Steel Industry Measures to Combat Global Warming

Voluntary Action Plan Progress Report

November 2011

The Japan Iron and Steel Federation

INDEX

1. FY2010 Report for Voluntary Action Program

Highlights of this year's report

- As FY10 crude steel production recovered to the 110 million-ton level, energy consumption was 6.7% less than in FY1990.
- The steel industry will continue to focus on energy conservation (investments to conserve energy leading up to FY2012 (equivalent to -0.6%)) and use the Kyoto Mechanism as required (current contract volume is 35 million tons, equivalent to -5.3%) to increase the probability of reaching the target.

Voluntary Action Program of Steel Industry

1. Conserve energy with more efficient steel production processes

- Assuming annual crude steel production of about 100 million tons, the goal is to achieve a 10% reduction in energy consumption used by steel production processes by fiscal 2010 compared with fiscal 1990, the reference year.
- However, even if crude steel output exceeds 100 million tons, the steel industry is determined to do what is needed, including use of the Kyoto Protocol mechanisms, to reach this target.
- The 10% reduction is to be achieved based on average energy consumption for the five-year period ending in fiscal 2012

*A 10% cut in energy consumption is viewed as equivalent to a 9% cut in CO2 emissions.

2. Contribute to energy conservation outside the steel industry

(1) Reuse one million tons of waste plastics and other materials, assuming that the required collection system can be established.

(2) Use steel products and byproducts to contribute to energy conservation

(3) Use international technical cooperation to contribute to energy conservation

(4) Utilize unused energy at steel mills in neighboring areas

(5) Increase activities involving consumers, businesses and transportation

3. Development of revolutionary technologies

- Technology to separate CO_2 from blast furnace gas for recovery
- Iron ore reduction technology using modified hydrogen from coke oven gas

Voluntary Action Plan Progress Toward Reduction Targets (Fiscal 2010 Performance)

- FY2010 crude steel production of 107,508 thousand tons was increased 2.7% compare to fiscal 1990 (91 participating companies).
- Energy consumption was 6.7% less than in FY1990
- CO2 emissions were 7.3% less than in FY1990
- Unit energy consumption was down 9.1% from FY1990 and unit CO2 emissions were down 9.7%.

*CO2 emissions in this presentation are calculated by using electric power coefficients after reflecting emission credits.

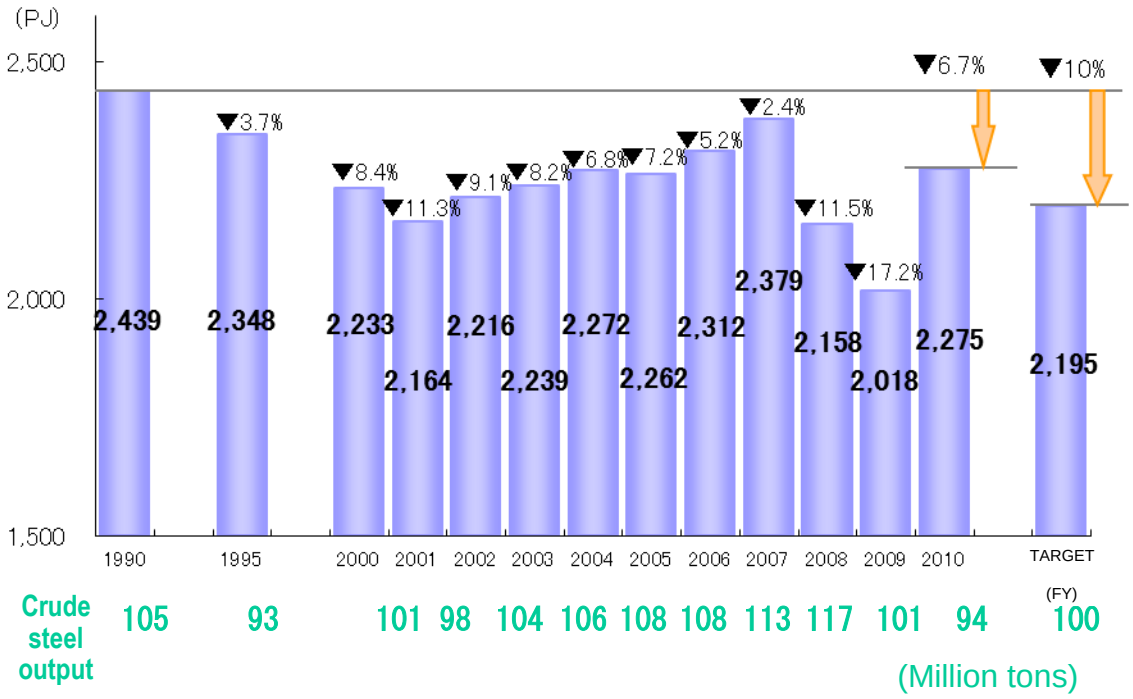
Reference: Data for entire Japanese steel industry

- FY2010 crude steel production was 110,792 thousand tons which is 0.8% less than in FY1990
- Energy consumption was 7.3% less than in FY1990
- CO2 emissions were 7.7% less than in FY1990

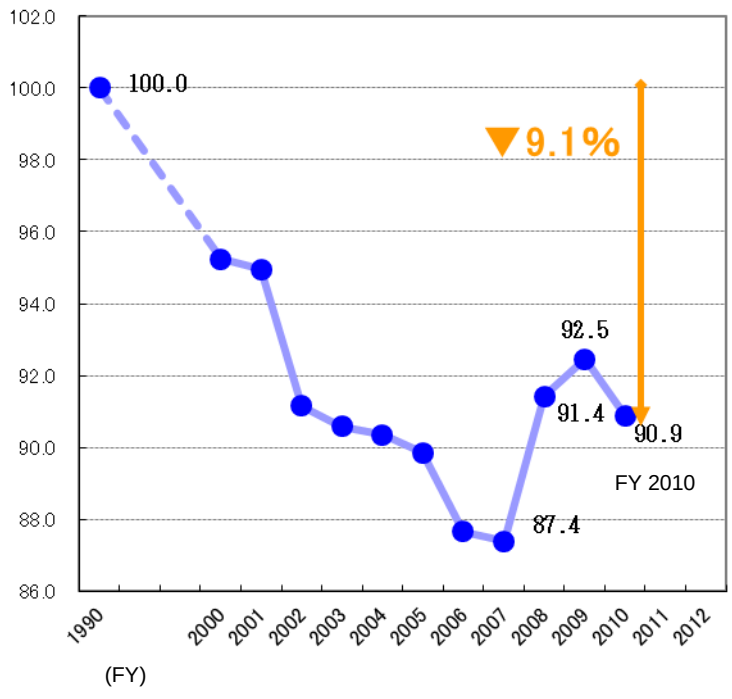
* Energy consumption is total of steel producers. CO2 emissions were estimated based on "Current Survey of Energy Consumption".

Energy Consumption

Total Energy Consumed



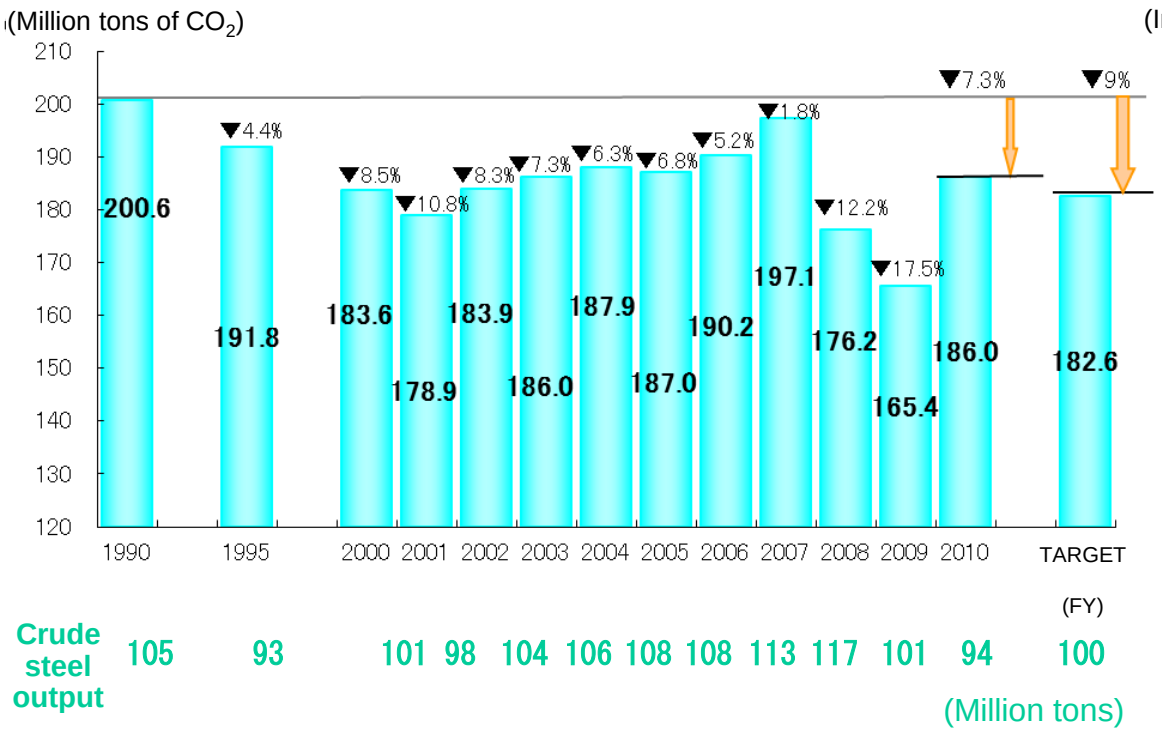
Unit Energy Consumption (Based on FY1990)



*PJ is a petajoule (10^{15} joules). One joule is 0.23889 calories. 1PJ is equivalent to about 2.58 million kiloliters of crude oil.

