Results of the Fiscal 2013 Follow-up to the Voluntary Action Plan on the Environment (Summary)
—Section on Global Warming Measures—
< Performance in Fiscal 2012 >

November 19, 2013
Keidanren

Contents

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, Keidanren 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_2 emissions from the industrial and energy-conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990" as the uniform 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_2 emissions in fiscal 2012 by industry as a whole (comprising the industrial and energy-conversion sectors)

The 34 industries[1] in the industrial and energy-conversion sectors that participated in the Fiscal 2013 Follow-up (performance in fiscal 2012) together emitted 505.51 million t-CO_2 in fiscal 1990, the base year.[2] The emissions accounted for approximately 44% of Japan's total emissions of 1,141.20 million t-CO_2 in that year. Moreover, they represented approximately 83% of the total amount of CO_2 emitted by Japanese industrial and energy-conversion sectors in fiscal 1990 (612.30 million t-CO_2).[3]

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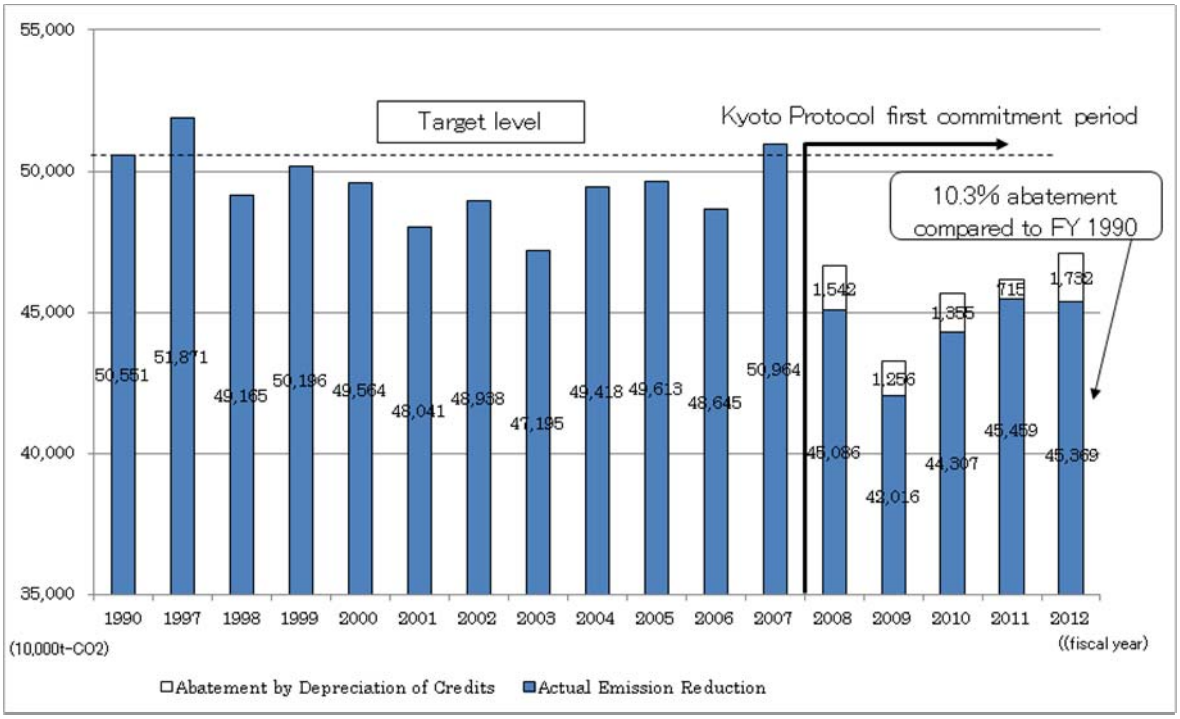
1. The following are the 34 participating industry groups in the industrial and energy-conversion sectors: Flat Glass Manufacturers Association of Japan; Japan Federation of Housing Organizations; four electrical/electronics-related groups (Communications and Information Network Association of Japan, 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 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.

2. When calculating emission volumes for the industrial and energy-conversion sectors as a whole, Keidanren uses the following electricity CO_2 emission factor survey data (averages for all power sources at generating ends) provided by the Federation of Electric Power Companies. Unless stated otherwise, electricity 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 2010: 3.16 [with credits] / 3.72 [without credits]; FY 2011: 4.29 [with credits] / 4.60 [without credits]; FY 2012: 4.41 [with credits] / 5.17 [without credits]). Note that the FY 2012 electricity carbon emission factor noted by the Federation of Electric Power Companies is projected to improve slightly to reflect credits issued following delays in UN validation, etc.
Other conversion factors for energy: For caloric value, Keidanren 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, Keidanren uses *National Greenhouse Gas Inventory Report of Japan* (2012).

3. The total of emissions is from the industrial and energy-conversion sectors and industrial processes as contained in the statistics on total CO_2 emissions for Japan, which are announced by the Ministry of the Environment.

According to the Fiscal 2013 Follow-up, CO_2 emissions in fiscal 2012 were 453.69 million t-CO_2, representing a 10.3% decrease compared to fiscal 1990 (and a 0.2% decrease compared to fiscal 2011),[4] as shown in the graph below.[5] These results far surpass the uniform target of endeavoring "to reduce average CO_2 emissions from the industrial and energy-conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990" by reducing average CO_2 emissions between fiscal 2008 and 2012 by 12.1%[6] compared to fiscal 1990.

CO_2 Emissions by the Industrial and Energy-Conversion Sectors[7]



4. Without credits, CO_2 emissions were 471.01 million t-CO_2, representing a 6.8% decrease compared to fiscal 1990 (and a 2.0% increase compared to fiscal 2011).
5. Industries review actual figures on CO_2 emissions each year with the aim of improving the accuracy. Therefore, cited figures may vary from the previous fiscal year.
6. Without credits, a 9.5% reduction from the fiscal 1990 level.
7. Total of the 34 industries in 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 2013 Follow-up, 22 reported CO_2 emission reductions compared to fiscal 1990,[8] while 21 reported reductions compared to fiscal 2011.[9]

Of the 14 industries that defined their goals in terms of CO_2 emission reductions,[10] 13 reported reductions compared to fiscal 1990[11] and 10 reported reductions compared to fiscal 2011.[12] Of the five industries that defined their goals in terms of energy savings, four reported savings compared to fiscal 1990. Of the 10 industries that defined their goals in terms of CO_2 emission reductions per unit of output, six reported improvements compared to fiscal 1990,[13] and two showed improvements compared to fiscal 2011.[14] Of the 12 industries that defined their goals in terms of energy efficiency improvements, nine reported improvements compared to fiscal 1990, and eight showed improvements compared to fiscal 2011 (Attachment 1).

