Environmental Conservation

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 social responsibility and an environmental policy that emphasizes consistency with and advancement 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 the use of chemical and energy-saving technologies, 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 environmental 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

Priority Environmental Targets and Results

2007 Priority Environmental Targets

<table>
<thead>
<tr>
<th>Target</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy saving rate</td>
<td>1.0% or higher</td>
</tr>
<tr>
<td>Waste recycling rate</td>
<td>20% or more</td>
</tr>
<tr>
<td>Water recycling rate</td>
<td>35% or more</td>
</tr>
<tr>
<td>Greenhouse gas emissions reduction</td>
<td>15% or more</td>
</tr>
</tbody>
</table>

2007 Results

- Energy saving rate: 1.0% or higher
- Waste recycling rate: 20% or more
- Water recycling rate: 35% or more
- Greenhouse gas emissions reduction: 15% or more

2008 Priority Environmental Targets

<table>
<thead>
<tr>
<th>Target</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy saving rate</td>
<td>1.5% or higher</td>
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<tr>
<td>Waste recycling rate</td>
<td>25% or more</td>
</tr>
<tr>
<td>Water recycling rate</td>
<td>40% or more</td>
</tr>
<tr>
<td>Greenhouse gas emissions reduction</td>
<td>20% or more</td>
</tr>
</tbody>
</table>

2008 Results

- Energy saving rate: 1.5% or higher
- Waste recycling rate: 25% or more
- Water recycling rate: 40% or more
- Greenhouse gas emissions reduction: 20% or more

For further company information, business descriptions, product information, and operating facilities, etc., please refer to JFE GROUP BUSINESS REPORT 2007 on our website at http://www.jfe-holdings.co.jp/en/about.html
Message from Senior Management

Coordinating Corporate Growth, Environmental Conservation

The JFE Group is dedicated to implementing effective strategies for protecting the natural environment. To date, we have invested substantial time and energy into projects such as energy savingproduction processes, green technologies, and environmental efforts, both domestically and internationally. We will maintain these efforts in the years to come, guided by corporate standards of business conduct and an environmental policy that emphasizes consistency with and enhancement of the global environment.

The Kyotoprotocol 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 the 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.

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Environmental Policy

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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

Environmental Targets and Results

2007 Priority Environmental Targets

- Reduced unit energy consumption by approximately 10% compared to the year ended March 1991 level.
- Reduced units of greenhouse gases by approximately 10% compared to the year ended March 1991 level.
- Reduced chemical substances by approximately 20% compared to the year ended March 1991 level.
- Reduced final disposal of waste bricks by 20% in a year-to-year comparison.

2007 Results

- 17% reduction compared to the year ended March 2005 level.
- 16% reduction compared to the year ended March 2005 level.
- 4% increase in green procurement rate of office supplies.
- 10% reduction compared to the year ended March 2005 level.
- 10% reduction compared to the year ended March 2005 level.
- 17% reduction compared to the year ended March 1998 level.
- 17% reduction compared to the year ended March 1998 level.
- 16% reduction compared to the year ended March 1998 level.

2008 Priority Environmental Targets

- Strive to reduce environmental risks.
- Comply with new regulations.
- Promote voluntary environmental conservation activities.

2008 Target Results

- To promote international cooperation.
- To make contributions through technologies and products
- To reduce environmental influence in all business operations
- To promote communication with society
- To promote international cooperation

For further company information, business descriptions, product information, and operation facilities, etc., please refer to JFE GROUP BUSINESS REPORT 2007 on our website at http://www.jfe-holdings.co.jp/en/index.html.
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 CO2 emissions through our technological measures, and partly by using the Kyoto Mechanisms as a complementary measure.

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 CO2 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 melt 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 CCU, 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.

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 CO2 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 CO2 emissions.

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

Transition of Unit Energy Consumption Index at JFE Steel

<table>
<thead>
<tr>
<th>Year</th>
<th>JFE Steel</th>
<th>HIS (1974=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974-1990</td>
<td>69</td>
<td>100</td>
</tr>
<tr>
<td>1991-2007</td>
<td>67</td>
<td>82</td>
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<td>2008</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>2009</td>
<td>67</td>
<td>67</td>
</tr>
</tbody>
</table>

(From establishment March 31)

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), achieving waste heat recovery, etc.
  - Process combination
    - Continuous casting line, continuous annealing line, etc.

Further promotion of energy saving
- Waste plastics feeding into BF
- Exhaust rolling
- City gas using technology for BF
- High efficiency oxygen plant

Global energy conservation achievements by energy-saving
- New construction of shaft furnace (operation start scheduled in August 2008)
- Augmentation of CO2
  - Reduction of CO2
  - New construction of shaft furnace (operation start scheduled in March 2009)
  - Introduction of regenerative burner
  - Augmentation of high efficiency oxygen plant
  - BF gas sensible heat recovery

Efforts of Iron Industry

(The JISF’s Voluntary Action Program)

The JISF has aimed at a 6.5% reduction in energy consumption in the year ended March 2006 (4.9% reduction in CO2 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 and Unit CO2 Emissions at JFE Steel

Transition in Energy Consumption in comparison to the year ended March 1991

- Unit energy consumption: approx. 18% cut

Transition in Unit CO2 Emissions in comparison to the year ended March 1991

- Unit CO2 emissions: approx. 18% cut

JFE Steel will implement further energy savings by promoting energy-saving by the CISA and JISF and the Asia-Pacific Partnership based on the cultivated technologies.

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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 2.3% in the year ended March 2007.

Using the same comparison, energy consumption and CO2 emissions recorded a 1.4% increase and a 0.8% increase, respectively. And yet, JFE Steel has substantially improved efficiency with an approximately 18% reduction in unit energy consumption and unit CO2 emissions.

* The non-consolidated base calculation does not include electric furnace steel companies in the JFE Steel Group.
For Compliance with the Voluntary Action Program
JFE Steel is determined to prevent global warming by promoting further energy saving (reduction of CO2 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 scrap), energy savings by streamlining equipment, and technological innovations through R&D.

