cr oil well tube and 12% Cr line pipe for production and transport of oil and natural gas, and 9% Cr steel pipe for high-efficient power generation are materials having long life and low environmental loads. As for threaded joints used in combination with oil well tubes, new products using no environmental pollutants are provided.



### ■ Resource-saving Type Stainless Product

JFE443CT is all-purpose stainless steel which does not contain such rare resources as nickel or molybdenum but ensures high corrosion resistance equivalent to SUS304. When applied to cooking pans for induction heating (IH), it leads to substantial energy saving because of its properties of excellent heat transmission and magnetism.



### ■ Road Cool®

This pavement material contains ground granulated BF slag to reduce urban heat island effects. Road Cool® excellently retains rainwater and ensures water-sprinkling effects.



### ■ High Performance Weathering Steel

This steel product suppresses the corrosion of steel products and eliminates painting process in the air by forming dense rust in the air. It reduces environmental loads due to painting.



For the corporate profile

JFE Steel

<http://www.jfe-steel.co.jp/>

## JFE Engineering's Products/Technologies Which Contribute to Global Warming Prevention

JFE Engineering has been contributing to global warming prevention by providing its cutting-edge technologies to reduce CO<sub>2</sub> emissions, such as biomass technology, energy technology and CO<sub>2</sub> immobilization technology.

Babcock & Wilcox  
Volund wood biomass  
gas-fired power  
generation system:  
Comprehensive energy  
utilizing efficiency rate

**80%**  
or more

### ■ Clathrate Hydrate Slurry (CHS) Heat Storage Air-conditioning System

Using clathrate hydrate slurry instead of water, the Clathrate Hydrate Slurry (CHS) Heat Storage Air-conditioning System is a cooling system with excellent energy saving effects. This system substantially reduces power consumption and thereby contributes to global warming prevention. The Kawasaki shopping mall "Azalea" is one of our major clients who have adopted this system. The new air-conditioning system has been awarded the Prime Minister Prize of the 35<sup>th</sup> Japan Industrial Technology Grand Prix.



Clathrate Hydrate Slurry (CHS) Heat Storage Air-conditioning System

### ■ Babcock & Wilcox Volund Wood Biomass Gas-fired Power Generation System

Combining gasification furnace and gas engine, this system efficiently generates power from carbon-neutral biomass. It has realized comprehensive energy utilizing efficiency rate as high as 80% or more by not only generating power but also utilizing heat.



Wood biomass gas-fired power generation plant



Gas engine for power generation

CO<sub>2</sub> reduction effect  
by wind power  
generation

**60,000**  
tons / year

### ■ Wind Power Generation System

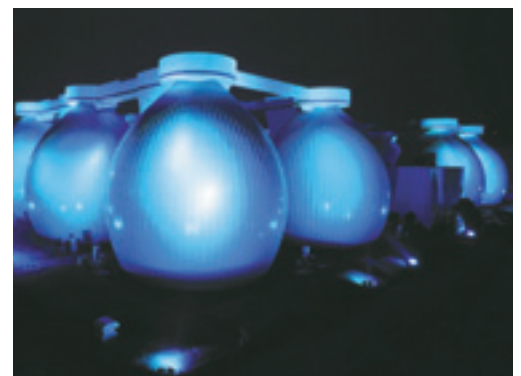
This system generates power by utilizing natural wind, and provides extremely clean energy with no CO<sub>2</sub> emissions at the time of power generation. JFE Engineering has installed 130 systems at 24 sites across Japan, reducing annual CO<sub>2</sub> emissions by approximately 60,000 tons.



Windmill for power generation

### ■ Sewerage Sludge Digestion Gas Power Generation

High-efficiency gas engine of this system converts digestion gas, which is generated from sludge digestion tank at a sewerage treatment plant, into electricity and thermal energy for power generation use.



Sewerage sludge digestion tank



### ■ Biomass Boiler System

This system uses a circulating fluidized bed boiler to efficiently generate power and supply heat from carbon-neutral biomass. The biomass boiler system has been adopted and used mainly by wood biomass power plants and paper-manufacturing companies and contributed to reduce CO<sub>2</sub> emission.



Biomass boiler system

### ■ VOC Recovery Equipment

This system recovers VOC (Volatile Organic Compounds) which are otherwise diffused into air at the time of crude oil shipment, removes odorous components and simultaneously uses the recovered VOC as energy. Some of the world's largest VOC recovery equipment has been in operation at the Kiire Oil Terminal (Kagoshima Prefecture) of Nippon Oil Staging Terminal Company, Limited.



VOC recovery equipment



**Hiroyuki Shiga**

Engineering Division  
New Energy Saving  
Air-conditioning  
JFE Engineering Corporation

### Clathrate Hydrate Slurry (CHS)

Clathrate hydrate slurry (CHS) is an accomplishment of joint development of JFE Engineering and NEDO (New Energy and Industrial Technology Development Organization), and contributes to reduction of CO<sub>2</sub> emissions through energy saving and electric-load leveling.



**Yasunori Kanamaru**

Planning Department,  
Environment Planning  
Division  
JFE Environmental Solutions  
Corporation

### Wood Biomass

We are proposing local production for local consumption-type high efficient power generation system, which efficiently uses wood materials such as thinned wood. When adopted, it assists global warming prevention.

# Recycling Technology Contributing to a Sustainable Society

The JFE Group is engaged in a wide range of waste recycling businesses by combining with steelmaking technologies and engineering technologies. We are playing our part in building a recycling-oriented society by recycling and effectively using a wide variety of used products: our efforts include converting waste

plastics into raw material for blast furnaces through the sophisticated utilization of our steelworks infrastructure, recycling fluorescent tube, used home electric appliances and food waste, and manufacturing NF® boards from waste plastics.