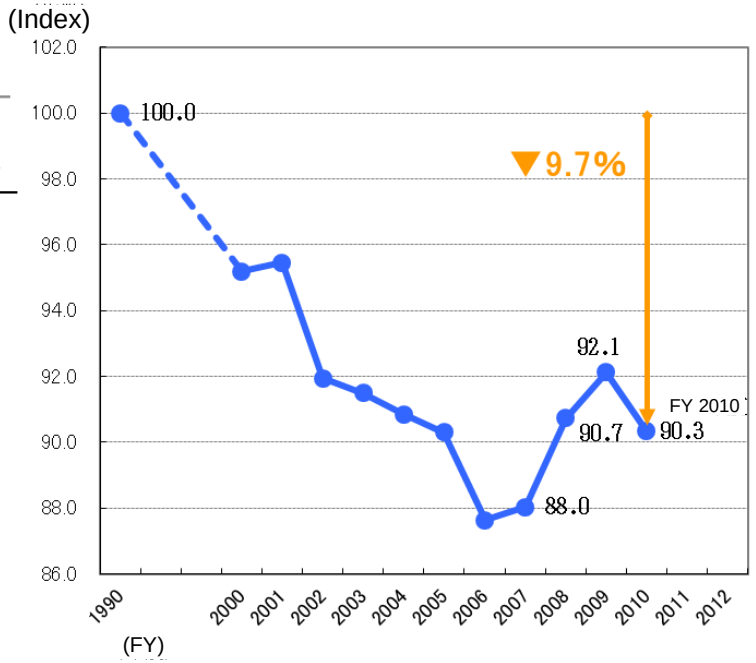
CO_2 Emissions from Fuel Combustion

CO_2 Emissions from Fuel Combustion



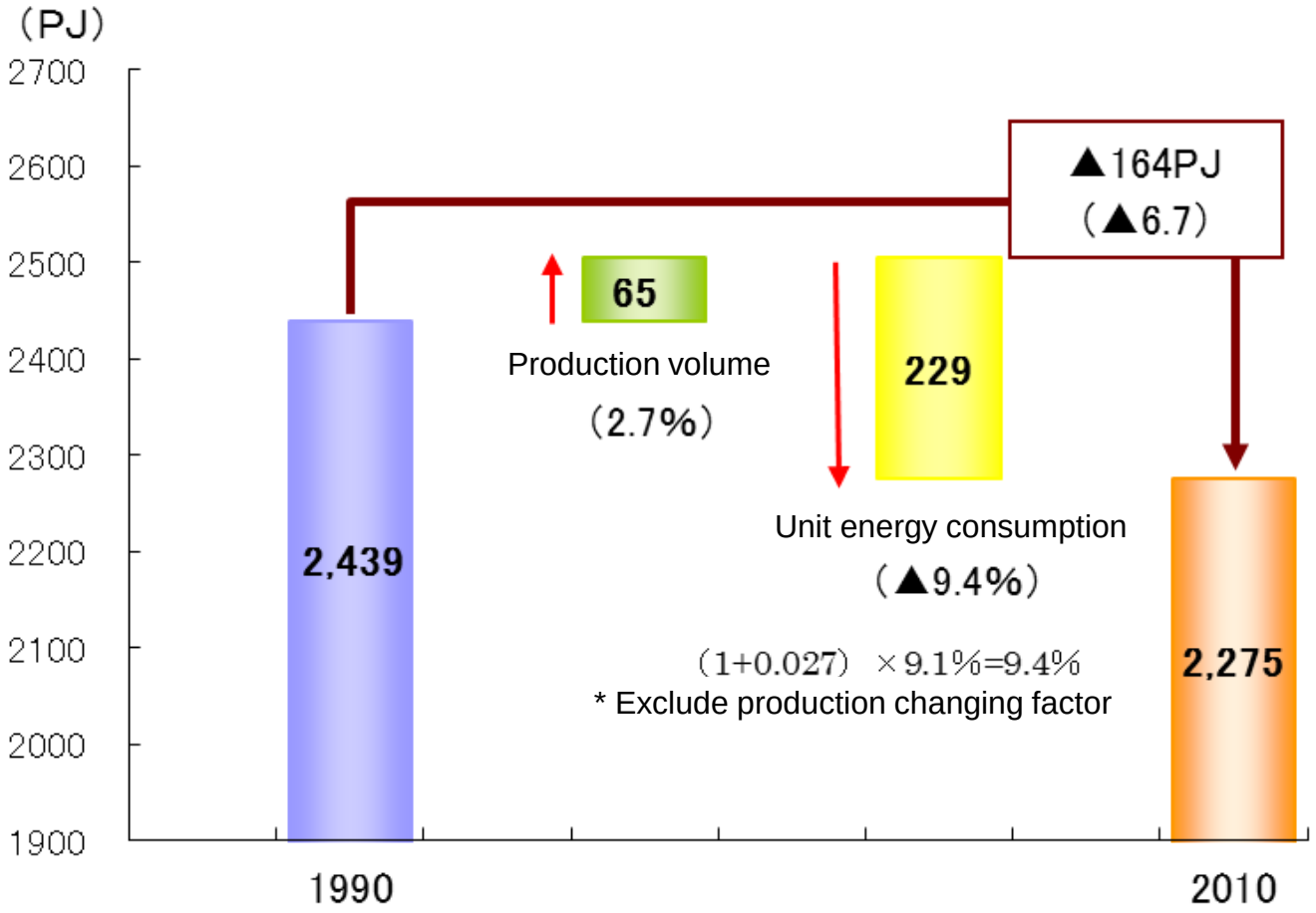
Crude steel output	105	93	101	98	104	106	108	108	113	117	101	94	100	(Million tons)

Unit CO2 Emissions (Based on FY1990)



Causes of Change in FY10 Energy Consumption

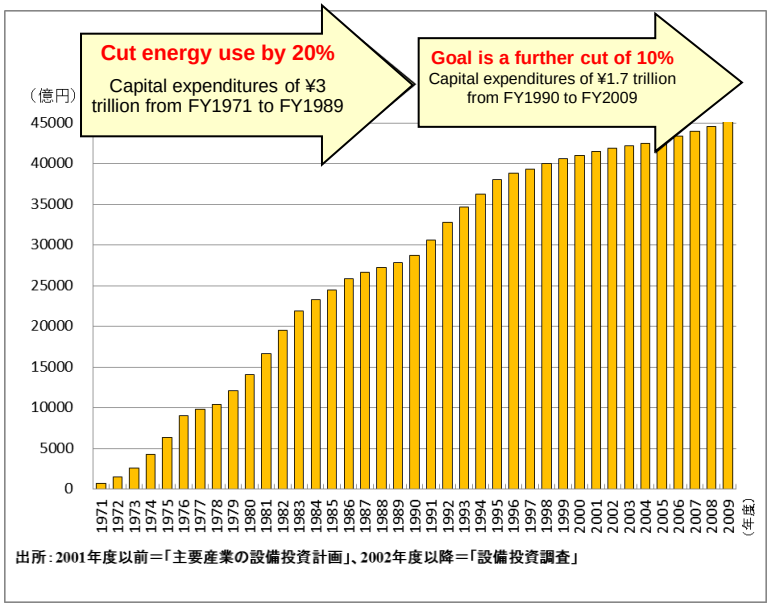
FY2010 energy consumption was 6.7% less than in FY1990 because of a 2.7% increase in crude steel production and a 9.1% improvement in unit energy consumption.



Outlook for Energy Conservation Measures

- The steel industry made investments of about ¥3 trillion between FY1971 and FY1989 for environmental protection and energy conservation. These investments totaled about ¥1.7 trillion between FY1990 and FY2009.
- Total energy to be conserved by projects now under consideration by Japanese steelmakers between now and 2012 will cut energy consumption by about 1.3% vs. FY1990. About 56% of these projects have been approved.
- Specific actions are listed below.

(Ref.) Steel Industry Environmental/Energy Conservation Investments

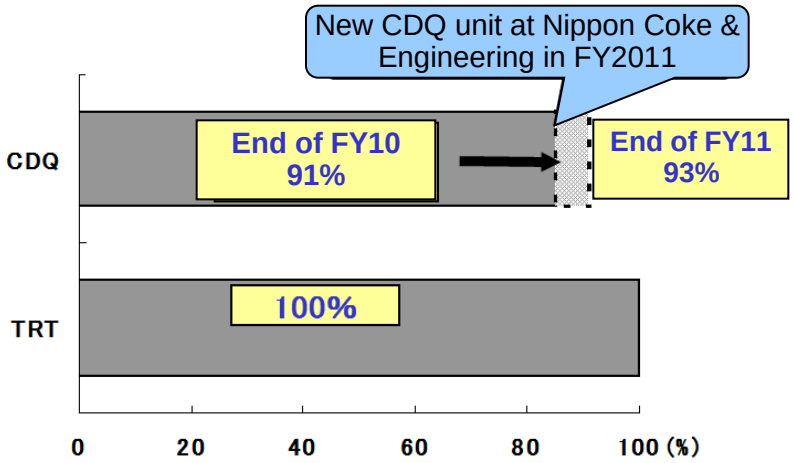


FY12 Energy Conservation Measures and Composition

(% share)

Exhaust heat recovery	Larger TRTs (top pressure recovery turbine), CDQ (coke dry quenching) installation, more gas recovery, recovery of LD converter gas, regenerative burners, others	18
More efficient equipment	High-efficiency oxygen equipment, improved power generation turbines, improved sintering, improved blast furnace, more efficient motors, more efficient power generation equipment, improved hot blast stove, others	74
Better operating methods	Smaller ratio of reducing agent, temperature management of steel materials, use of cold iron, others	5
Effective reuse of materials	Reuse of waste plastics, etc., more waste plastic treatment equipment, others	2
Others	Dust recycling, coal moisture control, preliminary iron ore processing, others	1

(Ref.) Increase in Use of CDQ and TRT



Use of Kyoto Protocol Mechanisms

Use these mechanisms as a supplementary means of achieving the goal.

(1) JISF investments in Japan Greenhouse Gas Reduction Fund and Bio Carbon Fund: Total of 1 million tons

(2) Starting steel energy conservation technology (CDQ/China, Sintering exhaust heat recovery/Philippines) and steel engineering technology (CFC treatment, etc./China) CDMs and other projects: Total of 34 million tons

Signed contracts to purchase 35 million tons (7mn tons/year = -3.5%)

33 million tons of this amount has been registered with the UN (6.6mn tons/year = -3.3%)

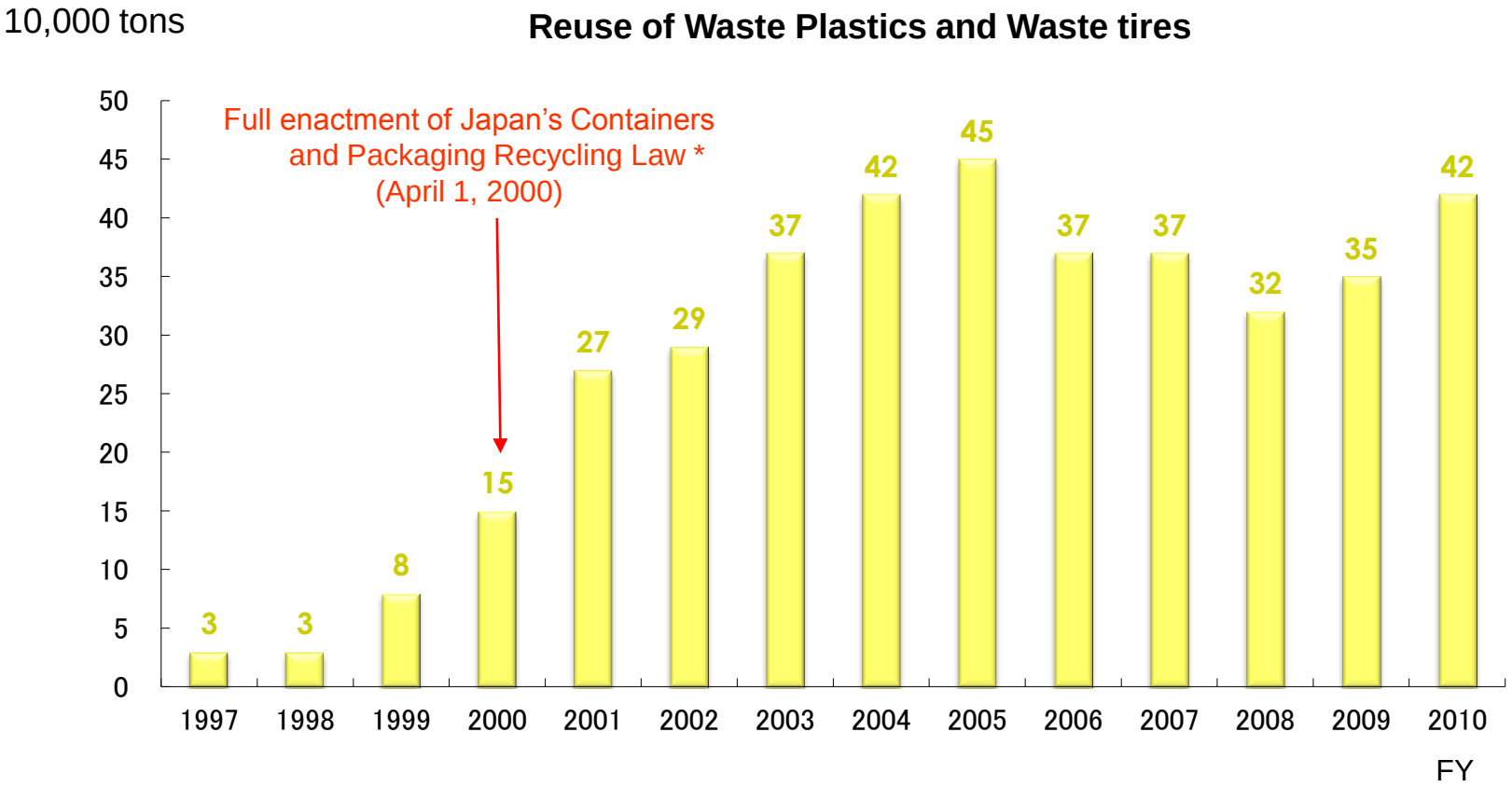
CDM Projects of Japanese Steelmakers (UN Registered)*1