4. Evaluation of Voluntary Action Plan achievements

(1) Attribution analysis of CO_2 emissions in the industrial and energy-conversion sectors for fiscal 2012

An attribution analysis was made of the 10.3% decrease in CO_2 emissions between fiscal 1990 and fiscal 2012 for the 34 industries in the industrial and energy-conversion sectors. Increases in production activity and CO_2 emission factors between fiscal 1990 and fiscal 2012 respectively contributed to rises of 1.7% and 2.1% in CO_2 emissions. On the other hand, a reduction in CO_2 emissions per unit of output contributed to a decrease of 14.1% in CO_2 emissions. The low-carbon rate (the improvement of the CO_2 emission factor compared to fiscal 1990 and the improvement of CO_2 emissions per unit of output compared to fiscal 1990), which reflects industries' efforts to reduce emissions,

8. Twenty industries excluding credits.
9. Nine industries excluding credits.
10. Achievements made toward each target are counted for those industries that have declared multiple targets.
11. Eleven industries excluding credits.
12. Seven industries excluding credits.
13. Six industries excluding credits.
14. One industry excluding credits.

was -12.0%.

Compared to fiscal 2011, while increases in production activity and CO_2 emissions intensity respectively resulted in increases of 0.2% and 0.4% in CO_2 emissions, a decrease in CO_2 emissions per unit of output reduced CO_2 emissions by 0.8%. As a result, CO_2 emissions in fiscal 2012 represented a decrease of 0.2% compared to fiscal 2011.

Reference: An Attribution Analysis for Changes in CO_2 Emissions by Industrial and Energy-Conversion Sectors in Fiscal 2012*[1]

	Comparison to FY 1990	Comparison to FY 2011
Change in production activity*[2]	+1.7%	+0.2%
Change in CO_2 emission factor*[3]	+2.1%	+0.4%
Change in CO_2 emissions per unit of output (efficiency improvement)	-14.1%	-0.8%
Total	-10.3%	-0.2%

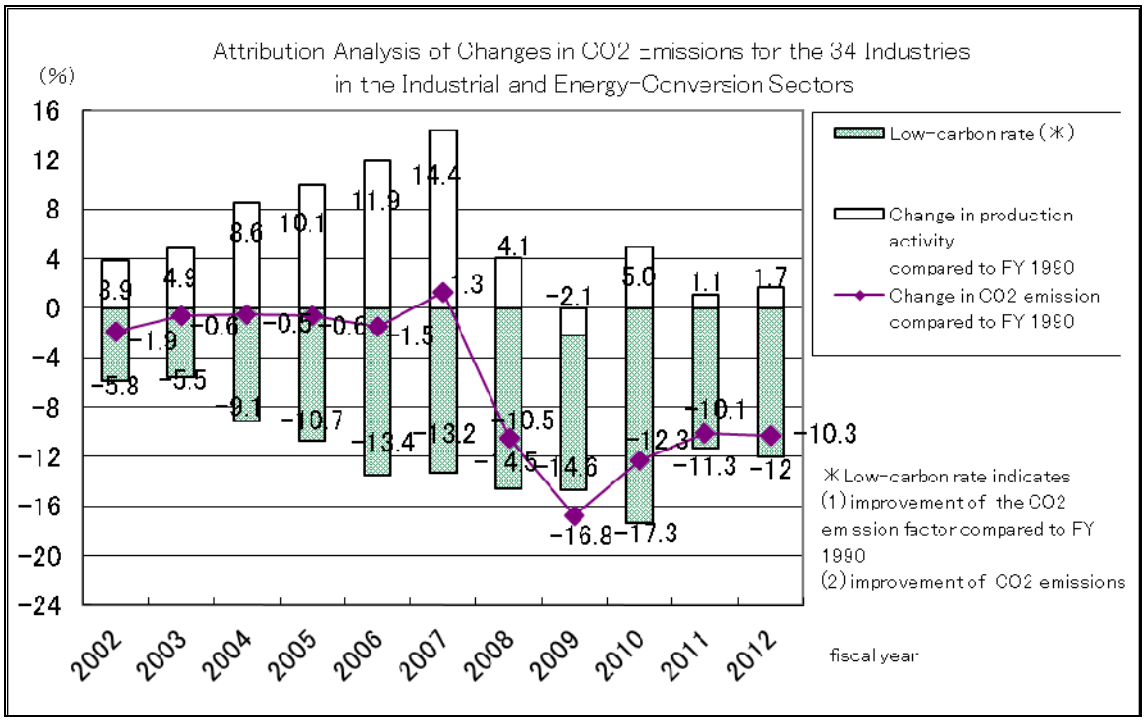
*[1] Due to the rounding of values to two decimal places, totals may differ slightly from the sum of individual items.

*[2] For change in production activity, the indices with the closest relation to energy consumption in each industry were selected.

*[3] CO_2/MJ for fuel use and CO_2/kWh for electricity consumption.

Note: The effect of depreciating credits

Emission credits depreciated by electric power companies in fiscal 2012 to help achieve their targets were about 72.00 million t-CO_2 of Kyoto Mechanism credits (approximately 30.00 million t-CO_2 in fiscal 2011, 57.00 million t-CO_2 in fiscal 2010, 52.00 million t-CO_2 in fiscal 2009, and 64.00 million t-CO_2 in fiscal 2008) and around 138,000 t-CO_2 of domestic credits. This contributed to an improvement of the CO_2 emission factor accompanying electricity use. Combining the portion of the above credit depreciation by electric power companies that corresponded to electricity consumption by the 34 industries and credit depreciation by industries other than electric power companies, the total amount of credits contributing to a reduction in CO_2 emissions by the 34 industries in fiscal 2012 was approximately 17.32 million t-CO_2 (equivalent to about 3.8% of fiscal 2012 CO_2 emissions).