The year ending March 2008:  
Successful bidding of packaging plastic wastes

**96,000**  
tons / year

The year ended March 2007:  
Used fluorescent tubes treated (by 40w direct tube conversion)

**20**  
million tubes / year

The year ended March 2007:  
4 items of waste home appliances treated

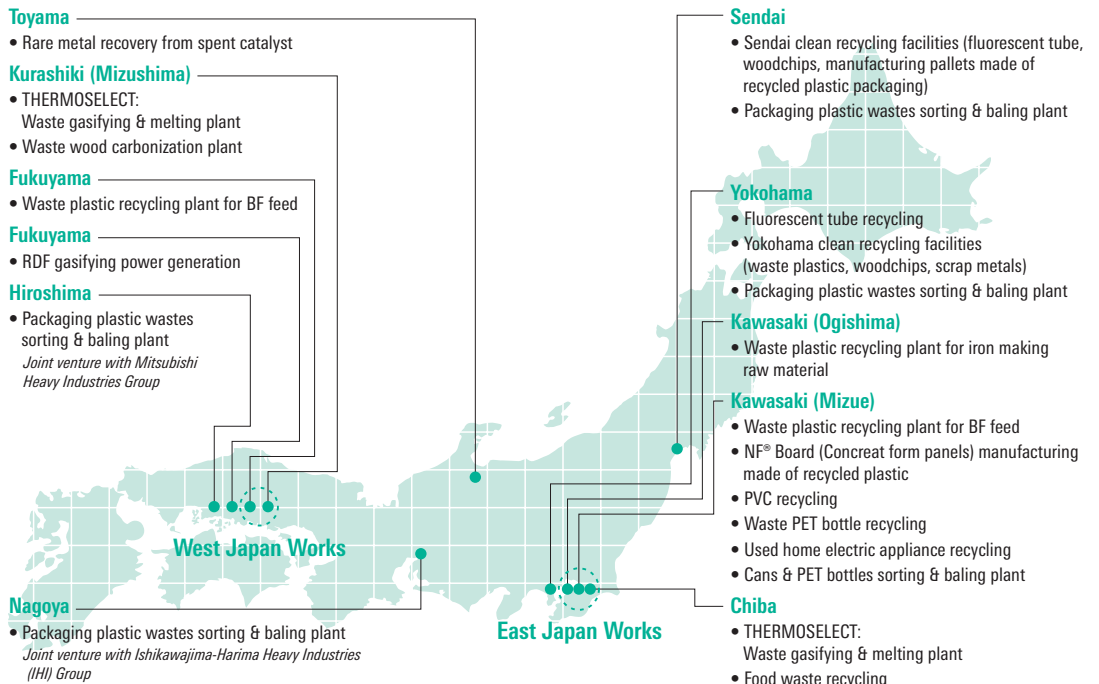
**710,000**  
units / year

**Recycle overview**

JFE KANKYO Corporation  
<http://www.jfe-kankyo.co.jp/>

JFE GROUP ENVIRONMENTAL SUSTAINABILITY REPORT 2007

**JFE Group's Recycling Businesses**



**Customers' Comments**

**Matsushita Electric Works, Ltd.**

Our company provides Light and Trust Service, where service companies of Panasonic offer total services from "renting" fluorescent lamps to collecting and appropriately treating used fluorescent tubes. In other words, we provide "functions of light" as "package service." Our company trusts JFE KANKYO Corporation's recycling factory for used fluorescent tubes as an important treatment base for our Kanto area's Light and Trust Service, because of its excellent treatment process as evidenced by its safety operation and high recycling rate.

■ For further information on Light and Trust Service, please refer to our website at <http://biz.national.jp/Ebox/akarianshin/index.html>.



**Masatoshi Miyaki**  
General Manager in charge of Environment & Maintenance Business Promotion (Light and Trust Service), Solution Group, Customer Create Center, Electronic Materials Marketing Headquarters, Matsushita Electric Works, Ltd.

**Sumida Office, Kao Corporation**

**Efforts at Sumida Office, Kao Corporation**

Our company has a companywide-shared waste control system, which enables us to check and confirm treatment approval status, contract details and expiry dates, etc. concerning waste treatment companies. This serves our purpose of making operations appropriate and efficient. Our Sumida Office achieved Kao's standard target of zero emission (less than 0.5%) in the year ended March 2006, partly thanks to cooperation from JFE KANKYO Corporation.



**Kyoichi Iizuka**  
Safety Environment Group Sumida Service Center Kao Corporation

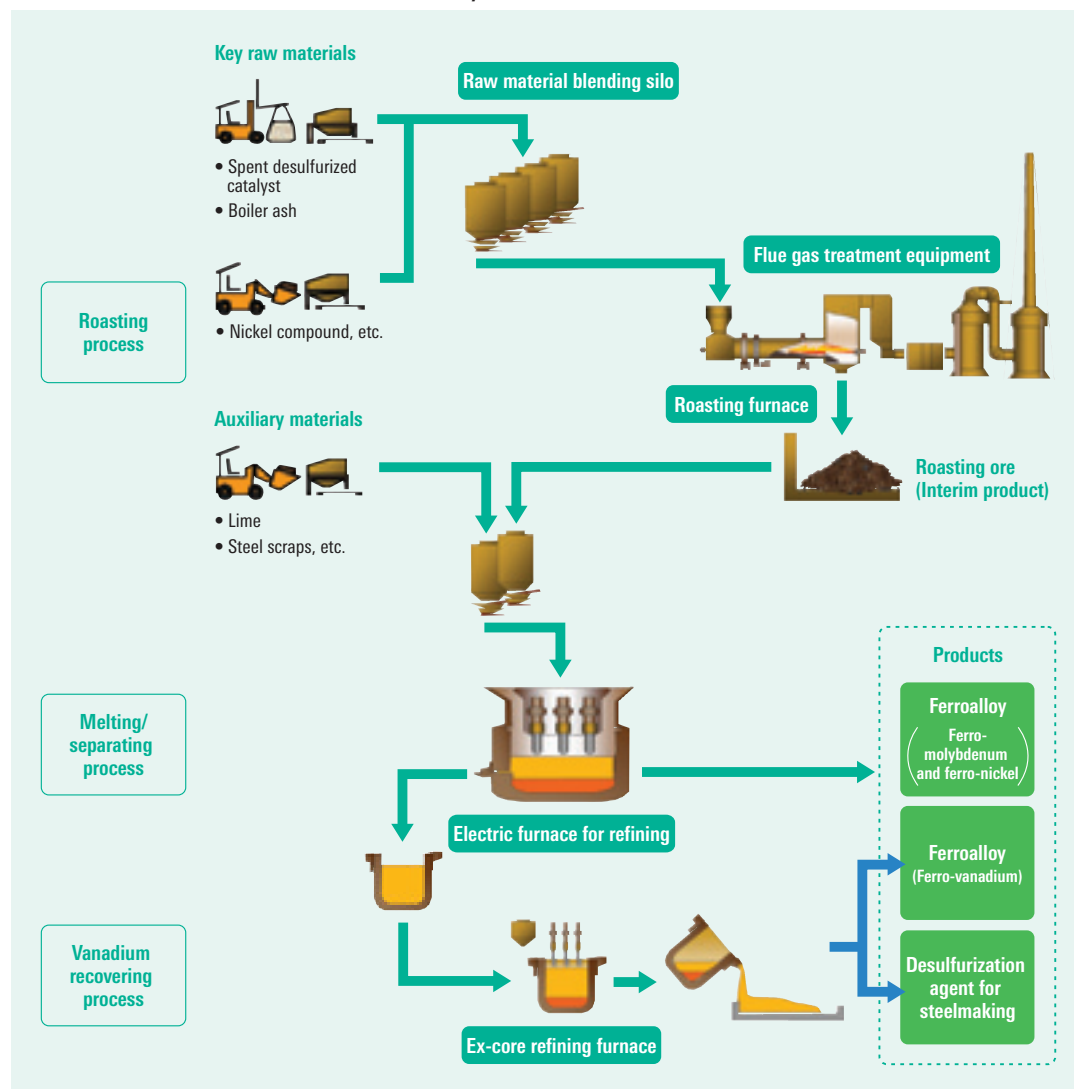
### Rare Metal Recovery from Spent Catalyst, etc.