Company	Country	Project	(10,000t CO_2 emission reduction CO_2/year)	Credit period	Amount for first commitment period (10,000t CO_2/year)
Nippon Steel Mitsubishi Corp	China	Shandong Dongyue HFC 23 destruction project	1,011	7 years starting in July '07	1,000 *2
Nippon Steel	China	Installation of heat recovery system for coke plant in Qian'an	21	10 years starting in Oct. '06	105
JFE Steel	Philippines	Power generation using exhaust heat from sinter cooling equipment	5.5	10 years starting in Jan. '08	27.5

Notes: *1.These materials are for projects conducted by steelmakers; total is 47mn tons of CO_2

*2. Only Nippon Steel's portion of contractual credits for this project

Reuse of Waste Plastics and Tires



*Start of reuse of general waste plastics as products

Effective Use of Waste Plastics and Other Waste Materials

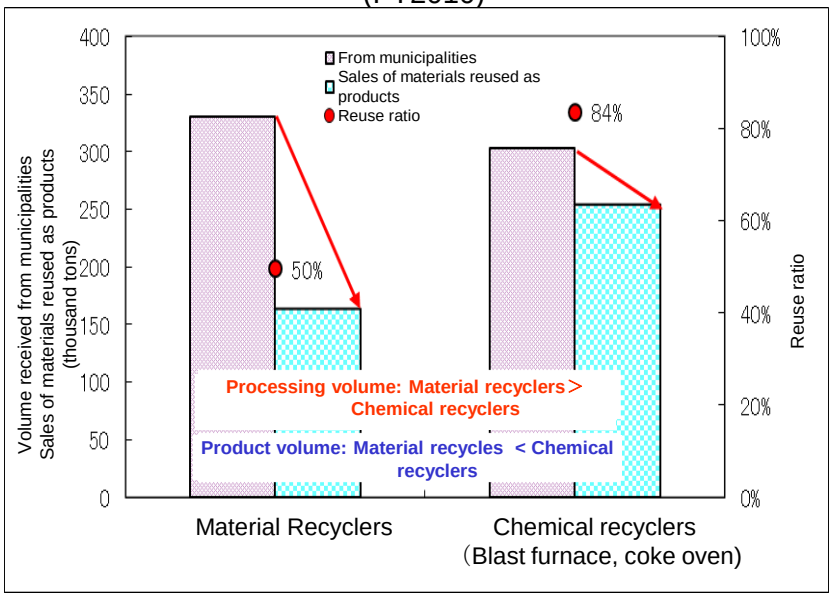
- Due to priority on recycling materials, purchased 260,000 tons of waste plastics in FY2010 under the container and packaging recycling system; current waste plastic processing capacity in the steel industry is about 400,000 tons, leaving significant unused capacity (utilization rate is slightly over 60%)
- A review of policies can produce a big drop in CO_2 emissions through the effective use of waste plastics, etc. We hope to see a quick reexamination of recycling systems from the following standpoints.

(1) From the standpoint of efficiently and effectively using waste materials (recycling waste materials that are highly effective at cutting CO2 emissions and have a low social cost), the container and packaging recycling system should stop placing priority on recycling materials that produce only small reductions in CO2 emissions.

(2) A payment system should be considered to provide incentives to local governments that cut costs below a certain level or make big improvements; this would lower the social cost of recycling by encouraging local governments to improve efficiency of collecting and storing waste materials in separate categories

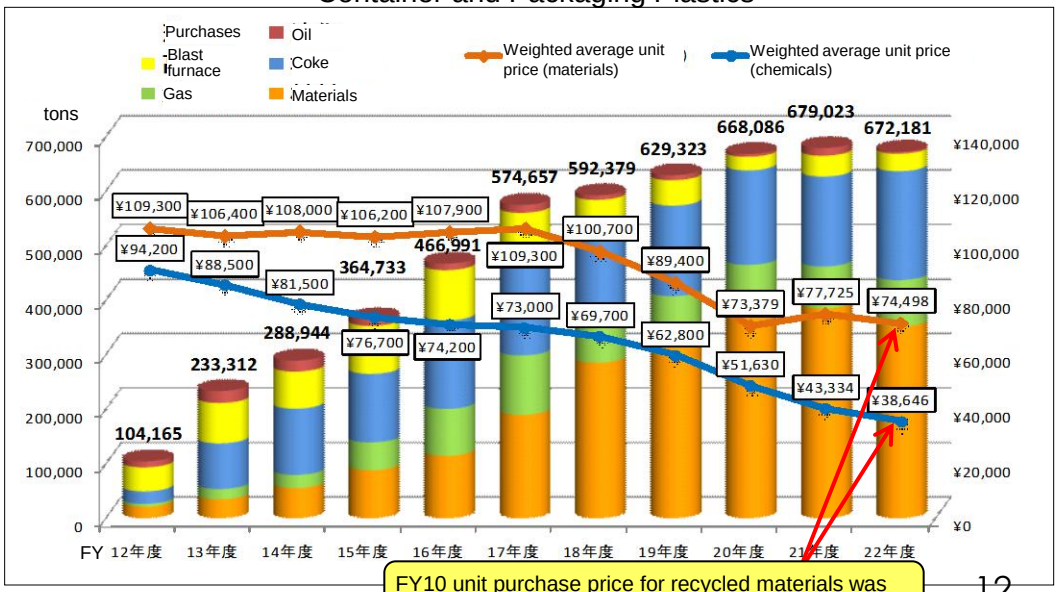
(3) Collection of waste materials should not be restricted to items covered by the Container and Packaging Recycling Law; collecting product plastic waste and other materials too could reduce the need for consumers to discard trash by category and reduce the trash classification expenses for local governments. The government should thus consider enlarging recycling activities to include more types of materials.

Materials Received, Products Sold and Reuse Ratio by Method (FY2010)



Source: The Japan Containers and Packaging Recycling Association

Volume Purchased and Unit Price by Method for Recycling Container and Packaging Plastics



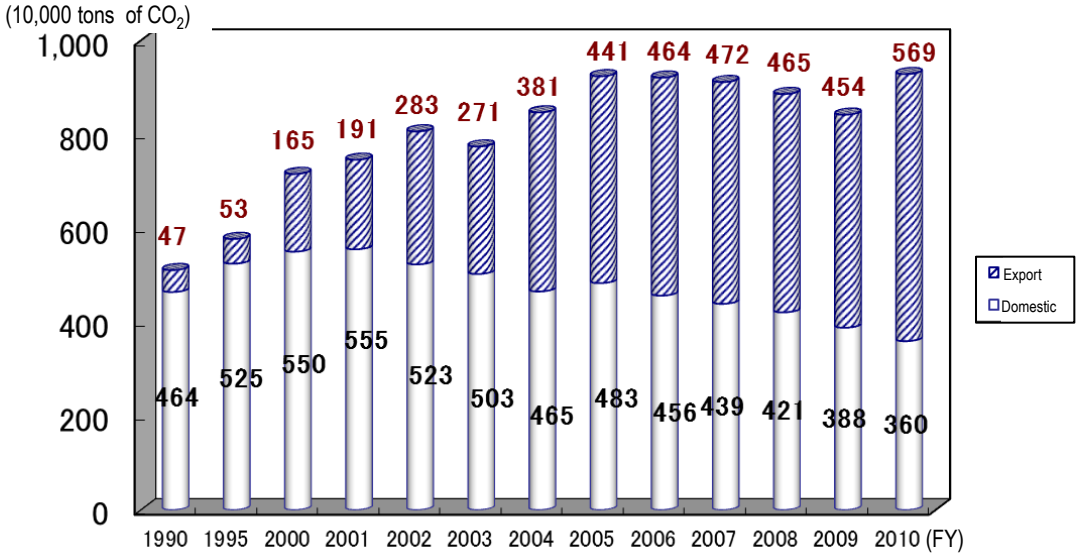
FY10 unit purchase price for recycled materials was ¥74,000/ton and ¥39,000/ton for chemicals

CO2 Emission Reduction from Blast Furnace Slag Used in Cement

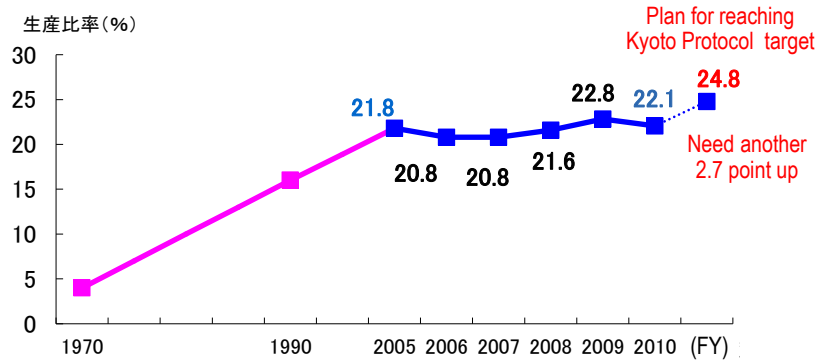
- Plan for reaching Kyoto Protocol targets assumes a higher pct. of mixed cement (mainly blast furnace cement) = From 22.1% in '10 to 24.8% in '10
- Higher pct. of mixed cement production can significantly cut CO_2 emissions

- Blast furnace cement was designated in 2001 as a specified procurement item under Japan's Green Procurement Law.
- National and other green procurement programs along with green procurement efforts of local governments and agencies can significantly cut CO_2 emissions by further increasing use of blast furnace cement.

Estimate of CO_2 Emission Reduction from Use of Blast Furnace Cement (Domestic + Exports)



Production ratio of mixed cement



Replacing conventional cement (Portland cement), which generates CO2 during the firing of raw materials, with slag cement, which does not generate CO2 during production, reduced CO2 emissions by 9.29mn tons/year (FY2010).

