

**Results of the Fiscal 2010 Follow-up to the Keidanren Voluntary Action Plan on  
the Environment (Summary)**  
**—Section on Global Warming Measures—**  
**< Performance in Fiscal 2009 >**

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Japan Business Federation (Nippon Keidanren)

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## **1. Target achievement policies for the Kyoto Protocol commitment period (fiscal 2008 to fiscal 2012)**

Under the philosophy that positive involvement in environmental issues is essential to the survival of companies as well as their activities, the Japan Business Federation established the Keidanren Voluntary Action Plan on the Environment (section on global warming measures) in June 1997 prior to adoption of the Kyoto Protocol. Since then, it has declared that it will “endeavor to reduce average CO<sub>2</sub> emissions from the industrial and energy-conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990” as the overall target, while participating industries and companies have set their own targets and have been striving to achieve those targets as their social commitment.

The Voluntary Action Plan on the Environment has recognized the achievement of targets through the supplementary use of domestic credits contributing to material reductions as well as the credits of the Kyoto Mechanisms when the achievement of such targets is difficult through voluntary reduction efforts alone.

## **2. CO<sub>2</sub> emissions in fiscal 2009 by industry as a whole (comprising the industrial and energy-conversion sectors)**

The 34 industries<sup>9</sup> in the industrial and energy-conversion sectors that participated in

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9. The following are the 34 participating industry groups in the industrial and energy-conversion sectors: Flat Glass Manufacturers Association of Japan; Japan Federation of Housing Organizations; four electrical/electronics-related groups (Communications and Information Network Association of Japan, Japan Electronics and Information Technology Industries Association, The Japan Electrical Manufacturers' Association and Japan Business Machine and Information System Industries Association); Japan Sugar Refiners' Association; Flour Millers Association; Japan Petroleum Development Association; Petroleum Association of Japan; Limestone Association of Japan; Lime Manufacture Association; Japan Cement Association; Japan Soft Drink Association; The Federation of Electric Power Companies of Japan; Japan Aluminium Association; Japan Sanitary Equipment Industry Association; Japan Chemical Industry Association; The Japan Gas Association; Japan Federation of Construction Contractors, Japan Civil Engineering Contractors' Association, and Building Contractors Society; Japan Mining Industry Association; Japan Machine Tool Builder's Association; The Japan Rubber Manufacturers Association; The Japan Society of Industrial Machinery Manufacturers; Japan Industrial Vehicles Association; Japan Automobile Manufacturers Association; Japan Auto-Body Industries Association; Japan Auto Parts Industries Association; Japan Copper and Brass Association; Japan Paper Association; The Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association; The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders; The Japan Iron and Steel Federation; Japan Association of Rolling Stock Industries; The Japanese Electric Wire & Cable Makers' Association; Japan Dairy Industry Association; The Japan Bearing Industrial Association; and Brewers Association of Japan.

the Fiscal 2010 Follow-up together emitted 506.60 million t-CO<sub>2</sub> in fiscal 1990, the base year.<sup>10</sup> The emissions accounted for approximately 44% of Japan's total emissions of 1,143.40 million t-CO<sub>2</sub> in that year. Moreover, it represented approximately 83% of the total amount of CO<sub>2</sub> emitted by Japanese industrial and energy-conversion sectors in fiscal 1990 (612.20 million t-CO<sub>2</sub>).<sup>11</sup>

According to the Fiscal 2010 Follow-up, CO<sub>2</sub> emissions in fiscal 2009 were 421.70 million t-CO<sub>2</sub>, representing a 16.8% decrease compared to fiscal 1990 (and a 6.8% decrease compared to fiscal 2008)<sup>12</sup> (graph on next page).<sup>13</sup>

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10. When calculating emission volumes for the industrial and energy-conversion sectors as a whole, Japan Business Federation uses the following carbon emission factor survey data (averages for all power sources at generating ends) provided by the Federation of Electric Power Companies. However, for FY 2008 to FY 2012, Japan Business Federation has independently established carbon emission factors based on the targets of the Federation of Electric Power Companies. Unless stated otherwise, carbon emission factors cited for individual industries are also based on the following data. (For FY 1990: 3.71; FY 1997: 3.24; FY 1998: 3.13; FY 1999: 3.32; FY 2000: 3.35; FY 2001: 3.36; FY 2002: 3.60; FY 2003: 3.87; FY 2004: 3.74; FY 2005: 3.79; FY 2006: 3.68; FY 2007: 4.07; FY 2008: 3.35 (with credits) / 4.00 (without credits); FY 2009: 3.16 (with credits) / 3.70 (without credits); FY 2008–2012: 3.05; FY 2008–2012 (BAU): 3.70 [t-CO<sub>2</sub>/10,000 kWh]).

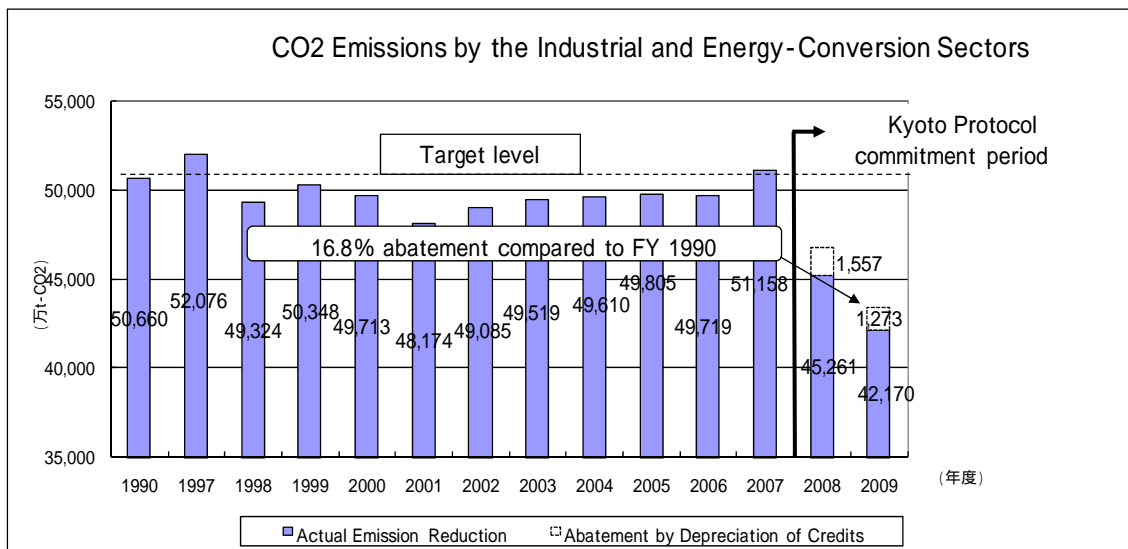
Other conversion factors for energy: For caloric value, Japan Business Federation utilizes data from the following: *Comprehensive Energy Statistics*, the Agency of Natural Resources and Energy's "2005 *nenn iko tekiyo suru hyojun hatsunetsu ryo no kento kekka to kaiteichi ni tsuite*" (Examination results and revised values for standard caloric values applicable in fiscal 2005 and beyond) (May 2007), and survey data by the Federation of Electric Power Companies. Due to revisions of the Caloric Value Table, caloric conversion factors for periods prior to FY 2000 differ from those for the period from FY 2000 through FY 2004 and from FY 2005 onward. For carbon conversion factors, Japan Business Federation uses *National Greenhouse Gas Inventory Report of Japan (2010)*.

11. The total of emissions is from the industrial and energy-conversion sectors and industrial processes as contained in the statistics on total CO<sub>2</sub> emissions for Japan, which are announced by the Ministry of the Environment.

12. Without credits, CO<sub>2</sub> emissions were 434.43 million t-CO<sub>2</sub>, representing a 14.2% decrease compared to fiscal 1990 (and a 7.2% decrease compared to fiscal 2008).

13. Industries review actual and forecasted figures on CO<sub>2</sub> emissions each year with the aim of improving the accuracy. Therefore, cited figures may vary from the previous fiscal year.

## CO<sub>2</sub> Emissions by the Industrial and Energy-Conversion Sectors



### 3. Trends by industry

Of the 34 industries in the industrial and energy-conversion sectors that participated in the Fiscal 2010 Follow-up, 27 reported CO<sub>2</sub> emission reductions compared to fiscal 1990,<sup>14</sup> while 33 reported reductions compared to fiscal 2008.<sup>15</sup>

Of the 14 industries that defined their goals in terms of CO<sub>2</sub> emission reductions, all 14 reported reductions compared to fiscal 1990<sup>16</sup> and all 14 reported reductions compared to fiscal 2008.<sup>17, 18</sup> Of the five industries that defined their goals in terms of energy savings, all five reported savings compared to fiscal 1990 and all five reported savings compared to fiscal 2008.

Of the 10 industries that defined their goals in terms of CO<sub>2</sub> emission reductions per unit of output, nine reported improvements compared to fiscal 1990,<sup>19</sup> and six showed

14. Twenty-five industries excluding credits.

15. Thirty-three industries excluding credits.

16. Thirteen industries excluding credits.

17. Fourteen industries excluding credits.

18. Achievements made toward each target are counted for those industries that have declared multiple targets.

19. Eight industries excluding credits.

improvements compared to fiscal 2008.<sup>20</sup> Of the 12 industries that defined their goals in terms of energy efficiency improvements, nine reported improvements compared to fiscal 1990, and five showed improvements compared to fiscal 2008 (Attachment 1).

#### **4. Evaluation of Voluntary Action Plan achievements**

- (1) Attribution analysis of CO<sub>2</sub> emissions in the industrial and energy-conversion sectors for fiscal 2009

An attribution analysis was made of the 16.8% decrease in CO<sub>2</sub> emissions between fiscal 1990 and fiscal 2009 for the 34 industries in the industrial and energy-conversion sectors. With the decrease of production activity between fiscal 1990 and fiscal 2009, CO<sub>2</sub> emissions fell 2.1%. Also, reductions in CO<sub>2</sub> emissions per unit of output and the CO<sub>2</sub> emission factor respectively contributed to decreases of 13.2% and 1.4% in CO<sub>2</sub> emissions. The low-carbon rate (the improvement of the CO<sub>2</sub> emission factor compared to fiscal 1990 and the improvement of CO<sub>2</sub> emissions per unit of output compared to fiscal 1990), which reflects companies' efforts to reduce emissions, was -14.6%. Compared to fiscal 2008, the reduction of production activity and the reduction of the CO<sub>2</sub> emission factor resulted in CO<sub>2</sub> emissions decreasing 6.8%.

The reason emissions per unit of output decreased even as production activity fell is the consequence of the steady accumulation of industry efforts in such areas as technological innovation, the installation of energy-saving and high-efficiency facilities, fuel conversion, the recovery and use of waste energy, and improvements in the operation of facilities and equipment (Attachment 5). Voluntary Action Plans are yielding enormous results.

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20. Six industries excluding credits.

Reference: An Attribution Analysis for Changes in CO<sub>2</sub> Emissions by Industrial and Energy-Conversion Sectors in Fiscal 2009

	Comparison to FY 1990	Comparison to FY 2008
Change in production activity* <sup>1</sup>	-2.1%	-6.1%
Change in CO <sub>2</sub> emission factor* <sup>2</sup>	-1.4%	-0.6%
Change in CO <sub>2</sub> emissions per unit of output (efficiency improvement)	-13.2%	-0.2%
Total	-16.8%	-6.8%

\*<sup>1</sup> For change in production activity, the indices with the closest relation to energy consumption in each industry were selected.

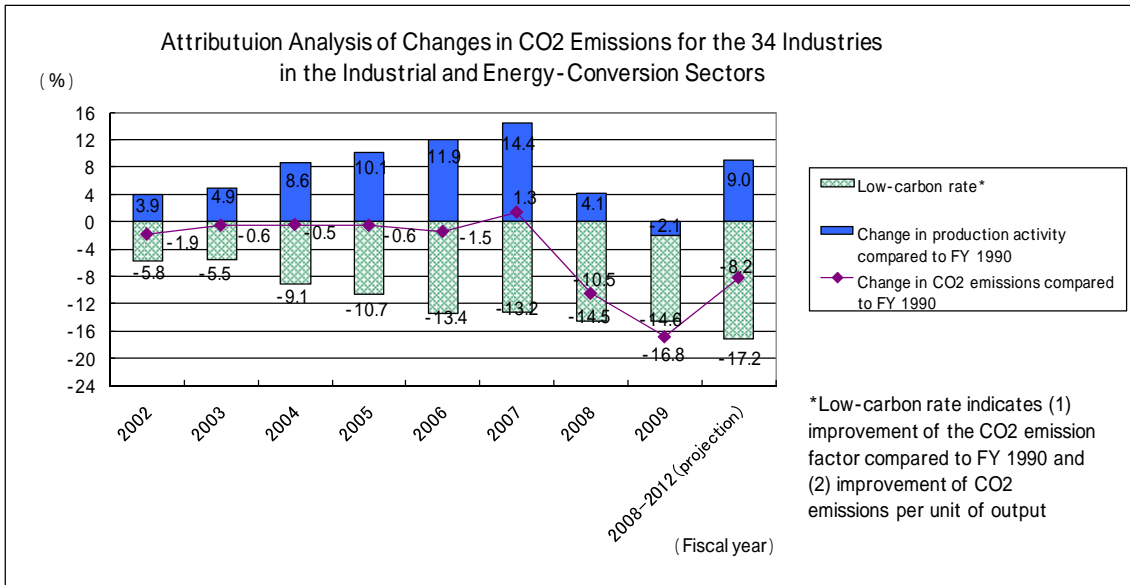
\*<sup>2</sup> CO<sub>2</sub>/MJ for fuel use and CO<sub>2</sub>/kWh for electricity consumption.

Note: The effect of retiring credits

With respect to Kyoto Mechanism credits, electric power companies retiring 52.00 million t-CO<sub>2</sub> in fiscal 2009 (64.00 million t-CO<sub>2</sub> in fiscal 2008) led to an improvement of the CO<sub>2</sub> emission factor accompanying electricity use. As a result, the CO<sub>2</sub> emissions of the 34 industries were 12.73 million t-CO<sub>2</sub> lower than if electric power companies did not retire their Kyoto Mechanism credits (corresponding to about 3.0% of fiscal 2009 CO<sub>2</sub> emissions). Industries other than electric power companies did not retire Kyoto Mechanism credits in fiscal 2009. Also, no industry retired domestic credits.<sup>21</sup>

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21. The Federation of Electric Power Companies of Japan and the Japan Federation of Printing Industries acquired and retained 2,000 t-CO<sub>2</sub> domestic credits and 600 t-CO<sub>2</sub> domestic credits, respectively, in fiscal 2009.



(2) Setting higher target levels by industries in fiscal 2009

In the Keidanren Voluntary Action Plan on the Environment, industries that have achieved greater reductions than initially forecast are expected to set higher target levels. In the Fiscal 2007 Follow-up, a record high of 23 industries set higher target levels. In the Fiscal 2010 Follow-up, five industry groups in the industrial and energy-conversion sectors set higher target levels (the Japan Gas Association, Japan Federation of Construction Contractors, Lime Manufacture Association, the Japan Rubber Manufacturers Association, and the Japanese Electric Wire & Cable Makers' Association; see Attachment 3 for details).

The initiative among industry groups nearing the achievement of current targets continuing to set higher targets highlights the advantage of Voluntary Action Plans that cannot be matched by tax or regulatory measures.

(3) Estimates for the achievement of fiscal 2008 to fiscal 2012 targets

Based on the projections of the 34 industries in the industrial and energy-conversion sectors, their CO<sub>2</sub> emissions are estimated to average 465.33 million t-CO<sub>2</sub> from fiscal 2008 to fiscal 2012, or 8.2% below the fiscal 1990 level.<sup>22</sup> This estimate also includes

22. Estimated average production activity between FY 2008 and FY 2012 was based on economic indicators shared with *Chuchoki no michiyuki wo kangaeru tame no kikaiteki shisan* (Mechanical



the use of credits.

Reference: Projected CO<sub>2</sub> Emissions of the 34 Industries in the Industrial and Energy-Conversion Sectors from FY 2008 through FY 2012

	FY 1990 actual	FY 2008–2012 projections
CO <sub>2</sub> emissions	506.60 million t-CO <sub>2</sub>	465.33 million t-CO <sub>2</sub>
Comparison to FY 1990	-	8.2% decrease from FY 1990

An attribution analysis of changes in CO<sub>2</sub> emissions projected for fiscal 2008 to fiscal 2012 for the 34 industries in the industrial and energy-conversion sectors discloses that, compared to fiscal 1990, as CO<sub>2</sub> emissions increase 9.0% in tandem with the growth of production activity, CO<sub>2</sub> emissions would decrease 15.2% with the decline of CO<sub>2</sub> emissions per unit of output. In addition, the decrease of the CO<sub>2</sub> emission factor resulting from electric power companies achieving their target<sup>23</sup> would cause CO<sub>2</sub> emissions to decrease 2.0%.

Reference: Attribution Analysis of Changes in CO<sub>2</sub> Emissions by the 34 Industries in the Industrial and Energy-Conversion Sectors from FY 2008 through FY 2012

	Comparison to FY 1990
Change in production activity* <sup>1</sup>	+9.0%
Change in CO <sub>2</sub> emission factor* <sup>2</sup>	-2.0%
Change in CO <sub>2</sub> emissions per unit of output	-15.2%
Total	-8.2%

\*<sup>1</sup> For change in production activity, the indices with the closest relation to energy consumption in each industry were selected.

\*<sup>2</sup> CO<sub>2</sub>/MJ for fuel use and CO<sub>2</sub>/kWh for electricity consumption.