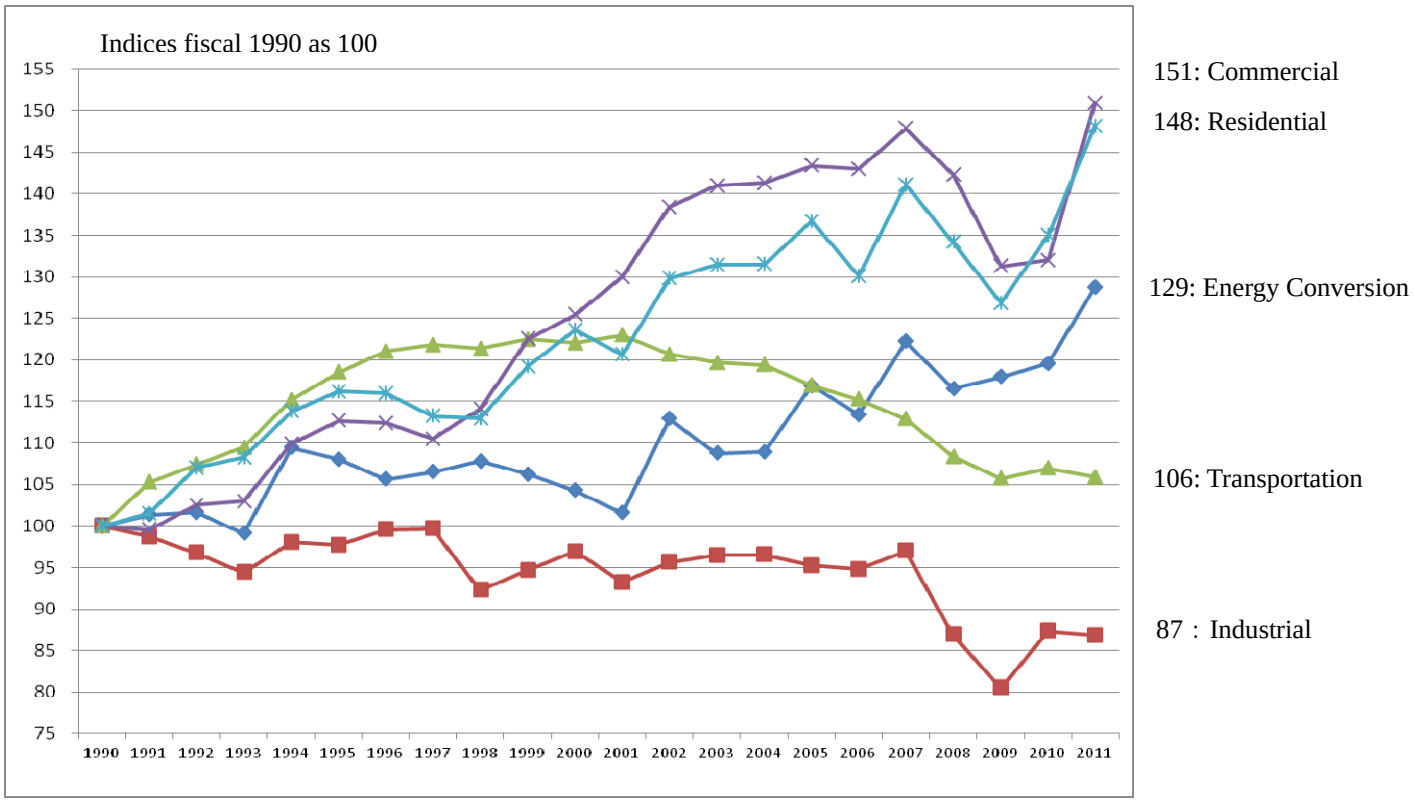
(2) Setting higher target levels by industries

Industries that have achieved greater reductions than initially forecast in the Voluntary Action Plan on the Environment have set higher target levels. A total of 39 industries have raised their targets since the Fiscal 2007 Follow-up (23 industries in fiscal 2007, six industries in fiscal 2008, five industries in 2009, and five industries in 2010).

5. Efforts in the commercial, residential, and transportation sectors to reduce CO_2 emissions

An examination of trends of Japan's total CO_2 emissions from energy consumption reveals that, based on final figures for fiscal 2011, such emissions increased 8.4% compared to fiscal 1990 (a decrease of 3.7% for all greenhouse gases including non-energy-consumption CO_2, methane, and alternatives to chlorofluorocarbons [CFCs]). A breakdown of CO_2 emissions by sector shows that emissions from the industrial sector declined 13% whereas emissions from the commercial and residential sectors recorded substantial increases of 51% and 48%, respectively.

Reference: CO_2 Emissions from Energy Consumption in Japan, by Sector

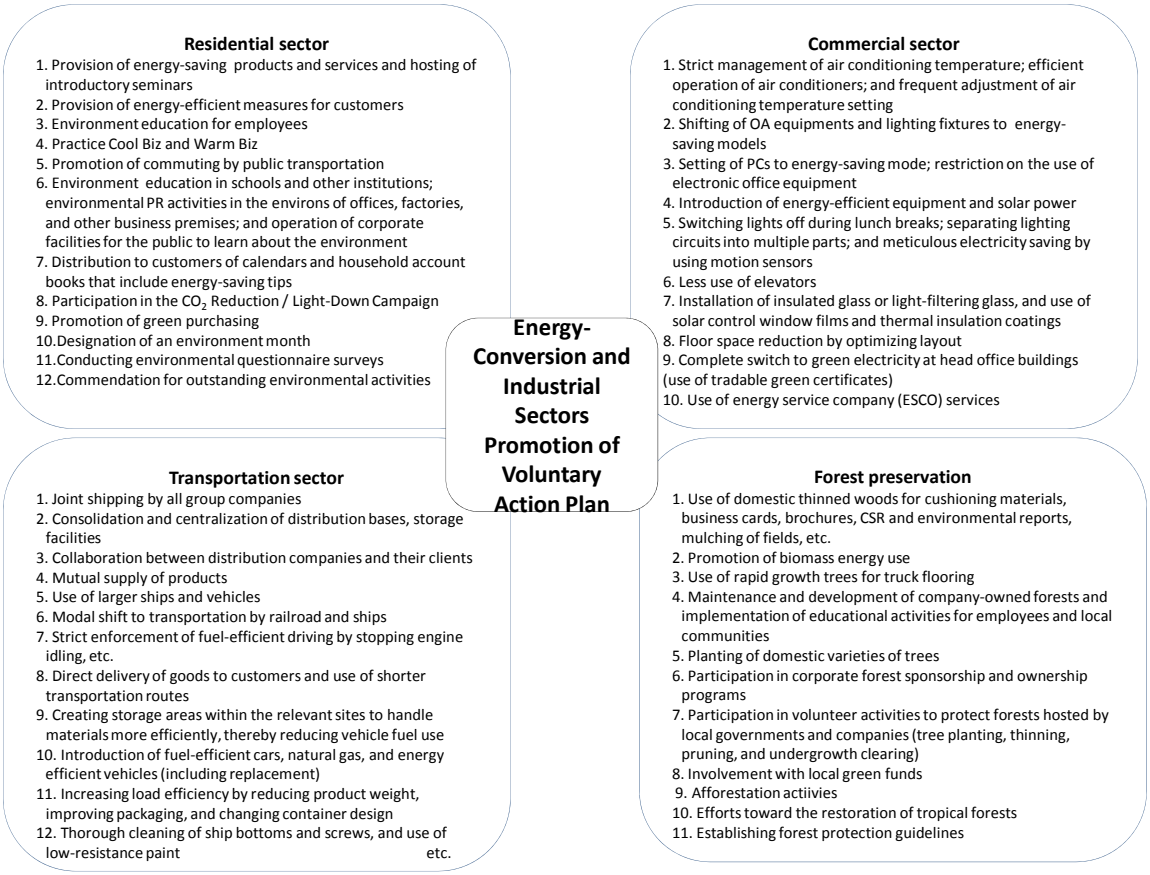


Source: Ministry of the Environment

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. Keidanren 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 by individual companies to fight climate change. Keidanren 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 June 1, 2010, statement titled “A Call for Efforts to Create a Low-Carbon Society;” the June 14, 2011, statement, “A Call for Reduced Energy Usage and Measures to Address Global Warming;” the June 19, 2012, statement, also titled “A Call for Reduced Energy Usage and Measures to Address Global Warming;” and the June 3, 2013, statement, “A Call for Electricity Savings and Measures to Address Global Warming.” All issued in Japanese.)