Use of the Kyoto Mechanisms
JFE Steel has been promoting the utilization of CO2 emission rights according to the Kyoto Mechanisms as a complementary measure to reduce CO2 emissions in addition to implementing technologies. This is being done so that we can achieve the goals of the Voluntary Action Program with certainty.

Energy Saving Measures at the Transportation Division
JFE Steel has been also striving to reduce the CO2 and NOx 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.

Non-energy Origin CO2 Emissions
Limestone and dolomite used in BF, converters and the like are kinds of non-energy origins of CO2 emissions. Methane is emitted in the process of manufacturing coke, and NOx is emitted by fuel usage or from water treatment equipment and similar sources.

The total limestone/dolomite origin CO2 and NOx equivalent of methane emitted by JFE Steel reached 3.2 million tons*1 in the year ended March 2007.

*1 We started aggregate calculations from the year ended March 2007 under the Energy Saving Law and the Global Warming Mitigation Law.

Modal Shift Rate of the Iron and Steel Industry in Japan

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 steel products 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 CO2 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

CO2 Emission Reduction Effect at the Stage of Using Steel Products (As of the Year Ended March 2006)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
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<td>Trains</td>
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<td>0.11</td>
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<tr>
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<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<td>0.01</td>
</tr>
<tr>
<td>Cars</td>
<td>0.24</td>
<td>0.33</td>
<td>0.37</td>
<td>0.39</td>
<td>0.39</td>
<td>0.43</td>
<td>0.44</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Source: The Japan Iron and Steel Federation

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

<table>
<thead>
<tr>
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<td>6.1</td>
<td>6.1</td>
<td>6.1</td>
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<tr>
<td>Ship + Rail</td>
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<td>0.1</td>
<td>0.1</td>
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We will make concrete efforts such as improving operational efficiency (cutting the reducing agent ratio and utilizing more iron scrap), energy savings by streamlining equipment, and technological innovations through R&D.

Use of the Kyoto Mechanisms

JFE Steel has been promoting the utilization of CO2 emission rights according to the Kyoto Mechanisms as a complementary measure to reduce CO2 emissions in addition to implementing technologies. This is being done so that we can achieve the goals of the Voluntary Action Program with certainty.

Energy Saving Measures at the Transportation Division

JFE Steel has also been striving to reduce the CO2 and N2O 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.

The modal shift rate in production transportation has reached 95%, including JFE Steel.

JFE Steel’s CO2 emissions caused by transportation as a cargo owner were estimated at approximately 400,000 tons in the year ended March 2007.

Non-energy Origin CO2 Emissions

Limestone and dolomite used in BF, converters and the like are kinds of non-energy origins of CO2 emissions. Methane is emitted in the process of manufacturing coke, and N2O is emitted by fuel usage or from water treatment equipment and similar sources.

The total limestone/dolomite origin CO2 and N2O equivalent of methane and N2O emitted by JFE Steel reached 3.2 million tons in the year ended March 2007.

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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 decreased CO2 emissions of approx. 7.6 million tons as of the year ended March 2006, proving a significant contribution to society.

CO2 Emission Reduction Effect at the Stage of Using Steel Products (As of the Year Ended March 2006)

*2 We counted 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

This project has been approved as CDM by the United Nations.

Power generation by PSC entering waste heat recovery

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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 objectivities for environmental protection activities, progress check of those activities, and evaluation on environmental performance as a whole group.

Environmental Management System

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 2001, “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

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 JFE Group will continuously extend the number of accredited companies/production facilities.

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.

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.

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.

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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.

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.

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.
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 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 2003, “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.

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. These 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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Examples of green purchasing:

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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

The year ended March 2007:
Environmental cost
13.5 billion yen

The year ended March 2007:
Environmental cost
74.8 billion yen

Cumulative investment in energy saving since 1990
506.7 billion yen

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.

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.

Communication with Society Related to the Environment

Environmental Abnormality prevention system

For further information
About environmental problems concerning water quality, please refer to the following:
http://www.jfe-steel.co.jp/works/est/chiba/environment2.html

Environmental Abnormality prevention system

For further information
JFE Holding’s environmental initiative website at:

Environmental activities

Environmental website “ecobeing” at:
http://www.ecobeing.net/
Environmental Accounting

Environmental Abnormality Prevention System (Publication of Environmental Information)

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 comprehensible 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.

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For further information


Environmental website “ecobing.net” at: http://www.ecobing.net/

Locaiton: 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)

JFE Steel at Eco-Products 2006

"Let’s See How to Make Steel" section

Open Tour for the Real-time Information Disclosure System

- Opening hours: 9:00 a.m. to 5:30 p.m. (including Saturdays and holidays)
- Contact/Register: Environmental Management Department, East Japan Works (Chiba)

JFE Steel Corporation
Tel: +81-43-262-2371
Fax: +81-43-216-2118

For further information

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

http://www.jfe-steel.co.jp/works/est/chiba/environment2.html

JFE Group Environmental Sustainability Report 2007

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Environmental website “ecobing.net” at: http://www.ecobing.net/
**Contribution to Biodiversity**

**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.

**Okukusatsu**
JFE has been promoting forest conservation such as afforestation and thinning within the area of Kunimura, Agatsuma-gun, Gunma Prefecture. 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.

**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 CO₂ through a solidification reaction, has been adopted for coral reef restoration works in Sekisiaihoko 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.

**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.

**We were surprised to find various living creatures including over nine kinds of dragonflies, water stick insects, and water beetles 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.**
Contribution to Biodiversity

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**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.