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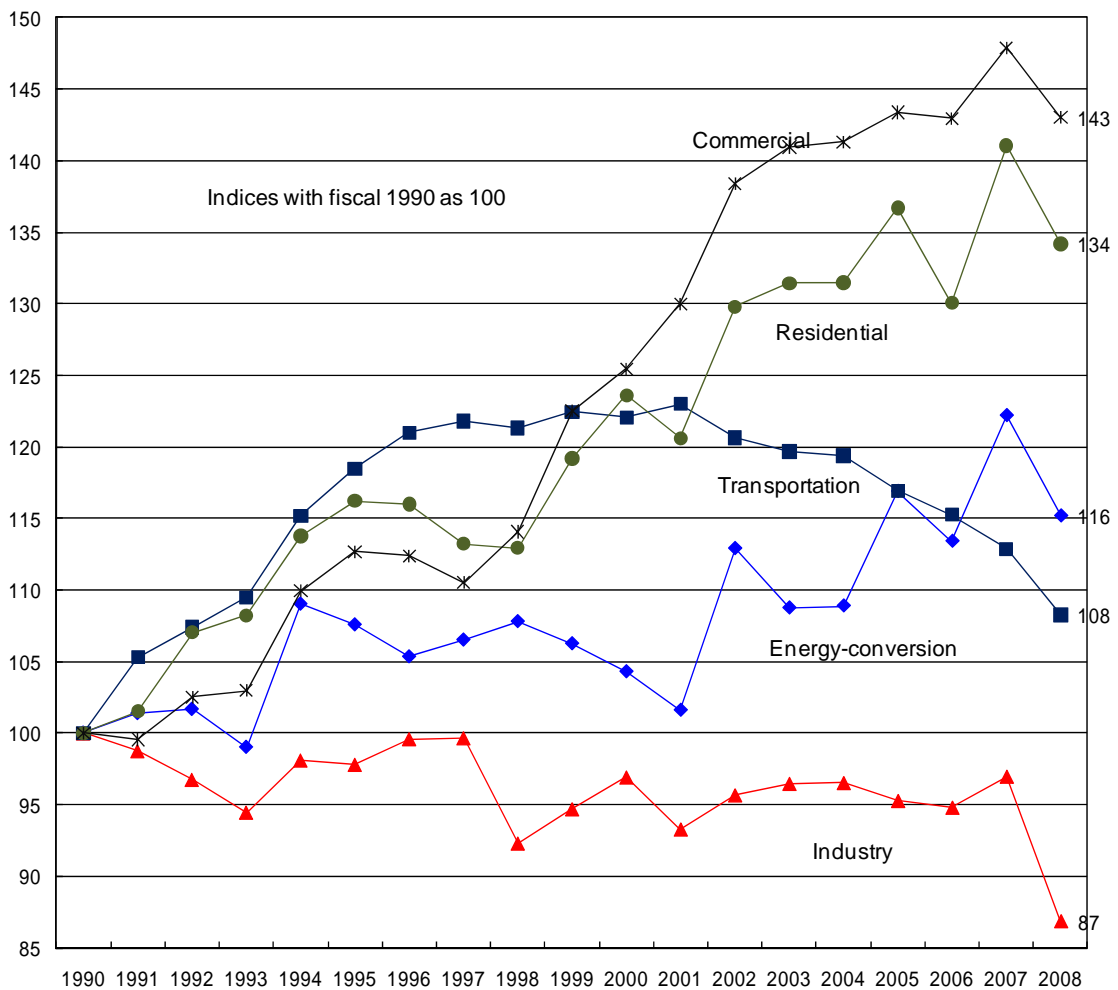
estimates for thinking about the medium- to long-term course) published by the Cabinet Office on June 23, 2009, but some industries based their forecasts on their own assumptions.

23. Reduction of consumption-side CO<sub>2</sub> emission intensity by an average of 20% or so between FY 2008 and FY 2012 compared to FY 1990 (reduction to around 0.34kg-CO<sub>2</sub>/kWh). Credits may be used to achieve the target.

## 5. Efforts in the commercial, residential, and transportation sectors to reduce CO<sub>2</sub> emissions

An examination of trends of Japan's total CO<sub>2</sub> emissions from energy consumption reveals that, based on final figures for fiscal 2008, such emissions increased 7.5% compared to fiscal 1990 (an increase of 1.6% for all greenhouse gases including non-energy-consumption CO<sub>2</sub>, methane, and alternatives to chlorofluorocarbons [CFCs]). A breakdown of CO<sub>2</sub> emissions by sector shows that emissions from the industrial sector declined by 13.2% whereas emissions from the commercial and residential sectors increased a substantial 43.0% and 34.2%, respectively, compared to fiscal 1990.

Reference: CO<sub>2</sub> Emissions from Energy Consumption in Japan, by Sector



Source: Ministry of Environment

Japanese industry has supported efforts in the residential, commercial, and transportation sectors to reduce emissions by developing and providing various services and disseminating energy-efficient products that meet “Top Runner” standards and by providing information to employees and customers. In carrying out its Voluntary Action Plan on the Environment, Japan Business Federation is determined to continue contributing to Japan’s achievement of its commitments under the Kyoto Protocol by harnessing the technological capabilities and creative ingenuity of Japanese companies.

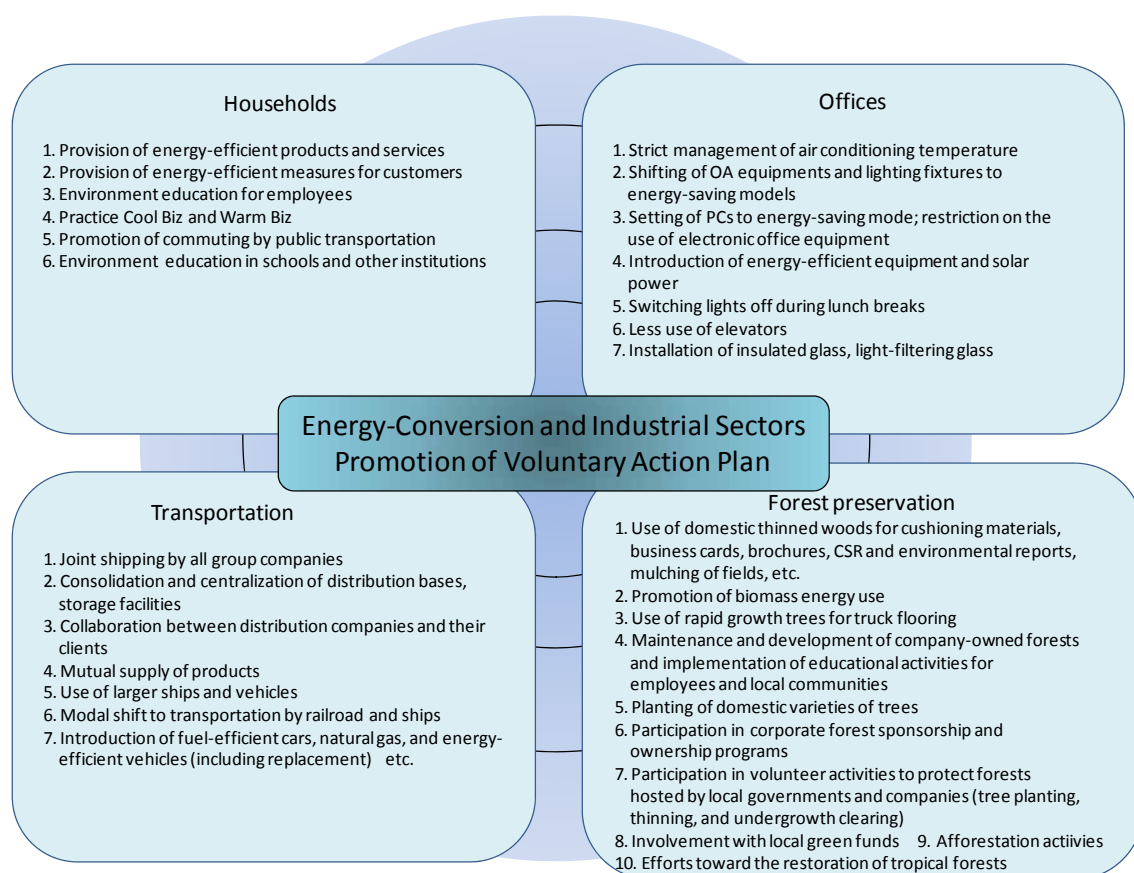
Industry measures to combat climate change have spread from manufacturing to distribution and office operations and are developing into nationwide efforts through corporate employees. It is important for more companies to expand their activities aimed at preventing climate change by sharing and effectively exploiting the experience and accomplishments of broad-ranged efforts made to date to fight climate change. Japan Business Federation has taken every opportunity to urge member companies and organizations to step up their efforts against climate change in the commercial, residential, and transportation sectors. (Examples include the November 20, 2007, statement titled “A Call for Energy-Saving Practices in the Workplace and Other Steps to Strengthen the Fight against Climate Change;” the April 1, 2008, statement, “More Action against Climate Change: On the Start of the Kyoto Protocol Commitment Period;” and the June 1, 2010, statement, “A Call for Efforts to Create a Low-Carbon Society.” All issued in Japanese.)

Furthermore, in April 2007, Japan Business Federation compiled the *Fiscal 2006 Report on Global Warming Prevention Measures: 900 Hints on Reducing CO<sub>2</sub> Emissions*<sup>24</sup> and is now working to disseminate that information to member companies.

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24 For detailed information on efforts by member companies, please refer to the *Fiscal 2006 Report on Global Warming Prevention Measures: 900 Hints on Reducing CO<sub>2</sub> Emissions*, which is available at the following URL (in Japanese): <http://www.keidanren.or.jp/japanese/policy/2007/029.html>.

Reference: Circle of Widening Voluntary Efforts in the Commercial, Residential, Transportation, and Other Sectors



(1) Efforts by participating industries of the transportation, commercial, and other sectors

In the Fiscal 2010 Follow-up 14 industry groups and companies from the commercial and other sectors took part. They were also joined by 13 industrial associations and companies from the transportation sector to formulate their own Voluntary Action Plans and to take steps to deal with climate change (Attachment 2).<sup>25</sup> Some of the participating industries and companies have set specific quantitative targets for fiscal 2008 through 2012, including targets for CO<sub>2</sub> emissions or CO<sub>2</sub> emission intensity.

(2) Efforts related to offices and other operational units

A variety of energy efficiency improvement measures in offices being pursued is not limited to industry groups in the commercial sector. In a broad range of industry groups in the industrial, energy-conversion, transportation, and other sectors, a diversity of efforts are being made, such as to strengthen the control of air conditioning temperatures, to conserve electricity by switching off lights, and to install high-efficiency, energy-saving facilities.

Also, many companies have established numerical targets and are actively promoting measures toward their achievement.

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25. The following 14 industry groups and companies participated from the commercial and other sectors: The Life Insurance Association of Japan; Japanese Bankers Association; Japan Federation of Printing Industries; Japan LP Gas Association; The General Insurance Association of Japan; Japan Chain Stores Association; Japan Department Stores Association; Japan Franchise Association; Japan Hotel Association; Japan Foreign Trade Council, Inc.; Japan Association of Refrigerated Warehouses; The Real Estate Companies Association of Japan; NTT Group, and KDDI Corporation.

Participating industries from the transportation sector consist of the following 13 associations and companies: All Japan Freight Forwarders Association; Japan Trucking Association; The Scheduled Airlines Association of Japan; The Japanese Shipowners' Association; Japan Federation of Coastal Shipping Associations; The Association of Japanese Private Railways; and JR Freight, JR Kyushu, JR Shikoku, JR Central, JR West, JR East, and JR Hokkaido.

Reference: Examples of Numerical Targets Reported by Participating Industries for Offices and Operational Units

Industry	Target setting entity	Numerical targets
The Japan Gas Association	Companies	Reduce CO <sub>2</sub> emissions per unit of floor area by 2% in FY 2010 compared to FY 2006
Petroleum Association of Japan	Companies	Reduce energy consumption by 10% in FY 2010 compared to FY 2006
Japan Chemical Industry Association	Companies	Reduce electricity consumption by 6% in FY 2010 compared to FY 1990
Japan Cement Association	Companies	Reduce annual kerosene consumption by 5% in FY 2012 compared to FY 2005 Reduce CO <sub>2</sub> emissions from 388 tons in FY 2009 to 385 tons in FY 2010
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	Companies	Reduce CO <sub>2</sub> emissions (per unit of employees) an average of 2% between FY 2008 and FY 2010 Reduce CO <sub>2</sub> emissions by 5% in FY 2010 compared to FY 2003
Japan LP Gas Association	Companies	Reduce energy consumption by 10% in FY 2012 compared to FY 2008 Reduce electricity consumption by an average of 10% between FY 2008 and FY 2012 compared to FY 1999

Note: See Attachment 2 for the targets of industries and companies in the commercial sector.

(3) Efforts related to distribution operations

In relation to the emissions reduction in distribution operations, world-leading fuel efficiency technologies targeting motor vehicles are being applied to achieve further improvements. In addition, emissions reduction is steadily progressing through such efforts as consolidating distribution bases, converting to low-emission vehicles, and increasing the efficiency of distribution through collaboration between distribution companies and their clients.

Some companies have established numerical targets for their distribution operations as well, which is leading to energy saving. For example, the member companies of the Japan Chemical Industry Association, by effecting a modal shift to rail transport and transport by coastal container ships, have respectively achieved reductions of 153 t-CO<sub>2</sub> and 690 t-CO<sub>2</sub>.

Reference: Examples of Numerical Targets Reported by Participating Industries for Distribution Operations

Industry	Target setting entity	Numerical targets
The Japan Gas Association	Companies	In FY 2010, vehicles owned are to be 100% natural-gas-powered vehicles (excluding emergency, work, and special-use vehicles)
Japan Chemical Industry Association	Companies	Reduce energy consumption per t/km by 1% per year Increase the rail transport rate by 1% over the previous year
The Japanese Electric Wire & Cable Makers' Association	Industry	Reduce energy consumption intensity 1% per year
Japan LP Gas Association	Companies	As a specified consigner, reduce the energy consumption per t/km by an average of 1% or more per year between FY 2007 and FY 2011 compared to FY 2006

Note: See Attachment 2 for the targets of industries in the transportation sector.

(4) Efforts from a life cycle assessment (LCA) perspective

Companies indirectly contribute to the reduction of greenhouse gas emissions by providing low-carbon products and energy-efficient services. It is noteworthy that multifaceted efforts are being pursued, including (1) the promotion of energy-saving measures based on evaluations from a life cycle assessment (LCA) perspective, (2) the expanded use of wastes that were considered to be worthless as raw materials and sources of heat energy, and (3) the steady progress in energy service companies (ESCO) operations that fully utilize the energy-saving know-how and technologies that companies possess.

Reference: Examples of Measures Pursued from an LCA Perspective, Including Contributions Made through Products and Services

Products	Overview		CO <sub>2</sub> reduction benefits
Appliances	Introduce energy-efficient appliances that exceed standards set by the Top Runner Program		26.00 million t-CO <sub>2</sub> reduction in commercial and residential sectors in FY 2010 (estimation based on reference materials for the Kyoto Protocol Target Achievement Plan of March 2008)
	Products	Numerical targets for energy efficiency gains	Actual gains (energy efficiency)
	TVs	16.4% (FY 1997→FY 2003)	25.7%
	VCRs	58.7% (FY 1997→FY 2003)	73.6%
	Air conditioners	66.1% (FY1997→FY 2004)	67.8%
	Refrigerators	30.5% (FY 1998→FY 2004)	55.2%
	Freezers	22.9% (FY 1998→FY 2004)	29.6%
High-performance steel	Requires more energy in production process compared to ordinary steel, but offers energy savings when used in machinery such as transformers and heat-resistant boilers.		FY 2009 About 18.81 million t-CO <sub>2</sub> /yr



Carbon fiber	Carbon fiber manufacture involves a high-temperature processing stage that consumes more energy than comparable manufacturing processes for conventional materials. However, when used in automobiles and aircraft, carbon fiber enables weight reductions that in turn facilitate gains in fuel efficiency, thus significantly easing the burden on the environment over the product's life cycle.	At the manufacturing stage, one metric ton of carbon fiber results in the emission of 20 t-CO <sub>2</sub> but has the benefit of reducing emissions by 70 t- CO <sub>2</sub> from automobiles and 1,400 t-CO <sub>2</sub> from aircraft over a 10-year life cycle . If carbon fiber were used in all automobiles (42 million, excluding light motor vehicles) and airplanes (430 owned) in Japan, emissions would be reduced by 22.00 million t-CO <sub>2</sub> .
Biomass fuel for automobiles	Plant-based bio-ethanol, which is carbon neutral in the Kyoto Protocol, is added to gasoline as bio-ETBE and sold as bio-gasoline.	FY 2010 Reduction of CO <sub>2</sub> emissions corresponding to 210,000 kl per year (crude oil equivalent)
High-efficiency boilers ("Eco Cute")	These water heaters are based on a heat-pump system that uses CO <sub>2</sub> as a cooling medium and heat recovered from the atmosphere as heat energy.	Cumulative units installed by FY 2009 year-end: 2.25 million units CO <sub>2</sub> reductions in FY 2009: about 1.60 million t-CO <sub>2</sub> . If placed in Japan's commercial, residential, and industrial sectors for heating and air-conditioning appliances, expected to reduce a maximum of approx. 140 million t-CO <sub>2</sub> per year (equivalent to approx. 12% of total CO <sub>2</sub> emissions by Japan in FY

		2008).
Natural gas cogeneration	A high-efficiency system using city gas as fuel to generate electricity and to reuse waste heat.	Cumulative capacity installed by FY 2009 year-end: 4.49 million kW CO <sub>2</sub> reductions in FY 2009: 12.60 million t-CO <sub>2</sub> (estimation based on reference materials for the Kyoto Protocol Target Achievement Plan of March 2008)
Double glazed windows	Replacing residential single-pane glass windows with double-glazed ones will boost thermal insulation efficiency and enable up to 40% cuts in air-conditioning costs. The percentage of double-glazed glass windows used in relation to total window area is estimated at 89.1% for all newly built single-family housing and 47.7% for all new apartments (FY 2009 figures).	As of FY 2009, double-glazed windows contributed to a reduction of 198,000 t-CO <sub>2</sub> .
In-house production of lightweight soft-drink containers	Producing a higher percentage of PET bottle containers in-house would cut CO <sub>2</sub> emissions attributable to PET bottle delivery and shipping operations.  The use of lighter-weight containers would help reduce emissions that occur at the bottle manufacturing and shipping stages.	In-house production would reduce emissions by about 20,988 t-CO <sub>2</sub> , corresponding to about 188,000 trucks.  Weight reductions would reduce emissions by about 11,690 t-CO <sub>2</sub> (assuming 1.5 grams of CO <sub>2</sub> is released per gram of PET bottle material produced).
Fuel cells for residential use (Ene-farm)	A system using city gas to simultaneously generate electricity and heat water.	Emissions reduced 1,200 kg-CO <sub>2</sub> per year compared to the use of normal water heaters and thermal power generation.