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

Fourteen industry groups and companies from the commercial and other sectors, and 13 industrial associations and companies from the transportation sector, took part in the Fiscal 2013 Follow-up (Attachment 2).[15] Many of the participating industries and

15. 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,

companies have set specific quantitative targets for fiscal 2008 through 2012, including targets for CO_2 emissions or CO_2 emissions intensity. They have been making steady efforts toward achieving the targets by pursuing such measures as installation of energy-saving facilities and equipment, operational improvements, and in-house education (Attachment 3).

In the transportation, commercial, and other sectors, many of the participating industries and companies that achieved results surpassing initial expectations have raised their targets, in the same manner as in the industrial and energy-conversion sectors.

(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. These efforts have led to the reduction of CO_2 emissions and of CO_2 emissions per unit of floor area (Attachment 4).

Also, as shown in the table below, there are multiple companies that have established numerical targets for operational units and are actively promoting measures toward their achievement.

Reference: Examples of Numerical Targets for Offices and Operational Units Reported by the Industrial and Energy-Conversion Sectors

Industry	Target setting entity	Numerical targets
Petroleum Association of Japan	Companies	・ Reduce energy consumption intensity by 3% in FY 2012 compared to FY 2009 ・ Reduce CO_2 emissions by an average of 8% between FY 2010 and FY 2014 compared to the average between FY 2005 and FY 2008

JR Shikoku, JR Central, JR West, JR East, and JR Hokkaido.

The Japan Gas Association	Companies	・ Reduce CO_2 emissions per unit of floor area by more than 1% annually between FY 2008 and FY 2012 compared to FY 2007 ・ Reduce total energy consumption by 22% in FY 2020 compared to FY 2005
The Japan Iron and Steel Federation	Industry	・ Reduce CO_2 emissions by an average of 5% between FY 2008 and FY 2012 compared to the average between FY 2003 and FY 2005
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% compared to FY 2005
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	Companies	・ Reduce energy consumption intensity by 3% in FY 2013 compared to FY 2010 ・ Reduce by 15% in FY 2020 compared to FY 2005

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 employing third-party logistics providers and other initiatives to increase the efficiency of distribution through collaboration between distribution companies and their clients (Attachment 5).

As shown in the table below, some companies in the industrial, energy-conversion, commercial, and other sectors have established numerical targets for their distribution operations as well.

Reference: Examples of Numerical Targets for Distribution Operations Reported by the Industrial, Energy-Conversion, Commercial, and Other Sectors

Industry	Target setting entity	Numerical targets
The Japan Gas Association	Companies	・Reduce vehicle CO_2 emissions by more than 5% by the end of FY 2015 compared to FY 2010
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 ・Reduce land transport by 1% per year
The Japanese Electric Wire & Cable Makers' Association	Industry	・Reduce energy consumption intensity by 1% per year
Japan LP Gas Association	Companies	・Enhance transport energy efficiency (energy consumption/sales) by 1% per year

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

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

Companies contribute to CO_2 emissions reduction not only by enhancing efficiency in manufacturing and production processes but also by providing low-carbon products and services, leading to cross-industry partnerships. Their ongoing efforts include the development and diffusion of products that emit less CO_2 in use, and the expanded use of wastes that were considered worthless as raw materials and sources of heat energy.

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

<table>
<tr><th>Products</th><th colspan="2">Overview</th><th>CO_2 reduction benefits</th></tr>
<tr><td rowspan="8">Appliances</td><td colspan="2">Introduce energy-efficient appliances that exceed standards set by the Top Runner Program</td><td>26.00 million t-CO_2 reduction in commercial and residential sectors in FY 2010 (estimation based on reference materials for the Kyoto Protocol Target Achievement Plan of March 2008)</td></tr>
<tr><td>Products</td><td>Numerical targets for energy efficiency gains</td><td>Actual gains (energy efficiency)</td></tr>
<tr><td>LCD/plasma TVs</td><td>16.6%
(FY 2004→FY 2008)</td><td>29.6%</td></tr>
<tr><td>DVD recorders</td><td>20.5%
(FY 2006→FY 2010)</td><td>45.2%</td></tr>
<tr><td>Air conditioners</td><td>22.4%
(FY 2005→FY 2010)</td><td>16.3%</td></tr>
<tr><td>Refrigerators</td><td>21.0%
(FY 2005→FY 2010)</td><td>43.0%</td></tr>
<tr><td>Freezers</td><td>12.7%
(FY 2005→FY 2010)</td><td>24.9%</td></tr>
<tr><td>Computers</td><td>77.9%
(FY 2007→FY 2011)</td><td>85.0%</td></tr>
<tr><td>High-function steel</td><td colspan="2">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.</td><td>Reduction of about 23.62 million t-CO_2 in FY 2012</td></tr>
</table>

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_2 but has the benefit of reducing emissions by 70 t-CO_2 from automobiles and 1,400 t-CO_2 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_2.
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.	210,000 kl per year (crude oil equivalent) introduced in FY 2010. Efforts now under way target introduction of 500,000 kl per year (crude oil equivalent) by FY 2017.
High-efficiency boilers (Eco Cute)	These water heaters are based on a heat-pump system that uses CO_2 as a cooling medium and heat recovered from the atmosphere as heat energy.	Cumulative units installed by the end of August 2011: 3.00 million units CO_2 reductions: about 2.16 million t-CO_2 per year
Natural gas cogeneration	A high-efficiency system using city gas as fuel to generate electricity and to reuse waste heat.	CO_2 reductions of 13.48 million t-CO_2 per year at FY 2012 year-end (sales of 4.82 million kW)
Fuel cells for residential use (Ene-Farm)	Highly efficient system that uses city gas to simultaneously produce electricity and hot water (including that for heating) for household use.	Emissions reduction of 49% compared to the use of conventional water heaters and electricity generated by thermal power plants (sales of about 40,000 units)
Double-glazed windows	Replacing residential single-pane glass windows with double-glazed ones boosts thermal insulation efficiency and enables some 40% cuts in air-conditioning costs.	As of FY 2012, double-glazed windows contributed to a reduction of 235,000 t-CO_2 per year. The percentage of double-glazed glass windows used in relation to total window area is estimated at 94.2% for all newly built single-family housing and 73.4% for all new apartments.