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**Further information**
ecobeing
JFE Okukusatsu Holiday Village
http://www.ecobeing.net/ecopeople/peo30/index.html

**JFE GROUP ENVIRONMENTAL SUSTAINABILITY REPORT 2007**

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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
- Reducing Environmental Loads in Business Activities at JFE Steel
- Reducing Environmental Loads in Business Activities at JFE Engineering
- Reducing Environmental Loads in Business Activities at Kawasaki Microelectronics
- Reducing Environmental Loads in Business Activities at JFE Urban Development
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.
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### Energy/Material Flow in the Steelmaking Process

**Steel Production Process at JFE Steel**

**Byproducts recycling rate**

- **Recycled water**
  - 93.8%

**Energy recycling in works**

- 66%

**Total output**

- 99.6%

**Output**

- Energy supply
  - 34% Gas
  - 36% Fuel oil
  - 30% Diesel

**Byproducts recycling rate**

- 30.6%

**Input**

- Recycled materials
  - Waste PET bottles
  - Toner (sintering)
  - Food waste
  - Electric appliances
  - Others

**Materials for steel production**

- Lime: 5 million tons
- Coal: 24 million tons
- Iron ore: 46 million tons

**Energy conservation technology**

- Counter-measures for dust
  - Byproduct gas recovery, dust collection, dust recycling

**Environmental conservation technology**

- Counter-measures for SOx, NOx
  - Sintering plant dust recovery, SOx, NOx reduction treatment

**Recycling Process at the JFE Group**

- Iron and steel products: 29.8 million tons ( crude steel base )
- Other products
  - Chemicals
  - Slag
  - Nitrogen
  - Hydrogen
  - Argon

**Energy recycling in works**

- 66%

**CD-G Approx.**

- 59 million tons

**Flue-gas**

- 30% 3.6 million m³
- 20% 1.2 million m³
- Dust 30,000 tons

**Recycled water**

- 93.8%

**Evaporation loss**

- 0.4%

**Recovered energy recycling**

- Gas recovery, dust treatment, gas recovery, dust treatment

**Byproducts**

- BF, BOF, Top pressure recovery

**Steel production processes**

- BF, BOF, Top pressure recovery

**Water recycling**

- 93.8%

**Byproducts**

- Argon, Hydrogen, Nitrogen, Oxygen, Chemicals

**Other products**

- Chemicals
- Slag
- Nitrogen
- Hydrogen
- Argon
Reducing Environmental Loads in Business Activities at JFE Steel

Reducing Environmental Loads in Business Activities at JFE Steel

Air Quality Preservation

Reducing Sulfur Oxide (SOx) and Nitrogen Oxide (NOx) Emissions

JFE Steel has implemented active measures to reduce emissions of SOx and NOx. In these actions as well as R&D, particular emphasis has been placed on sintering furnaces, of which emissions of SOx and NOx 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.

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.

Effective Utilization of Byproducts

JFE Steel has been recycling byproducts (i.e., iron and steel slag*1, dust, and sludge*2) 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.

For the corporate profile

Transition of SOx Emissions

Transition of NOx Emissions

Transition of COD (Chemical Oxygen Demand)

Transition of Landfill Disposal and Recycling Rate of Byproducts

Transition of Received Industrial Water and Circulation Rate

Industrial water circulation rate

Byproduct recycling rate

93.8%

99.6%
Reducing Environmental Loads in Business Activities at JFE Steel

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

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Transition of SOx Emissions

Transition of NOx Emissions

Transition of Received Industrial Water and Circulation Rate

Transition of COD (Chemical Oxygen Demand)

Transition of Landfill Disposal and Recycling Rate of Byproducts

For the corporate profile

JFE Steel

CHAPTER 1
JFE GROUP ENVIRONMENTAL SUSTAINABILITY REPORT 2007
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 coke into a blast furnace (BF). Actually, the company has become the world's first practical user of this integrated process, which not only uses plastics but also contributes to reduction of CO2 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 recycling resources.

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.
- "Marine Stone"
  "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 Rock"
  "Artificial Stone"
  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.

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

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 coke into a blast furnace (BF). Actually, the company has become the world's first practical user of this integrated process, which not only uses plastics but also contributes to reduction of CO2 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 recycling resources.

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Reduction of Environmental Loads in Business Activities

Waste Recycling in Steel Production Process

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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 fluorscents is also recycled as a refining agent in the steel production process. To sum up, steelsworks have become important bases for recycling resources.

Advanced Applications for Iron and Steel Slag

- **“Road Tough” Temporary Road Material**
  Temporary road material made from steel slag. Road Tough has an excellent compassion 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.

- **“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 Stone” Submerged Embankment**
  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”** Artificial Stone
  (Steel Slag Hydrated Block: Ferro-Foam)
  Artificial stone made of steel slag and blast furnace slag. It is used as stone materials for shores and harbor construction.

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

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.

Substances Reported under PRTR (The Year Ended March 2007)

JFE Group is promoting R&D to turn steel slag into socially useful materials.

Noriyuki Tobe
Senior Researcher
JFE Steel Corporation
Steel Research Laboratory

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

Release and Landfill Disposal

![Graph showing release and landfill disposal](http://www.jfe-steel.co.jp/products/slag/slag.html)
Reducing Environmental Loads in Business Activities at JFE Engineering

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 CO2 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 Cathrate Hydrate Slurry (CHS) Latent Energy conservation such as turning off lights during the daytime, more efficient use of compressed air, and energy-saving check patrols.

Combined CO2 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 CO2 emissions in site construction works since August 2004. In addition, CO2 reduction activities such as a “stop idling” campaign have been implemented at construction sites since the year ended March 2007 on a trial basis.

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 effect 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 30% or less ahead of the deadline of the year ending March 2008. The planning and designing division has also been making environment-friendly plans and designs by adopting recycling materials or selecting energy-saving equipment, etc.

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, CO2 and propane, etc., to make its business activities environment-friendly.

Reduction of Waste (The Year Ended March 2007)

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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, CO2 and propane, etc., to make its business activities environment-friendly.

Reduction of Waste (The Year Ended March 2007)

JFE Engineering 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 Cathrate Hydrate Slurry (CHS) Latent Energy conservation such as turning off lights during the daytime, more efficient use of compressed air, and energy-saving check patrols.

Combined CO2 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 CO2 emissions in site construction works since August 2004. In addition, CO2 reduction activities such as a “stop idling” campaign have been implemented at construction sites since the year ended March 2007 on a trial basis.