Concrete pavements	Rolling resistance is 6% to 20% less with concrete pavement compared to asphalt pavement (as of FY 2006). Large vehicles will save 0.8% to 4.8% in fuel costs with concrete pavement compared to asphalt pavement.	If arterial roads (expressways and designated sections of national highways) are fully paved with concrete, emissions will be reduced about 270,000 to 1,610,000 t-CO <sub>2</sub> per year (average of 940,000 t-CO <sub>2</sub> per year).
Use of sewage sludge as material for cement	Sewage sludge and other waste products that are difficult to process and are generated in large quantities are being actively used as raw material for cement, and this is contributing to lower energy use in sewage sludge treatment for Japan as a whole.	Using sewage sludge as material for cement has reduced energy consumption by $1,062 \times 10^6$ MJ for Japan as a whole (corresponding to 18.2 MJ/t-cement on a per ton of cement basis). This is equivalent to a reduction in emissions of about 76,000 t-CO <sub>2</sub> .
High-performance grooved copper tubes	Compared to the use of bare tubes, air conditioners with high-performance grooved copper tubes cause CO <sub>2</sub> emissions to increase 3.3 kg-CO <sub>2</sub> per unit in the manufacturing process, but emissions from the use of air conditioners can be reduced.	Assuming that air conditioners are in use 4,319 hours per year (JISC 9612) and that they have a life of 10 years, emissions will be reduced about 2,216 kg-CO <sub>2</sub> per unit compared to bare-tube units even when the difference in CO <sub>2</sub> emissions during manufacture is factored in.
Electric forklifts	By replacing forklifts with engines with those using electric motors, CO <sub>2</sub> emissions from the use of forklifts can be greatly reduced.	With the increase in the proportion of electric vehicles in the number of vehicles owned, when CO <sub>2</sub> emissions from domestic vehicles owned at FY 1998 year-end are keyed to 100,

		emissions were 88 at FY 2008 year-end and 87 at FY 2009 year-end, a decrease of 13 points compared to FY 1998.
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(5) Support for national campaigns and the promotion of forest management activities

At present, Japanese consumers are not making maximum use of energy-efficient products and services. It is essential that each individual acts day-to-day with a keen awareness of the problem of climate change and adapt his or her lifestyle accordingly. To this end, it will be necessary to change people's attitudes and behavior so that they will use more energy-efficient products and environmentally-friendly goods and services by stepping up national campaigns. Many companies are actively pursuing measures aimed at encouraging national campaigns, including the use of the Internet and the sponsorship of assorted events to provide consumers with more information on energy conservation as well as running environmental education programs for their own employees. The eco-car tax break, the eco-car subsidy, and the eco-point program for household electrical appliances that began in the spring of 2009 are helping to promote the purchases of automobiles and household electrical appliances with advanced energy-saving performance. In the spring of 2010, a housing eco-point program was instituted, which is hoped to encourage the construction of highly energy-efficient homes and renovations to realize such homes.

Along with strengthened measures to increase the energy efficiency of offices, stores, and other commercial operations and in distribution operations, Japan Business Federation has been calling for strengthened measures that will help expand national campaigns, such as having business leaders set an example by wearing casual summertime dress ("Cool Biz"), promoting the active use of highly energy-efficient equipment, and encouraging employees to keep environmental household account books.<sup>18</sup>

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18. On June 1, 2010, Hiromasa Yonekura, Chairman of Japan Business Federation, issued a statement urging that member companies step up their efforts to prevent climate change by augmenting and achieving the goals of their Action Plans, participating in Nippon Keidanren's Commitment to a Low Carbon Society, supporting climate change campaigns on environmental issues, and encouraging clients, employees, and other stakeholders to become more actively involved.

Reference: Examples of Environmental Household Account Book Programs Reported by Participating Industries

Industry	Program
The Federation of Electric Power Companies of Japan	Spreading the use of environmental household account books has been made an industry-wide effort, and their greater use is being actively promoted as a part of “make visible” programs. Specifically, electric power companies are calling on the active participation of customers and employees through inventive activities, such as by publicizing environmental household account books through business offices, websites, and meter reading notices. (About 70,000 participants)
The Japan Gas Association	Out of 103 member companies, environmental household account books are being used by about 5,000 employee households.
The Japan Iron and Steel Federation	Energy-saving activities using environmental household account books were started in FY 2005. Member companies have strengthened such efforts as educational activities targeting all employees including group companies and the development of computerized environmental household account books using intranets. As a result, the use of such account books has spread to about 20,000 households in FY 2009.
Japan Chemical Industry Association	Participating employees of member companies total 10,866.
Japan Paper Association	<p>Between March 2009 and March 2010, electricity, gas, and water usage was checked by stakeholder households to experience the use of environmental household account books and to understand the state of utility use.</p> <p>It was revealed that households were implementing such energy-saving measures as insulation (use of double-glazed windows), installation of high-efficiency water heaters (replacement with eco-jozu and eco-cute units), replacement of incandescent light bulbs with florescent light bulbs, installation of LEDs, and installation of solar panels.</p>

In addition, an increasing number of initiatives to protect forests and CO<sub>2</sub> sinks are being reported. These include the increased use of domestic lumber such as timber from thinning, maintenances of company-owned forests, and the promotion of afforestation

projects both in Japan and abroad. As these examples illustrate, industry's efforts against climate change are spreading into various sectors (see "Reference: Circle of Widening Voluntary Efforts in the Commercial, Residential, Transportation, and Other Sectors" on page 9). Furthermore, the Japan Paper Association has the target "to increase owned or managed forests to 700,000 ha (an area 11 times larger than the 23 wards in Tokyo) by fiscal 2012" as part of the industry's Voluntary Action Plan targets along with goals for carbon and energy intensity improvements. As of fiscal 2009 year-end, the afforested areas they owned or managed totaled 655,000 ha domestically and overseas.

## **6. Efforts to make international contributions utilizing the technological capabilities of Japanese industry**

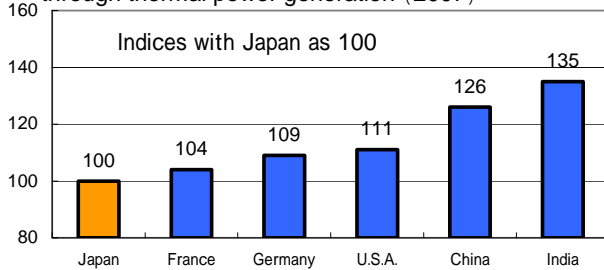
### **(1) International comparisons of energy efficiency**

Japanese industry has been a forerunner in energy-saving by launching efforts in the 1970s following the oil shocks. According to the international comparisons of energy efficiency conducted by participating industries as part of the Fiscal 2010 Follow-up, world-leading levels of energy efficiency have been achieved once again in participating industries that carried out comparisons (see chart on the next page and Attachment 4).

Climate change is a global problem, and it is vital that Japanese companies promote the spread of their advanced energy-saving and alternative energy technologies overseas and contribute to the reduction of greenhouse gas emissions on a global scale.

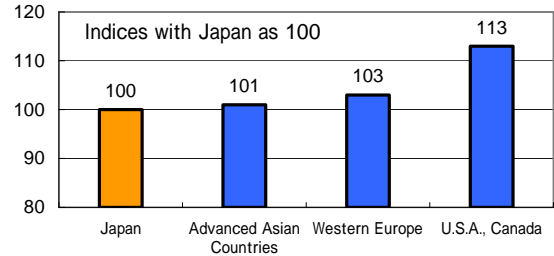
## Reference: International Comparisons of Energy Efficiency in Industrial and Energy-Conversion Sectors

Energy required to produce 1kWh of electricity through thermal power generation (2007)



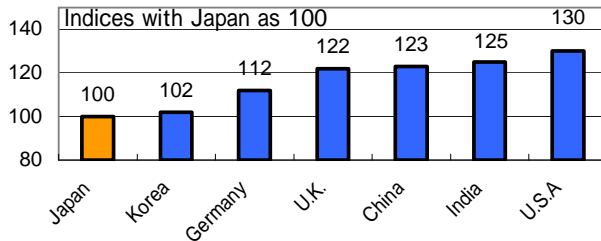
Source: ECOFYS, "International Comparison of Fossil Power Efficiency", 2010.

Energy required to produce 1 kl of oil products



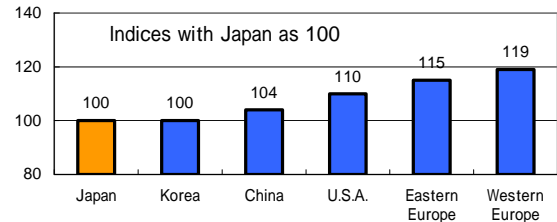
Source: Data from the results of a survey by Solomon Associates Ltd.

Energy required to produce 1 ton of iron (2005)



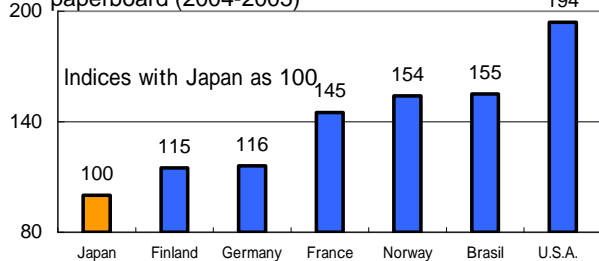
Source: Research Institute for Innovative Technology for the Earth, "International Comparison of Energy Efficiency (Power Generation, Steel, and Cement)", October 2009. Japan Iron and Steel Federation indexed the

Energy required to produce 1 ton of electrolytic caustic soda (2004)



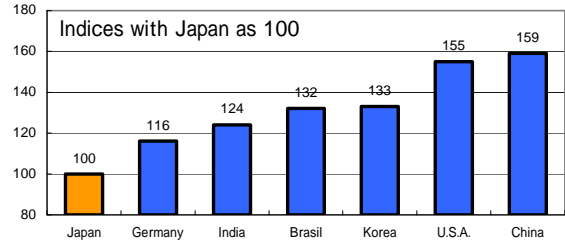
Source: SRI Chemical Economic Handbook; Japan Soda Industry Association, Soda Handobukku (Soda Handbook)

Energy required to produce 1 ton of paper or paperboard (2004-2005)



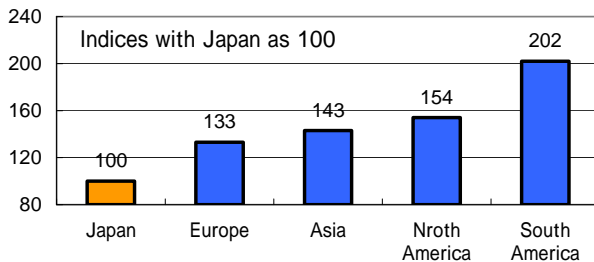
Source: Institute of Energy Economics, Japan, "Research Paper for Technological Measures of Manufacturers in 2007: The Production and Energy Consumption of Pulp, Paper, and Paperboard Industries of Countries", 2007.

Energy required to produce 1 ton of cement clinker (in-process material) (2003)



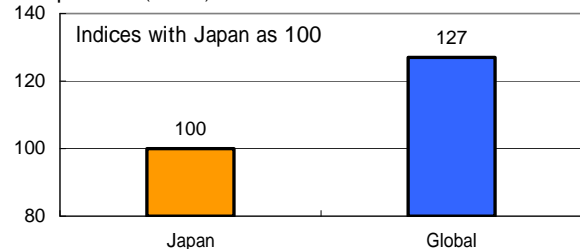
Source: The International Energy Agency (IEA), "Worldwide Trends in Energy Use and Efficiency 2008".

Energy required to refine copper (2000)



Source: Sample data collected through interviews by Japan Mining Industry Association.

Energy required in the aluminum plate rolling process (2000)



Source: International Aluminium Institute and Life Cycle Assessment Society of Japan's Database (2006).

(2) Overseas operations to reduce greenhouse gases based on the Kyoto Mechanisms

In the Fiscal 2010 Follow-up, as well as in the 2009, many specific operations including hydropower generation, alternative energy projects, waste heat recovery, and methane gas recovery in various regions of the world were reported along with the number of carbon credits expected to be generated from such Kyoto Mechanisms-based projects. Furthermore, many industrial associations and corporations have made financial contributions to domestic and international funds such as the Japan GHG Reduction Fund and the World Bank.

When the achievement of the targets is difficult by reduction efforts alone, under the Voluntary Action Plan on the Environment, industry groups may utilize supplementary means of the Kyoto Mechanisms such as credits from the Clean Development Mechanism (CDM) and Joint Implementation (JI) to achieve their goals. Active corporate efforts to acquire carbon credits not only help to mitigate climate change on a global scale but also increase the probability of achieving the overall targets of Voluntary Action Plans.

Since the current Kyoto Protocol does not accurately reflect past energy-saving achievements in setting emission reduction obligations, it is possible to say that Japanese companies, while achieving world-leading levels of energy efficiency, are compelled to make massive financial contributions to utilize the Kyoto Mechanisms.

Reference: Examples of Projects Reported by Participating Industries Aimed at Making International Contributions Utilizing the Kyoto Mechanisms

Industry	Project outline	Credits earned (Estimate)
The Federation of Electric Power Companies of Japan	<ul style="list-style-type: none"> <li>• Hydroelectric power plant project in Luertai and Kaifeng, China</li> <li>• Palm kernel shell biomass power generation project in Malaysia</li> <li>• Project to recover and burn methane gas recovered from Chilean pig farm waste</li> <li>• Participation in various carbon funds</li> </ul>	For the industry overall, around 260.00 million t-CO <sub>2</sub> by 2012 *Credits of 64.00 million t-CO <sub>2</sub> and 52.00 million t-CO <sub>2</sub> were respectively retired in FY 2008



		and FY 2009
The Japan Iron and Steel Federation	<ul style="list-style-type: none"> <li>• Shandong Dongyue HFC23 decomposition project in China</li> <li>• Installation of waste heat recovery system at Qian'an coke plant in China</li> <li>• Electric power generation project using the waste heat of sinter cooling systems in the Philippines</li> <li>• Participation in various carbon funds</li> </ul>	For the industry overall, 53.00 million t-CO <sub>2</sub>
Petroleum Association of Japan	<ul style="list-style-type: none"> <li>• Operations in Vietnam to capture and utilize gas released during oil drilling</li> <li>• Operations in Brazil to capture methane gas from landfill disposal sites</li> <li>• Participation in various carbon funds</li> </ul>	<ul style="list-style-type: none"> <li>• 0.68 million t-CO<sub>2</sub> per year</li> <li>• 0.66 million t-CO<sub>2</sub> per year</li> </ul>
Japan Petroleum Development Association	<ul style="list-style-type: none"> <li>• Project in China's Zhejiang Province to recover and decompose HFC23 gas generated as a byproduct during alternative CFC production</li> </ul>	• About 27.70 million t-CO <sub>2</sub>
Japan Federation of Construction Contractors	<ul style="list-style-type: none"> <li>• Promotion mainly by major companies of CDM projects in developing countries, such as those for capturing methane gas at waste disposal sites and for power generation</li> </ul>	—
The Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association	<ul style="list-style-type: none"> <li>• Participation in various carbon funds</li> </ul>	• About 4,556 t-CO <sub>2</sub> (as of FY 2009 year-end)

Note: The above also includes efforts by individual companies.

## **7. Future Policies**

The Kyoto Protocol Target Achievement Plan that the government revised in March 2008 refers to the advantages of Keidanren Voluntary Action Plan on the Environment. It states that “it enables each entity to use its originality and ingenuity to select outstanding countermeasures, afford incentives for higher level of targets, and involve no procedural costs either for the government or for implementing entities. We expect that these advantages will be further enhanced in Voluntary Action Plans by businesses.” In the Kyoto Protocol Target Achievement Plan, the Keidanren Voluntary Action Plan on the Environment is recognized for an instrumental role in facilitating the industrial sectors’ efforts toward the achievement of targets.

While urging that participating industries remain committed to individual efforts to achieve the goals, Japan Business Federation will work toward achieving the common goal for all industries, namely, “to endeavor to reduce average CO<sub>2</sub> emissions from the industrial and energy-conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990.”