In-house production of lightweight soft-drink bottles	Producing a higher percentage of PET bottles in-house cuts emissions attributable to PET bottle delivery and shipping operations. The use of lighter-weight packaging for bottles helps reduce emissions that occur at the bottle manufacturing and shipping stages.	Greater in-house production would reduce emissions by about 25,414 t-CO_2, which corresponds to emissions of about 228,000 trucks. Weight reductions would reduce emissions by about 14,298 t-CO_2 compared to 2011 (assuming 1.5 kg of CO_2 is released per kilogram of PET bottle material consumed).
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_2 per year (average of 940,000 t-CO_2 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 raw material has reduced energy consumption by $1{,}302\times10^6$ MJ for Japan as a whole (corresponding to 22.0 MJ/t-cement). This is equivalent to a reduction in emissions of about 93,000 t-CO_2.
High-performance grooved copper tubes	Compared to the use of bare tubes, air conditioners with high-performance grooved copper tubes cause CO_2 emissions to increase 3.3 kg-CO_2 per unit in the manufacturing process, but emissions from the use of air conditioners can be reduced.	Assuming that air conditioners are in use 4,445 hours per year (JISC 9612) and that they have a life of 10 years, emissions will be reduced about 2,216 kg-CO_2 per unit compared to bare-tube units even when the difference in CO_2 emissions during manufacture is factored in.
Hybrid forklifts	By replacing gasoline-driven forklifts with hybrid ones, CO_2 emissions from the use of forklifts can be greatly reduced.	Use of hybrid forklifts reduces CO_2 emissions by up to 74% compared to gasoline-driven forklifts with equivalent load capacity.

Lightweight paper and cardboard	Reducing the weight of paper and cardboard per unit area (by about 10% compared to conventional products made overseas) has contributed to reducing CO_2 emissions during shipping.	Reducing the weight of paper and cardboard products by about 10% would cut CO_2 emissions during cargo shipping by about 0.6%. As of FY 2011, lighter-weight paper and cardboard contributed to a reduction of about 500,000 t-CO_2 per year in Japan.
Water-saving toilets / toilets with heated bidet seats	Sanitary ware products are used over significantly longer periods of time compared to the time required for production and disposal. The total amount of water flushed during the use phase of these products is enormous. Since the processes of generating water for flushing as well as treating sewage consume energy and emit CO_2, reducing the amount of water flushed helps cut CO_2 emissions.	By replacing a conventional toilet that uses 13 liters per flush with a water-saving toilet that uses 6 liters, CO_2 emissions can be cut by about 60% (a reduction of 26.7 kg- CO_2 per year). Use of ultra-water-saving toilets (73% water saving) and heated toilet seats that warm only when in use achieves a reduction of 127 kg-CO_2 per year.

(5) Support for national campaigns and the promotion of forest management activities

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 through national campaigns so that they will use more energy-efficient products and environmentally friendly goods and services. Many companies actively pursued 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, the eco-point program for household electrical appliances, and the housing eco-point program that were introduced in or after the spring of 2009 have helped promote the purchases of automobiles and household electrical appliances with advanced energy-saving performance, as well as encouraging 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, Keidanren called 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.[16]

Reference: Examples of Environmental Household Account Book Programs Reported by the Industrial and Energy-Conversion Sectors

Industry	Program
The Japan Gas Association	Out of 106 member companies, environmental household account books are being used by about 5,500 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 number of participating households has remained over 20,000 since FY 2008.
Japan Chemical Industry Association	Participating employees of member companies total 5,600.
Japan Paper Association	Each year (April–March) stakeholder households check electricity, gas, and water usage to experience the use of environmental household account books and understand the state of utility use. In FY 2012, 301 people in 104 households submitted environmental household account books. 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, installation of solar panels, switching to high-efficiency air conditioners, and using power strips with on/off switches.

16. On June 14, 2011, Keidanren Chairman Hiromasa Yonekura issued a statement urging that member companies step up their efforts to prevent climate change by augmenting and achieving the goals of their Voluntary Action Plans on the Environment, participating in Keidanren's Commitment to a Low Carbon Society, and encouraging clients, employees, and other stakeholders to become more actively involved.

In addition, a number of initiatives to protect forests and CO_2 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 have spread into various sectors (see "Reference: Circle of Widening Voluntary Efforts in the Commercial, Residential, Transportation, and Other Sectors" on page 9).

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

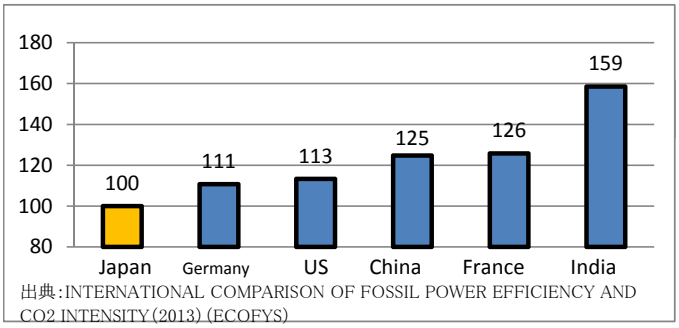
(1) International comparisons of energy efficiency

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 2013 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 6).

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.

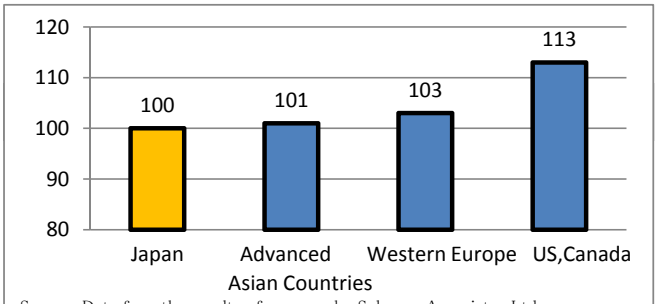
Reference: International Comparisons of Energy Efficiency in Industrial and Energy-Conversion Sectors

Energy required to produce 1kWh of electricity through thermal power generation (2010)



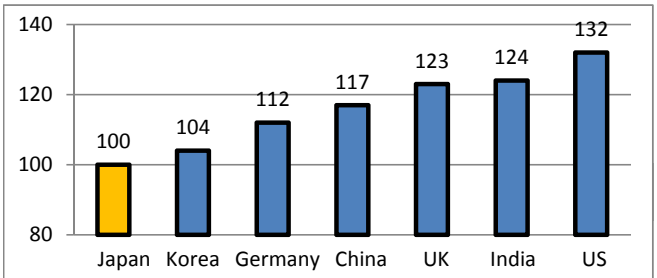
出典:INTERNATIONAL COMPARISON OF FOSSIL POWER EFFICIENCY AND CO2 INTENSITY (2013) (ECOFYS)

Energy required to produce 1 kl of oil products (2004)



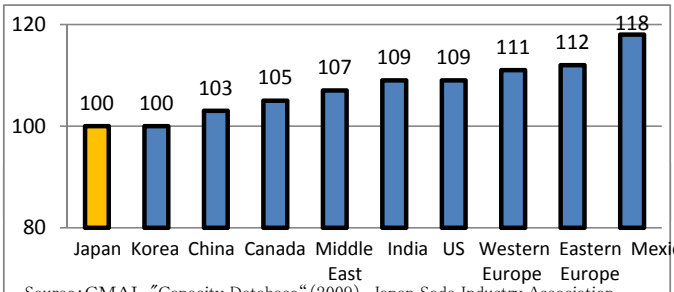
Source: Data from the results of a survey by Solomon Associates Ltd.