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Reducing Environmental Loads in Business Activities at JFE Engineering

**CHAPTER**

Reducing Environmental Loads in Business Activities

**Material Balance**

**Input**

- Raw materials: 63,310 t
- Energy: 31,344,244 kWh
- Electricity: 31,344,244 kWh
- A-heavy oil: 480.1 kl
- Kerosene: 75.6 kl
- Light oil: 8.9 kl
- Gasoline: 22.7 kl
- Urban gas: 369,669 Nm³
- LPG: 206.9 t
- LNG: 0 t
- Water: 176.4 thousand tons

**Output**

- Products: 69,152 t
- Air pollutants: 15,255 t
- NOx: 81 ppm
- SOx: 500 ppm
- Dust: max 0.0220 g/Nm³
- Waste generated: 1,508 t
- Wastewater: 147.1 thousand tons
- Other (PRTR): 114 thousand kg

**JFE Engineering**

- Tsurumi Engineering and Manufacturing Center
- Shimizu Works
- Tsu Works

**Preventing Global Warming**

The Japan Society of Industrial Machinery Manufacturers formulated a "Voluntary Action Plan for the Environment" for the Industrial Machinery Industry in 1993. The Plan aims for a 12.2% reduction in CO₂ emissions from the year ended March 1998 levels by the year ending March 2011. Under such circumstances, JFE Engineering has been promoting activities to reduce CO₂ emissions in site construction works since August 2004. In addition, CO₂ reduction activities such as a "stop idling" campaign have been implemented at construction sites since the year ended March 2007 on a trial basis.

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

- Landfill disposal of office waste: Target = 25 t, Actual = 17.3 t
- Shimizu Works (%): 35, 34.8
- Tsu Works (%): —

**Reduction of CO₂ Emissions**

<table>
<thead>
<tr>
<th>Year</th>
<th>CO₂ emissions (1000 t-CO₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>16.0</td>
</tr>
<tr>
<td>1998</td>
<td>19.4</td>
</tr>
<tr>
<td>2003</td>
<td>15.1</td>
</tr>
<tr>
<td>2004</td>
<td>14.5</td>
</tr>
<tr>
<td>2005</td>
<td>15.6</td>
</tr>
<tr>
<td>2006</td>
<td>18.0</td>
</tr>
<tr>
<td>2007</td>
<td>19.3</td>
</tr>
</tbody>
</table>

**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, CO₂ and propane, etc., to make its business activities environment-friendly.

**Substances Reported under PRTR**

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>Release</th>
<th>Transfer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discharge (water-soluble)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>30</td>
<td>Discharge (gas-soluble)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>40</td>
<td>Methanol</td>
<td>0.004</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>63</td>
<td>Ethanol</td>
<td>0.303</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>227</td>
<td>Toluene</td>
<td>0.581</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>230</td>
<td>Lead and its compounds</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>232</td>
<td>Mercury</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>311</td>
<td>Lead and its compounds</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>3.985</td>
<td>0.0</td>
<td>0.0</td>
<td>3.985</td>
</tr>
</tbody>
</table>

**Reduction of waste at site construction works**

- Landfill disposal rate of site construction waste: Target = 35%, Actual = 32.4%
- Construction work sites (%): 100

**Reducing Generating/Discharge of Waste**

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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.

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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 in 1996 to 14 items since the year ended March 2005 in order to further promote recycling efforts. In the year ended March 2007, generation of office waste in Tsurumi Center increased by 1.7% year to year mainly due to transfer of some headquarter functions to Tsurumi area, while the recycling efforts resulted in a 32% increase in recycled volumes.
Reducing Environmental Loads in Business Activities at Kawasaki Microelectronics

Material Balance

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Kawasaki Microelectronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total energy</td>
<td>Total energy</td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>Coal and oil</td>
<td>Coal and oil</td>
<td></td>
</tr>
<tr>
<td>PFC purchase</td>
<td>PFC purchase</td>
<td></td>
</tr>
<tr>
<td>Chemical purchase</td>
<td>Chemical purchase</td>
<td></td>
</tr>
<tr>
<td>Water usage</td>
<td>Water usage</td>
<td></td>
</tr>
<tr>
<td>Resource input (raw material)</td>
<td>Resource input (raw material)</td>
<td></td>
</tr>
</tbody>
</table>

Substances Reported under PRTR (The Year Ended March 2007)

<table>
<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>Release</th>
<th>Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Air</td>
<td>Soil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Health</td>
<td>Energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waste</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Preventing Global Warming

In the year ended March 2007, energy-origin unit CO2 emissions per capacity utilization increased, while the 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 CF3 gas (accounting for approximately 70% of total emissions of PFC gases) by substitutes since the year ended March 2006.

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.

Central and Reduction of Chemical Substances

Kawasaki Microelectronics succeeded in replacing acetic acid 2-ethoxyethyl 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.

Providing Green and Affluent Open Space

Grand Scena Tamagawa, a condominium which JFE Urban Development developed in the year ended March 2004, has a rooftop skydeck on a rooftop energy management district within the authority of trustees, subject to the revision of the Energy Saving Law.

Reducing Generation/Discharge of Waste

Orito 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 grouping the amount of the discharged waste by category, Orito Yokohama has been promoting reduction and recycling of waste.
Reducing Environmental Loads in Business Activities

Reduction of Environmental Loads in Business Activities at Kawasaki Microelectronics

Material Balance

<table>
<thead>
<tr>
<th>Input</th>
<th>Total energy</th>
<th>0.392 PJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>37.2x10^4 kWh</td>
<td>4 t</td>
</tr>
<tr>
<td>Coal and oil</td>
<td>822 Kt</td>
<td></td>
</tr>
<tr>
<td>PFC purchase</td>
<td>66x10^4 t</td>
<td></td>
</tr>
<tr>
<td>Chemical purchase</td>
<td>5,948 t</td>
<td></td>
</tr>
<tr>
<td>Water usage</td>
<td>197x10^3 m^3</td>
<td></td>
</tr>
<tr>
<td>Resource input (raw material)</td>
<td>2.60 t</td>
<td></td>
</tr>
</tbody>
</table>