In order to effectively use resources, JFE has been engaged in recovering rare metals such as nickel, molybdenum and vanadium from spent desulfurized catalyst generated in Japanese oil refineries and boiler ash emitted in domestic thermal power plants, and producing/supplying ferroalloy from the recovered rare metals.

Spent desulfurized catalyst and boiler ash transported from oil refineries or power plants receive primary treatment such as removal of water, oil content and sulfur content in roasting furnace. After the first-

step treatment, they are separated into nickel, molybdenum and oxidized vanadium in electric furnaces. Thereafter, vanadium receives reduction treatment, while nickel and molybdenum receive treatment to remove impurities. Having gone through these processes, main rare metals, i.e., nickel, molybdenum and vanadium are recovered. Amid increasing worldwide demand for rare metals, JFE contributes to forming a recycle-oriented society through its rare metal recovery operation from wastes.

### Outlined Production Processes of Metal Recovery Business



The above business is operated by Metal Technology Co., Ltd., in which JFE Material Co., Ltd. has taken a stake.

# Research & Development of Environmental Conservation Technology



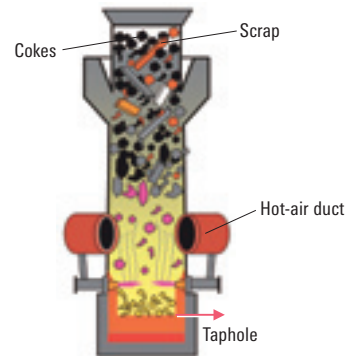
**Hidehisa Matsuno**  
Chief Researcher  
Steel Research Laboratory

## Technology Development of New-type Shaft Furnace:

### Steel Production Process with Fewer CO<sub>2</sub> Emissions

Steel Research Laboratory has been striving to develop technologies to reduce CO<sub>2</sub> emissions in the steel production process. Compared to the conventional blast furnace (BF), the new-type shaft furnace will be able to reduce CO<sub>2</sub> emissions by approximately 50% since it utilizes steel scrap. We are now working on development of reducing cokes consumption for the purpose of lowering costs.

Blueprint of New-type Shaft Furnace

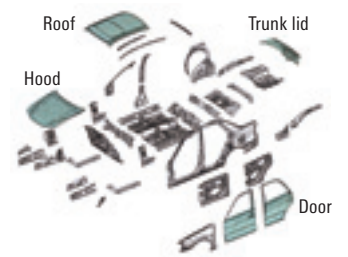


**Hideyuki Kimura**  
Chief Researcher  
Steel Research Laboratory

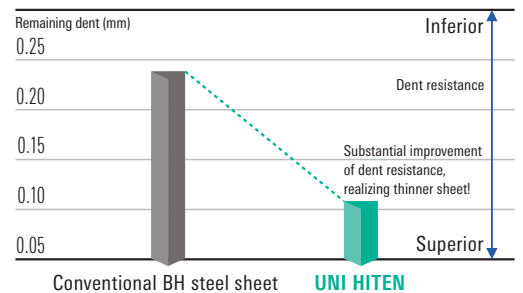
## New HITEN "UNI HITEN" Supporting Weight Reduction of Automotive Outer Panel

Steel Research Laboratory has developed high tensile UNI HITEN steel sheet, which reduces automotive weight, improves fuel efficiency and ultimately contributes to reduction of CO<sub>2</sub> emissions. While maintaining excellent formability, UNI HITEN has superior dent resistance relative to conventional bake-hardening (BH) steel sheet. On the strengths of these properties, the width of steel sheet can be reduced by 6% to 8%, indicating a great role can be played by UNI HITEN in automotive weight reduction.

Parts in Scope of Application of UNI HITEN



Dent Resistance of UNI HITEN

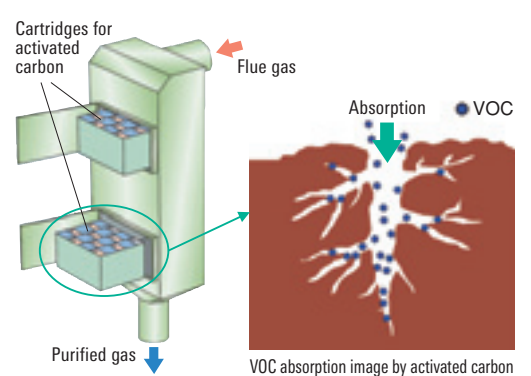


**Atsushi Hirayama**  
Chief Researcher  
Energy Environment System  
Research Division  
JFE R&D Corporation

## Environmental Load Reduction Technology: Development of Technology to Remove Volatile Organic Compounds

The JFE Group provides a great number of environmental purification technologies to societies. Among the Group companies, JFE R&D Corporation has been developing a unique technology to remove volatile organic compounds (VOC) by applying JFE Gas-Clean DX to remove dioxins in flue gas. The absorption/removal equipment, which uses special cartridges and activated carbon for this exclusive use, will realize highly effective removal of various kinds of VOC.