Energy required to produce 1 ton of iron (2010)



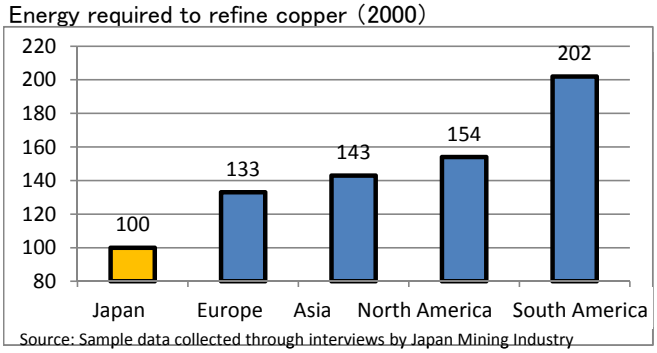
Source:Research Institute for Innovative Technology for the Earth,"International Comparison of Energy Efficienc"

Energy required to produce 1 ton of electrolytic caustic soda (2009)



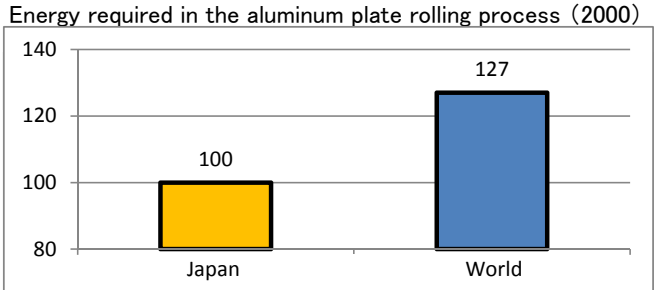
Source:CMAI "Capacity Database"(2009), Japan Soda Industry Association "Soda Handbook" (2009)

Energy required to refine copper (2000)



Source: Sample data collected through interviews by Japan Mining Industry

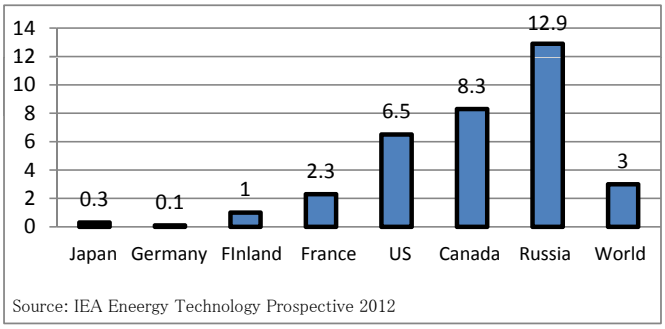
Energy required in the aluminum plate rolling process (2000)



Source: International Aluminium Institute and Life Cycle Assessment Society of Japan's Datab

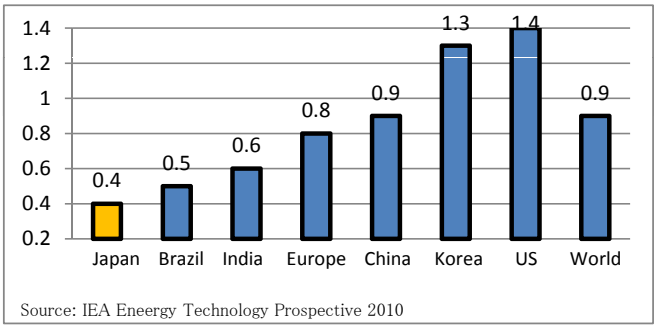
Reference: International Comparisons of Energy Saving Potentials Compared to BAT

Energy saving potential by adopting BAT (Pulp and Paper) (GJ/T)



Source: IEA Eneergy Technology Prospective 2012

Energy saving potential by adopting BAT (Cement) (GJ/T)



Source: IEA Eneergy Technology Prospective 2010

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

In the Fiscal 2013 Follow-up, many specific operations including 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 industry's reduction efforts alone, under the Voluntary Action Plan on the Environment, the industry may utilize supplementary means of the Kyoto Mechanisms such as credits from the Clean Development Mechanism (CDM) and Joint Implementation (JI) to achieve their targets.

Some industry groups have made massive financial contributions to acquire credits through the Kyoto Mechanisms in order to help meet their voluntary targets, despite having already achieved world-leading levels of energy efficiency.

7. Future Policies: From Voluntary Action Plans to Keidanren's Commitment to a Low Carbon Society

The Kyoto Protocol Target Achievement Plan that the government revised in March 2008 refers to the advantages of the 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 Voluntary Action Plan on the Environment is recognized for an instrumental role in facilitating the industrial sectors' efforts toward the achievement of targets.

As stated above, Keidanren far surpassed its uniform target of endeavoring "to reduce average CO_2 emissions from the industrial and energy-conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990" by reducing average CO_2 emissions between fiscal 2008 and 2012 by 12.1% compared to fiscal 1990.

From 2013, following the end of the first commitment period under the Kyoto Protocol, we will maintain a rigorous approach to compiling industry-specific action plans submitted in accordance with Keidanren's Commitment to a Low Carbon Society announced in January 2013, and to reviewing industry initiatives on the basis of a transparent and credible plan-do-check-act (PDCA) cycle. To reinforce the PDCA cycle, review of the action plans has been expanded to include a third-party evaluation committee. This committee has already conducted reviews of targets set by 16 industries and published its report.

Keidanren's Commitment to a Low Carbon Society 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. In addition to voluntary reduction targets set by each industry, Keidanren will present information on potential for emissions reduction during the usage phase of energy-saving products and potential reductions that could be achieved by installing or supplying highly efficient Japanese products, technologies, expertise, and services overseas. Through such initiatives, we will contribute to reducing greenhouse gases on a global scale.