Kawasaki Microelectronics

<table>
<thead>
<tr>
<th>Movement</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Air</td>
<td>327</td>
<td>33.2</td>
<td>44.6</td>
</tr>
<tr>
<td>Recycling (end of previous year)</td>
<td>135</td>
<td>1,198</td>
<td>0</td>
</tr>
<tr>
<td>Substances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2</td>
<td>25</td>
<td>15</td>
<td>15.9</td>
</tr>
<tr>
<td>Energy utilization rate (%)</td>
<td>10</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Output

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<thead>
<tr>
<th>Movement</th>
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Substances Reported under PRTR (The Year Ended March 2007) (kg)

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<thead>
<tr>
<th>No.</th>
<th>Substance</th>
<th>Release</th>
<th>Transfer</th>
<th>Offsite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tetrafluoroethane</td>
<td>14.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Difluoromethane/Perfluoroethane</td>
<td>32.6</td>
<td>33.3</td>
<td>44.2</td>
</tr>
<tr>
<td>3</td>
<td>Hydrogen fluoride</td>
<td>37.2</td>
<td>44.4</td>
<td>33.8</td>
</tr>
<tr>
<td>4</td>
<td>Chlorine</td>
<td>1.99</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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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

- JFE’s Products/Technologies Which Contribute to Global Environmental Protection - - - 24
- Contributing through Steel Technologies/Products - - - - - - - - - - 25
- JFE Engineering’s Products/Technologies Which Contribute to Global Warming Prevention - - 27
- Recycling Technology Contributing to a Sustainable Society - - - - - - - - - - - - - - 29
- Research & Development of Environmental Conservation Technology - - - - - - - - - - - 31
- International Contribution by Providing Environment/Energy Technologies - - - - - - 32

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 CO2 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 CO2 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 pipeline, 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 recyclable 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.
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- Automotive weight reduction and performance enhancement
  - High tensile strength steel sheets
  - Electrical steel sheets
  - Stainless steel
  - Coated steel sheets

- Recyclable energy
  - Solar cell silicon
  - Biomass technology

- Waste reduction/recycling
  - Melting furnace
  - Clathrate hydrate slurry

- Energy saving

- Reduction of harmful substances used in home electric appliances
  - Coated steel sheets

- Environmental cleanup technology
  - DXN removal
  - VOC reduction

- Reduction of harmful substances used in home electric appliances

- Waste reduction/recycling
  - Waste recycling
Reducing Environmental Loads through Products and Technologies

Contributing through Steel Technologies/Products

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)” has strength and high formability.

- **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 CO₂ emissions, and contributes to exhaust gas purification.

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.

- **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.

- **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 CO₂ emissions.

- **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.

- **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.
CHAPTER 2
Reducing Environmental Loads through Products and Technologies

Contributing through Steel Technologies/Products

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-lubricant GA steel sheets. In this unique product, a surface reforming layer with nano-level thickness is formed on a zinc coated layer. “JAZ®” 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.

- **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 CO₂ emissions, and contributes to exhaust gas purification.

- **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.

- **Electrical 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 5.5% Si (known as “Super Core”) are adopted in reactor cores for pressor systems.

- **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.

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.

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For the corporate profile
JFE Steel
http://www.jfe-steel.co.jp/
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 contributes to global warming prevention.

- **Sewerage Sludge Digestion Gas Power Generation**
  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.

- **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.

- **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 CO2 emission.

- **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.

JFE Engineering has been contributing to global warming prevention by providing its cutting-edge technologies to reduce CO2 emissions, such as biomass technology, energy technology and CO2 immobilization technology.

- **Wind Power Generation System**
  This system generates power by utilizing natural wind, and provides extremely clean energy with no CO2 emissions at the time of power generation. JFE Engineering has installed 130 systems at 24 sites across Japan, reducing annual CO2 emissions by approximately 60,000 tons.
JFE Engineering has been contributing to global warming prevention by providing its cutting-edge technologies to reduce CO2 emissions, such as biomass technology, energy technology and CO2 immobilization technology.

**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 35th Japan Industrial Technology Grand Prix.

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**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 CO2 emissions through energy saving and electric-load leveling.

**Biomass Boiler System**
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Reducing Environmental Loads through Products and Technologies

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 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.

JFE Group’s Recycling Businesses

- Used home electric appliance recycling
- Fluorescent tube recycling
- PVC recycling
- NF® Board (Concret form panels) manufacturing
- Recycling of tric appliances and food waste, and manufacturing NF® boards from waste plastics.

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 desulphurized catalyst generated in Japanese oil refineries and boiler ash emitted in domestic thermal power plants, and producing/supplying recoverability from the recovered rare metals.

Spent desulphurized 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

1. Spent desulphurized catalyst
2. Boiler ash

Key raw materials

- Rare material blending site
- Nickel compound, etc.
- Raw material blending silo
- Boiler ashes

Auxiliary materials

- Lime
- Sheet scrap, etc.

Products

- Ferroalloy
- Ferroalloy (intermediate product)
- Ferroalloy (final product)

Furnaces

- Electric furnace for refining
- SX core refining furnace

Melting/separating process

- Vannadium recovering process
- Enrichment agent for vanadium

Metal recovery processes

- Roasting process
- Roasting by-products
- Rare material recovery from spent catalysts and boiler ashes

Customers’ Comments

Matsuike Electric Works, Ltd.

Our company provides Light and Trust Service, where service companies of Panasonic offer total services from “reusing” 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 endorsed 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.

Maetoshi Miyaki
General Manager in charge of Environment

Sumida Office, Kan Corporation

Our company has a company-wide 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 Manager

JFE KANKYO Corporation

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

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CHAPTER 2

Reducing Environmental Loads through Products and Technologies

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

JFE GROUP ENVIRONMENTAL SUSTAINABILITY REPORT 2007
Reducing Environmental Loads through Products and Technologies

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 NFM boards from waste plastics.