To enhance the transparency and credibility of the Voluntary Action Plan on the Environment, in fiscal 2002 Japan Business Federation established the Evaluation Committee for the Voluntary Action Plan on the Environment consisting of outside experts. This committee (1) ensures that the data reported by participating industries are aggregated appropriately and (2) evaluates the overall Follow-up system from the perspective of enhancing its transparency and credibility (Attachment 6). Acting in response to points made by the Evaluation Committee, in the Fiscal 2010 Follow-up, Japan Business Federation endeavored to explain the progress made in achieving overall targets, to explain how the use of low-carbon products helps to reduce CO<sub>2</sub> emissions, and to specify the CO<sub>2</sub> emissions reductions achieved by individual industries as well as the supplementary CO<sub>2</sub> emissions reductions achieved through the retirement of credits. Japan Business Federation will maintain its efforts to address issues brought up by the Evaluation Committee and in other ways and strive to enhance its Voluntary Action Plan.

At the same time, Japan Business Federation will continue to pursue the following specific initiatives in the commercial and transportation sectors: (1) development and diffusion of energy-efficient products and services; (2) establishment of numerical

targets and the increase of target levels for energy-efficient activities at head offices and other office buildings, (3) deployment of outstanding CO<sub>2</sub> emissions reduction schemes in the commercial and transportation sectors; (4) improvements in distribution efficiency through cross-industry collaboration, including coordination between distributors and their clients; (5) support for household energy-efficiency activities through corporate employees; (6) contribution to environmental education; and (7) the promotion of forest management activities. Also, through the use of the domestic credit system, it will support the measures of small- and medium-sized companies to fight climate change.

Climate change is a problem that must be addressed on a global scale, and long-term efforts will be essential to solve it. The 13th session of the Conference of Parties to the UNFCCC (COP 13) in Bali, Indonesia in December 2007 initiated discussions regarding a post-2012 international framework on climate change. Toward the end of November 2010, COP 16 is scheduled to be held in Cancun, Mexico.

In view of endeavors to extend the Kyoto Protocol, Japan Business Federation published a statement on November 16, 2010, calling for the establishment of a single international framework that is equitable and effective, and it intends to lobby the Japanese government and other signatory countries in cooperation with other economic organizations abroad.

As an independent initiative under the post-2012 framework, Nippon Keidanren's Commitment to a Low Carbon Society was announced in December 2009, which set out a vision for the Japanese business community to harness its technological prowess and assume an instrumental role in realizing a low-carbon society that achieves economic growth in harmony with the environment. This commitment consists of the four pillars of (1) maximizing the introduction of best available low-carbon technologies in corporate activities, (2) developing and commercializing products and services that harness world-leading energy-saving technologies for consumers, (3) transferring technology and expertise to other countries, and (4) developing innovative technologies. Responding to this commitment, many industries have already announced or are proceeding to determine action plans.

In the interest of battling climate change through the remaining commitment period under the Kyoto Protocol and beyond, Japan Business Federation will continue to aim

for the highest levels of energy efficiency in the world and take the initiative in developing and promoting the adoption of existing energy-efficient technologies in Japan and abroad and encouraging the development of innovative new technologies.

(10,000-CO<sub>2</sub>: 10,000kl, crude oil equivalents)

Industry	( : target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	Compare d to FY 1990(%)	Compare d to FY 2008(%)	
Federation of Electric Power Companies	CO <sub>2</sub> emissions (with credits)		27,500	29,000	28,300	30,400	31,000	34,000	36,100	36,200	37,300	36,500	41,700	33,200	30,100	30,100	+9.5%	-9.3%	
	CO <sub>2</sub> emissions (excluding credits)																+28.4%	-10.6%	
	CO <sub>2</sub> emissions intensity (with credits)	-20%	1	0.88	0.85	0.89	0.90	0.90	0.97	1.04	1.00	1.01	0.98	1.09	1.06	0.99			
	CO <sub>2</sub> emissions intensity (excluding credits)																		
	Energy consumption		10,800	11,200	10,900	11,700	12,000	11,700	12,700	13,500	13,300	13,600	13,500	15,500	14,600	13,200		+22.2%	-9.6%
	Energy consumption intensity		1	0.97	0.97	0.96	0.95	0.95	0.94	0.94	0.95	0.95	0.94	0.94	0.93	0.93			
	Production activity index		1	1.20	1.21	1.24	1.27	1.25	1.28	1.27	1.31	1.34	1.35	1.40	1.35	1.30			
	CO <sub>2</sub> emissions (with credits)		3,070	3,350	3,220	3,340	3,340	3,340	3,700	3,860	3,850	3,850	3,700	4,250	3,960	3,560		+16.0%	-10.1%
	CO <sub>2</sub> emissions (excluding credits)		1,210	1,300	1,240	1,280	1,300	1,260	1,380	1,440	1,440	1,410	1,370	1,580	1,470	1,330		+9.9%	-9.5%
	Energy consumption																		
Petroleum Association of Japan	CO <sub>2</sub> emissions (with credits)		3,094	4,105	4,062	4,093	4,053	4,047	4,016	4,058	4,037	4,133	4,059	4,164	4,053	3,936		+26.7%	-2.8%
	CO <sub>2</sub> emissions (excluding credits)																	+27.2%	-2.9%
	CO <sub>2</sub> emissions intensity (with credits)		1	0.92	0.93	0.90	0.89	0.89	0.88	0.88	0.87	0.85	0.85	0.85	0.86	0.85			
	CO <sub>2</sub> emissions intensity (excluding credits)																		
	Energy consumption		1,287	1,705	1,670	1,675	1,661	1,657	1,650	1,665	1,665	1,714	1,682	1,725	1,688	1,633		+26.9%	-3.2%
	Energy consumption intensity	-13%	1	0.92	0.92	0.89	0.87	0.87	0.87	0.87	0.87	0.86	0.84	0.85	0.86	0.84			
	Production activity index		1	1.44	1.42	1.46	1.48	1.48	1.47	1.49	1.50	1.58	1.55	1.58	1.53	1.50			
	CO <sub>2</sub> emissions (with credits)*5		133	107	96	92	83	72	66	58	53	46	38	40	34	31		-76.6%	-7.1%
	CO <sub>2</sub> emissions (excluding credits)*5																		
	CO <sub>2</sub> emissions intensity (with credits)*5		1	0.56	0.49	0.45	0.39	0.33	0.28	0.24	0.21	0.17	0.13	0.13	0.12	0.11			
CO <sub>2</sub> emissions intensity (excluding credits)*5																			
Energy consumption		66.5	55.3	50.6	48.1	43.9	38.5	34.8	29.8	28.1	24.8	21.1	21.3	20.1	19.2		-71.0%	-4.4%	
Energy consumption intensity		1	0.58	0.52	0.47	0.41	0.36	0.30	0.25	0.22	0.18	0.14	0.14	0.13	0.13				
Production activity index		1	1.43	1.46	1.54	1.60	1.62	1.76	1.82	1.94	2.10	2.20	2.33	2.25	2.21				
Japan Iron and Steel Federation	CO <sub>2</sub> emissions (with credits)		20,061	19,799	18,643	19,233	18,363	17,894	18,387	18,601	18,791	18,704	19,015	19,708	17,622	16,557		-17.5%	-6.0%
	CO <sub>2</sub> emissions (excluding credits)																		
	CO <sub>2</sub> emissions intensity (with credits)		1	1.09	1.15	1.10	0.95	0.96	0.92	0.92	0.91	0.90	0.88	0.88	0.92	0.93			
	CO <sub>2</sub> emissions intensity (excluding credits)																		
	Energy consumption	-10%	6,288	6,240	5,871	6,022	5,761	5,582	5,716	5,775	5,861	5,837	5,964	6,138	5,568	5,207		-17.2%	-6.5%
	Energy consumption intensity		1	1.09	1.16	1.10	0.95	0.95	0.91	0.91	0.90	0.90	0.88	0.87	0.91	0.92			
	Production activity index		1	0.91	0.81	0.87	0.96	0.93	1.00	1.01	1.03	1.03	1.08	1.12	0.97	0.90			
	CO <sub>2</sub> emissions (with credits)		6,456	7,070	6,783	7,048	7,034	6,695	6,826	6,899	7,012	6,953	6,901	6,899	6,082	5,948		-7.9%	-2.2%
	CO <sub>2</sub> emissions (excluding credits)																		
	CO <sub>2</sub> emissions intensity (with credits)		1	0.92	0.88	0.91	0.92	0.92	0.91	0.90	0.88	0.86	0.84	0.83	0.87	0.82			
Energy consumption		2,705	3,029	2,903	2,998	2,940	2,799	2,832	2,839	2,918	2,903	2,914	2,933	2,671	2,651		-2.0%	-0.7%	
Energy consumption intensity	-20%	1	0.94	0.90	0.92	0.91	0.91	0.90	0.88	0.87	0.86	0.84	0.84	0.88	0.85				
Production activity index		1	1.19	1.19	1.20	1.19	1.13	1.16	1.19	1.24	1.25	1.28	1.29	1.12	1.15				
Japan Paper Association	CO <sub>2</sub> emissions (with credits)		2,554	2,608	2,610	2,650	2,733	2,631	2,654	2,644	2,591	2,474	2,330	2,321	2,134	1,961		-24.5%	-7.8%
	CO <sub>2</sub> emissions (excluding credits)																		
	CO <sub>2</sub> emissions intensity (with credits)	-16%	1	0.96	0.99	0.96	0.97	0.99	0.97	0.97	0.94	0.89	0.84	0.82	0.81	0.80			
	CO <sub>2</sub> emissions intensity (excluding credits)																		
	Energy consumption		949	957	955	966	984	938	944	932	912	877	837	831	760	696		-26.7%	-8.4%
	Energy consumption intensity	-20%	1	0.95	0.97	0.94	0.93	0.95	0.93	0.92	0.90	0.85	0.81	0.79	0.78	0.78			
	Production activity index		1	1.06	1.04	1.08	1.11	1.04	1.07	1.06	1.07	1.09	1.09	1.10	1.01	0.94			

Industry	target level	FY1990 to FY2009											Compare d to FY 1990(%)	Compare d to FY 2008(%)				
		FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006			FY2007	FY2008	FY2009	
Cement Association of Japan		2,741	2,681	2,480	2,464	2,473	2,376	2,249	2,186	2,107	2,177	2,184	2,107	1,944	1,736	-36.7%	-10.7%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)																	
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		861	823	756	747	745	715	674	652	650	651	656	628	584	521	-39.5%	-10.8%
	Energy consumption intensity	-3.8%	1	0.96	0.99	0.98	0.98	0.98	0.97	0.96	0.95	0.95	0.97	0.96	0.96	0.97		
Production activity index		1	0.99	0.89	0.88	0.88	0.85	0.81	0.79	0.77	0.79	0.78	0.76	0.71	0.63			
Japan Electrical Manufacturers' Association, Japan Electronics and Information Technology Industries Association, Communications and Information network Association of Japan, Japan Business Machine and Information System Industries Association		1,112	1,302	1,247	1,307	1,382	1,328	1,453	1,699	1,730	1,804	1,843	2,109	1,865	1,666	+49.9%	+10.7%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-35%	1	0.78	0.76	0.76	0.71	0.70	0.71	0.76	0.71	0.69	0.66	0.67	0.64	0.65		
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		638	832	799	803	849	817	838	933	978	1,010	1,065	1,136	1,028	980	+53.7%	+4.6%
	Energy consumption intensity		1	0.87	0.85	0.82	0.76	0.75	0.72	0.72	0.70	0.67	0.66	0.63	0.62	0.66		
Production activity index		1	1.50	1.48	1.54	1.75	1.70	1.83	2.02	2.20	2.35	2.52	2.83	2.62	2.31			
Japan Federation of Construction Contractors		923	892	876	718	704	659	642	514	492	518	490	512	509	454	-50.8%	-10.9%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-13%	1	0.97	0.95	0.94	0.90	0.92	0.97	0.90	0.86	0.87	0.81	0.87	0.88	0.89		
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		429	416	409	336	324	301	286	229	225	222	215	209	208	189	-56.0%	-9.2%
	Energy consumption intensity		1	0.97	0.95	0.95	0.89	0.90	0.93	0.86	0.85	0.80	0.77	0.76	0.77	0.79		
Production activity index		1	1.00	1.00	0.82	0.85	0.78	0.72	0.62	0.62	0.64	0.65	0.64	0.63	0.55			
Japan Automobile Manufacturers Association Japan Auto-body Industries Association		844	724	684	682	680	643	674	679	672	682	660	657	508	453	-46.4%	-10.9%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-25%	1	0.91	0.94	0.96	0.90	0.83	0.79	0.80	0.76	0.72	0.64	0.60	0.61	0.64		
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		435	400	381	367	354	336	339	333	337	343	338	337	289	266	-39.0%	-8.1%
	Energy consumption intensity		1	0.98	1.01	1.00	0.91	0.84	0.77	0.76	0.74	0.70	0.64	0.59	0.62	0.68		
Production activity index		1	0.94	0.87	0.85	0.89	0.92	1.01	1.01	1.04	1.13	1.21	1.30	1.08	0.90			
Japan Auto Parts Industries Association		715	688	645	650	637	578	626	644	654	695	682	735	531	464	-35.1%	-12.7%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-7%	1	0.92	0.92	0.91	0.86	0.81	0.82	0.82	0.80	0.78	0.71	0.68	0.63	0.59		
	CO2 emissions intensity (excluding credits)	-20%																
	Energy consumption		375	406	390	381	361	329	340	335	348	362	366	373	308	282	-25.0%	-8.6%
	Energy consumption intensity		1	1.03	1.06	1.02	0.93	0.88	0.85	0.81	0.81	0.78	0.72	0.66	0.63	0.62		
Production activity index		1	1.05	0.98	1.00	1.03	0.99	1.07	1.10	1.15	1.24	1.35	1.51	1.31	1.22			
Japan Federation of Housing Organizations		519	549	507	517	506	494	472	442	427	409	415	373	368	263	-49.3%	-28.6%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-20%	1	1.15	1.18	1.12	1.11	1.18	1.18	1.09	1.05	0.99	0.99	1.09	1.10	1.01		
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		197	209	193	169	164	164	182	170	164	157	160	143	142	101	-48.9%	-28.9%
	Energy consumption intensity		1	1.15	1.18	0.96	0.95	1.03	1.20	1.11	1.06	1.01	1.00	1.11	1.12	1.01		
Production activity index		1	0.92	0.83	0.89	0.87	0.81	0.77	0.78	0.78	0.79	0.81	0.66	0.64	0.50			
Japan Mining Industry Association		486	483	481	494	505	503	502	516	510	497	482	491	433	426	-12.4%	-1.6%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)		1	0.92	0.93	0.91	0.88	0.89	0.90	0.91	0.92	0.89	0.83	0.85	0.86	0.84		
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		205	210	213	219	220	217	215	215	216	208	206	205	196	197	-3.9%	+0.6%
	Energy consumption intensity	-12%	1	0.95	0.97	0.95	0.91	0.91	0.91	0.90	0.92	0.88	0.84	0.83	0.86	0.87		
Production activity index		1	1.08	1.07	1.12	1.18	1.16	1.15	1.16	1.14	1.15	1.19	1.19	1.11	1.11			