Looking back over the results of initiatives undertaken through Voluntary Action Plans, it is clear that proactive industry-led efforts in Japan contribute to curbing greenhouse gas emissions. The Japanese government is currently formulating global warming measures for 2013 and beyond. To create effective global warming measures, the government should position Keidanren's Commitment to a Low Carbon Society as the key pillar for industry efforts. Conversely, a domestic emissions trading scheme should not be introduced, since it would run counter to global warming measures on a worldwide scale by leading to carbon leakage and diverting resources that could otherwise be devoted to researching, developing, and introducing advanced technologies.

In order to support initiatives under Keidanren's Commitment to a Low Carbon Society, we urge the government to take truly effective steps to resolve the worldwide issue of global warming, in particular, by designing appropriate bilateral offset mechanisms to promote the widespread overseas use of Japanese products, technologies, and expertise,

which attain world-class levels of energy efficiency, and by enhancing R&D tax incentives with a view to encouraging further research and development.

To promote truly effective global warming countermeasures, Keidanren will contribute to worldwide reduction of greenhouse gases by reassessing Voluntary Action Plans on the Environment to incorporate their best points into its Commitment to a Low Carbon Society and steadily working to resolve outstanding issues.

(Attachment 1)

Trends in Industrial and Energy-Conversion Sectors

(10,000t-CO2; 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	FY2010	FY2011	FY2012	Compared to FY 1990(%)	Compared to FY 2010(%)
Federation of Electric Power Companies	CO2 emissions (with credits)														33,200	30,100	31,700	40,900	41,500	+50.9%	+1.5%
	CO2 emissions (excluding credits)		27,500	29,000	28,300	30,400	31,500	31,000	34,000	36,100	36,200	37,300	36,500	41,700	39,500	35,300	37,400	43,900	48,600	+76.7%	+10.7%
	CO2 emissions intensity (with credits)														0.89	0.84	0.84	1.14	1.17		
	CO2 emissions intensity (excluding 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	0.99	1.22	1.37		
	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	13,600	16,600	18,300	+69.4%	+10.2%
	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	0.93	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	1.37	1.31	1.29		
Portion attributed to power industry: figures	CO2 emissions (with credits)														3,330	3,030	3,100	4,010	3,930	+28.0%	−2.0%
	CO2 emissions (excluding credits)		3,070	3,350	3,220	3,340	3,410	3,340	3,700	3,860	3,830	3,850	3,700	4,250	3,960	3,560	3,650	4,300	4,610	+50.2%	+7.2%
	Energy consumption		1,210	1,300	1,240	1,280	1,300	1,260	1,380	1,440	1,410	1,410	1,370	1,580	1,470	1,330	1,330	1,630	1,740	+43.8%	+6.7%
Petroleum Association of	CO2 emissions (with credits)														4,036	3,922	3,963	3,750	3,770	+21.9%	+0.5%
	CO2 emissions (excluding credits)		3,094	4,105	4,062	4,093	4,053	4,047	4,016	2,186	4,037	4,133	3,294	4,164	4,053	3,936	3,978	3,758	3,792	+22.5%	+0.9%
	CO2 emissions intensity (with credits)														0.85	0.84	0.84	0.84	0.84		
	CO2 emissions intensity (excluding credits)		1	0.92	0.93	0.90	0.89	0.89	0.88	0.47	0.87	0.85	0.69	0.85	0.86	0.85	0.84	0.84	0.85		
	Energy consumption		1,287	1,705	1,670	1,675	1,661	1,657	1,650	735	1,665	1,714	1,470	1,725	1,688	1,633	1,651	1,556	1,575	+22.4%	+1.2%
	Energy consumption intensity ☆	-13%	1	0.92	0.92	0.89	0.87	0.87	0.87	0.38	0.86	0.84	0.74	0.85	0.86	0.84	0.84	0.84	0.85		
	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	1.52	1.44	1.44		
Japan Gas Association	CO2 emissions (with credits)*5														34	31	31	36	36	−73.2%	−1.1%
	CO2 emissions (excluding credits)*5		133	107	96	92	83	72	66	58	53	46	38	40	37	34	34	38	39	−70.4%	+4.8%
	CO2 emissions intensity (with credits)*5														0.11	0.11	0.10	0.11	0.11		
	CO2 emissions intensity (excluding 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	0.11	0.12	0.12		
	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	19.1	18.8	18.4	−72.4%	−2.3%
	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	0.12	0.12	0.12		
	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	2.33	2.38	2.39		
Japan Iron and Steel	CO2 emissions (with credits)														17,619	16,545	18,618	18,377	18,577	−7.4%	+1.1%
	CO2 emissions (excluding credits)		20,061	19,800	18,644	19,234	18,364	17,895	18,387	18,601	18,792	18,703	19,015	19,715	17,815	16,690	18,796	18,475	18,811	−6.2%	+1.8%
	CO2 emissions intensity (with credits)														0.91	0.92	0.90	0.93	0.93		
	CO2 emissions intensity (excluding 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	0.91	0.94	0.94		
	Energy consumption ☆	-10%	6,288	6,241	5,872	6,023	5,762	5,582	5,717	5,776	5,861	5,837	5,965	6,138	5,569	5,208	5,869	5,708	5,746	−8.6%	+0.7%
	Energy consumption intensity		1	1.09	1.16	1.10	0.95	0.95	0.91	0.90	0.90	0.90	0.88	0.87	0.91	0.93	0.91	0.92	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	1.03	0.98	0.99		
Japan Chemical Industry Association	CO2 emissions (with credits)														5,923	5,786	5,961	6,042	5,763	−9.3%	−4.6%
	CO2 emissions (excluding credits)		6,352	6,890	6,643	6,915	6,908	6,582	6,703	6,774	6,845	6,801	6,671	6,738	6,110	5,938	6,133	6,135	5,997	−5.6%	−2.3%
	CO2 emissions intensity (with credits)														0.83	0.79	0.76	0.82	0.82		
	CO2 emissions intensity (excluding credits)		1	0.92	0.92	0.91	0.91	0.92	0.91	0.90	0.88	0.86	0.83	0.82	0.86	0.81	0.79	0.84	0.85		
	Energy consumption		2,674	2,973	2,863	2,961	2,910	2,773	2,802	2,808	2,867	2,881	2,858	2,901	2,639	2,620	2,717	2,584	2,485	−7.1%	−3.8%
	Energy consumption intensity ☆	-20%	1	0.94	0.94	0.92	0.91	0.92	0.90	0.88	0.87	0.86	0.84	0.84	0.88	0.85	0.83	0.84	0.84		
	Production activity index		1	1.18	1.14	1.20	1.19	1.13	1.16	1.19	1.23	1.25	1.27	1.29	1.12	1.15	1.23	1.15	1.11		
Japan Paper Association	CO2 emissions (with credits)														2,081	1,917	1,842	1,836	1,787	−29.8%	−2.7%
	CO2 emissions (excluding credits)		2,547	2,605	2,607	2,647	2,729	2,629	2,650	2,640	2,585	2,464	2,321	2,313	2,124	1,949	1,877	1,854	1,826	−28.3%	−1.5%
	CO2 emissions intensity (with credits)														0.80	0.80	0.75	0.78	0.78		
	CO2 emissions intensity (excluding 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	0.82	0.81	0.77	0.79	0.80		
	Energy consumption		947	955	954	964	982	937	942	929	910	875	834	828	757	693	673	643	616	−34.9%	−4.1%
	Energy consumption intensity ☆	-20%	1	0.95	0.97	0.94	0.94	0.95	0.92	0.92	0.89	0.85	0.81	0.79	0.79	0.77	0.74	0.73	0.72		
	Production activity index		1	1.06	1.04	1.08	1.11	1.04	1.08	1.07	1.08	1.09	1.09	1.11	1.02	0.94	0.96	0.92	0.90		
Cement Association of Japan	CO2 emissions (with credits)														1,944	1,736	1,642	1,695	1,740	−36.5%	+2.7%
	CO2 emissions (excluding credits)		2,741	2,681	2,480	2,464	2,473	2,376	2,249	1,883	2,107	2,177	2,144	2,107	1,959	1,747	1,654	1,701	1,757	−35.9%	+3.3%
	CO2 emissions intensity (with credits)														1.00	1.01	1.00	1.00	1.00		
	CO2 emissions intensity (excluding credits)		1	0.98	1.02	1.02	1.02	1.02	1.01	0.87	1.00	1.00	1.00	1.02	1.01	1.02	1.00	1.01	1.01		
	Energy consumption		861	823	756	747	745	715	674	568	630	651	641	628	584	521	495	505	518	−39.8%	+2.6%
	Energy consumption intensity ☆	-3.8%	1	0.96	0.99	0.98	0.98	0.98	0.97	0.84	0.95	0.95	0.95	0.96	0.96	0.97	0.96	0.95	0.94		