JFE Group’s Recycling Businesses

- Rare metal recovery from spent catalyst
- Florescent lamp recycling (ex: Kanto area’s Light and Trust Service)
- Electric appliance recycling
- Recycling of plastics (waste plastics, woodchips, scrap metals)
- Recycling of lighting plastics
- Recycling of packaging plastic wastes
- Recycling of PVC
- Recycling of Cans & PET bottles
- Food waste recycling

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 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://bic.national.go.jp/Elcs/aikeisan/index.html.

Masatoshi Miyaki
Senior Manager in charge of Environmental & Marketing Headquarters, Matsushita Electric Works, Ltd.

Sumida Office, Kao Corporation
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Kyotichi Iizuka
Safety Environment Group, Sumida Service Center, Kao Corporation

Outline of Production Processes of Metal Recovery Business

Key raw materials
- Spent desulfurized catalyst
- Boiler ash
- Nickel compound, etc.
- Lime, Steel scrap, etc.

Products
- Furnace slag (metallic slime)
- Furnace waste (gasification agent)
- Dechlorination product for steelmaking

Electric furnace for refining

Vandium recovering process

NFM® Board (Concrete form panels) manufacturing

NF® boards from waste plastics.

Tric appliances and food waste, and manufacturing NFM® boards from waste plastics.

Recyle overview
JFE KANKYO Corporation
http://www.jfe-kanko.co.jp/

This document is an excerpt from the JFE GROUP ENVIRONMENTAL SUSTAINABILITY REPORT 2007.
Technology Development of New-type Shaft Furnace:
Steel Production Process with Fewer CO2 Emissions

JFE R&D Corporation has developed high tensile UNI HITEN steel sheet, which reduces automotive weight, improves fuel efficiency and ultimately contributes to reduction of CO2 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.

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.

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 ensures JFE’s contribution to global warming prevention.

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.

*CDM: Clean Development Mechanism. Under CDM, signatory countries implement projects which reduce GHG emissions in a signatory developing nation, and the signatory advanced nations uses the reduction achieved for their own purposes.  
*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.
Reducing Environmental Loads through Products and Technologies

Research & Development of Environmental Conservation Technology

Technology Development of New-type Shaft Furnace:
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World Map of International Cooperation Projects by the JFE Group

PP for palm refuse fueled biomass

PP for power generation

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

China

- DSM production from unused coke oven gas
- Model project to reduce energy consumption at thermal electric furnace by new material mazzoni and substation of flue gas
- FS for energy saving at Pakistan Steelworks

Philippines

- Study of natural gas DME production from unused coke oven gas

Japan

- Study of palm refuse fueled biomass power generation

India

- Study of activated carbon for remediation of biomass power generation

Vietnam

- Study of palm refuse fueled biomass power generation

Australia

- Study of palm refuse fueled biomass power generation

APP

Asia Pacific Partnership.

*1 CDM: Clean Development Mechanism. Under CDM, signatory advanced nations carries out a reduction project in another advanced nation, and counts part of the emission reduction as its own reduction.

*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.
### History of Environmental Measures in JFE Group

#### Social Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1965</td>
<td>7th National Industrial Planning Law Enforcement (Industrial Planning Council)</td>
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<tr>
<td>1966</td>
<td>Establishment of General Environmental Measures Committee (Induction)</td>
</tr>
<tr>
<td>1967</td>
<td>Establishment of General Environmental Measures Committee (Regularization)</td>
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<td>1968</td>
<td>Establishment of General Environmental Measures Committee (Enforcement)</td>
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#### Environmental Protection & Energy Saving Activities at Works

<table>
<thead>
<tr>
<th>Year</th>
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<tr>
<td>1970</td>
<td>Implementation of Law for Promotion of Effective Utilization of Resources (Recycling Law)</td>
</tr>
<tr>
<td>1971</td>
<td>Establishment of Environmental Acceleration Center by Ministry of International Trade and Industry</td>
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<tr>
<td>1972</td>
<td>Establishment of Environmental Action (Japan’s Basic Law of Environmental Action)</td>
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<tr>
<td>1973</td>
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<tr>
<td>1974</td>
<td>Establishment of Environmental Charter by Keidanren (Japan Business Federation)</td>
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<td>1979</td>
<td>Implementation of Law concerning the Promotion of the Measures to Cope with Global Warming (PPM Law)</td>
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#### Supply of Environment-friendly Products, Engineering Technology, Equipment

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### Environmental Businesses Network of JFE Group Companies