Structure of JFE Gas-Clean DX





# International Contribution by Providing Environment/Energy Technologies

JFE has been achieving international cooperation by implementing many projects based on its accumulated technologies for energy saving and GHG emission reduction in order to contribute to sustainable growth in developing nations. The JFE Group is also actively involved in CDM\*1 and JI\*2 projects, which ensure JFE's contribution to global warming prevention.

## ■ APP\*3/Steel Task Force

This partnership was launched in January 2006 by the private and public sectors among the six nations of Japan, the United States, China, India, South Korea, and Australia. It is tackling issues of global warming and environmental problems through development, permeation, and transfer of energy and environmental technologies in the eight main industries. Japan is a

presidency holder of the Steel Task Force and is promoting this activity.

## ■ The Advanced Technology Exchange Meeting for Environmental Protection and Energy-saving Co-sponsored by the China Iron and Steel Association and the Japan Iron and Steel Federation

This meeting was launched by Japan Iron and Steel Federation and China Iron and Steel Association. It aims to reduce the environmental load from the iron and steel industry of China by Japan's excellent energy-saving and environment-preservation technologies. JFE Steel is participating in this activity proactively through expert meetings, etc.

\*1 CDM: Clean Development Mechanism. Under CDM, signatory nations implement projects which reduce GHG emissions in the signatory developing nation, and the signatory advanced nation uses the reduction achieved by the project to achieve its target.

\*2 JI: Joint Implementation. Under this mechanism, a signatory advanced nation carries out a reduction project in another advanced nation, and counts part of the emission reduction as its own reduction.

\*3 APP: Asia-Pacific Partnership.

\*4 FS: Feasibility Study.

## World Map of International Cooperation Projects by the JFE Group

● APP member nations

### Bangladesh

- FS for rehabilitation and optimization of pipelines to reduce GHG emissions

### India

- FS\*4 for coke oven waste heat recovery facility for SESA GOA Ltd.
- FS for waste heat recovery at sintering cooler at Tata Iron and Steel Co., Ltd. 3 others

### Pakistan

- FS for energy saving at Pakistan Steelworks

### Russia

- FS for conversion of coal-fired power plant in Sakhalin to natural gas-fired 2 others

### Ukraine

- Study on optimization of gas pipeline improvement 2 others

### Poland

- Study on introduction of high performance industrial furnace technology for reheating furnaces in Poland

### China

- DME production from unused coke oven gas
- Model project to reduce energy consumption at ferroalloy electric furnace by raw material pretreatment and utilization of flue gas
- FS for regenerative burners at Shoudu Iron & Steel Co. and Anshan Iron & Steel (Group) Co.
- Study for energy saving measures for lime burning furnace
- Study of natural gas DME project in Sichuan Province 14 others

### Vietnam

- FS for energy saving at Vietnam Steel Corp. Other

### Thailand

- Industrial waste incinerator heat recovery model project for Industrial Estate Authority of Thailand
- Study on introduction of high performance industrial furnace for steel rolling reheating furnaces in Thailand 5 others

### Malaysia

- Energy saving model project for waste heat recovery from papermaking sludge incinerator
- FS for power generation by waste heat recovery from cement production process
- FS for palm refuse fueled biomass power generation Other

### Indonesia

- FS for biomass (palm refuse) power generation using circulating fluidized bed (CFB) boiler
- FS for power generation by waste heat recovery from cement production process
- FS for fuel conversion of diesel power generation system Other