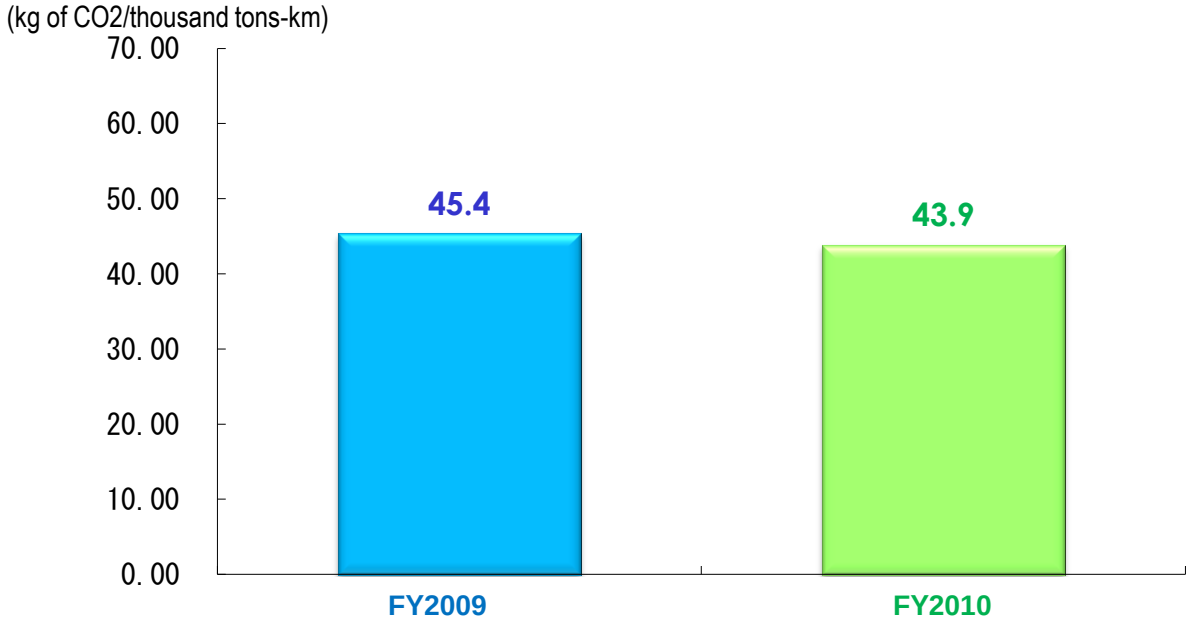
- Japan: Annual reduction of 3.6mn tons of CO_2
- Exports: Annual reduction of 5.69mn tons of CO_2

Assumptions for emission reduction contribution
Conversion to volume of cement: 450kg of slag/ Ton of cement
CO_2 emission reduction: 312kg of CO_2/Ton of cement

Initiatives for Transportation

- CO2 emissions per unit of cargo transport decreased to 43.9kg of CO2/thousand ton-kilometer in FY2010 from 45.4kg of CO2/thousand ton-kilometer in FY2009.
- In FY2010, the steel industry modal shift (ships + rail) was 79% for primary transportation and 96% for cargo transported more than 500km. This is far higher than the average modal shift rate of 38.1% for all industries in Japan (Ministry of Land, Infrastructure and Transport FY05 data for more than 500km).
- Steelmakers are taking other actions too, such as improving cargo transport efficiency by using a higher pct. of cargo space on ships, using eco-tires on trucks and using eco-friendly driving methods.

CO2 Emissions per Unit of Cargo Transport



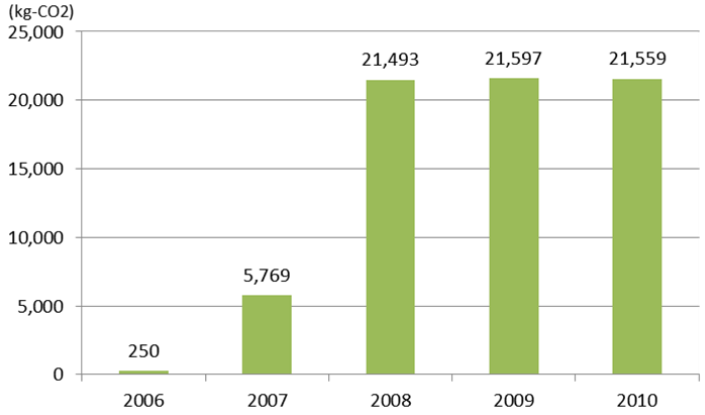
Note: Total CO2 emissions from use of gasoline, light oil and heavy oil at the 43 companies surveyed divided by total ton-kilometers of cargo transported

Private Sector Initiatives

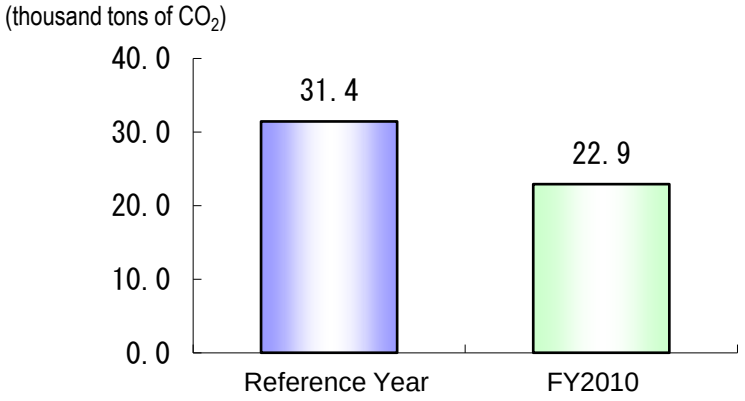
- In FY2005, Japan's steelmakers started energy conservation programs using environmental ledgers for households.
- Steelmakers started education programs that included all employees, including at group companies, promotion of use of household environmental ledgers, and other actions. There were 22,000 households participating in this program in FY2010.

- In the steel industry, to reduce CO2 emissions at offices, companies have been aiming for the goal of "reducing 2008-2012 average emissions by 5% in relation to 2003-2005 average emissions."
- In FY10, steel industry office CO2 emissions and energy consumption were both below the reference years.

Households Using Environmental Ledgers

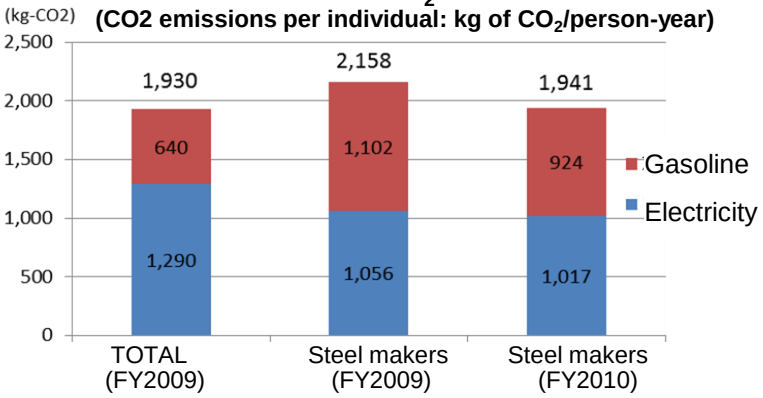


CO2 Emissions at Offices

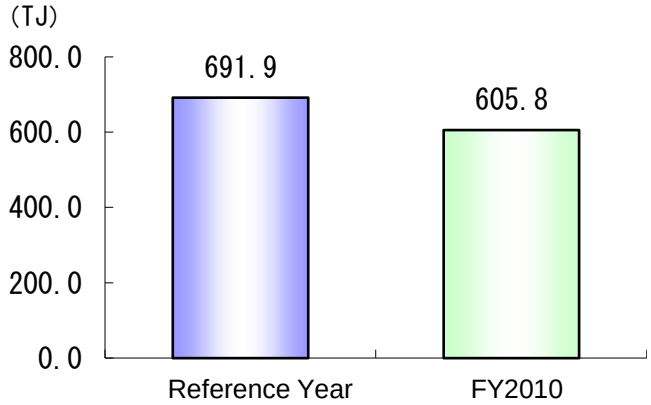


Household CO_2 Emissions

(CO2 emissions per individual: kg of CO_2/person-year)



Energy Consumption at Offices



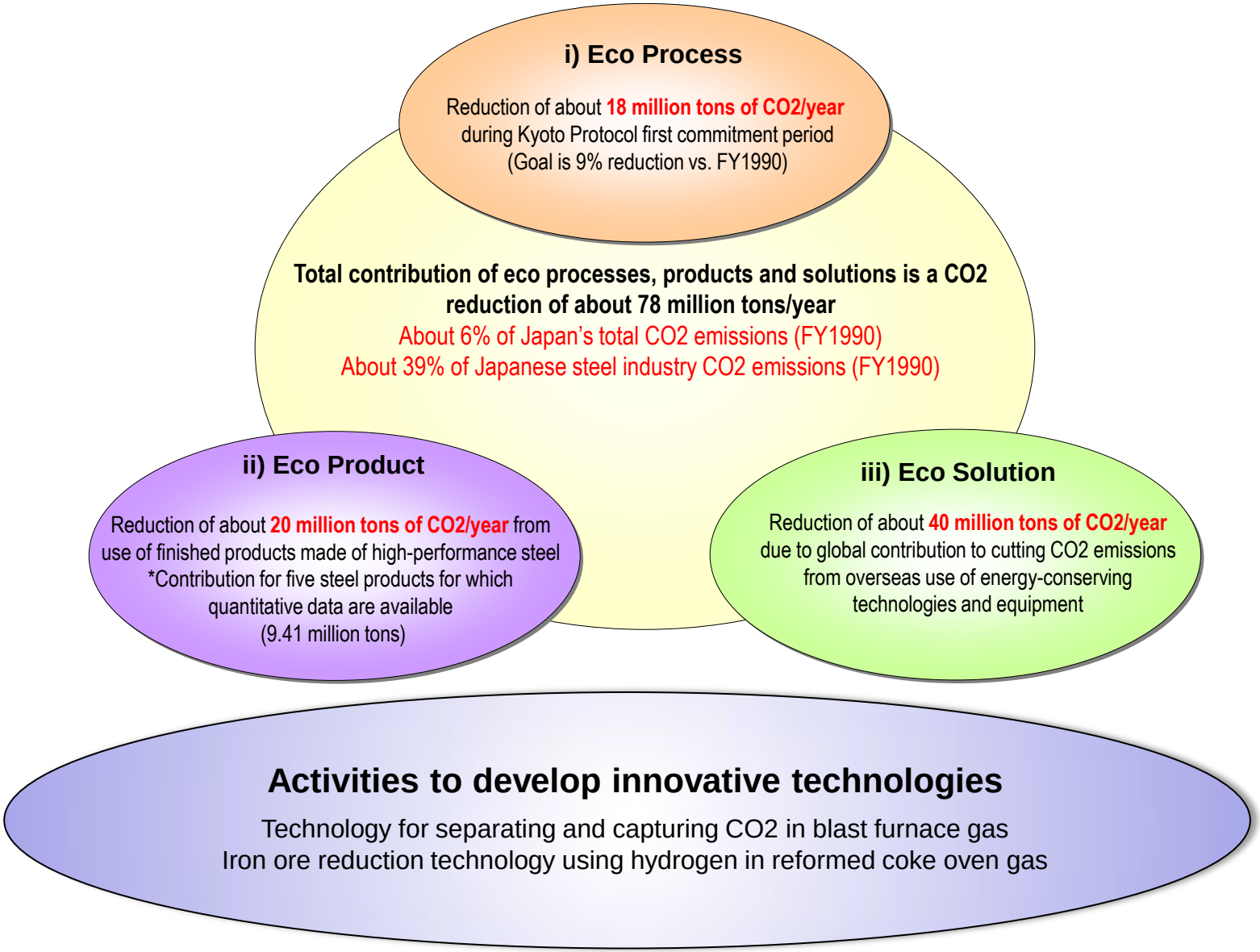
Source: Estimates based on Greenhouse Gas Inventory Office materials

Notes:
1.Total for Japanese households includes households and household use of automobiles.
2. Total for steel industry households is an estimate by JISF based on the inventory in Japan

Note: Data for 318 business sites of 77 companies. In principle, FY03-FY05 average is used, but FY04-FY05 average is used in cases where office data was difficult to obtain

2. The Goals and Vision of Japan's Steel Industry

Global "eco" Contributions by Japanese Steel Industry



The Goals and Vision of Japan's Steel Industry

(1) 2020

Eco process⇒ **Goal is reduction of 5 million tons**

- Aiming for a further improvement in energy efficiency of steel production processes, which are already the highest in the world

The 2020 goal is to aim for a reduction of about 5 million tons of CO2 emissions (emission reduction vs. business as usual in 2020, excluding reduction from improvement in electric power emission coefficient), which is based on the maximum use of the latest technological advances and 2020 crude steel output of 119.66 million tons. This is the long-term energy supply-demand outlook (recalculated) of the Advisory Committee on Energy and Natural Resources. (Cost of this reduction is about ¥1 trillion.)