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<th>Area</th>
<th>Company</th>
<th>Business</th>
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</thead>
<tbody>
<tr>
<td>Environmental management</td>
<td>JFE Net Corporation</td>
<td>Consultation on development of environmental management systems; ISO-based environmental training seminars for in-house environmental monitoring personnel; internal environmental auditing.</td>
</tr>
<tr>
<td>Environmental management</td>
<td>JFE TECHNO-RESEARCH CORP.</td>
<td>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 SCA lifecycle assessment; information-collation and surveys on environmental-related technologies.</td>
</tr>
<tr>
<td>Environmental management</td>
<td>Japan Technominute Corporation</td>
<td>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.</td>
</tr>
<tr>
<td>Waste treatment and recycling</td>
<td>JFE URBAN RECYCLE CORP.</td>
<td>Recycling of the 4 waste home electric appliances 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 wastes.</td>
</tr>
<tr>
<td>Waste treatment and recycling</td>
<td>JFE KANKYO CORP.</td>
<td>Waste treatment and recycling (lounge 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.</td>
</tr>
<tr>
<td>Waste treatment and recycling</td>
<td>JFE LOGISTICS CORP.</td>
<td>Collection of toner cartridges and fluorescent tubes; landfill transportation of waste plastics, industrial wastes and construction waste soil, etc.; environmental improvement works (such as waste fighting and cleaning); intermediate treatment of industrial waste; construction, operation, repair, dismantling and washing of environmental equipment.</td>
</tr>
<tr>
<td>Waste treatment and recycling</td>
<td>JFE MINERAL CORP.</td>
<td>Manufacture of iron and steel slag products; technological development for effective use of slag; development of high-value-added slag products; recycling business (recycling waste concrete/asphalt into concrete/asphalt aggregate, recycling of melting sand); soil and underground water pollution surveys and cleanup work.</td>
</tr>
<tr>
<td>Waste treatment and recycling</td>
<td>JAPAN RECYCLING CORP.</td>
<td>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.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE LIFE CORP.</td>
<td>Collection and transportation of industrial wastes; design, installation, sale, and maintenance of building and industrial air conditioner filter; recovery of chlorofluorocarbon gas from welding machines.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>DAIWA STEEL CORP.</td>
<td>Intermediate treatment of wastes (melting of dry batteries, etc.; in organic foam).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE S-Tec Corporation</td>
<td>Manufacture, installation, and maintenance of waste treatment and water treatment equipment, operation and maintenance of waste incinerators.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE PRECISION CO., LTD.</td>
<td>Manufacture, installation, and maintenance of water treatment and waste treatment equipment.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Solide Corporation</td>
<td>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 basic energy saving consultation.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Technologies Corporation</td>
<td>Manufacture, installation, and maintenance of waste treatment equipment and water treatment equipment; experimental fabrication and testing related to research and development (UHMW diesel engine, countermeasure for diesel, etc.)</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE SHOJI TRADE CORPORATION</td>
<td>Overall sales of environmental plants, equipment, commodities, and services; overseas afferentation.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Environmental Solutions Corporation</td>
<td>Maintenance service of environmental plant facilities and machinery.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>GEOCSS CORP.</td>
<td>GSS method for recycling soil generated from soil-cement continuous wall construction, reducing industrial wastes more than 30% than conventional method.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE ADVANCE CO., LTD.</td>
<td>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.).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE ELECTRICAL CONTROL SYSTEMS INC.</td>
<td>Design, installation, and maintenance of electrical systems and instrumentation of waste treatment facilities; design and manufacture of photoelectric power generation systems; design and installation of energy saving systems.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE MECHANICAL CORP.</td>
<td>Design, manufacture, installation and consultation maintenance of environment-related/vacuum equipment and water treatment equipment; manufacture and sale of compact dry distillation type incinerators; dissipation of incinerator utilizing technologies of countermass flow for design.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Electro Corp.</td>
<td>Design and installation of electrical systems and instrumentation of various plants such as waste treatment plants and incinerators.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>Tohoku Dock Tekko Co., Ltd.</td>
<td>Design, manufacture, installation, and maintenance of waste treatment equipment design, manufacture and sales of raw garbage treatment plants.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Environment Service Corporation</td>
<td>Design, manufacture, installation, and maintenance of waste treatment equipment design, manufacture and sales of raw garbage treatment plants.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Kanen Corporation</td>
<td>Corrugated operation of environment-related plants such as waste treatment and water treatment equipment.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Pipe Fitting MFG. CO., LTD.</td>
<td>Prevention of soil contaminated and restoration of contaminated soil; installation of water treatment equipment; environment-friendly construction methods (such as no-trenching method).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>NIPPON CHUZU K.K.</td>
<td>Manufacture and sale of heat and water resistant castings for waste incinerators; melting and recycling equipment, slag converter.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>Nippon Chusaku K.K.</td>
<td>Design, manufacture, and turnkey execution of water environment engineering-related projects.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>Recycling Management Japan, Inc.</td>
<td>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.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE Mio Tec Service Corporation</td>
<td>Manufacture, installation, trial run, and maintenance of waste/water treatment equipment.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE G.S. CORP.</td>
<td>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.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>KEYO CITY SERVICE CORP.</td>
<td>Design and construction of gardens and civil works; maintenance of gardens and planted areas; consultation on environmental greening; green plant lancing; washing of waste collection containers; washing and lancing of restaurant kitchen filters.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>FUKUYAMA GENERAL SERVICE CO., LTD.</td>
<td>Collection and transportation of municipal wastes.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>FUKUYAMA GENERAL SERVICE CO., LTD.</td>
<td>Grooming; cleaner service; environment-related management.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>MINAMIYAMA TOWN SERVICE CORP.</td>
<td>Design and construction of gardens and civil works; maintenance of gardens and planted areas; consultation on environmental greening; green plant lancing; recycling of rendering machines.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE CHEMICAL CORP.</td>
<td>Plastic recycling; gas reforming and byproducts recovery; carbon dioxide gas recovery and reuse; water treatment chemicals (e.g., hydrated lime, etc.).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE METAL PRODUCTS &amp; ENGINEERING INC.</td>
<td>Development and manufacture of construction/civil engineering products with low environmental loads, and environmental cleanup-type building materials (glass and sound insulating wall using photocatalyst).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE GAIYOU LTD.</td>
<td>Environment-friendly coated steel products (manufacture of vanadium steel reactor prepared steel sheet for roofing/windowed/industrial insulating; heat insulating prepainted steel sheet, and acid resistant prepainted steel sheet; manufacture and construction work of metal roofing materials and siding materials).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE GENERAL ENGINEERING &amp; CONSTRUCTION CORP.</td>
<td>Environment-friendly construction method (slop slope road widening method: Metal Road).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE ROCKFIBER CORP.</td>
<td>Manufacture and sale of rock wool products made mainly from BF slag, contributing to energy saving and better housing environment.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>JFE CONTAINER CO., LTD.</td>
<td>Manufacture and sale of reusable drum cans (Iron-drum, 5 Open drum can); recovery service of new drum and used drum care.</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>CHIBA RIVERMENT AND CEMENT CORP.</td>
<td>Manufacture of slag powder and BF cement (designated item by the Green Procurement Law).</td>
</tr>
<tr>
<td>General environmental protection</td>
<td>MIZUSHIMA RIVERMENT CORP.</td>
<td>Manufacture of slag powder and BF cement (designated item by the Green Procurement Law).</td>
</tr>
</tbody>
</table>
### Environmental Businesses Network of JFE Group Companies