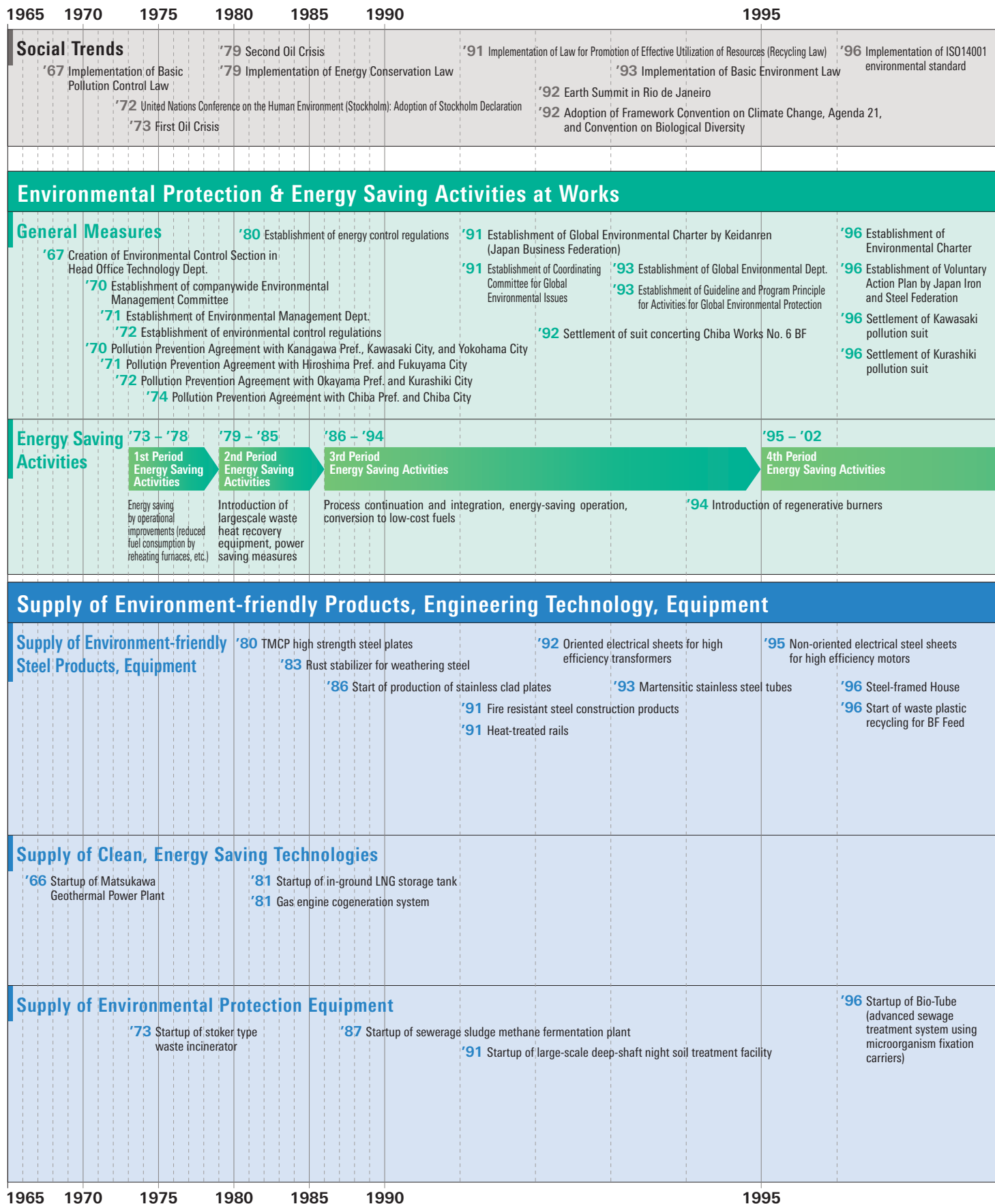
### Philippines

- Project for power generation by waste heat recovery from sintering furnace

### Brazil

- Study on energy saving measures by low-temperature waste heat recovery at Acominas Works Other

# History of Environmental Measures in JFE Group



2000		2005		2006		2007	
'97 Kyoto Conference of the Parties of the United Nations Framework Convention on Climate Change (COP3): Adoption of Kyoto Protocol '98 Implementation of Law concerning the Promotion of the Measures to Cope with Global Warming '99 Implementation of Law concerning Special Measures against Dioxins '99 Implementation of PRTR Law		'00 Implementation/revision of 6 laws related to establishment of recycling-based society '02 Implementation of Soil Contamination Control Law		'05 Effect of Kyoto Protocol '05 Revision of Law Concerning the Promotion of the Measures to Cope with Global Warming		'06 Enforcement of the revised Energy Saving Law	
'97 Establishment of Voluntary Action Plan by Keidanren '98 ISO14001 certification of Fukuyama Works '98 ISO14001 certification of Chiba Works '99 ISO14001 certification of Engineering Division '99 ISO14001 certification of Chita Works '97 ISO14001 certification of Keihin Works '97 ISO14001 certification of Mizushima (Kurashiki) Works and Utsunomiya Works (LSI plant)		'01 Establishment of Environment & Energy Liaison Center '02 Start of JFE Group (September) '03 Start of 5 operating companies (April) '03 Start of Environmental Management Network System		'05 Overhaul of the environmental management system '06 Startup of environmental abnormality prevention system (Chiba)			
Energy saving for global warming prevention		'03 - 5th Period Energy Saving Activities Thorough effort for global warming prevention					
'99 "Tsubasa" screw pile '98 Development of Super-OLAC technology for plates (high strength, high toughness, high weldability) '98 Ni-added high performance weathering steel '98 Water-permeable steel sheet piles '98 BF cement/BF granulated slag '98 Chromate-free coated steel sheets		'00 Development of Super-OLAC technology for shape steel '01 Tailor Welded Blank '01 As-sintered alloy steel powder (heat treatment-free) '01 High-purity silicon for solar cells '01 Lead-free free-cutting bars for machine structural use '02 Development of Super-OLAC technology for high carbon hot-rolled sheets '02 Start of production of NF Board for concrete forms using recycled resin		'03 JFE EWEL '03 Laminated steel sheet for food cans '04 Chromate-free steel sheet JC/JP '04 New alloy steel powder for automotive parts '04 Hat-shaped steel sheet pile 900 '05 Road Cool '05 Fine $\gamma$ '05 Ultra-high strength plate HITEN (HOP technology)		'06 Highly lubricant GA steel sheet "JAZ" '06 for automobiles '06 Chromate-free steel sheet "Eco-Frontier JM" '06 High heat-resistance stainless steel for exhaust manifolds '06 New press technology "JIM-Form" '06 High formability 1180 MPa grade cold-rolled HITEN '06 JIP Clean Mix HDX	
'97 Startup of circulating fluidized bed (CFB) boiler turbine power plant '98 Startup of wind power generation facilities		'01 Tie-up for high efficiency fuel cell power generation (SOFC)		'03 Startup of pilot-scale plant for high efficiency fuel cell power generation (SOFC) '03 Startup of BIGADAN process biogas system '03 Order for JFE-Babcock & Wilcox Volund fixed-bed updraft gasifier for wood chips '03 Startup of RDF gasifying power generation plant '04 Startup of clathrate hydrate slurry (CHS) latent heat air-conditioning system		'05 Order for JFE-Babcock & Wilcox Volund wood biomass gas-fired power generation system '06 Startup of refinement process of containers and packaging plastics '06 Completion of wood biomass gas-fired power generation plant '06 Serial orders for wood biomass gas-fired power generation plant '06 Development of large-scale gas engine E3G	
'97 Startup of electric resistance type ash melting furnace		'00 Startup of JFE THERMOSELECT gasifying & melting furnace '00 Startup of U-tube ozone contact equipment '01 Startup of home electric appliance recycling plant '01 Startup of environment-friendly high-efficiency arc furnace (ECOARC) '01 Completion of seawater exchange-type hybrid caisson '02 Startup of sewerage sludge circulating fluidized bed incinerator		'02 Startup of sewerage sludge circulating fluidized bed incinerator '04 Order for Hyper 21 Stoker System '04 Order for flue gas dioxin removal equipment (Gas-Clean DX) '04 Sales startup of cleaning robot for boiler water tube (Boiler-Clean DX) '04 Sales startup of photocatalyst air purification system		'05 Startup of packaging plastic material recycling plant '06 Order for VOC recovery equipment '06 Sales startup of sewerage sludge inhibition system (Half & Half) '06 Startup of Sendai clean recycling facilities	
2000		2005		2006		2007	