Eco product⇒ **Estimated contribution of 34 mil. tons**

⬅ **20.39 million ton contribution in FY2010**
(Products included: Production of 9.41mn tons, 8.5% of total crude steel output)

- By supplying high-performance steel, which is vital to creating a low-carbon society, Japanese steelmakers contribute to cutting CO2 emissions when finished products made of this steel are used.

Eco solution⇒ **Estimated contribution of 70 mil. tons**

⬅ **FY2010 contribution was 40.1 million tons**

- Contribute worldwide by transferring the world's most advanced energy-conserving technologies to other countries (mainly developing countries) and increasing the use of these technologies.

(2) Long term

Development of revolutionary steelmaking processes (COURSE50)

Cut CO2 emissions from production processes about 30% by using hydrogen for iron ore reduction and collecting CO2 from blast furnace gas. The first production unit is to begin operations by about 2030*. Goal is widespread use of these processes by about 2050 in line with timing of updates of existing blast furnace facilities. *Assumes establishment of economic basis for CO2 storage infrastructure and creation of a practical unit using these processes.

Eco Process

- The 2020 goal is a reduction of 5 million tons of CO2 emissions, which is based on the maximum use of the latest technological advances and the steel production volumes envisioned in the report of the Advisory Committee on Energy and Natural Resources. The Japanese steel industry is thus aiming for further improvements in energy efficiency, which is already the world's highest.
- Specifically, the goal is to cut emissions by 5 million tons by using advanced technologies that have reached the stage of practical use when current facilities are updated or replaced. Examples include the use of next-generation coke production technology, higher efficiency for joint thermal and internal power generation, more energy-conserving equipment like TRT, CDQ and facilities to recover heat emissions and sensible heat, higher efficiency for equipment powered by electricity, and more chemical recycling of waste plastics and other materials at steel mills.
- Emission reduction targets are calculated using the maximum potential for reductions. Technical and physical limitations when starting to use new technologies are not taken into consideration.
- When starting to use new technologies, in addition to initiatives of the steel industry itself, specific emission-reduction measures (promotion of widespread use, actions to recover and utilize waste plastics and other materials, and other measures) using the cooperation of the public sector and others will be vital as well.

Emission Reduction Targets for 2020

(Million tons, Million tons of CO2)

	For lower production (10 million tons less than standard case)	Standard case	For higher production (10 million tons above standard case)
Total crude steel production in Japan	109.66	119.66	129.66
Production at participating companies	105.16	114.75	124.34
BAU emissions at participating companies	183.31	195.40	207.51
Reduction from new technologies	5		
Total reduction at participating companies	178.31	190.40	202.51

*Production volume at participating companies is calculated by using the ratio of FY2005 crude steel production at companies participating in the voluntary action program (91 companies) to total crude steel production in Japan (95.9%).

*A significant change in production volume may cause these figures to become greater or less than the anticipated range. If this happens, the suitability of the BAU and emission reduction volumes will have to be reexamined based on actual production volume.

Eco Process (Revolutionary steelmaking technologies)

(Reference: Advisory Committee on Energy and Natural Resources report)

Premise for long-term energy supply-demand outlook (recalculated) (proposal)

About 5 million tons of CO2
About ¥1 trillion

Maximum use of advanced technologies at practical stages when facilities are updated or replaced

In Japan's steel industry, which is already the world's most efficient, cut CO2 emissions by using the following types of advanced technologies.

Ironmaking

Major technologies envisioned

○ **Higher efficiency for internal and joint thermal power generation equipment** — **420,000kL**

Replace internal and joint thermal power generation facilities with more efficient equipment → Install more efficient equipment when existing facilities are due for replacement to create the optimum composition of equipment in the future

○ **Increase chemical recycling using waste plastics at steel mills** — **470,000kL**

Use less coal by utilizing waste plastics and other materials collected in accordance with Japan's container recycling law. → Collect and use 1 million tons of waste plastics and other materials

○ **Improve efficiency of equipment powered by electricity** — **120,000kL**

Replace electrically powered equipment at steel mills with more efficient facilities.

○ **Increase the use of energy-conservation equipment** — **510,000kL**

Install more facilities for utilizing waste heat, such as blast furnace top equivalent pressure gas recovery and coke oven sensible heat recovery. → When updating or replacing equipment, raise efficiency to the highest possible level.

○ **SCOPE21 coke oven** — **310,000kL**

Conserve energy when producing coke by using preliminary coal processing and other measures. → Start using new technologies at all coke ovens as they are updated or replaced (six ovens by 2020).

Major associated initiatives thus far

Development of a revolutionary coke production technology (SCOPE21) that conserves energy and produces coke very efficiently
(FY1994-FY2003: ¥8.2 billion)

Issues

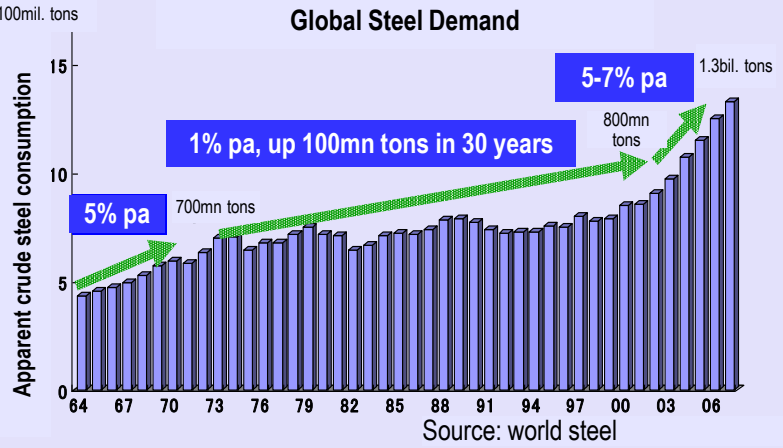
○ **Issues involving users of advanced technologies**
- Limited space for new equipment
- Compatibility with current infrastructure (energy supplies, etc.)
- Restrictions on timing of installation work (need to reflect production plans, limitations on lost output during installation)

○ **Issues involving providers of advanced technologies**
- Ability of manufacturers to supply technologies (technology development, design and production capabilities)
- Engineering capabilities

○ **Other restrictions**
- Limitations on the ability to collect and supply waste plastics and other materials

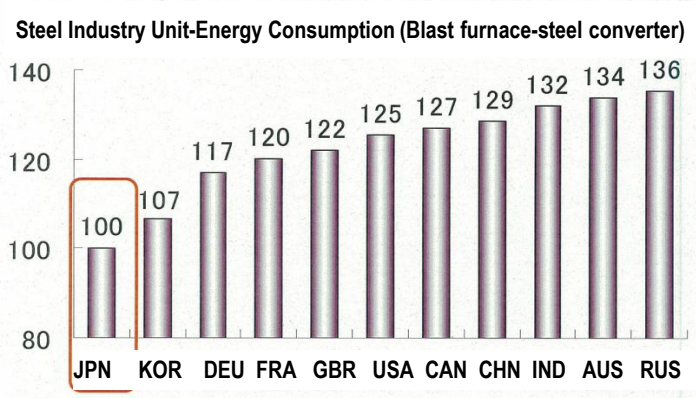
*These materials are based on assumptions that use model calculations.

Rapid increase in global steel demand due mainly to higher demand in developing countries



Source: world steel

Japan's steel industry has the world's highest energy efficiency. As global steel demand rises, lowering Japan's production while raising production in other countries would thus cause worldwide CO2 emissions to increase.



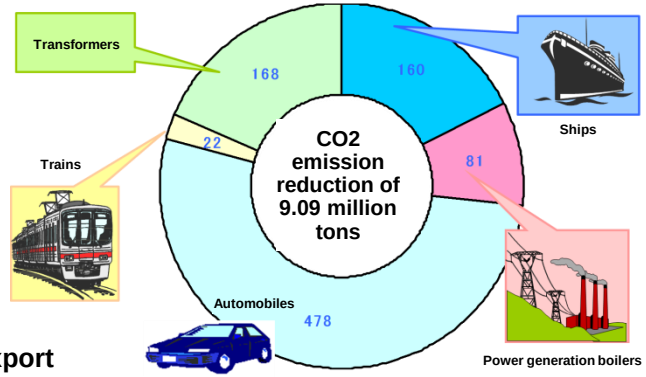
Source: RITE "International Comparison of Energy Efficiency (Electric Power, Steel and Cement)"

CO2 Emission Reductions from Use of Eco Product

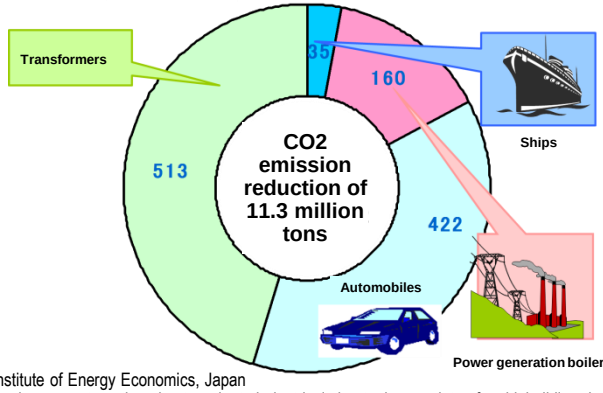
- To determine the contribution of high-performance steel products, the JISF established the LCA Energy Assessment Committee (Chairman: Professor Kanji Yoshioka, Keio University) in FY2001. This committee has been monitoring this contribution every year since then by performing assessments and analyses from a life cycle assessment (LCA) perspective with user industry associations and The Institute of Energy Economics, Japan.
- For the five steel products for which quantitative data are available (FY2010 production 9.41 million tons, 8.5% of Japan's total crude steel output), the use of finished products made of high-performance steel cut FY2010 CO2 emissions by 9.09 million tons for steel used in Japan and 11.3 million tons for exports, a total of 20.39 million tons of CO2.
- If demand for these five high-performance steel products remains at the FY2010 level until FY20, the CO2 reduction from the use of finished products made of these steel products in FY20 will be an estimated 11.51 million tons for steel used in Japan and 22.54 million tons for exports, a total of about 34 million tons of CO2.