Industry	( : target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	Compare d to FY 1990(%)	Compare d to FY 2008(%)	
Lime Manufacture Association	CO2 emissions (with credits)	-10%	354	310	272	293	302	275	292	299	300	306	312	327	272	239	-32.5%	-12.2%	
	CO2 emissions (excluding credits)														276	242	-31.7%	-12.3%	
	CO2 emissions intensity (with credits)		1	0.94	0.90	0.92	0.93	0.91	0.92	0.92	0.90	0.87	0.86	0.86	0.80	0.77			
	CO2 emissions intensity (excluding credits)														0.81	0.78			
	Energy consumption	-10%	121.8	108.2	95.9	103.0	104.7	95.4	99.9	100.8	101.3	104.5	107.0	112.0	96.5	86.4	-29.0%	-10.4%	
	Energy consumption intensity		1	0.95	0.92	0.94	0.94	0.92	0.91	0.88	0.85	0.86	0.86	0.85	0.82	0.81			
	Production activity index		1	0.93	0.86	0.90	0.91	0.86	0.90	0.94	0.98	1.00	1.03	1.08	0.96	0.88			
The Japan Rubber Manufacturers Association	CO2 emissions (with credits)*5		196	191	188	194	191	184	195	209	216	221	213	219	188	170	-12.8%	-9.2%	
	CO2 emissions (excluding credits)*5														200	180	-7.9%	-9.9%	
	CO2 emissions intensity (with credits)		1	0.92	0.91	0.94	0.87	0.87	0.88	0.88	0.90	0.84	0.76	0.78	0.80	0.80			
	CO2 emissions intensity (excluding credits)														0.72	0.72			
	Energy consumption		96.2	99.3	99.0	100.1	96.4	93.5	96.5	96.5	100.3	103.8	106.2	105.7	99.6	92.8	-3.5%	-6.9%	
	Energy consumption intensity		1	1.02	1.03	1.05	0.94	0.95	0.92	0.92	0.93	0.92	0.92	0.90	0.93	0.99			
	Production activity index		1	1.01	1.00	0.99	1.06	1.02	1.09	1.14	1.17	1.21	1.22	1.23	1.12	0.98			
The Federation of Pharmaceutical Manufacturers' Association of Japan Pharmaceutical Manufacturers Association	CO2 emissions (with credits)	-0%	167	186	187	205	204	200	206	216	219	216	208	212	178	159	-4.5%	-10.8%	
	CO2 emissions (excluding credits)														193	171	-2.8%	-11.3%	
	CO2 emissions intensity (with credits)		1	0.96	0.91	0.94	0.91	0.86	0.86	0.86	0.90	0.87	0.83	0.79	0.65	0.55			
	CO2 emissions intensity (excluding credits)														0.70	0.60			
	Energy consumption		79.0	95.9	97.9	104	101	101	101	101	104	106	104	103	103	97	92	+16.1%	-5.6%
	Energy consumption intensity		1	1.04	1.00	1.01	0.95	0.91	0.89	0.91	0.89	0.84	0.83	0.81	0.74	0.67			
	Production activity index		1	1.16	1.24	1.30	1.35	1.41	1.44	1.45	1.51	1.56	1.58	1.62	1.65	1.73			
Flat Glass Association	CO2 emissions (with credits)	-22%	178	163	145	138	134	137	132	134	134	133	136	130	122	108	-39.2%	-11.3%	
	CO2 emissions (excluding credits)														113	112			
	CO2 emissions intensity (with credits)		1	1.15	1.17	1.09	1.10	1.11	1.11	1.11	0.97	0.98	1.03	1.09	1.15	1.15			
	CO2 emissions intensity (excluding credits)														48.2	43.2	-39.5%	-10.3%	
	Energy consumption	-21%	71.4	65.0	58.8	55.4	53.8	55.1	52.3	52.2	52.2	51.7	53.5	50.5	48.2	43.2			
	Energy consumption intensity		1	1.14	1.18	1.10	1.09	1.11	1.10	0.95	0.95	0.95	1.00	1.01	1.06	1.13	1.14		
	Production activity index		1	0.80	0.70	0.71	0.69	0.69	0.67	0.77	0.77	0.77	0.72	0.74	0.67	0.60	0.53		
Japan Aluminum Association *4	CO2 emissions (with credits)		148	162	152	161	163	155	161	165	163	160	154	156	126	118	-20.7%	-6.6%	
	CO2 emissions (excluding credits)														135	125	-15.4%	-7.4%	
	CO2 emissions intensity (with credits)		1	1.01	1.01	1.00	1.00	1.03	1.03	1.01	1.00	1.04	0.97	0.99	0.87	0.89			
	CO2 emissions intensity (excluding credits)														0.77	0.74			
	Energy consumption		73.4	84.5	79.8	83.1	80.8	76.8	78.4	78.4	79.1	77.3	77.2	78.0	69.2	66.5	-9.4%	-3.9%	
	Energy consumption intensity	-11%	0.95	0.95	0.96	0.93	0.89	0.92	0.90	0.86	0.87	0.90	0.87	0.89	0.87	0.89			
	Production activity index	cf. 95	1	1.16	1.08	1.15	1.18	1.08	1.13	1.18	1.18	1.12	1.14	1.14	1.04	0.96			
Brewers Association of Japan	CO2 emissions (with credits)	-10%	112	121	117	114	108	104	99.8	94.5	89.4	87.3	84.8	78.4	60.0	56.0	-50.2%	-6.7%	
	CO2 emissions (excluding credits)														62.9	58.2	-48.2%	-7.4%	
	CO2 emissions intensity (with credits)		1	0.99	0.95	0.92	0.88	0.85	0.84	0.84	0.80	0.80	0.78	0.73	0.57	0.54			
	CO2 emissions intensity (excluding credits)														0.60	0.56			
	Energy consumption		53.8	60.1	60.2	58.2	54.2	53.3	49.3	45.0	43.7	41.9	41.0	36.9	33.1	31.3	-41.8%	-5.4%	
	Energy consumption intensity		1	1.03	1.02	0.99	0.93	0.91	0.86	0.84	0.82	0.80	0.79	0.72	0.66	0.63			
	Production activity index		1	1.09	1.09	1.10	1.09	1.09	1.06	1.00	1.00	1.00	0.98	0.97	0.96	0.93	0.92		

Industry	target level	: target defined by the industry)											Compare d to FY 1990(%)	Compare d to FY 2008(%)				
		FY 1990	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006			FY 2007	FY 2008	FY 2009	
Japan Electric Wire and Cable Makers' Association		100	92.7	87.3	87.7	91.9	85.5	84.9	88.8	82.7	83.7	81.7	88.8	68.5	62.9	-36.8%	-8.2%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (copper/aluminum) (with credits)																	
	CO2 emissions intensity (copper/aluminum) (excluding credits)																	
	CO2 emissions intensity (optical fiber)(with credits)																	
	CO2 emissions intensity (optical fiber) (excluding credits)																	
	Energy consumption(copper/aluminum)	-29%	57.5	55.1	52.8	50.0	48.9	43.7	43.0	42.8	41.9	42.2	41.8	41.6	37.0	35.1	-38.9%	-5.2%
	Energy consumption(optical fiber)		1.3	6.0	5.6	6.9	8.3	9.6	7.1	6.7	5.4	4.6	5.5	6.1	6.0	6.4		
	Energy consumption intensity(copper/aluminum)		1	1.07	1.17	1.21	1.12	1.16	1.10	1.10	1.06	1.01	0.99	1.00	1.01	1.07		
	Energy consumption intensity (optical fiber)	78%	1	0.85	0.81	0.63	0.46	0.40	0.42	0.43	0.39	0.24	0.23	0.22	0.22	0.21		
	Production activity index (copper/aluminum)		1	0.89	0.79	0.72	0.76	0.65	0.68	0.68	0.69	0.73	0.73	0.73	0.63	0.57		
	Production activity index (optical fiber)		1	5.38	5.29	8.33	13.82	18.02	13.03	11.75	10.62	14.37	17.98	21.16	20.54	23.59		
	Japan Dairy Industry Association *4		85.5	95.5	98.1	102	100	102	93	111	109	110	110	113	112	108	+20.2%	-3.5%
CO2 emissions (with credits)																		
CO2 emissions (excluding credits)																		
CO2 emissions intensity (with credits)			0.92	0.85	0.87	0.89	1	1.03	1.09	1.06	1.04	1.07	1.05	1.08	1.11	1.10		
CO2 emissions intensity (excluding credits)			40.2	48.4	50.2	51.2	48.9	50.2	43.9	51.5	50.7	50.8	52.0	53.0	53.1	52.6	+30.9%	-0.9%
Energy consumption			0.89	0.89	0.91	0.91	1	1.04	1.05	1.01	1.00	1.02	1.02	1.04	1.08	1.10		
Energy consumption intensity		-0.5%	1	1.20	1.21	1.23	1.08	1.06	0.92	1.12	1.12	1.10	1.12	1.13	1.07	1.05		
Production activity index		cf. 00																
CO2 emissions (with credits)			65.5	57.2	50.7	54.1	56.4	47.9	53.6	56.6	57.2	58.0	58.4	62.5	53.6	46.5	-29.0%	-3.1%
CO2 emissions (excluding credits)																		
CO2 emissions intensity (with credits)			1	0.88	0.86	0.93	0.85	0.94	0.89	0.97	0.88	0.91	0.88	0.99	1.01	1.00		
CO2 emissions intensity (excluding credits)			37.0	35.4	31.6	32.7	33.3	28.2	30.3	30.7	31.9	31.7	32.5	32.9	28.7	29.0	-21.6%	+0.8%
Energy consumption			1	0.97	0.95	1.00	0.89	0.98	0.90	0.93	0.87	0.88	0.87	0.92	0.96	1.00		
Energy consumption intensity		-9.05%	1	0.99	0.90	0.89	1.02	0.78	0.92	0.89	1.00	0.98	1.01	0.96	0.81	0.78		
Production activity index	cf. 95																	
Japan Society of Industrial Machinery Manufacturers *4		63.4	60.3	52.9	52.2	53.4	52.9	53.9	57.0	58.3	60.7	59.6	61.6	59.3	48.7	-31.1%	-17.2%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)																	
	CO2 emissions intensity (excluding credits)																	
	Energy consumption		33.1	34.3	30.9	29.4	28.7	28.4	27.8	28.1	29.5	30.2	30.5	29.9	29.2	25.4	-23.3%	-13.1%
	Energy consumption intensity		1	1.03	1.13	1.11	1.14	1.14	1.15	1.19	1.15	1.14	1.06	0.95	0.98	0.98		
	Production activity index		1	0.87	0.76	0.75	0.75	0.73	0.71	0.69	0.75	0.77	0.84	0.92	0.87	0.76		
	CO2 emissions (with credits)		60.1	56.5	52.6	55.3	59.3	54.8	61.0	66.5	69.6	73.1	71.5	79.8	69.0	57.8	-14.8%	-15.4%
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)	-13%	1	1.00	1.00	1.00	0.97	1.01	1.04	1.04	1.00	1.00	0.94	0.98	1.01	0.97		
	CO2 emissions intensity (excluding credits)	cf. 97	35.2	35.8	34.3	34.7	35.7	33.1	35.3	36.6	39.4	40.4	40.7	42.3	37.3	33.3	-5.4%	-10.6%
	Energy consumption		1	1.03	0.99	0.92	0.96	0.96	0.95	0.90	0.89	0.87	0.84	0.82	0.86	0.88		
	Energy consumption intensity		1	0.93	0.98	0.98	1.08	0.96	1.04	1.13	1.24	1.29	1.35	1.44	1.21	1.05		
Production activity index																		
Japan Bearing Industrial Association *4		58.0	48.8	47.6	47.4	49.1	48.6	45.8	47.8	43.9	43.0	42.8	44.2	43.5	41.1	-30.6%	-5.6%	
	CO2 emissions (with credits)																	
	CO2 emissions (excluding credits)																	
	CO2 emissions intensity (with credits)		1	0.94	0.94	0.94	0.95	0.96	0.93	0.95	0.89	0.85	0.90	0.92	0.90	0.88		
	CO2 emissions intensity (excluding credits)		24.3	22.1	21.6	21.5	22.0	21.8	20.1	20.9	19.6	19.7	20.4	21.1	20.5	19.9	-18.2%	-2.9%
	Energy consumption		1	1.01	1.02	1.02	1.01	1.03	0.97	0.98	0.95	0.96	1.03	1.02	1.01	1.01		
	Energy consumption intensity		1	0.90	0.88	0.87	0.90	0.88	0.85	0.87	0.85	0.85	0.82	0.84	0.83	0.81		
	Production activity index																	



Industry	( : target defined by the industry)	target level	FY 1990	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Compare d to FY 1990(%)	Compare d to FY 2008(%)	
Japan Sanitary Equipment Industry Association	CO2 emissions (with credits)	-2.5%	47.8	41.5	34.8	35.4	36.4	37.2	35.3	36.3	36.1	35.0	33.3	29.8	25.4	23.3	-51.2%	-8.3%	
	CO2 emissions (excluding credits)														26.9	24.6	-48.5%	-8.6%	
	CO2 emissions intensity (with credits)		1	0.81	0.82	0.83	0.80	0.83	0.83	0.80	0.78	0.69	0.62	0.56	0.52	0.53			
	CO2 emissions intensity (excluding credits)														0.55	0.56			
	Energy consumption		22.4	21.4	18.3	18.4	18.3	18.2	17.0	16.9	16.8	16.7	16.5	14.9	13.6	12.9	13.6	-42.4%	-4.8%
	Energy consumption intensity		1	0.89	0.91	0.91	0.86	0.86	0.82	0.82	0.77	0.73	0.70	0.65	0.59	0.59	0.63		
	Production activity index		1	1.08	0.89	0.89	0.95	0.94	0.93	0.93	0.98	1.03	1.07	1.13	1.12	1.03	0.92		
	CO2 emissions (with credits)		45.9	65.9	68.4	74.6	80.7	85.1	85.1	88.7	94.1	100.0	103.0	104.5	108.4	100.6	98.8	+115.4%	-1.8%
	CO2 emissions (excluding credits)															106.2	103.8	+126.4%	-2.2%
	CO2 emissions intensity (with credits)	-6%	1	0.98	0.99	1.02	1.07	1.04	1.04	1.09	1.09	1.08	1.17	1.14	1.11	1.11	1.08		
CO2 emissions intensity (excluding credits)															1.05	1.03			
Energy consumption		20.3	30.9	32.9	35.8	38.4	40.9	42.3	44.3	47.6	49.4	51.7	53.6	53.5	54.3	54.3	+167.1%	+1.5%	
Energy consumption intensity		1	1.04	1.07	1.10	1.15	1.13	1.13	1.17	1.12	1.16	1.24	1.27	1.24	1.26	1.28			
Production activity index		1	1.47	1.51	1.60	1.64	1.78	1.78	1.77	1.87	2.01	1.92	2.00	2.13	2.09	2.09			
Limestone Association of Japan	CO2 emissions (with credits)		45.3	41.8	39.8	40.4	41.5	41.2	39.0	36.4	35.5	36.2	35.6	36.8	33.8	29.3	31.3	-39.5%	-12.5%
	CO2 emissions (excluding credits)														33.8	29.3	35.4%	-13.4%	
	CO2 emissions intensity (with credits)		1	0.91	0.95	0.98	0.98	0.98	1.02	0.95	0.97	0.96	0.95	0.93	0.98	0.98	0.97		
	CO2 emissions intensity (excluding credits)														0.91	0.91			
	Energy consumption		22.6	22.0	21.1	20.9	20.9	20.6	20.6	19.0	17.2	17.1	17.1	17.1	16.9	15.7	14.0	-37.9%	-10.5%
	Energy consumption intensity	-6%	1	0.96	1.01	1.02	0.99	0.99	0.99	0.92	0.92	0.93	0.91	0.89	0.91	0.91	0.93		
	Production activity index		1	1.02	0.93	0.91	0.94	0.92	0.92	0.91	0.82	0.81	0.84	0.85	0.83	0.76	0.67		
	CO2 emissions (with credits)		22.9	20.8	22.8	20.0	20.6	19.4	19.4	18.4	20.3	22.6	24.9	26.2	30.5	29.2	18.0	-21.5%	-38.3%
	CO2 emissions (excluding credits)															0.78	1.33		
	CO2 emissions intensity (with credits)		1	1.00	1.13	1.13	1.02	1.02	1.02	1.27	1.15	1.03	0.89	0.84	0.87	0.90	1.50		
CO2 emissions intensity (excluding credits)															0.90	1.50			
Energy consumption	-6%	13.5	13.5	15.2	12.8	12.6	11.9	10.7	10.7	11.2	12.7	13.6	14.6	16.0	15.7	10.3	-23.9%	-34.7%	
Energy consumption intensity	-6%	1	1.03	1.12	1.12	0.96	0.96	0.96	1.15	0.98	0.89	0.76	0.73	0.71	0.76	1.33			
Production activity index	cf. 97	1	1.00	1.10	0.85	0.98	0.92	0.92	0.69	0.85	1.06	1.33	1.50	1.67	1.55	0.57			
Flour Millers Association	CO2 emissions (with credits)		16.9	18.6	18.0	18.6	19.1	18.9	20.3	22.5	21.3	21.2	21.1	22.9	21.7	20.1	18.5	+1.8%	-7.0%
	CO2 emissions (excluding credits)														0.96	0.89	+18.7%	-7.8%	
	CO2 emissions intensity (with credits)		1	1.00	0.93	0.95	0.97	0.96	1.03	1.12	1.08	1.07	1.08	1.16	1.13	1.04			
	CO2 emissions intensity (excluding credits)	-5%													1.22	1.21	+11.9%	-0.8%	
	Energy consumption		10.8	12.6	12.9	12.7	12.5	12.4	12.4	12.5	13.0	12.7	12.3	12.5	12.6	12.2	12.1		
	Energy consumption intensity		1	1.06	1.04	1.02	0.99	0.98	0.98	1.00	1.02	1.00	0.98	1.00	1.00	0.99	0.98		
	Production activity index		1	1.10	1.15	1.16	1.17	1.16	1.16	1.16	1.19	1.17	1.17	1.16	1.17	1.14	1.14		
	CO2 emissions (with credits)		14.3			18.1	17.8	17.8	17.8	24.1	25.8	26.5	28.6	30.7	35.4	30.1	27.6	+92.8%	-8.3%
	CO2 emissions (excluding credits)														35.9	32.4	+126.5%	-9.6%	
	CO2 emissions intensity (with credits)		1	0.73	0.75	0.73	0.75	0.75	1.00	0.98	0.98	0.84	0.85	0.84	0.92	0.94	0.79		
CO2 emissions intensity (excluding credits)														0.79	0.67				
Energy consumption		9.4			12.6	12.3	12.3	15.6	15.5	16.5	17.1	18.9	19.8	20.4	19.9	19.9	+112.0%	-2.4%	
Energy consumption intensity	-10%	1	0.87	0.89	0.94	0.96	0.96	0.94	0.96	0.90	0.92	0.94	0.95	0.94	0.94	0.90			
Production activity index		1	1.74	1.66	1.68	1.66	1.66	1.66	1.68	1.84	2.20	2.34	2.57	2.70	2.65	2.87			
Japan Industry Vehicles Association	CO2 emissions (with credits)	-10%	6.2	6.1	5.7	6.1	6.1	6.1	5.4	5.7	6.0	6.6	6.5	7.3	5.7	3.9	-36.9%	-31.6%	
	CO2 emissions (excluding credits)														6.2	4.1	-32.9%	-32.8%	
	CO2 emissions intensity (with credits)		1	1.22	1.47	1.53	1.36	1.33	1.40	1.37	1.21	1.15	1.05	1.04	1.08	1.35			
	CO2 emissions intensity (excluding credits)														0.99	1.27			
	Energy consumption		3.3	3.5	3.3	3.4	3.4	3.0	3.1	3.2	3.3	3.5	3.5	3.8	3.2	2.3	2.3	-30.4%	-29.2%
	Energy consumption intensity		1	1.33	1.60	1.61	1.43	1.42	1.44	1.37	1.23	1.15	1.07	1.02	1.06	1.40	1.40		
	Production activity index		1	0.81	0.63	0.65	0.72	0.65	0.66	0.66	0.71	0.82	0.93	1.00	1.13	0.93	0.50		