# Environmental Businesses Network of JFE Group Companies

Area	Company	Business
Environmental surveys, analysis, and consultation	JFE Net Corporation <a href="http://www.jfe-net.co.jp/">http://www.jfe-net.co.jp/</a>	Consultation on development of environmental management systems; ISO-based environmental training; seminars for in-house environmental monitoring personnel; internal environmental auditing.
	JFE TECHNO-RESEARCH CORP. <a href="http://www.jfe-tec.co.jp/">http://www.jfe-tec.co.jp/</a>	Environmental and energy-related measurement, surveys, and analysis (air and soil quality, etc.); consultation on environmental issues (Environmental ISO, PPD preparation of overseas CDM, etc.); consigned LCA (life cycle assessment); information collection and surveys on environment-related technologies.
	Japan Technomate Corporation <a href="http://www.jtmc.co.jp/">http://www.jtmc.co.jp/</a>	Manufacture of experimental equipment for marine environment remediation technologies; implementation and consultation of hydraulic experiment and numerical simulations, environmental and energy-related measurements, surveys and analysis.
Waste treatment and recycling	JFE URBAN RECYCLE CORP. <a href="http://www.urrec.co.jp/">http://www.urrec.co.jp/</a>	Recycling of the 4 waste home electric appliance items subject to the Home Appliance Recycling Law; recycling of household appliances used in business, OA equipment and vending machines, etc.; collection and transportation of industrial waste.
	JFE KANKYO CORP. <a href="http://www.jfe-kankyo.co.jp/">http://www.jfe-kankyo.co.jp/</a>	Waste treatment and recycling (waste plastics, wastewater and sludge, fluorescent lamps, batteries, etc.); collection and transportation of wastes; environmental measurement and analysis, environmental measurement certificates; consultation on waste treatment and recycling.
	JFE LOGISTICS CORP. <a href="http://www.jfe-logistics.co.jp/">http://www.jfe-logistics.co.jp/</a>	Collection of toner cartridges and fluorescent tubes; land/marine transportation of waste plastics, industrial waste and construction waste soil, etc.; environmental improvement works (such as washing and cleaning); intermediate treatment of industrial waste; construction, operation, repair, dismantling and washing of environmental equipment.
	JFE MINERAL CO., LTD. <a href="http://www.jfe-mineral.co.jp/e_mineral/index.html">http://www.jfe-mineral.co.jp/e_mineral/index.html</a>	Manufacture of iron and steel slag products; technological development for effective use of slag; development of high-value-added slag products; recycling businesses (recycling waste concrete/asphalt into concrete/asphalt aggregate, recycling of molding sand); soil and underground water pollution surveys and cleanup work.
	JAPAN RECYCLING CORP.	Industrial waste treatment; recycling of waste containers and packaging; sale of by-products from waste treatment; operation and maintenance of municipal and industrial waste treatment facilities.
	JFE LIFE CORP. <a href="http://www.jfe-life.co.jp/index.html">http://www.jfe-life.co.jp/index.html</a>	Collection and transportation of industrial wastes; design, installation, sale, and maintenance of building and industrial air conditioner filter; recovery of chlorofluorocarbon gas from vending machines.
	DAIWA STEEL CORP. <a href="http://www.daiwa-steel.com/">http://www.daiwa-steel.com/</a>	Intermediate treatment of wastes (melting of dry batteries, etc., in electric furnace).
Environmental plant and equipment	JFE S-Tec Corporation <a href="http://www.jfe-stec.co.jp/index1.html">http://www.jfe-stec.co.jp/index1.html</a>	Manufacture, installation, and maintenance of waste treatment and water treatment equipment; operation and maintenance of waste incinerators.
	JFE PRECISION CO., LTD. <a href="http://www.jfe-seimitsu.co.jp/">http://www.jfe-seimitsu.co.jp/</a>	Manufacture, installation, and maintenance of water treatment and waste treatment equipment.
	JFE Soldec Corporation <a href="http://www.jfe-soldec.co.jp/">http://www.jfe-soldec.co.jp/</a>	Design of waste treatment equipment; development of planning and operation management support systems for environmental equipment; design of environmental protection systems (combustion exhaust gas); VOC treatment systems; development support for production and use systems related to environment-friendly fuels; energy saving consultation.
	JFE Technos Corporation	Manufacture, installation, and maintenance of waste treatment equipment and water treatment equipment; experimental fabrication and testing related to research and development (DME diesel engine, countermeasures for dioxins, etc.).
	JFE SHOJI TRADE CORPORATION <a href="http://www.jfe-shoji.co.jp/english/">http://www.jfe-shoji.co.jp/english/</a>	Overall sales of environmental plants, equipment, commodities, and services; overseas afforestation.
	JFE Environmental Solutions Corporation <a href="http://www.jfe-kansol.co.jp/">http://www.jfe-kansol.co.jp/</a>	Maintenance service of environmental plant facilities and machinery.
	GECOSS CORP. <a href="http://www.gecoss.co.jp/">http://www.gecoss.co.jp/</a>	GSS method for recycling soil generated from soil-cement continuous wall construction, reducing industrial wastes more than 50% than conventional method.
JFE ADVANTECH CO., LTD. <a href="http://www.jfe-advantech.co.jp/eng/index.html">http://www.jfe-advantech.co.jp/eng/index.html</a>	Manufacture and sale of measuring instruments for waste treatment facilities, sewage system, and waterworks (industrial weighing scale, measuring devices of water level, quality, flow rate, etc.).	