CO2 Emission Reductions FY10

1. Domestic



2. Export

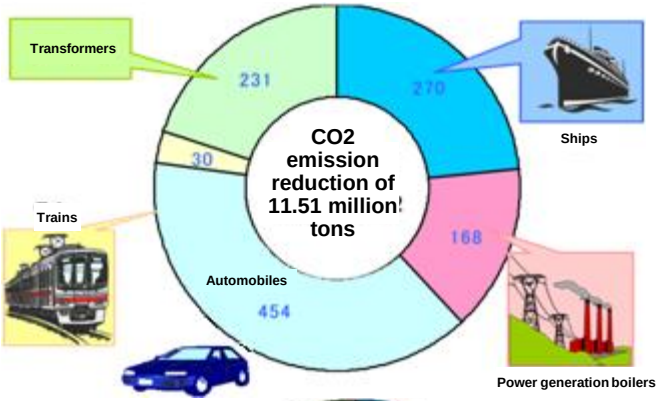


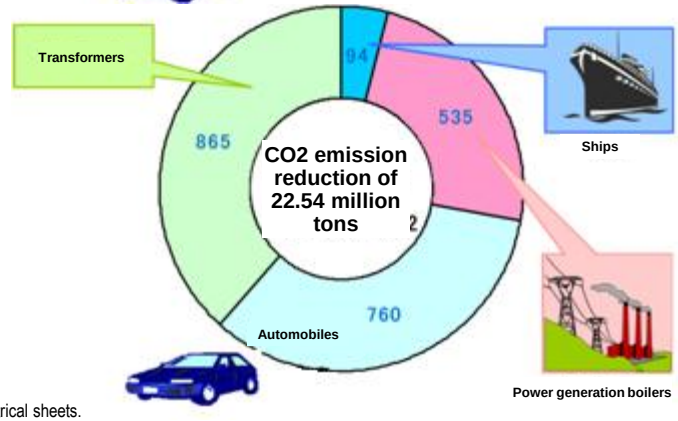
20.39 million tons

If FY2010 demand level remains until FY20

34 million tons

CO2 Emission Reductions FY20 (E)





Source: The Institute of Energy Economics, Japan

*The five categories are automotive sheets, oriented electrical sheets, heavy plates for shipbuilding, boiler tubes and stainless steel sheets

*Assessments in Japan started in FY1990 and for exports assessments started in FY2003 for automobiles and shipbuilding, in FY1998 for boiler tubes and in FY1996 for electrical sheets.

*In FY2010, use of the five categories of steel products in Japan was 4.68 million tons and exports were 4.73 million tons for a total of 9.41 million tons.

Examples of Eco Product

High-performance steel, much of which is made by Japanese steelmakers, will be vital to making the broad range of products that will be needed to create a low-carbon society. Examples include high-tensile strength steel sheets and electrical steel sheets for hybrid and electric vehicles; pipes with outstanding strength and corrosion resistance for ultra-super-critical boilers for coil-fired power plants; and forged steel parts and steel sheets for reactor pressure vessels and steel pipes for steam generators in nuclear power stations. Demand is certain to increase significantly in all these areas.

How high-performance steel helps fight global warming

Hybrid vehicles and electric vehicles

High-efficiency grain-oriented electrical steel sheets for hybrid and electric vehicle motors cut fuel consumption, boost power and reduce size and weight.

Cumulative global sales of hybrid vehicles, a market sector where Japanese automakers have a dominant position, a 2 million vehicles. These vehicles have cut CO2 emissions by an estimated 11 million tons (compared with gasoline-powered vehicles). Source: Toyota website

Power generation plants

Ultra-super-critical boilers, which raise power generation efficiency, require steel pipes that are very strong at high temperatures and able to resist oxidation and high-temperature corrosion caused by exposure to steam.

Large size forged steel parts for power generation

Steel pipes made in Japan have been used at 191 ultra-super-critical boilers worldwide between 1993 and 2008. The higher power generating efficiency of these boilers lowered the amount of coal used, resulting in an estimated annual CO2 emission reduction of 66 million tons (compared with subcritical pressure boilers and super-critical boilers).

All nuclear power stations in Japan use large forged components. The 53 reactors operating at nuclear power stations in Japan in FY2008 are estimated to have cut annual CO2 emissions by 228.93 million tons (compared with coal-fired power stations)

Eco Solution

Major energy-conserving technologies developed and applied by the Japanese steel industry have been transferred to other countries by Japanese companies. Looking only at coke dry quenching (CDQ), top pressure recovery turbines (TRT) and other major facilities, these technologies have cut annual CO2 emissions by about 40 million tons collectively in China, Korea, India, Russia, Ukraine, Brazil and other countries.

Based on the potential for lowering global CO2 emissions through major energy-conserving technologies, the current share (of CO2 emissions) of Japanese companies, their supply capacities and other factors, Japan's contribution for lowering annual CO2 emissions globally in 2020 is estimated at 70mn tons .

If energy-conserving technologies (including high-efficiency blast furnaces, etc.) are transferred and utilized worldwide, the potential for lowering annual CO2 emissions is estimated at 130 million tons in the seven APP countries and 340 million tons worldwide (equivalent to about 25% of Japan's total CO2 emissions).

Emission Reductions in Other Countries from Japanese Energy-conserving Equipment

	No. of units	Reduction (10,000 tons/year)
Coke dry quenching (CDQ)	61	985
Top-pressure recovery turbines (TRT)	48	818
Byproduct gas combustion (GTCC)	25	1257
Basic oxygen furnace OG gas recovery	21	792
Basic oxygen furnace sensible heat recovery	7	85
Sintering exhaust heat recovery	5	73
Total emission reduction		4,010

※CDQ：Coke Dry Quenching
TRT：Top Pressure Recovery Turbines
GTCC：Gas Turbine Combined Cycle system

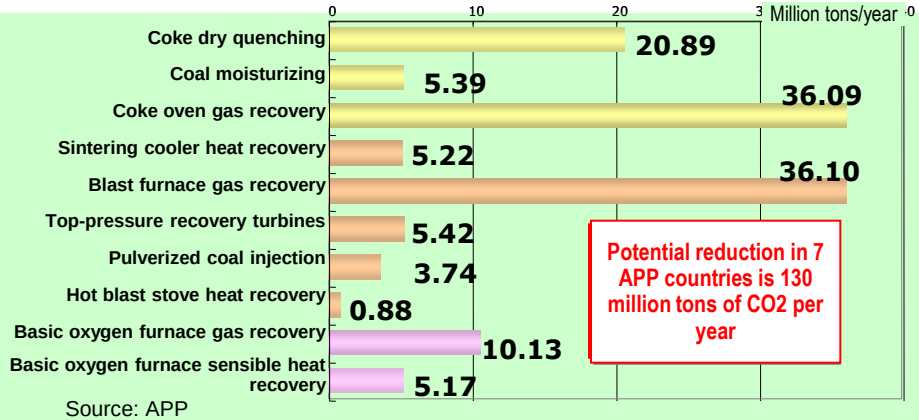
Potential CO2 emission reduction 340 million tons/year world wide

Japan's contribution by transferring major energy-conserving technologies

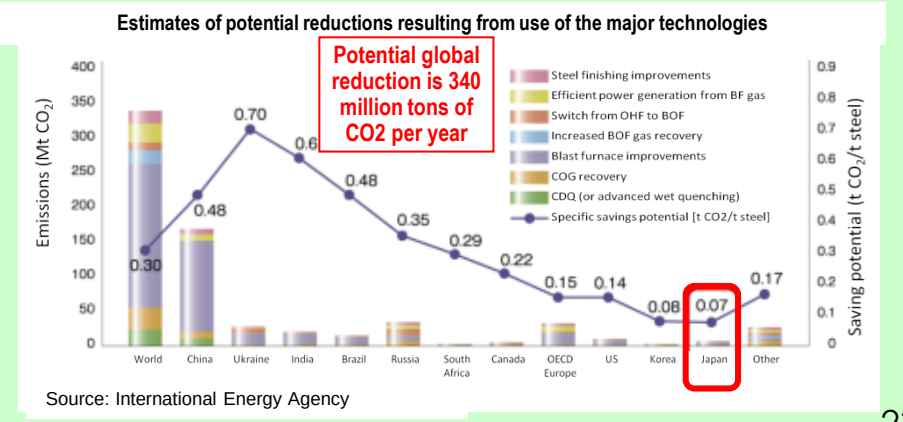
FY2010: 40million tons

FY2020: 70million tons

Potential Emission Reductions from Use of Major Energy Conservation Technologies in APP and world



Source: APP



Source: International Energy Agency

International Alliances of the Japanese Steel Industry 1

The Japanese steel industry has achieved concrete results by using the Japan-China Steel Industries Conference on Exchange of Advanced Technologies on Environmental Preservation and Energy-Saving, Asia-Pacific Partnership (seven countries), World Steel Association (60 countries) and other forums to encourage adoption of the global sectoral approach.
With these activities, the Japanese steel industry is making a significant contribution to the "Hatoyama initiative" by transferring the industry's outstanding energy-conserving technologies and equipment to other countries and increasing their use in these countries.

1. Japan-China Steel Industries Conference on Exchange of Advanced Technologies on Environmental Preservation and Energy-Saving

(Japan and China account for about half of the world's crude steel production)

- Japanese and Chinese executives signed a memorandum of understanding at the first meeting that was held in July 2005 in Beijing. Since then, technology exchange conferences attended by experts from the two countries have been held every year.
- The foundation for international cooperation in the steel industry

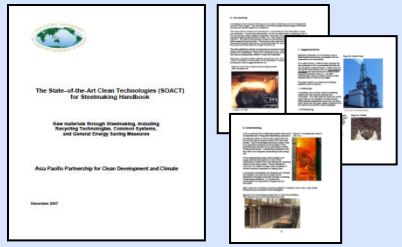
2. APP Steel Task Force

(The 7 APP countries account for 64% of the world's crude steel production)

- This task force was started in April 2006 by the ministers of six countries: Japan, Australia, China, India, Korea and the U.S. Canada joined in 2007, raising participation to the current seven countries. Meetings are held twice each year and are consistently producing benefits.
- There are eight task forces, including for steel and cement, and Japan chairs the steel task force.
- Member countries have given the steel task force high marks for facilitating the sharing of energy-conservation technologies, establishing a uniform system for measuring efficiency, performing energy-conservation diagnoses using specialists, and performing other activities.

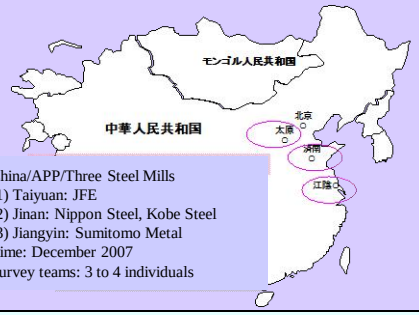
SOACT Handbook

- The State-of-the-Art Clean Technologies (SOACT) for Steelmaking Handbook contains 22 environmental-protection technologies and 42 energy-conservation technologies. Of these technologies, 27 are provided by Japan.
- All technologies are posted on a website and are available to the public.

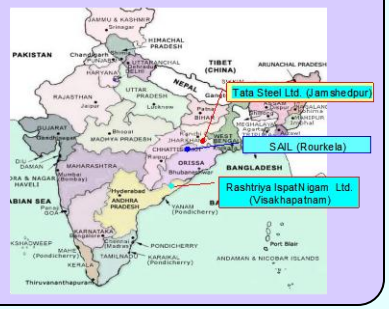


Steel Mill Diagnostic Surveys

- Engineers performed energy-conservation diagnostic surveys at three steel mills in China and three steel mills in India between fiscal 2007 and 2009.
- These surveys showed that the potential CO_2 emission reductions at the six steel mills total about 6 million tons.