#### Business Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Company</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental plant and equipment</td>
<td>JFE Nit Corporation</td>
<td>Consultation on development of environmental management systems; ISO-based environmental training seminars for in-house environmental monitoring personnel; internal environmental auditing.</td>
</tr>
<tr>
<td></td>
<td>JFE TECHNIO RESEARCH CORP.</td>
<td>Environmental and energy-related measurement, surveys, and analysis (air and soil quality, etc.); consultation on environmental issues (Environmental ISO, P&amp;D preparation of overseas GDP, etc.); consigned ISS lifecycle assessment, information:collection and survey on environmental-related technologies.</td>
</tr>
<tr>
<td></td>
<td>Japan Technomate Corporation</td>
<td>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 analyses.</td>
</tr>
<tr>
<td></td>
<td>JFE URBAN RECYCLE CORP.</td>
<td>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 wastes.</td>
</tr>
<tr>
<td></td>
<td>JFE KANKYO CORP.</td>
<td>Waste treatment and recycling (aestas 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.</td>
</tr>
<tr>
<td></td>
<td>JFE LOGISTICS CORP.</td>
<td>Collection of tire carcases and fluorescent tubes; landline transportation of waste plastics, industrial wastes 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.</td>
</tr>
<tr>
<td></td>
<td>JFE MINERAL CO., LTD.</td>
<td>Manufacture of iron and steel slag products; technological development for effective use of slag; development of high-value-added slag products; recycling business (recycling waste concrete/asphalt into concrete/asphalt aggregate, recycling of recasting sand); soil and underground water pollution surveys and cleanup work.</td>
</tr>
<tr>
<td></td>
<td>JAPAN RECYCLING CORP.</td>
<td>Industrial waste treatment; recycling of waste containers and packaging; sale of ro-products from waste treatment; operation and maintenance of municipal and industrial waste treatment facilities.</td>
</tr>
<tr>
<td></td>
<td>JFE LIFE CORP.</td>
<td>Collection and transportation of industrial wastes; design, installation, sale and maintenance of building and industrial air conditioner filter; recovery of chlorine/fluorocarbon gas from welding machines.</td>
</tr>
<tr>
<td></td>
<td>DAIWA STEEL CORP.</td>
<td>Intermediate treatment of wastes (melting of dry batteries, etc.); in industrial facilities.</td>
</tr>
<tr>
<td></td>
<td>JFE S-Tox Corporation</td>
<td>Manufacturing, installation, and maintenance on waste treatment and water treatment equipment, operation and maintenance of waste incinerators.</td>
</tr>
<tr>
<td></td>
<td>JFE PRECISION CO., LTD.</td>
<td>Manufacturing, installation, and maintenance of water treatment and water treatment equipment.</td>
</tr>
<tr>
<td></td>
<td>JFE Soldeo Corporation</td>
<td>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 basic energy-saving consultation.</td>
</tr>
<tr>
<td></td>
<td>JFE Technologies Corporation</td>
<td>Manufacturing, installation, and maintenance of waste treatment equipment and water treatment equipment; experimental fabrication and testing related to research and development (UHMW diesel engine, carbon nanotubes for diesel, etc.)</td>
</tr>
<tr>
<td></td>
<td>JFE SHOJI TRADE CORPORATION</td>
<td>Overall sales of environmental plants, equipment, commodities, and services; overseas affiliation.</td>
</tr>
<tr>
<td></td>
<td>JFE Environmental Solutions Corporation</td>
<td>Maintenance services of environmental plant facilities and machinery.</td>
</tr>
<tr>
<td></td>
<td>GEOCSS CORP.</td>
<td>GSS method for recycling soil generated from soil-cement continuous wall construction, reducing industrial wastes more than 50% than conventional method.</td>
</tr>
<tr>
<td></td>
<td>JFE ADVANTECH CO., LTD.</td>
<td>Manufacturing and sale of measuring instruments for waste treatment facilities, sewage system, and wastewater (industrial weighing scales, measuring devices of water level, quality, flow rate, etc.);</td>
</tr>
</tbody>
</table>
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 electrostatic precipitator (ESP)
- Ichimura Industrial Award
  - 2005 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 development of deep natural gas fields (ORIFISK)
    - Suppression of oxidation of stainless steel using Lavo phase
- Resource Recycling Technology & System Award (Clean Japan Center)
  - 2004 Prize from Minister of Economy, Trade and Industry
    - Recycling of waste plastics for Used Foreman Feed
- Excellent Environment Equipment Award (The Japan Machinery Federation)
  - 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 nanocrystalline precipitation
- Chugoku Regional Invention Award
  - 2006 Prize from Minister of Education, Culture, Sports, Science and Technology
    - Environment-friendly chromium-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 forming method (HSS) of high strength and thin wall steel pipe and application to arm part
  - 2006 Best Award Aida Technology Award
    - High strength and high formability HSS/TSS steel pipe using warm narrow path rolling
  - 2005 Aida Technology Encouragement Award
    - Development of high precision shape control technology for cluster roll
  - 2004 Technical 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 mechanisms of anti-corrosion steel sheets for automotive use
- WASTEC Award
  - 2004 Plant category award
    - "Hydro 21 Global 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 column
- Eco-Products Award
  - 2004 1st Prestigious convention chairman’s award
    - Recycled plastic frame "NF Board"
- The Japan Institute of Energy Award
  - 2005 The JFE 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
- Third-Party Comments

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 “CO2 emissions” deserves special mention. CO2 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 CO2 generation by 18%, and contribution to reduction of environmental loads in Asia and Korea Mechanisms. Now that the commitment period of the Kyoto Protocol is about to start, I would like to see JFE further strive to reduce CO2 emissions by coping with energy source issues as part of various measures.

CO2 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 CO2 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 CO2 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 Environmental 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 1.8%. 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 CED’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 adequately.

Regardless of the conversion from Environmental Report into Business Report, current environmental 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 2003, 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 affair 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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Shinagawa Greening Award
2005
- Environmental communications.

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