Area	Company	Business
Environmental plant and equipment	JFE ELECTRICAL & CONTROL SYSTEMS, INC. <a href="http://www.jfe-densei.co.jp/english/index.html">http://www.jfe-densei.co.jp/english/index.html</a>	Design, installation, and maintenance of electrical systems and instrumentation of waste treatment facilities; design and manufacture of photovoltaic power generation systems; design and installation of energy saving system.
	JFE MECHANICAL CORP. <a href="http://www.jfe-m.co.jp/">http://www.jfe-m.co.jp/</a>	Design, manufacture, installation and comprehensive maintenance of environment-related/recycling equipment and water treatment equipment; manufacture and sale of compact dry distillation type incinerators; dismantling of incinerator using technologies of countermeasures for dioxins.
	JFE Eletech Corporation <a href="http://www.jfe-elt.co.jp/">http://www.jfe-elt.co.jp/</a>	Design and installation of electrical systems and instrumentation of various plants such as water treatment plants and incinerators.
	Tohoku Dock Tekko Co., Ltd. <a href="http://business3.plala.or.jp/t-dock/">http://business3.plala.or.jp/t-dock/</a>	Design, manufacture, installation, and maintenance of waste treatment equipment design, manufacture and sales of raw garbage treatment plants.
	JFE Environment Service Corporation	Consigned operation of environment-related plants such as waste treatment and water treatment equipment.
	JFE Koken Corporation <a href="http://www.jfe-koken.co.jp/">http://www.jfe-koken.co.jp/</a>	Prevention of soil contamination and restoration of contaminated soil; installation of water treatment equipment; environment-friendly construction methods (such as no-trenching method).
	JFE PIPE FITTING MFG. CO., LTD. <a href="http://www.jfe-pf.co.jp/">http://www.jfe-pf.co.jp/</a>	Design, manufacture, and installation of molding sand recycling equipment (energy saving fluidized calcination furnace etc.).
	NIPPON CHUZO K.K. <a href="http://www.nipponchuzo.co.jp/">http://www.nipponchuzo.co.jp/</a>	Manufacture and sale of heat and wear resistant castings for waste incinerators; molding sand recycling equipment, slag comminutor.
	Nippon Chutetsukan K.K. <a href="http://www.nichu.co.jp/">http://www.nichu.co.jp/</a>	Design, manufacture, and turnkey execution of water environment engineering-related projects.
	Recycling Management Japan, Inc.	Operation and maintenance of municipal and industrial waste treatment facilities; production of RDF and compost; design and manufacture of production facilities for RDF and compost fuel.
JFE Mie Tec Service Corporation <a href="http://www.jfe-mts.co.jp/">http://www.jfe-mts.co.jp/</a>	Manufacture, installation, trial run, and maintenance of waste/water treatment equipment.	
General environmental protection	JFE G.S. CORP. <a href="http://www.jfe-gs.co.jp/">http://www.jfe-gs.co.jp/</a>	Collection and transportation of municipal and industrial wastes; operation and maintenance of waste incinerating plants and environment-related facilities; greening and landscape planting; environmental measurement/analysis, measurement certificate of air and water quality; consultation on waste treatment, environmental greening and environmental surveys.
	KEIYO CITY SERVICE CORP. <a href="http://www.mmjp.or.jp/syokuhincenter/">http://www.mmjp.or.jp/syokuhincenter/</a>	Design and construction of gardens and civil works; maintenance of gardens and planted areas; consultation on environmental greening; green plant leasing; washing of waste collection containers; washing and leasing of restaurant kitchen filter.
	JFE West Technology Co., Ltd. <a href="http://www.jfe-fst.co.jp/">http://www.jfe-fst.co.jp/</a>	Collection and transportation of municipal wastes.
	FUKUYAMA GENERAL SERVICE CO., LTD. <a href="http://www.jfe-fgs.co.jp/index.html">http://www.jfe-fgs.co.jp/index.html</a>	Greening; cleanup service; environment-related measurement.
	MINAMIACHI TOWN SERVICE CORP. <a href="http://www13.ocn.ne.jp/~mats/gaiyou.html">http://www13.ocn.ne.jp/~mats/gaiyou.html</a>	Design and construction of gardens and civil works; maintenance of gardens and planted areas; consultation on environmental greening; green plant leasing; recycling of vending machines.
Environment-friendly products	JFE CHEMICAL CORP. <a href="http://www.jfe-chem.com/e/index.html">http://www.jfe-chem.com/e/index.html</a>	Plastic recycling; gas refining and byproducts recovery; carbon dioxide gas recovery and reuse; water treatment chemicals (iron, hydrated lime, etc.).
	JFE METAL PRODUCTS & ENGINEERING INC. <a href="http://www.jfe-kenzai.co.jp/">http://www.jfe-kenzai.co.jp/</a>	Development and manufacture of construction/civil engineering products with low environmental loads, and environment cleanup-type building materials (guardrail and sound insulating wall using photocatalyst).
	JFE GALVANIZING AND COATING CO., LTD. <a href="http://www.jfe-kouhan.co.jp/">http://www.jfe-kouhan.co.jp/</a>	Environment-friendly coated steel products (manufacture of raindrop-stain resistant prepainted steel sheet for roofing/siding/sound insulating, heat insulating prepainted steel sheet, and acid resistant prepainted steel sheet; manufacture and construction work of metal roofing materials and siding materials).
	JFE CIVIL ENGINEERING & CONSTRUCTION CORP. <a href="http://www.jfe-civil.com/">http://www.jfe-civil.com/</a>	Environment-friendly construction method (steep slope road widening method: Metal Road).
	JFE ROCKFIBER CORP. <a href="http://homepage3.nifty.com/jfe-rockfiber/">http://homepage3.nifty.com/jfe-rockfiber/</a>	Manufacture and sale of rock wool products made mainly from BF slag, contributing to energy saving and better housing environment.
	JFE CONTAINER CO., LTD. <a href="http://www.jfecon.jp/">http://www.jfecon.jp/</a>	Manufacture and sale of reusable drum cans (Eco-drum, S Open drum can); recovery service of new drum and used drum can.
	CHIBA RIVERMENT AND CEMENT CORP.	Manufacture of slag powder and BF cement (designated item by the Green Procurement Law).
	MIZUSHIMA RIVERMENT CORP.	Manufacture of slag powder and BF cement (designated item by the Green Procurement Law).

# Awards Received for Excellence of Environmental Technologies (since 2004)

## National Invention Award

### 2004 Invention Award

- Development and application of advanced on-line accelerated cooling process

## Japan Industrial Technology Grand Prix

### 2005 Prime Minister Prize

- Development and practical application of new air-conditioning system using clathrate hydrate slurry (CHS)

## Ichimura Industrial Award

### 2004 Contribution Award

- Development of manufacturing technology of high speed tool steel (HSS) rolls for hot rolling strip finishing mill by centrifugal casting process

## Japan Institute of Metals Award

### 2006 Technical Development Award

- High strength and high corrosion resistant stainless oil well steel pipe for the development of deep natural gas fields (UHP15Cr)
- Suppression of oxidation of stainless steel using Laves phase

## Resource Recycling Technology & System Award (Clean Japan Center)

### 2004 Prize from Minister of Economy, Trade and Industry

- Recycling of waste plastics for blast furnace feed

## Excellent Environment Equipment Award (The Japan Society of Industrial Machinery Manufacturers)

### 2005 President Prize

- Phosphorus recovery recycling system by the MAP method

## Kanto Regional Invention Award

### 2006 Encouragement Prize from Japan Patent Office Commissioner

- High strength hot-rolled steel sheet using nanosized deposition

## Chugoku Regional Invention Award

### 2006 Prize from Minister of Education, Culture, Sports, Science and Technology

- Environment-friendly chromate-free high-performance plastic chemical conversion treatment steel sheets