China/APP/Three Steel Mills
(1) Taiyuan: JFE
(2) Jinan: Nippon Steel, Kobe Steel
(3) Jiangyin: Sumitomo Metal
Time: December 2007
Survey teams: 3 to 4 individuals



3. International cooperation using the World Steel Association

- The decision was made in October 2007 to use the sectoral approach on a global scale. Uniform worldwide assessment methods were established and CO_2 emission data at the world's major steel mills are being gathered and reported.
- The CO_2 Breakthrough Programme was started in 2003 with the goal of developing breakthrough technologies for CO_2 emission reductions. Japan is participating in this initiative through COURSE50, an initiative to develop innovative technologies for steelmaking processes that lower CO_2 emissions.

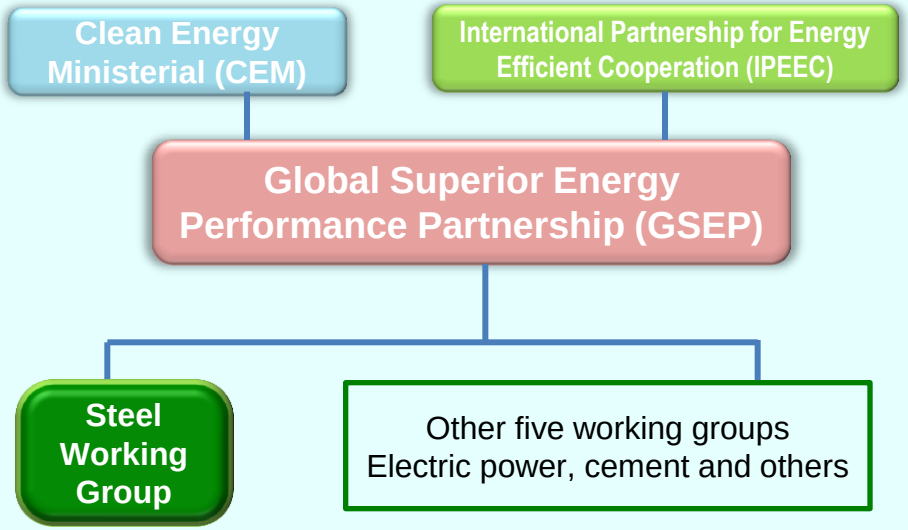
International Alliances of the Japanese Steel Industry 2

- The Japanese steel industry has started taking the following actions to reinforce activities involving the global sectoral approach.
- These initiatives will support economic growth in Japan, preserve and create jobs, and contribute to fighting climate change on a global scale. The steel industry thus asks for the continued support of the Japanese government, too.

1. GSEP Steel Working Group

- At the July 2010 Clean Energy Ministerial, the decision was made to terminate APP to form a new international organization called GSEP, a proposal by Japan and the U.S. for improving energy efficiency. With public and private-sector participation, GSEP is moving forward with six working groups, including a steel working group.
- Under the leadership of Japan, the steel working group is involved in increasing the use of clean technologies in member countries and activities for energy security, economic progress and environmental protection.
- The conference will be held once each year, as a rule. The first conference is planned for February 2012.

Structure of GSEP

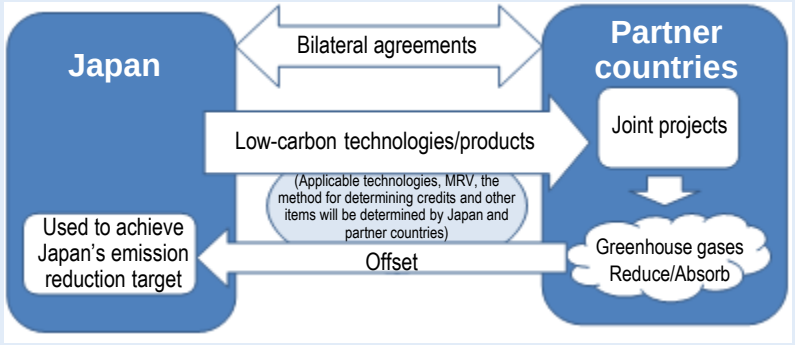


Source: Ministry of Economy, Trade and Industry

2. Bilateral Offset Mechanism

- The aim of this system is to use bilateral agreements to assess and recognize with flexibility and speed Japan's contributions from low-carbon technologies to reducing overseas CO2 emissions, thereby certifying these reductions as CO2 emission reductions for Japan.
- This system is closely linked to the international cooperation activities of the Japanese steel industry. It is an effective framework for evaluating the international contribution of transfers and use of Japanese energy-conservation technologies. As a result, the steel industry will cooperate extensively with the Japanese government regarding this mechanism.
- There were two FS in FY2010 and five FS are under way in FY2011.

Offset Mechanism Flowchart



Steel Industry Bilateral Offset Mechanism - FS List

FY 10	Nippon Steel (India) Provision of energy-conservation technology for coke oven	JFE (Philippines) Provision of energy-conservation technology for sintering furnace			
FY 11	JFE (India) Study for energy-conservation project at JSW steel mill	Sumitomo Metals (India) Establishment of project for reducing GHG emissions produced during steel sintering process	Steel Industry (India) Policy advice for the Indian steel industry and use of energy-conservation technologies by considering business schemes	Steel Industry (South Africa) Study to identify sites for use of energy-conservation technologies in the South African steel sector	Steel Industry (Vietnam) Feasibility study for new mechanism to increase the use of blast furnace slag in blended cement

Development of Revolutionary Technology for Steelmaking Process (COURSE50)

(COURSE50 : *CO2 Ultimate Reduction in Steelmaking process by Innovative technology for cool Earth 50*)

CO2 emissions are unavoidable when coal is used for the reduction of iron ore.

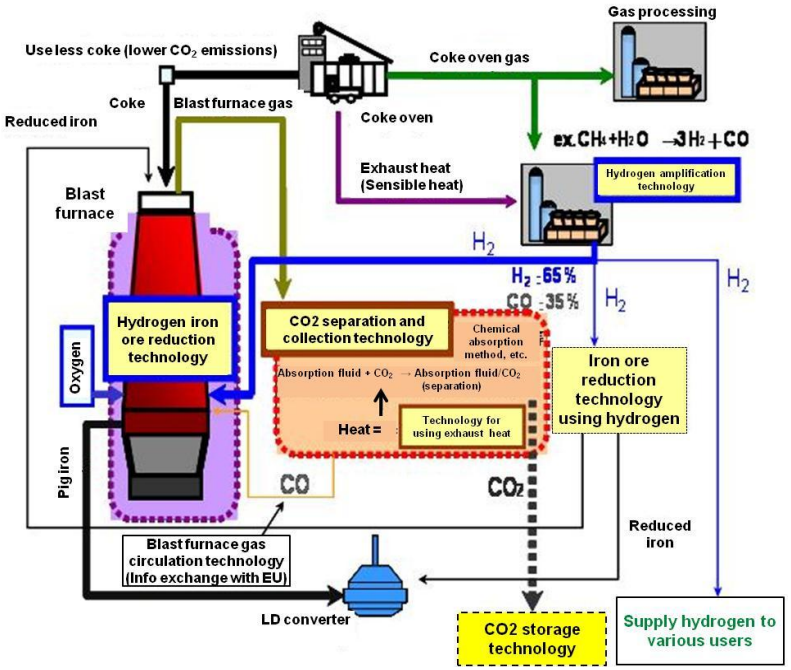
The goal is to cut total CO2 emissions by about 30% by using hydrogen to reduce iron ore and collecting CO2 from blast furnace gas.

The first practical system is to start operating by about 2030*. All blast furnaces are to be switched to this technology by 2050 as blast furnace facilities are updated and replaced.

*Assumes establishment of economic basis for CO2 storage infrastructure and creation of a practical unit using these processes.

Project summary

1. Total cost (Phase1, Step 1): About ¥10 billion (tentative)
2. R&D activities (technology development)
   a) Development of hydrogen amplification technology using unused coke oven gas sensible heat (800ºC)
   b) Development of iron ore reduction technology using hydrogen
   c) Collection of CO2 from blast furnace gas by using unused exhaust heat at steel mills



NEDO Project (Phase1 Step1 2008～12)

2008	09	10	11	12
1.6	2.5	2.1	2.7+α	2.0～3.0(billion yen)

Medium/long-term timeline

2010 2020 2030 2040 2050

Phase1 Step1 (2008～12) | Phase1 Step2 (2013～17) | Phase2 | Practical applications, more widespread use

Development of CO2 Separation and Capture Technologies (COURSE50)

Evaluation plants are working on the development of two methods for separating and capturing CO2 from blast furnace gas (BFG) by utilizing unused heat at steel mills: *the chemical absorption method* and *the physical absorption method*.

Development of the Chemical Absorption Method*1

	CAT*-LAB	CAT*-1	CAT*-30
CO2 collected	5kg/day	1 ton/day	30 tons/day
Objectives of tests	Seek a gas-absorbing liquid by using performance assessments of continuous trials using simulated BFG	Basic assessment of performance the absorbing fluid under development when using actual BFG	Assess performance of the absorbing fluid under development Assess effects on durability, stability and ironmaking processes

*Chemical Absorption Test plant

- **Begin with a small continuous test (5kg/day) and then operate a small trial plant (1 ton/day) to evaluate performance. Use a 30 ton/day evaluation plant to develop the chemical absorption method and perform assessments and tests involving overall performance.**
- **While repeating the above cycle for evaluations and tests, develop a high-performance chemical absorption method that cuts by about 40% the energy required for separating and capturing CO2. Will continue to work on developing high-performance absorbing fluids and processes in order to achieve the goals.**

*1 An alkaline solvent that selectively dissolves CO2 is used as the absorbing fluid. CO2 is absorbed by using a chemical reaction after which the absorbing fluid is heated to release the CO2 so that it can be captured.

Development of the Physical Absorption Method*2

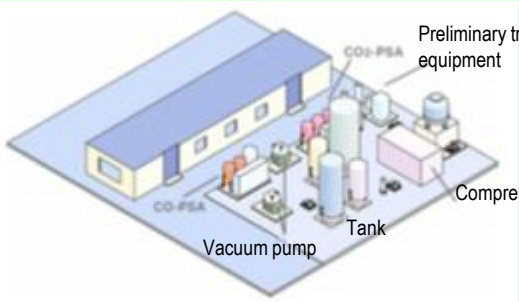


Diagram of bench testing equipment (ASCOA*-3)

*Advanced Separation system by Carbon Oxides Adsorption

- **Bench testing equipment (ASCOA-3) with a processing capacity of 3 tons/day has been constructed. This facility is used to assess CO2 separation performance and to study gas preliminary treatment methods and cost reduction methods.**

*2 A porous adsorbing substance such as zeolite or activated charcoal is used. CO2 is adsorbed by this substance under high pressure. Then, the CO2 is released by moving the adsorbing substance to a low-pressure environment so that CO2 can be separated from the exhaust gas and captured.

3. Requests Concerning Initiatives in Japan

Overview of the Japanese Steel Industry Today

- The Japanese steel industry is facing four major challenges to its ability to remain competitive on a global scale:

  (1) A high effective corporate tax rate in comparison to rates in other countries

  (2) Uncertainty about participation in TPP

  (3) A much higher CO2 reduction target than in other countries, and

  (4) The recent increase in the yen's value

- In addition, Japan's energy supply structure is undergoing dramatic changes because of the Great East Japan Earthquake. If there are interruptions in the supply of electricity or a significant increase in the cost of electricity, it would become extremely difficult to manufacture steel in Japan.