Industry	( : target defined by the industry)	target level	FY 1990	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Compare d to FY 1990(%)	Compare d to FY 2008(%)	
Japan Association of Rolling Stock Industries	CO2 emissions (with credits)	-8%	4.3	3.0	2.9	3.0	2.9	2.7	2.9	3.1	3.1	3.4	3.5	4.0	3.3	2.9	-32.5%	-12.1%	
	CO2 emissions (excluding credits)																		
	CO2 emissions intensity (with credits)		1	0.76	0.74	0.67	0.66	0.66	0.66	0.66	0.76	0.55	0.50	0.60	0.49	0.38			
	CO2 emissions intensity (excluding credits)		2.4	1.8	1.8	1.8	1.6	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.0	1.9			
	Energy consumption		1	0.83	0.83	0.74	0.70	0.71	0.68	0.76	0.49	0.55	0.51	0.57	0.53	0.43			
	Energy consumption intensity		1	0.91	0.91	1.04	1.02	0.96	1.04	0.93	1.51	1.43	1.63	1.55	1.58	1.80			
	Production activity index																		
	CO2 emissions (with credits)		22.2	27.0	25.4	24.4	29.3	29.0	35.2	38.1	33.7	39.0	44.9	44.9	59.0	61.9	63.1	+183.8%	+1.9%
	CO2 emissions (excluding credits)																		
	CO2 emissions intensity (with credits)	-20%	1	0.83	0.79	0.74	0.85	0.86	1.02	1.06	0.75	0.79	0.85	0.85	0.89	0.80	0.85		
CO2 emissions intensity (excluding credits)		6.0	6.8	6.9	6.4	6.9	6.3	7.0	6.6	7.0	8.4	9.0	10.2	9.7	9.6				
Energy consumption		1	0.90	0.93	0.87	0.89	0.81	0.86	0.74	0.76	0.80	0.81	0.81	0.81	0.77	0.81			
Energy consumption intensity		1	1.28	1.25	1.23	1.31	1.30	1.38	1.50	1.55	1.75	1.86	2.12	2.11	2.00				
Production activity index		6.208	6.067	5.436	5.437	5.489	5.317	5.192	5.033	5.020	5.158	5.230	5.062	4.669	4.146				
CO2 emissions		-69	-118	-113	-102	-107	-108	-122	-141	-142	-144	-148	-148	-176	-157	-140			
CO2 emissions (excluding credits)		-56	-71	-59	-60	-97	-91	-76	-82	-87	-98	-104	-104	-112	-106	-101			
Energy consumption																			
CO2 emissions (with credits)	±0%																		
CO2 emissions (excluding credits)		50.660	52.076	49.324	50.348	49.713	48.174	49.085	49,519	49,610	49,805	49,719	51,158	46,818	43,443				
Energy consumption *3		16,482	17,444	16,661	16,854	16,552	15,969	16,244	16,376	16,532	16,565	16,650	17,126	15,732	14,824				
Total																			

Trends in the Transportation, Commercial and Other Sectors %

Industries	target level	FY 1990	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Compared to FY 1990(%)	Compared to FY 2008(%)					
																		( : target defined by the industry)				
Japan Association of Refrigerated Warehouses	CO2 emissions (with credits)	55.2	57.4	57.6	61.1	60.9	61.9	65.9	69.9	69.8	73.9	71.3	77.3	64.4	58.3	5.6%	-9.5%					
	CO2 emissions (excluding credits)													76.7	68.4	23.9%	-10.8%					
	CO2 emissions intensity (with credits)	1	0.82	0.80	0.84	0.83	0.85	0.91	0.96	0.96	0.96	1.00	0.97	1.02	0.89							
	CO2 emissions intensity (excluding credits)													43.6	42.0							
	Energy consumption	36.2	43.1	44.6	44.7	42.2	42.9	42.5	42.0	43.3	44.4	44.0	43.2	43.6	42.0	16.0%	-3.7%					
	Energy consumption intensity	1	0.94	0.95	0.93	0.88	0.90	0.89	0.88	0.88	0.91	0.92	0.91	0.88	0.88							
	Production activity index	1	1.27	1.30	1.32	1.32	1.32	1.31	1.32	1.31	1.33	1.33	1.35	1.37	1.39							
	CO2 emissions (with credits)	2.2						2.4	2.4	2.5	2.4	2.5	2.4	2.6	2.3	2.1	-18.2%	-10.0%				
	CO2 emissions (excluding credits)														0.88	0.84	-4.5%	-10.5%				
	CO2 emissions intensity (with credits)	1						0.93	0.93	0.97	0.97	1.00	0.98	1.07	1.04	0.98						
Japan LP Gas Association	CO2 emissions intensity (excluding credits)	1.4					1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.3	-10.0%	-2.8%					
	Energy consumption	1					0.92	0.89	0.92	0.91	0.92	0.91	0.90	0.90	0.92							
	Energy consumption intensity	1					1.16	1.16	1.12	1.12	1.12	1.12	1.12	1.03	0.97							
	Production activity index	1												48.2	43.2	-20.8%	-10.4%					
	CO2 emissions (with credits)						54.5	55.0	58.7	56.2	55.3	53.8	60.5	57.4	50.8	-6.9%	-11.6%					
	CO2 emissions (excluding credits)						37.8	38.0	36.5	35.2	34.9	33.2	33.8	32.7	31.2	-17.5%	-4.6%					
	Energy consumption													0.83	0.76							
	CO2 emissions intensity (with credits)	1	0.86	0.88	0.86	1.01	0.84	0.94	0.97	0.98	1.03	0.93	0.93	1.04	0.99	0.89						
	CO2 emissions intensity (excluding credits)	1	0.97	1.03	0.94	1.07	0.90	0.95	0.94	0.97	1.03	0.95	0.98	0.95	0.91							
	Energy consumption						3.4	4.3	4.1	4.1	3.7	3.6	3.9	3.3	3.3	2.9	-14.6%	-12.1%				
The Real Estate Companies Association of Japan	CO2 emissions (with credits)						2.3	2.6	2.4	2.2	2.1	2.1	2.1	2.0	1.9	-17.7%	-7.9%					
	CO2 emissions (excluding credits)													10.9	10.1	-12.8%	-7.3%					
	Energy consumption													12.8	11.7	1.1%	-8.4%					
	CO2 emissions intensity (with credits)													7.1	7.0	0.5%	-2.0%					
	CO2 emissions intensity (excluding credits)													6.9	6.8	7.0	0.5%	-2.0%				
	Energy consumption													31.2	31.0	330	341	370	369	346	170.2%	-6.3%
	CO2 emissions (with credits)	128	157	162	180	214	230	275	312	310	310	330	341	370	369	298	132.7%	-5.0%				
	CO2 emissions (excluding credits)														1.47	1.43						
	Energy consumption														1.73	1.66						
	CO2 emissions intensity (with credits)	1	0.81	0.82	0.85	0.91	0.96	1.23	1.37	1.37	1.40	1.50	1.55	1.69	1.73	1.66						
NTT Group	CO2 emissions intensity (excluding credits)	84	118	126	132	144	155	172	182	188	194	206	204	207	208	148.5%	0.6%					
	Energy consumption	1.00	0.93	0.97	0.94	0.94	0.99	1.17	1.22	1.29	1.35	1.43	1.43	1.48	1.53							
	Production activity index	1	1.51	1.56	1.67	1.83	1.87	1.75	1.77	1.73	1.72	1.72	1.71	1.67	1.63							
	CO2 emissions (with credits)													64.2	67.2	58.6%	4.7%					
	CO2 emissions (excluding credits)													75.4	78.9	86.1%	3.1%					
	Energy consumption													42.1	43.5	48.4	90.5%	11.3%				
	CO2 emissions intensity (with credits)													4.6	4.4	4.1	-30.5%	-7.7%				
	Production activity index													2.5	2.5	-43.5%	-0.7%					
	CO2 emissions (with credits)													114.2	105.5	-15.1%	-7.6%					
	CO2 emissions (excluding credits)													126.9	116.1	-6.6%	-8.5%					
Japan Foreign Trade Council, Inc. *7	Energy consumption													0.83	0.77							
	CO2 emissions intensity (with credits)													1.00	0.96	0.98						
	CO2 emissions intensity (excluding credits)													68.6	69.4	69.7	68.5	65.9	-3.8%	-3.7%		
	Energy consumption													1.00	0.98	0.94	0.87					
	Production activity index													1.00	1.03	1.08	1.11	1.11				
	CO2 emissions (with credits)																					
	CO2 emissions (excluding credits)																					
	Energy consumption																					
	CO2 emissions intensity (with credits)																					
	Production activity index																					
Japan Federation of Printing Industries *7	CO2 emissions (with credits)																					
	CO2 emissions (excluding credits)																					
	Energy consumption																					
	CO2 emissions intensity (with credits)																					
	CO2 emissions intensity (excluding credits)																					
	Energy consumption																					
	Production activity index																					
	CO2 emissions (with credits)																					
	CO2 emissions (excluding credits)																					
	Energy consumption																					

Industries	FY 1990	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Compared to FY 1990(%)	Compared to FY 2008(%)	
																	target level
The Scheduled Airlines Associations of Japan The Japanese Shipowners' Association	CO <sub>2</sub> emissions intensity (with credits)	1	0.91	0.90	0.89	0.90	0.87	0.89	0.88	0.88	0.88	0.87	0.85	0.84			
	CO <sub>2</sub> emissions intensity (excluding credits)																
	CO <sub>2</sub> emissions (with credits)	3,862	4,279	4,366	4,505	4,708	4,562	4,583	4,984	5,262	5,585	6,031	6,481	6,365	5,763	49.2%	-9.5%
	CO <sub>2</sub> emissions (excluding credits)																
	CO <sub>2</sub> emissions intensity (with credits)	1	0.86	0.90	0.85	0.84	0.85	0.87	0.85	0.88	0.88	0.86	0.84	0.85	0.82		
	CO <sub>2</sub> emissions intensity (excluding credits)																
	Energy consumption intensity	1	0.86	0.90	0.85	0.84	0.85	0.87	0.85	0.88	0.88	0.86	0.84	0.85	0.82		
	Production activity index	1	1.28	1.26	1.37	1.45	1.38	1.36	1.53	1.54	1.65	1.81	2.01	1.95	1.81		
	CO <sub>2</sub> emissions (with credits)	859	904	876	886	919	934	895	854	787	790	794	772	720	656	-23.7%	-9.0%
	CO <sub>2</sub> emissions (excluding credits)																
Japan Federation of Coastal Shipping Associations	CO <sub>2</sub> emissions intensity (with credits)	1	1.07	1.09	1.09	1.07	1.08	1.07	1.10	1.01	1.04	1.07	1.06	1.07	1.09		
	CO <sub>2</sub> emissions intensity (excluding credits)																
	CO <sub>2</sub> emissions (with credits)	314	330	320	323	335	340	326	311	287	288	289	281	262	239	-24.1%	-9.0%
	CO <sub>2</sub> emissions (excluding credits)																
	Energy consumption intensity	1	1.07	1.09	1.08	1.07	1.07	1.06	1.09	1.00	1.04	1.06	1.06	1.07	1.09		
	Energy consumption intensity (excluding credits)																
	Energy consumption intensity	1	0.98	0.94	0.95	1.00	1.01	0.98	0.91	0.91	0.88	0.87	0.85	0.78	0.70		
	Production activity index																
	CO <sub>2</sub> emissions (with credits)	4,587	4,628	4,546	4,630	4,772	4,733	4,780	4,719	4,472	4,316	4,377	4,412	4,272	4,074	-11.2%	-4.6%
	CO <sub>2</sub> emissions (excluding credits)																
Japan Trucking Association *8	CO <sub>2</sub> emissions intensity (with credits)	1	0.99	0.98	0.96	0.95	0.93	0.93	0.87	0.81	0.75	0.74	0.72	0.72	0.71		
	CO <sub>2</sub> emissions intensity (excluding credits)																
	CO <sub>2</sub> emissions (with credits)	1,724	1,739	1,708	1,740	1,793	1,778	1,796	1,773	1,680	1,622	1,645	1,658	1,605	1,531	-11.2%	-4.6%
	CO <sub>2</sub> emissions (excluding credits)																
	Energy consumption intensity	1	0.99	0.98	0.96	0.95	0.93	0.93	0.87	0.81	0.75	0.74	0.72	0.72	0.71		
	Energy consumption intensity (excluding credits)																
	Energy consumption intensity	1	1.01	1.01	1.05	1.10	1.11	1.12	1.18	1.21	1.25	1.30	1.33	1.30	1.26		
	Production activity index																
	CO <sub>2</sub> emissions (with credits)	199	192	188	201	198	198	214	227	221	224	212	234	228	210	-5.2%	-8.2%
	CO <sub>2</sub> emissions (excluding credits)																
Non-governmental Railways Association	CO <sub>2</sub> emissions intensity (with credits)	1	0.86	0.85	0.89	0.86	0.86	0.93	0.97	0.95	0.96	0.91	1.00	0.97	0.87		
	CO <sub>2</sub> emissions intensity (excluding credits)																
	CO <sub>2</sub> emissions (with credits)	131	144	146	147	137	137	138	136	137	134	131	131	130	129	-1.5%	-0.9%
	CO <sub>2</sub> emissions (excluding credits)																
	Energy consumption intensity	1	0.99	1.00	1.00	0.91	0.91	0.91	0.89	0.90	0.88	0.85	0.85	0.84	0.82		
	Energy consumption intensity (excluding credits)																
	Energy consumption intensity	1	1.12	1.12	1.13	1.15	1.16	1.16	1.17	1.17	1.17	1.17	1.18	1.18	1.20		
	Production activity index																

\*1 "Emissions from industrial processes" refers to CO<sub>2</sub> emitted by non-energy sources in the course of the manufacturing process.

\*2 Total CO<sub>2</sub> emissions and energy consumption for the 34 industries are calculated on the basis of "generating end" electric power input per unit output for the respective industries on a fiscal year basis. On the other hand, in follow-up surveys, industries may also choose to report emissions in terms of "demand end" electric power input per unit output or fixed (the ratio in fiscal 1990) electric power input per unit output (as in the Japan Gas Association, Japan Electrical Manufacturers' Association, Japan Electronics and Information Technology Industries Association, Communications and Information Network Association of Japan, Japan Business Machine and Information System Industries Association, and Japan Machine Tool Builders' Association). Revisions are defined as the differences between the totals of data submitted by industries and the totals of the revised industry figures.

\*3 Due to a revision of the Caloric Value Table, calculations of emissions before fiscal 1990, 2000-2004, and after 2005 are based on different heat conversion coefficients.

\*4 In cases where an industry uses a year other than fiscal 1990 as the base year, intensity indexes are calculated based on figures for the base year used by that industry (Japan Aluminium Association and Japan Copper and Brass Association use fiscal 1995, The Japan Society of Industrial Machinery Manufacturers, The Japan Bearing Industrial Association, and Japan Machine Tool Builders' Association use fiscal 1997 as the base year, and Japan Dairy Industry Association uses fiscal 2000 as the base year.)

\*5 The figures in the table above are based on the basic calculation method used by Keidanren. The figures for the target and the CO<sub>2</sub> emissions in fiscal 2009 of Japan Gas Association and The Japan Rubber Manufacturers Association, based on different method from the basic one are the following (refer to the industry-specific report in Japanese):

Japan Gas Association (targets are 349,000 t-CO<sub>2</sub> for CO<sub>2</sub> emissions and 9.0g/m<sup>3</sup> for CO<sub>2</sub> emissions intensity); CO<sub>2</sub> emissions in FY 2009: 296,000 t-CO<sub>2</sub> (with credits) / 326,000 t-CO<sub>2</sub> (excluding credits); CO<sub>2</sub> emission intensity: 8.4g-CO<sub>2</sub>/m<sup>3</sup> (with credits) / 9.3g-CO<sub>2</sub>/m<sup>3</sup> (excluding credits)

\*6 The Japan Rubber Manufacturers Association (target is to reduce CO<sub>2</sub> emissions -10% compared to fiscal 1990): FY 1990 : 1.92 Mt-CO<sub>2</sub> (with credits) / 1.53 Mt-CO<sub>2</sub> (excluding credits).

\*7 Japan Foreign Trade Council, Inc. and All Japan Freight Forwarders Association use fiscal 1998, Japanese Bankers Association and the General Insurance Association of Japan use fiscal 2000, KDDI uses fiscal 2003, Japan Federation of Printing Industries uses fiscal 2005, and The Life Insurance Association of Japan uses fiscal 2006 as their base year.

\*8 Japan Trucking Association uses fiscal 1996 as their base year, and their figures listed under fiscal 1990 represent actual figures for 1996.

\*9 CO<sub>2</sub> emissions intensity and energy consumption intensity are rounded off after the automatic calculation based on CO<sub>2</sub> emissions, energy consumption, and production activity figures.

\*10 In fiscal 2008 and fiscal 2009, only electric power companies retired credits, and other industries did not do so. Therefore, data with credits and excluding credits shown for each industry are the result of having two CO<sub>2</sub> emission factors accompanying electricity use, one indicating with credits and the other excluding credits.