## Nikkei Superior Products and Services Award

### 2006

- High corrosion resistant stainless "JFE443CT" without any use of nickel and molybdenum

## The Japan Society for Technology of Plasticity Award

### 2007 Aida Technology Encouragement Award

- Development of new bending method (PRB) of high strength and thin wall steel pipe and application to arm part

### 2006 Best award Aida Technology Award

- High strength and high formability HISTORY steel pipe using warm narrow path rolling

### 2005 Aida Technology Encouragement Award

- Development of high precision shape control technology for cluster mill

### 2004 Technological Development Prize

- Development of energy saving type bearing steel with excellent cold formability

## Japan Society of Corrosion Engineering Award

### 2004 Technology Award

- Pitting corrosion and anti-corrosion mechanism of anti-corrosion steel sheets for automotive use

## WASTEC Award

### 2004 Plant category award

- "Hyper 21 Stoker System"

### 2004 WASTEC Organizing Committee Chairman's special award

- "High Clean DX," "MAP Phosphorus recovering technology"

## Public Works Research Institute Award

### 2004 Chief Executive award

- Ultrasonic flaw detection analysis using phased array method

## Japanese Society of Steel Construction Award

### 2004 Achievement award

- Development and popularization of hybrid caisson

## Eco-Products Award

### 2004 1st Promotion committee chairman's award

- Recycled plastic frame "NF Board"

## The Japan Institute of Energy Award

### 2005 The JIE Award in Technical Division

- Research and development of high temperature air combustion control technology

## The 26th Excellent Energy Saving Machinery Award (The Japan Machinery Federation)

### 2005 Prize from Director-General, Agency for Natural Resources and Energy

- High performance descaling nozzle

## The Surface Finishing Society of Japan Award

### 2005 Technology Award

- Development of new laminated steel sheet for food cans

## Shinagawa Greening Award

### 2005

- Gentry House Shinagawa Ooi

## Regarding the JFE Group's Social and Environmental Efforts



**Yuko Sakita**

(Journalist,  
Environmental Counselor)

JFE GROUP BUSINESS REPORT 2007, which encompasses economical, social and environmental aspects, is first of all commendable for having clearly shown JFE's stance of striving to meet accountability to society by disclosing main CSR data/information in the first section titled "Business Highlights."

Specifically speaking, in the environmental aspects, disclosure related to "CO<sub>2</sub> emissions" deserves special mention. CO<sub>2</sub> emissions from the steel business increased by 0.9% compared to the year ended March 1991 levels as a result of a 23% increase in crude steel output in the wake of rapid growth in steel demand. The Report also clearly describes JFE's technological capability to have reduced unit CO<sub>2</sub> generation by 18%, and contribution to reduction of environmental loads in Asia and Kyoto Mechanisms. Now that the commitment period of the Kyoto Protocol is about to start, I would like to see JFE further striving to reduce CO<sub>2</sub> emissions by coping with energy source issues as part of various measures.

CO<sub>2</sub> emissions from the engineering business also increased. I would like JFE to contribute to warming prevention by developing cutting-edge technologies such as recyclable energy technology and CO<sub>2</sub> immobilization technology. In the recycling area, they are proposing new points of view including local community-centered cooperation. I hope JFE will play an important role in creating sustainable recycling-oriented communities. With regard to Kawasaki Microelectronics, the company has been endeavoring to reduce CO<sub>2</sub> emissions, waste and harmful substances, etc. I would like them to promptly implement measures under consideration, such as the one to reduce alternative CFC (chlorofluorocarbon) gas, of which the warming coefficient is high.

The JFE Group also prepares the Online Environmental Report, which incorporates separate articles such as "Biodiversity" to complement environmental aspect information. I would like to suggest a tie-up between the two reports by describing such articles in the Business Report as well.

As for the first section data related to social aspects, the JFE Group has disclosed "the employment rate for disabled persons." They have achieved the legal employment rate of 1.80%. From now on, I would like to see the Group reporting the status of creating a worker-friendly environment based on diversified points of view including that of "employees taking childcare leaves" as part of measures to combat the decreasing birthrate. In the main text, JFE has discussed "Measures to Prevent Recurrence of Antimonopoly Law Violations," disclosing so-called negative information. The aftermath of environmental problems associated with wastewater at JFE Steel's East Japan Works (Chiba) has also been described. The Group's care for building trust with society is commendable, and I would like to see the JFE Group continuously promote dialogues with stakeholders as well as further environmental communications.



**Yoshinao Kozuma**

(Professor of Accounting,  
Faculty of Economics, Sophia University)

Starting with the 2006 edition, the JFE Group has annually been preparing Business Report, an enhanced annual report with environmental and social reporting, disclosing both financial and non-financial information based on the triple bottom line approach. Some factors such as environment and compliance have been focused in the report as material CSR issues for recent years. It also appears a new measure in this year to reinforce corporate governance whereby internal control is embedded in the business processes. These activities are organized in an integrated fashion under JFE Group CSR Council in accordance with clear CEO's commitment to carry out them thoroughly. It would be easy to find the group's strong enthusiasm to understand CSR as an essential management policy for the entire group and to grapple with its related activities squarely.

Regardless of the conversion from Environmental Report into Business Report, current environment reporting has been free from deterioration which often occurs when different types of reports are combined, thanks to the PDF version of online environmental report which contains enough information in quantity and quality. From the year of 2007, many KPIs (key performance indicators) begin to be disclosed in almost every page, together with information on biodiversity particularly in the online environmental report. Thus the report leaves us a good impression of continuous progress.

However, credibility of information has been seriously impaired by the recent series of revelations of illegal waste water draining and related data manipulation, several cases violating Antitrust Law and the latest forced correction of corporate tax return. In such circumstances, it is hard to wipe out doubts whether the report reflects actual business activities in spite of improvement of reporting practices. Considering the group's corporate culture of sincerity which has been shown by timely disclosure of investigation results and thorough measures to prevent recurrence, it is a matter for regret that such an affairs should happen so frequently.

It must be certain that present efforts for CSR and organizational structures have been fostered on remorse for those past incidents. For the time being, it would be desirable for the JFE Group to accumulate steady efforts in daily environmental protection activities and compliance with laws and regulations and to continue such efforts from now on.



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