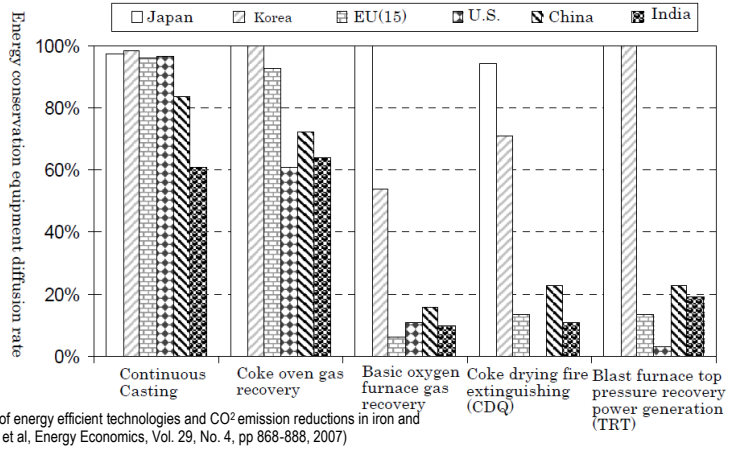
- The steel industry hopes to see appropriate management of the economy by the government in order to prevent the hollowing out of Japanese industry. In particular, the steel industry wants to see the government set a proper direction for energy initiatives and measures to fight global warming.

Stance Regarding Future Contributions to Combat Global Warming

- To contribute to fighting global warming, Japan must stop focusing on reducing GHG emissions only within Japan. Instead, Japan should focus primarily on reducing CO2 emissions on a global scale* by transferring to other countries its energy-conservation technologies, which are the most advanced in the world.
- By encouraging adoption of the global sectoral approach at the Japan-China Steel Industries Conference on Exchange of Advanced Technologies on Environmental Preservation and Energy-Saving, Asia-Pacific Partnership and other forums, the Japanese steel industry is working on building a framework for cooperation in order to transfer technologies involving the environment and energy conservation. In addition, with the cooperation of the Japanese government, the steel industry hopes to expand the scope of these initiatives by building new frameworks like GSEP and the bilateral offset mechanism.
- Transferring energy-conserving technologies to other countries will help cut GHG emissions on a global scale while and also play a big role in restoring the health of the slumping Japanese economy. We strongly request that these activities be made the core element of Japan's measures for combating global warming. At the same time, we ask the Japanese government to use strong leadership to make even more effective international contributions by using these technologies as well as to establish systems for ensuring that these contributions are properly evaluated from an international standpoint.

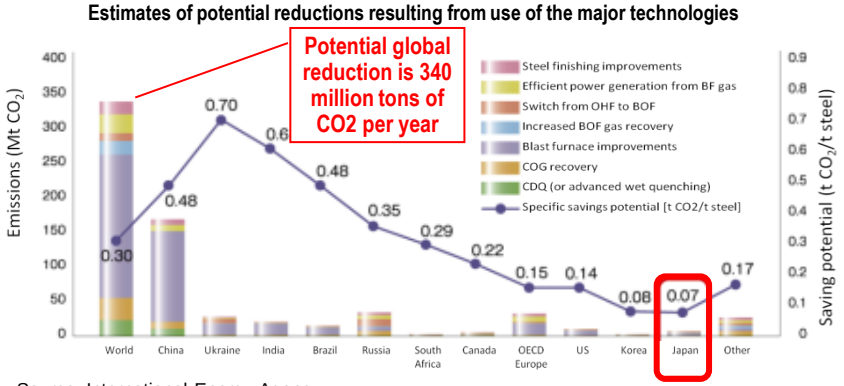
*Transfers of energy-conserving technologies developed and applied by the Japanese steel industry have thus far contributed to a reduction in CO2 emissions of about 40 million tons/year.
*The IEA estimates that if major energy-conserving technologies are used by the steel industry worldwide, the potential reduction in CO2 emissions is about 340 million tons/year.

The utilization rate of major energy-conserving technologies in the Japanese steel industry is virtually 100%.



Source: Diffusion of energy efficient technologies and CO^2 emission reductions in iron and steel sector (ODA et al, Energy Economics, Vol. 29, No. 4, pp 868-888, 2007)

Use of major energy-conserving technologies worldwide has the potential of reducing CO2 emissions by 340 million tons/year.



Source: International Energy Agency

Requests concerning the Review of Energy Policies

- For discussions concerning the Basic Energy Plan, which is now being revised, we ask that this process use debates based on objective facts and perform comprehensive evaluations of a variety of energy sources. In addition, we hope to see initiatives considered based on short-term and medium/long-term time frames.
- From a short-term standpoint, the highest priority is ensuring a stable supply of electricity. In particular, suspending the operation of all nuclear power plants would have an immense impact on economic activity due to electricity shortages during this winter and next summer. We ask for the quick resumption of operations of nuclear power plants under the strong leadership of the government while placing priority on confirming safety and obtaining the understanding of residents of nearby communities.
- To deal with the electricity shortage last summer, the steel industry helped prevent major power outages and other serious problems by operating on an emergency basis. To cut electricity demand, steel companies shifted the peak of their demand through actions such as altering production activities. To increase the supply of electricity, steel companies operated their own generators and joint thermal plants at full capacity and took other actions.
- From a medium/long-term standpoint, the most important point is what type of energy supply-and-demand structure Japan should aim for. The examination process should include an objective analysis of the economic suitability a variety of potential energy sources. The analysis should include the potential for using these sources in terms of quality and quantity, the cost of these sources, and other factors. We hope to see a fair and realistic debate.

Estimated cost of terminating all nuclear power plants and replacing the output with thermal power plants:
(The Institute of Energy Economics, Japan, June 13, 2011)

Additional cost: ¥3.5 trillion. If this is added to electricity rates, the cost of electricity will rise by ¥3.7/kWh

If electricity rates rise by ¥3.7/kWh

- For manufacturers, costs would increase by about ¥860 billion and ordinary income would fall by about 6%

This corresponds to about 36% of corporate income taxes (FY2009)*

* National Tax Agency, Company Sampling Survey, FY2009 manufacturing sector corporate income taxes totaled about ¥2.4 trillion

- At EAF steelmakers, ordinary income would fall by about 65% (JISF estimate)

Estimated Impact on Ordinary Income

(billion yen)

		Steelmakers	All manufacturers (A)	Manufacturers' ordinary income (B)	Impact on ordinary income (A/B)
Demand for electricity	(billion kWh)	36.2	231.7	14106.7	6.1%
Additional cost from higher electricity rate	¥3.7/kWh	133.9	857.1	(16251.6)	(5.3%)

Source: "Large Users of Electricity" Federation of Electric Power Companies; "Company Statistics" Ministry of Finance
*Electricity demand is actual data for FY2010 and includes all electric utilities except Okinawa Power.
*Ordinary income for manufacturers is the 20-year average for the period between FY1990 and FY2009. Figures in parentheses use the 10-year average for the period between FY2000 and FY2009.

Requests concerning Measures to Combat Global Warming

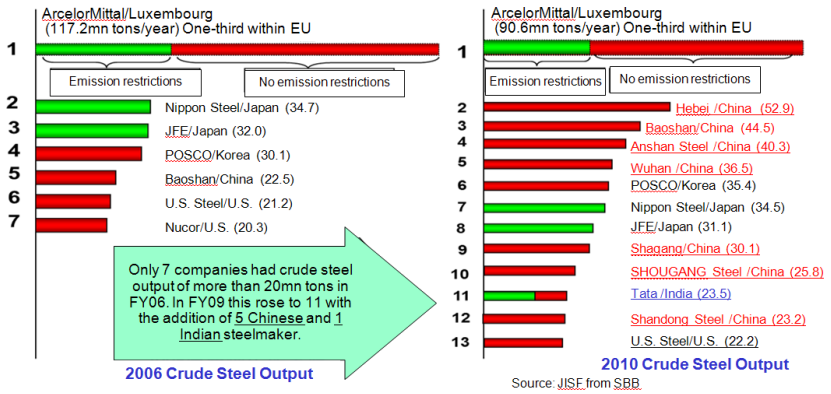
1. Requests concerning initiatives in Japan

- As part of the ongoing sweeping review of the Basic Energy Plan, an extensive reexamination of actions to fight global warming, which is closely linked to this policy, is needed from short and medium/long-term perspectives.
- From a short-term standpoint, to maintain a stable supply of electricity, Japan must use thermal power generation as much as possible. That means adopting an energy policy that increases the use of fossil fuels. Japan is considering the establishment of a climate change tax and other measures to fight global warming. But due to the current situation, these global warming countermeasures must be considered together with energy policies.
- Regarding the medium-term target (25% reduction), we have stated for some time that there must be sufficient examinations of the target from the standpoints of international fairness, the potential to reach this target, and the suitability of the target's burden on the people of Japan. In addition, Japan must reexamine its medium/long-term energy supply structure in the current Basic Energy Plan because of the March 2011 earthquake. As a result, the most pressing issue in Japan today is a reexamination of medium/long-term targets, which are an integral element of the Basic Energy Plan. Furthermore, Japan must also review the initiatives that have been regarded as necessary to achieve these targets.

2. Requests concerning international negotiations

- Regarding international frameworks for fighting global warming, it is clear that the current Kyoto Protocol is inadequate in terms of international fairness and effectiveness. Moreover, due to the situation in Japan following the March 2011 earthquake, Japan must absolutely avoid an extension of the framework of the Kyoto Protocol starting in 2013. At COP17, ***Japan must refuse to accept an extension of the Kyoto Protocol under any circumstances.*** Furthermore, we strongly ask the Japanese government to firmly reject any continuation, even if only for a short time, in the current internationally unfair framework under any name or characteristics.

* In the Kyoto Protocol, Japanese steelmakers are the only major steelmakers in the world that must practically comply with effective restrictions on CO2 emissions.
* In 2006, seven steelmakers with crude steel output of more than 20 million tons were exempt from the Kyoto Protocol. But in 2010, there were 13 of these steelmakers (including seven in China and one in India) because of growth in production in China and India, which are not subject to Kyoto Protocol restrictions. As a result, Japanese steelmakers that ranked second and third in the world in 2006 fell to seventh and eighth in 2010.
* The ability of the Japanese steel industry to compete internationally has been severely impacted by this framework that lacks international fairness.



Request concerning Feed-in Tariff Scheme for Renewable Energy

- The steel industry recognizes that the extensive use of renewable energy sources is an important issue concerning Japan's energy policies.
- The Act on Special Measures concerning the Procurement of Renewable Electric Energy by Operators of Electric Utilities includes measures to reduce the surcharge for renewable energy that is imposed on companies with electricity-intensive operations. However, from the standpoint of enacting measures for both energy and industrial activity, when enacting actual cost reduction measures, we strongly request that the Japanese government adopt the perspective of companies by using a flexible and transparent method that reflects the diverse range of business activities of electricity-intensive companies.
- In addition, the Special Measures Act and Basic Energy Plan are to be reviewed at least once every three years. Furthermore, there is to be a major reexamination of this law by no later than March 31, 2021. As global competition intensifies, we ask the Japanese government to properly revise various laws in a manner that fully reflects Japan's internationally high cost of energy and other factors.

Supplementary Resolution for the Act on Special Measures concerning the Procurement of Renewable Electric Energy by Operators of Electric Utilities (Excerpt)

(House of Councillors Committee on Economy, Trade and Industry, August 25, 2011)

Regarding special measures for the surcharge prescribed in Article 17 of the Act, (section omitted). In addition, for the manufacturing sector, when approving these special measures, there will be flexibility and transparency to adequately reflect the extremely diverse range of business activities conducted at the business sites of manufacturers.

Unit Electricity Consumption Based on Sales (FY2007)

(kWh/thousand yen)

	EAF industry avg.	Manufacturers avg
Unit	4.38	0.53

Source: EAF average: JISF Manufacturing average: Survey of Electric Power Statistics, Company Statistics