(Attachment 3)

### Industries Setting Higher Targets in the Fiscal 2010 Follow-up

1. Industries in the industrial and energy-conversion sectors (34 industries) that set higher targets or made other changes: five industries

	Nature of change		Reasons for change
	Former target	Revised target	
The Japan Gas Association	Reduce CO <sub>2</sub> emission intensity per 1 m <sup>3</sup> of gas in the production and supply of city gas from 83.6 g-CO <sub>2</sub> /m <sup>3</sup> in FY 1990 to an average 10.0 g-CO <sub>2</sub> /m <sup>3</sup> in the FY 2008–2012 period Reduce CO <sub>2</sub> emissions from FY 1990 level of 1.328 million t-CO <sub>2</sub> to 0.450 million t-CO <sub>2</sub>	Reduce CO <sub>2</sub> emission intensity per 1 m <sup>3</sup> of gas in the production and supply of city gas from 83.6 g-CO <sub>2</sub> /m <sup>3</sup> in FY 1990 to an average of 9.0 g-CO <sub>2</sub> /m <sup>3</sup> between FY 2008 and 2012 Reduce CO <sub>2</sub> emissions from 1.328 million t-CO <sub>2</sub> in FY 1990 to 0.349 million t-CO <sub>2</sub>	Increase of target
Japan Federation of Construction Contractors	Reduce the CO <sub>2</sub> generated during construction (on-site work) by 12% of the FY 1990 base year level in terms of the emission intensity per unit of construction volume by FY 2010	Reduce the CO <sub>2</sub> emitted during construction (on-site work) by 13% per unit of completed construction work by FY 2012 compared to FY 1990	Increase of target
Lime Manufacture Association	Reduce the five-year average of the energy consumption of lime production between FY 2008 and 2012 by 8% compared to FY 1990 Reduce the five-year average of CO <sub>2</sub> emissions related to the energy consumption of lime production between FY 2008 and 2012 by 8% compared to FY 1990	Reduce the energy consumption of lime production by an average of 10% between FY 2008 and 2012 compared to FY 1990 Reduce CO <sub>2</sub> emissions arising from the energy used in lime production by an average of 10% between FY 2008 and 2012 compared to FY 1990	Increase of target
The Japan Rubber Manufacturers Association	Reduce CO <sub>2</sub> emissions by 6% in FY 2010 compared to FY 1990 Reduce energy intensity by 8% in FY 2010 compared to	Reduce CO <sub>2</sub> emissions by an average of 10% between FY 2008 and 2012 compared to FY 1990	Increase of target  (Changed to a CO <sub>2</sub> emissions

	FY 1990		target only)
The Japanese Electric Wire & Cable Makers' Association	Reduce the energy consumption (in terms of crude oil) of copper and aluminum wire manufacture at plants by 27% by FY 2010 (average for FY 2008 to 2012) compared to FY 1990	Reduce the energy consumption (in terms of crude oil) of copper and aluminum wire manufacture at plants by 29% by FY 2010 (average for FY 2008 to 2012) compared to FY 1990	Increase of target

## International Comparison of Energy Efficiency in Participating Industries

### Electric Power (Federation of Electric Power Companies)

Fossil-fired power generation efficiency (electric power output per unit of energy input) (2007)

Japan	U.K.	Nordic countries	France	Germany	U.S.A.	China	India
100	98	103	104	109	111	126	135

Source: ECOFYS, "International Comparison of Fossil Power Efficiency", 2010.

The lower the number, the larger the amount of electricity produced per unit of energy input.

Comparison of CO<sub>2</sub> emissions intensity for the electric power industry ("generating-end")(2008)

Japan	France	Canada	Italy	Germany	U.K.	U.S.A.	China	India
100	20	44	107	115	117	134	195	242

Source: IEA, Energy Balances of OECD Countries 2009 Edition and Energy Balances of Non-OECD Countries 2008 Edition

Figures are for 2007 (2006 for China and India).

CO<sub>2</sub> emission intensity is low in France because 80% of its electric power is produced through nuclear power generation

### Oil (Petroleum Association of Japan )

Energy consumption index of refineries (2004)

Japan	Advanced Asian countries (excluding China)	Western Europe	U.S.A. and Canada
100	101	103	113

Source: Data from the results of a survey by Solomon Associates Ltd.

This is a comparison of "energy intensity index," which is Solomon Associates' proprietary benchmarking method. The index is based on throughput equivalents, which is similar in nature to the index used by the oil industry in its voluntary action plan (energy consumption intensity at oil refineries). A lower number indicates higher efficiency.

### Iron and Steel (Japan Iron and Steel Federation)

Energy efficiency of Steel Industries (2005)

Japan	South Korea	Germany	U.K.	U.S.A.	China	India	Russia
100	102	112	122	130	123	125	143

Source: Research Institute for Innovative Technology for the Earth (RITE) "International Comparison of Energy Efficiency (Power Generation, Steel, and Cement)", October 2009. Japan Iron and Steel Federation indexed the original figures.

### Chemicals (Japan Chemical Industry Association)

Electric power consumed in relation to production of electrolytic caustic soda (2004)

Japan	Taiwan	South Korea	China	U.S.A.	Western Europe	Eastern Europe
100	100	100	104	110	119	115

Source: SRI Chemical Economic Handbook; Japan Soda Industry Association, *Soda Handobukku* (Soda Handbook)

### Paper (Japan Paper Association)

Total energy efficiency for paper and paperboard produced (2004-2005)

Japan	Finland	Germany	France	Norway	Brazil	U.S.A.	Chile
100	115	116	145	154	155	194	246

Source: Institute of Energy Economics, Japan, "Research Paper for Technological Measures of Manufacturers in 2007: The Production and Energy Consumption of Pulp, Paper, and Paperboard Industries of Countries", 2007.

Since Germany relies largely on recycled pulp and imported pulp, its energy consumption related to pulp production is low. In addition, demand for quality such as whiteness of toilet paper is relatively low in Germany, which can also be considered a factor contributing to low energy consumption.

Cement (Cement Association of Japan)

Energy consumption per clinker ton (2003)

Japan	Germany	India	Brasil	Korea	U.S.A.	China
100	116	124	132	133	155	159

Source: International Energy Agency (IEA), Worldwide Trends in Energy Use and Efficiency 2008.

Mining (Japan Mining Industry Association)

Energy efficiency of copper refineries (2000)

Japan	Europe	Asia	North America	South America
100	133	143	154	202

Source: Sample data collected through interviews by Japan Mining Industry Association.  
Comparison is of energy efficiency (MJ/ton) of copper refineries

Aluminum (Japan Aluminum Association)

Energy consumption in the plate rolling process (2000)

Japan	Global
100	127

Source: International Aluminium Institute and Life Cycle Assessment Society of Japan's Database (2006).



(Attachment 5)

**Examples of Efforts to Achieve Targets Reported by Participating Industries of the Industrial and Energy-Conversion Sectors**

Industry	Examples of efforts made
The Federation of Electric Power Companies of Japan	<ol style="list-style-type: none"> <li>1. Shift to low-carbon energy on the supply side (reduction of CO<sub>2</sub> emission intensity)               <ol style="list-style-type: none"> <li>a) Expanded use of non-fossil fuel energy</li> <li>b) Improved efficiency of electric power plants</li> <li>c) International efforts (use of Kyoto Mechanisms, sectoral approaches)</li> </ol> </li> <li>2. Increased efficiency of energy use on the demand side               <ol style="list-style-type: none"> <li>a) Energy savings (promotion of electrification, diffusion of energy-saving and high-efficiency electrical equipment)</li> </ol> </li> <li>3. Research and development               <ol style="list-style-type: none"> <li>a) Clean coal technology, CO<sub>2</sub> capture and storage technology, next-generation transmission technology, ultra high-efficiency heat pumps, electric vehicles</li> </ol> </li> </ol>
The Japan Gas Association	<ol style="list-style-type: none"> <li>1. Improved manufacturing efficiency by promoting conversion to LNG gasification processes</li> <li>2. Promotion of energy-saving measures at city gas manufacturing plants               <ol style="list-style-type: none"> <li>a) Installation of cogeneration systems</li> <li>b) Use of LNG cold energy</li> <li>c) Increased efficiency of facilities</li> <li>d) Operations optimized in accordance with demand and other factors</li> </ol> </li> </ol>
Petroleum Association of Japan	<ol style="list-style-type: none"> <li>1. More advanced operational control through the progress of control technology and optimizing technology</li> <li>2. Expanded sharing of heat between equipment, expanded installation of waste heat and other waste energy recovery facilities</li> <li>3. Increased efficiency through appropriate maintenance of facilities</li> <li>4. Use of high-efficiency equipment and catalysts</li> <li>5. Energy-saving measures taking advantage of energy-saving subsidy programs               <ol style="list-style-type: none"> <li>a) Installation of high-performance trays for distillation columns</li> <li>b) Heat exchangers to recover the heat of the top pump-around of distillation columns via input oil</li> </ol> </li> </ol>
The Japan Iron and Steel Federation	<ol style="list-style-type: none"> <li>1. Strengthened waste heat recovery, and increased efficiency of facilities</li> <li>2. Establishment of technology for the clean use of coal, such as through desulphurization technology</li> <li>3. Achievement of comprehensive energy efficiency where most of the energy used in plants is met through the recovery and use of byproduct gas and waste energy (steam, electricity) derived from coal</li> <li>4. Energy savings through resource recycling (waste plastic, waste tires)</li> </ol>
Japan Chemical Industry Association	<ol style="list-style-type: none"> <li>1. Improved efficiency of facilities and equipment</li> <li>2. Improved operational methods</li> </ol>

	<ul style="list-style-type: none"> <li>3. Recovery of waste energy</li> <li>4. Rationalization of processes</li> <li>5. Fuel conversion</li> </ul>
Japan Paper Association	<ul style="list-style-type: none"> <li>1. Installation of energy-saving facilities <ul style="list-style-type: none"> <li>a) Ventilation and other heat recovery facilities</li> <li>b) Alterations made to presses</li> <li>c) Installation of inverters</li> </ul> </li> <li>2. Installation of high-efficiency facilities <ul style="list-style-type: none"> <li>a) Improved efficiency of turbines</li> <li>b) Alterations made to refiners</li> <li>c) Low differential pressure cleaners</li> <li>d) High-efficiency lighting</li> </ul> </li> <li>3. Overhaul of processes (shortened and unified processes)</li> <li>4. Conversion to renewable energy (black liquor, waste materials, bark, paper sludge), waste product energy (RPF, waste plastic, waste tires, waste oil), and fuel with low CO<sub>2</sub> emissions</li> </ul>
Japan Cement Association	<ul style="list-style-type: none"> <li>1. Promotion of the spread of energy-saving facilities</li> <li>2. Expanded use of energy substitute waste products</li> <li>3. Expanded use of raw material substitute waste products</li> <li>4. Higher production ratio for mixed cement</li> </ul>
Japan Federation of Construction Contractors	<ul style="list-style-type: none"> <li>1. Reduction of construction soil that is hauled away and reduction of transported distances</li> <li>2. Promotion of no idling and fuel-saving operation of vehicles</li> <li>3. Strict enforcement of appropriate servicing of heavy equipment and vehicles</li> <li>4. Promotion of the adoption of superior energy-saving methods, construction machinery, and construction vehicles</li> <li>5. Promotion of the use of high-efficiency temporary electrical equipment</li> <li>6. Promotion of energy-saving activities at on-site offices</li> </ul>
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	<ul style="list-style-type: none"> <li>1. Measures on the energy supply side <ul style="list-style-type: none"> <li>a) Installation of high-efficiency compressors, implementation of measures to reduce compressed air pressure and prevent leakage</li> <li>b) Replacement of refrigerators and air conditioners (including heaters)</li> <li>c) Use of high-efficiency boilers</li> <li>d) Energy-saving transformers</li> </ul> </li> <li>2. Measures regarding high energy-consumption facilities <ul style="list-style-type: none"> <li>a) Energy savings through such facility measures as improving the method for controlling booth air conditioning, integration of casting dust collectors, and improvement of air conditioners</li> </ul> </li> <li>3. More advanced energy supply methods and other operational control technology <ul style="list-style-type: none"> <li>a) Energy savings through operational improvements (efficient operation, improved energy savings at work sites) and through turning off boilers, transformers, pumps, and lighting when unneeded or through their intermittent operation</li> <li>b) Reduction of fuel usage by reducing paint booth temperature and</li> </ul> </li> </ul>

	<p>airflow and by improving air dehumidifiers</p> <p>c) Reduction of air and steam supply pressure, unit control of compressor operation, reconsideration of pipe routing</p> <p>4. Energy conversion measures</p> <p>a) Conversion from fuel oil to city gas for the fuel of aluminum melting furnaces</p> <p>b) Conversion from LPG and butane gas to city gas for the fuel of heat treatment furnaces</p>
Japan Auto Parts Industries Association	<p>1. Halting of no-load operation and other improvements to operational methods</p> <p>2. Improved efficiency of facilities and equipment</p> <p>3. Rationalization of processes</p> <p>4. Cogeneration and recovery of waste energy</p> <p>5. Mutual sharing of energy-saving technology, exchange of information about energy use</p>
Japan Federation of Housing Organizations	<p>1. Planning and design stage</p> <p>a) Preservation of the natural environment</p> <p>2. Creation of a quality living environment</p> <p>a) Promotion of increased housing functionality, including earthquake resistance and energy-saving improvement work; improvement of the interior environment; interior and exterior greenery</p> <p>b) Use of the housing performance indication system</p> <p>c) Implementation of comprehensive environmental functionality evaluations at the design stage through CASBEE-Sumai (single-family detached housing)</p> <p>d) Use of high-efficiency facilities and equipment and use of alternative energy</p> <p>e) Diffusion of high-insulation, highly air-tight housing (housing meeting next-generation energy-saving standards)</p> <p>3. Usage stage</p> <p>a) Educational activities for home buyers to promote the reduction of CO<sub>2</sub> emissions at the usage stage</p> <p>4. Demolition, processing, and disposal stage</p> <p>a) Rigorous adherence to segregated demolition</p> <p>b) Promotion of the reuse of building material waste</p>
Japan Mining Industry Association	<p>1. Improved productivity by consolidation and scaling up of production facilities</p> <p>2. Effective use of unused heat</p> <p>3. Improved efficiency through the replacement of old facilities</p> <p>4. Improved efficiency through facility measures</p> <p>5. Reduction of energy intensity through operational ingenuity</p> <p>6. Thermal recycling through shredder dust (ASR) processing</p> <p>7. Use of reclaimed oil and waste plastic</p>
Lime Manufacture Association	<p>1. Expanded use of recycled fuel</p> <p>2. Improved operational methods</p> <p>3. Recovery of waste energy</p>

	<p>4. Rationalization of processes</p> <p>5. Improved efficiency of facilities and machinery</p>
The Japan Rubber Manufacturers Association	<p>1. New and expanded installation of cogeneration systems</p> <p>a) New and expanded installation of high-efficiency cogeneration systems burning city gas</p> <p>b) Cogeneration fuel switched from fuel oil to LNG</p> <p>2. Installation of high-efficiency equipment</p> <p>a) Installation of high-efficiency fans, motors, lighting fixtures, and other such equipment</p> <p>3. Implementation of steady energy-saving activities as before</p> <p>a) Insulation of heating facilities, prevention of leakage, heat recovery</p> <p>b) Increased operational efficiency, such as through rotation control, intermittent operation, and scaling down</p> <p>4. Increased efficiency through energy conversion</p> <p>a) Process improvements, such as installation of furnaces that burn waste oil and modifying furnaces and boilers to burn gas</p> <p>5. Increased efficiency of air conditioning systems</p> <p>a) Installation of ice-based thermal energy storage and absorption refrigerators</p> <p>6. Increased product durability</p> <p>a) Significant increase in durability achieved by switching from bias tires to radial tires</p> <p>7. Tire labeling system</p>
The Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association	<p>1. Energy substitution</p> <p>2. Selection of high-efficiency equipment</p> <p>3. Reconsideration of operational and control methods for facilities and equipment</p> <p>4. Changes to standard and established values</p> <p>5. Reduction of radiated heat loss by insulating equipment and pipes</p> <p>6. Improved production efficiency</p>
Flat Glass Manufacturers Association of Japan	<p>1. Increased efficiency of production through the scrapping and consolidation of flat glass manufacturing facilities (melting furnaces)</p> <p>2. Improved heat recovery efficiency through the regular maintenance of furnaces (cold maintenance)</p> <p>3. Consolidation of production to reduce the loss per furnace arising from changing production items or colors</p> <p>4. Development and adoption of new combustion technology with high energy efficiency</p>
Japan Aluminium Association	<p>1. Improved energy efficiency through energy-saving operations and process improvements (improved yield)</p> <p>2. Promotion of facility improvements, such as energy recovery and greater efficiency, fuel conversion for melting furnaces, and the installation of regenerative burners</p> <p>3. Holding of meetings to publicize cases of energy-saving improvements and promotion of industry-wide application</p>

	<p>4. Promotion of active aluminum recycling (global program)</p> <p>5. Support of vehicle weight reductions through the use of aluminum in automobiles and railroad cars (domestic program)</p>
Brewers Association of Japan	<p>1. Power processes</p> <p>a) Installation of solar power facilities</p> <p>b) Fuel conversion to natural and city gas</p> <p>c) Installation of cogeneration facilities</p> <p>d) Installation of high-efficiency refrigeration and ice-based thermal energy storage systems</p> <p>e) Conversion to ammonia refrigerators and other high-efficiency refrigeration facilities</p> <p>f) Reduced use of fuel oil by installing waste-cooking-oil mixing devices in fuel-oil-fired boilers</p> <p>2. Preparation processes</p> <p>a) Installation of new boiling systems</p> <p>b) Installation of steam recompression facilities</p> <p>c) Increased efficiency of waste heat recovery</p> <p>3. Processes for wastewater processing</p> <p>a) Installation of anaerobic wastewater treatment facilities</p> <p>b) Promotion of the recovery and use of methane gas from anaerobic processes</p> <p>c) Installation of biogas cogeneration facilities</p> <p>d) Installation of biogas boilers and other high-efficiency boilers</p> <p>e) Installation of fuel cells</p>
The Japanese Electric Wire & Cable Makers' Association	<p>1. Efficient use of heat</p> <p>a) Measures to improve the insulation of furnaces</p> <p>b) Fuel conversion</p> <p>c) Recovery and use of waste heat</p> <p>d) Improvement of steam traps</p> <p>e) Increased insulation of steam pipes</p> <p>2. Installation of high-efficiency facilities</p> <p>a) Higher speed facilities and facilities for producing wires without joints</p> <p>b) Extruder motors</p> <p>c) Inverters installed in pumps</p> <p>d) Inverters installed in compressors, unit control of compressors</p> <p>3. More efficient operation of electric power facilities</p> <p>a) A more efficient electric power system through layout changes</p> <p>b) Efficient operation of electric power facilities through the consolidation of operational facilities</p>
Japan Dairy Industry Association	<p>1. Reduction of CO<sub>2</sub> emissions through fuel conversion</p> <p>a) Conversion of boiler fuel from fuel oil to city gas (LNG)</p> <p>b) Reduction of CO<sub>2</sub> emissions by establishing gas supply facilities and by modifying boilers burning fuel oil to burn gas</p> <p>c) Increased heat efficiency and reduction of CO<sub>2</sub> emissions by modifying boilers to burn gas</p>

	<ol style="list-style-type: none"> <li>2. Installation of energy-saving equipment <ol style="list-style-type: none"> <li>a) Installation of facilities using biomass heat</li> <li>b) Use of natural energy (solar heat, wind power, hydropower)</li> <li>c) Replacement of facilities for preventing water and soil contamination</li> <li>d) Installation of high-efficiency facilities when replacing aging facilities</li> <li>e) Improvement of steam drains</li> </ol> </li> <li>3. Promotion of energy savings by improving and revising processes <ol style="list-style-type: none"> <li>a) Reconsideration of outdoor advertising structures, conversion from neon signs to externally illuminated signs</li> <li>b) Non-refrigerated transport of products that can be stored at normal temperatures</li> <li>c) Insulation of steam and chilled pipes</li> <li>d) Halting of unnecessary idling of manufacturing machinery and vehicles</li> <li>e) Insulation jackets added to the valves and flanges of steam supply lines to prevent radiated heat loss</li> <li>f) Reconsideration of the warm-up time for filling equipment and other machinery</li> </ol> </li> </ol>
Japan Copper and Brass Association	<ol style="list-style-type: none"> <li>1. Promotion of activities for all business facilities <ol style="list-style-type: none"> <li>a) Installation of energy-saving lighting fixtures (with inverters)</li> <li>b) Change to energy-saving air conditioners</li> </ol> </li> <li>2. Installation, replacement, and improvement of facilities and equipment <ol style="list-style-type: none"> <li>a) Fuel conversion</li> <li>b) Replacement of mercury lamps with metal halide lamps</li> <li>c) Improved prevention of air leakage</li> </ol> </li> <li>3. Improvements in process and operational control, and in operations management <ol style="list-style-type: none"> <li>a) Reduction of standby electricity</li> <li>b) Reduction of transformers through load adjustment</li> <li>c) Centralized monitoring of electricity</li> <li>d) Establishment of an automatic power-factor regulation system</li> <li>e) Reductions made to peak electricity use</li> <li>f) Prevention of no-load operation of drawing facilities</li> <li>g) Reduction of maintenance electricity through the consolidation and stopping of furnaces</li> </ol> </li> </ol>
The Japan Society of Industrial Machinery Manufacturers	<ol style="list-style-type: none"> <li>1. Transfer to machinery with inverters</li> <li>2. Efficient operations through the unit control and consolidated control of compressors</li> <li>3. Replacement of transformer facilities</li> <li>4. Switch to high-efficiency lighting</li> <li>5. Reduction of test operation time</li> <li>6. Regular checking of pressurized air leakage</li> <li>7. Implementation of “cool biz” and “warm biz” programs</li> <li>8. Other daily energy-saving activities</li> <li>9. Efficient operation of air conditioning facilities and their replacement</li> </ol>

	10. Facility investments accompanied by fuel conversion
The Japan Bearing Industrial Association	<ol style="list-style-type: none"> <li>1. Efficiency of motors increased, inverters installed in motors</li> <li>2. Measures to prevent air leakage and to reduce air pressure for compressors</li> <li>3. Fuel conversion and use of waste heat for heat treatment facilities</li> <li>4. Installation of air conditioners using ice-based thermal energy storage, installation of gas heat pumps</li> <li>5. Installation of high-efficiency lighting fixtures</li> <li>6. Practice of turning off lights implemented</li> </ol>
Japan Sugar Refiners' Association	<ol style="list-style-type: none"> <li>1. Fuel conversion (higher ratio of city gas usage)</li> <li>2. Installation of auto-vapor recompression concentrators</li> <li>3. Installation of vacuum crystallizers with agitators</li> <li>4. Installation of vacuum crystallizers with automated boiling</li> <li>5. Installation of cogeneration facilities</li> <li>6. Installation of steam accumulators</li> <li>7. Rotational control through inverters adopted for motors</li> <li>8. Recovery of boiler waste heat</li> <li>9. Upgrades to turbo compressors</li> <li>10. Conversion to energy-saving transformers</li> <li>11. Conversion to absorption air conditioners</li> <li>12. Conversion to vacuum circuit breakers</li> <li>13. Insulation of steam pipes</li> <li>14. Promotion of production rationalization to increase the operating rate</li> </ol>
Japan Sanitary Equipment Industry Association	<ol style="list-style-type: none"> <li>1. Promotion of fuel conversion</li> <li>2. Installation of cogeneration systems</li> <li>3. Installation of evaporative radiator cooling equipment</li> <li>4. Installation of energy-saving inverter equipment</li> <li>5. Reduction of the weight of furnace carts</li> <li>6. Increased production efficiency and improvement of the reject rate</li> <li>7. Promotion of the use of solar power and other natural energy sources</li> <li>8. Higher energy-saving awareness at the individual level and programs to accumulate small energy-saving actions</li> <li>9. Temperature control of air conditioners, diligent practice of turning off lights</li> </ol>
Japan Soft Drink Association	<ol style="list-style-type: none"> <li>1. Use of cogeneration facilities</li> <li>2. Improved boiler operation</li> <li>3. Change in incinerator fuel</li> <li>4. Compressors (unit control, new installation of inverter-controlled compressors)</li> <li>5. Biogas recovered from water anaerobic treatment facilities used as fuel</li> </ol>
Limestone Association of Japan	<ol style="list-style-type: none"> <li>1. Reduced consumption of fuel (diesel fuel) <ol style="list-style-type: none"> <li>a) Upsizing and optimizing heavy machinery in use</li> <li>b) Reorganization of transportation routes and the shortening of traveled distances</li> <li>c) Strict enforcement of inspections and maintenance</li> <li>d) Promotion of energy-saving operation</li> </ol> </li> </ol>

	<ol style="list-style-type: none"> <li>2. Promotion of the acquisition of heavy machinery with environmentally compatible engines</li> <li>3. Reduction of electricity consumption (promoting the spread of energy-saving facilities, optimizing production processes)</li> <li>4. Promotion of the installation of cogeneration systems</li> <li>5. Promotion of energy-saving activities</li> </ol>
Japan Machine Tool Builder's Association	<ol style="list-style-type: none"> <li>1. Air-conditioning-related <ol style="list-style-type: none"> <li>a) Inverters installed in air conditioners and heat source pumps</li> <li>b) Adoption of city-gas air conditioners, appropriate operation control</li> </ol> </li> <li>2. Lighting-related <ol style="list-style-type: none"> <li>a) Switch to metal halide and other high-efficiency lighting</li> <li>b) Installation of electrical power saving systems</li> <li>c) Thorough practice of turning off unneeded lights</li> </ol> </li> <li>3. Compressor-related <ol style="list-style-type: none"> <li>a) Installation of inverters</li> <li>b) Unit control</li> <li>c) Reduction of air supply pressure</li> <li>d) Prevention of air leakage</li> </ol> </li> <li>4. Machining processes <ol style="list-style-type: none"> <li>a) Inverters installed in cutting and dust collection devices</li> <li>b) Switching off electricity to non-operating facilities</li> <li>c) Establishment of electrical power saving circuits</li> </ol> </li> </ol>
Flour Millers Association	<ol style="list-style-type: none"> <li>1. Consolidation and increased operation of mills</li> <li>2. Installation of cogeneration systems</li> <li>3. Adoption of high-efficiency motors</li> <li>4. Installation of high-efficiency blowers and rotation control devices</li> <li>5. Installation of compressor pressure optimization systems and unit control systems</li> </ol>
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	<ol style="list-style-type: none"> <li>1. Promotion of more efficient and advanced production by encouraging investments in automated facilities</li> <li>2. Installation of solar power generators</li> </ol>
Japan Industrial Vehicles Association	<ol style="list-style-type: none"> <li>1. Improvements to production facilities and processes</li> <li>2. Promotion of conversion to fuel with a low carbon emission factor</li> <li>3. Energy-saving renovations to factory facilities (lighting, air conditioning)</li> </ol>
Japan Association of Rolling Stock Industries	<ol style="list-style-type: none"> <li>1. Measures related to energy-saving facilities <ol style="list-style-type: none"> <li>a) Installation of energy-saving production facilities</li> <li>b) Adoption of the "eco-ice" system when replacing air conditioners</li> <li>c) Switch to energy-saving lighting fixtures (LED, metal halide)</li> </ol> </li> <li>2. Measures related to high-efficiency facilities <ol style="list-style-type: none"> <li>a) Inverters installed in welders and lighting fixtures</li> <li>b) Upgrading to low-loss transformers</li> <li>c) Inverter control of compressors</li> </ol> </li> <li>3. Measures related to fuel conversion <ol style="list-style-type: none"> <li>a) Fuel conversion (from fuel oil to propane) for heating facilities</li> </ol> </li> </ol>



	<p>(burners)</p> <p>b) Boiler fuel changed from kerosene to city gas</p> <p>c) Installation of solar power generators</p> <p>4. Operational improvements</p> <p>a) Reasonable air conditioner operating periods and temperature settings</p> <p>b) Reasonable operation of ventilators</p> <p>c) Reduction of the operating periods of hot water boilers</p>
Japan Petroleum Development Association	<ol style="list-style-type: none"> <li>1. Consolidation and rationalization of inefficient facilities</li> <li>2. Installation of energy-saving facilities and machinery at production plants, rationalization of systems</li> <li>3. Increased efficiency of operations (reduction of internal consumption of natural gas)</li> <li>4. Effective use of unused low-pressure gas</li> <li>5. Burning of diffused natural gas</li> <li>6. Installation of environmental management systems</li> <li>7. Implementation of energy-saving programs at business offices</li> <li>8. Use of natural-gas-powered vehicles</li> <li>9. Installation of cogeneration systems</li> <li>10. Installation of fuel cells at production plants</li> </ol>

(Attachment 6)

## **Evaluation Committee for the Voluntary Action Plan on the Environment**

**1. Establishment**      July 23, 2002

### **2. Objectives**

- (1) To confirm that follow-up surveys for the Voluntary Action Plan on the Environment (Measures against Global Warming) are performed properly and to evaluate their transparency and credibility from an independent standpoint.
- (2) To identify areas for improvement regarding the follow-up surveys for the Keidanren Voluntary Action Plan on the Environment (Measures against Global Warming), so as to contribute to further improving transparency and credibility.

### **3. Results of activities**

The evaluation of the past eight follow-up surveys (fiscal 2002–2009) was conducted from the following perspectives.

- (1) To assess whether the processes for the collection, aggregation and reporting of data by the industries participating in the follow-up surveys, and the aggregation of the data reported by the participating industries, were implemented properly.
- (2) With respect to the follow-up system as a whole, to identify aspects that should be improved in order to increase transparency and credibility.

A Voluntary Action Plan Evaluation Report was prepared and released to the public eight times.

### **4. Members of the Evaluation Committee (as of November 16, 2010)**

**Chairman:** Yoji Uchiyama (Professor, Graduate School of Systems and Information Engineering, Institute of Engineering Mechanics and Systems, University of Tsukuba)

**Members:** Tadashi Aoyagi (Former Senior Research Fellow, Mitsubishi Research Institute)

Kiyoe Asada (President, Women's Energy Network)

Kazuya Koujitani (Secretary-General, Green Purchasing Network)

Masaki Mashita (Advisor, Forest Management Association of Japan)

Ryuji Matsuhashi (Professor, Department of Environment Systems, Graduate School of Frontier Sciences, The University of Tokyo)

Kanji Yoshioka (Professor Economics, Keio Economic Observatory, Keio University)

## **Reference: The Formulation of the Voluntary Action Plan on the Environment: History and Aims**

### **1. History**

A step ahead of the Earth Summit in 1992, Nippon Keidanren (then known as Keidanren) formulated the Keidanren Global Environment Charter in 1991. Guided by a basic philosophy that the addressing of environmental problems is essential to corporate existence and activity, it proclaimed a course of voluntary and active efforts directed at environmental conservation.

In order to link the philosophy of the Global Environment Charter to concrete action, in 1996 the Keidanren Appeal on the Environment was announced. With respect to measures to counter global warming, Nippon Keidanren then announced the formulation of a voluntary action plan to promote practical and effective efforts by the business community.

This led to the formulation of the Keidanren Voluntary Action Plan on the Environment (renamed the Voluntary Action Plan on the Environment in fiscal 2002) in the following year, 1997. Today, 61 industrial organizations and companies are participating in the plan, through which they are actively addressing not only global warming but also the problem of waste. With respect to measures to counter global warming, the uniform goal is the “reduction of CO<sub>2</sub> emissions from participating industries in the industrial and energy-conversion sectors in fiscal 2010 to below the levels of fiscal 1990.” Since the Voluntary Action Plan on the Environment was adopted before the Kyoto Protocol (in June 1997), its target year differed from the Kyoto Protocol’s five-year commitment period of fiscal 2008 to fiscal 2012. In view of this situation, to further contribute to Japan’s achievement of its commitments under the Kyoto Protocol, Japan Business Federation modified the goal in 2006, stating that “the target level is to be achieved as an average in the five years of the Kyoto Protocol commitment period.”

### **2. Goals**

The causes of long-term environmental problems that occur globally, such as global warming, are to be found in business activities of all kinds and in many aspects of our daily lives. In consequence, they cannot be addressed by restricting activities uniformly, and it is also difficult to deal with them adequately through conventional means such as regulations and the levying of taxes and charges. In view of this, in place of the conventional regulatory measures that have been effective in the past, such as the anti-pollution measures of the 1970s, today it is to voluntary efforts that we must look to have an impact on problems occurring on a global scale. The rationale underlying voluntary efforts is that they constitute the most effective countermeasures, because business people themselves, who have the best grasp of the actual situation in each industry, can take technical trends and other factors affecting management judgments comprehensively into consideration, and draft and implement the most cost-effective measures. Nippon Keidanren conducts a follow-up every year of the state of progress of the Voluntary

Action Plan on the Environment, and releases its finding publicly through the Internet and other means.

Therefore, the Voluntary Action Plan on the Environment comprises four steps that are repeated each year: (1) the setting of targets; (2) the implementation of efforts to attain those targets; (3) the regular follow-up of the state of progress of those efforts; and (4) the public disclosure of the follow-up results through the Internet and other means. This mechanism spurs continuous improvements, and is able to prevent the non-achievement of targets.

The Japanese government's Kyoto Protocol Target Achievement Plan, which was approved by the Cabinet in April 2005 and revised in March 2008, positioned the Keidanren Voluntary Action Plan on the Environment as the plan that will play a central role in industry efforts toward the achievement of targets. It praised the Voluntary Action Plan stating that the merits of voluntary approaches is that they do not involve procedural costs and each entity can develop its own outstanding measures through original and innovative efforts. The hope that companies will take further advantage of these merits in their own voluntary action plans was also expressed.

The progress of the voluntary action plans is reviewed annually by the relevant government councils, and reports are also made to joint meetings of the councils concerned with domestic measures to address global warming.

### **3. Future Policy**

Nippon Keidanren will continue to require the participating industries to ensure the steady implementation of the plan's countermeasures, and to devote its full energies to the achievement of its overall uniform goals. It will also maintain its efforts to ensure a continuous improvement in transparency and credibility on the basis of the reports of the Evaluation Committee for the Voluntary Action Plan on the Environment.

For their part, companies will expedite their voluntary efforts, not only undertaking measures relating to their own business activities, but also contributing to problem-resolution both within Japan as a whole and globally.

#### **Addendum: Measures toward the Formation of a Recycling Society**

When the Keidanren Voluntary Action Plan on the Environment was formulated in 1997, waste-related measures were included as another core component. Targets were laid down for individual industries, and with the view of promoting voluntary measures, follow-up surveys of the state of progress towards achieving targets are conducted annually. In fiscal 1999, "reduction of the final disposal volume of industrial waste by 75% in fiscal 2010 compared to fiscal 1990" was established as an industry-wide target. This target was achieved early in fiscal 2002 and in each of the years that followed. Therefore, in fiscal 2006, the Section on Waste Products was changed to the Section on the Formation of a Recycling Society, and the target was increased to "reduction of the

final disposal volume of industrial waste by 86% in fiscal 2010 compared to fiscal 1990.” This target was achieved two years early in fiscal 2008. Currently, industry efforts for fiscal 2011 and beyond are being examined.