Industry	(☆: target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	Compared to FY 1990(%)	Compared to FY 2010(%)
	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	0.60	0.62	0.64		
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	CO2 emissions (with credits)														1,624	1,467	1,451	1,703	1,680	+51.1%	−1.4%
	CO2 emissions (excluding credits)		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	1,665	1,653	1,803	1,922	+72.9%	+6.6%
	CO2 emissions intensity (with credits)														0.56	0.57	0.53	0.66	0.66		
	CO2 emissions intensity (excluding 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	0.60	0.70	0.76		
	Energy consumption		638	832	799	803	849	817	838	933	978	1,010	1,065	1,136	1,028	980	974	890	863	+35.2%	−3.1%
	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	0.62	0.60	0.60		
	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	2.46	2.33	2.27		
Japan Federation of Construction Contractors	CO2 emissions (with credits)														495	442	375	381	381	−58.7%	−0.0%
	CO2 emissions (excluding credits)		923	892	876	718	704	659	642	514	492	518	490	512	509	454	387	388	394	−57.3%	+1.5%
	CO2 emissions intensity (with credits)														0.85	0.87	0.85	0.87	0.84		
	CO2 emissions intensity (excluding 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	0.88	0.88	0.87		
	Energy consumption		429	416	409	336	324	301	286	229	225	222	215	209	208	189	164	157	153	−64.3%	−2.5%
	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	0.80	0.77	0.73		
	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	0.48	0.48	0.49		
Japan Automobile Manufacturers Association Japan Auto-body Industries Association	CO2 emissions (with credits) ☆	-25%													508	451	469	550	549	−34.9%	−0.1%
	CO2 emissions (excluding credits)		844	724	684	682	680	643	674	679	672	682	660	657	553	486	507	571	601	−28.8%	+5.4%
	CO2 emissions intensity (with credits)														0.56	0.59	0.58	0.67	0.63		
	CO2 emissions intensity (excluding credits)		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	0.63	0.70	0.69		
	Energy consumption		435	400	381	367	354	336	339	333	337	343	338	337	289	265	275	280	277	−36.4%	−1.2%
	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	0.66	0.66	0.62		
	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	0.96	0.97	1.03		
Japan Auto Parts Industries Association	CO2 emissions (with credits) ☆	-7%													531	463	505	606	630	−11.9%	+3.9%
	CO2 emissions (excluding credits)		715	688	645	650	637	578	626	644	654	695	682	735	590	510	557	635	704	−1.6%	+10.8%
	CO2 emissions intensity (with credits)														0.57	0.53	0.54	0.63	0.63		
	CO2 emissions intensity (excluding credits) ☆	-20%	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	0.59	0.66	0.70		
	Energy consumption		375	406	390	381	361	329	340	335	348	362	366	375	308	282	307	305	312	−16.9%	+2.3%
	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	0.62	0.60	0.59		
	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	1.32	1.35	1.40		
Japan Federation of Housing Organizations	CO2 emissions (with credits) ☆	-20%													368	259	256	267	274	−47.1%	+2.8%
	CO2 emissions (excluding credits)		519	549	507	517	506	494	472	442	427	409	415	373	368	259	256	267	274	−47.1%	+2.8%
	CO2 emissions intensity (with credits)														1.10	0.99	0.90	0.91	0.90		
	CO2 emissions intensity (excluding credits)		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	0.99	0.90	0.91	0.90		
	Energy consumption		197	209	193	169	164	164	181	169	164	137	138	124	115	100	98	103	106	−46.4%	+2.8%
	Energy consumption intensity		1	1.15	1.18	0.96	0.95	1.03	1.19	1.10	1.06	0.87	0.87	0.95	0.91	1.00	0.91	0.93	0.91		
	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	0.55	0.56	0.59		
Japan Mining Industry Association	CO2 emissions (with credits)														433	426	438	460	520	+6.9%	+13.1%
	CO2 emissions (excluding credits)		486	483	481	494	505	503	502	516	510	497	482	491	463	452	466	474	558	+14.8%	+17.8%
	CO2 emissions intensity (with credits)														0.80	0.79	0.79	0.89	0.91		
	CO2 emissions intensity (excluding 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	0.84	0.92	0.98		
	Energy consumption		205	210	213	219	220	217	215	215	216	208	206	205	196	197	205	191	212	+3.2%	+10.8%
	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	0.87	0.88	0.88		
	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	1.14	1.06	1.18		
Lime Manufacture	CO2 emissions (with credits) ☆	-10%													272	239	263	229	220	−37.8%	−4.0%
	CO2 emissions (excluding credits)		354	310	272	293	302	275	292	299	300	306	312	327	276	242	266	231	224	−36.7%	−3.1%
	CO2 emissions intensity (with credits)														0.80	0.77	0.75	0.73	0.74		
	CO2 emissions intensity (excluding credits)		1	0.94	0.90	0.92	0.93	0.91	0.92	0.90	0.87	0.86	0.86	0.86	0.81	0.78	0.76	0.74	0.75		
	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	94.5	81.9	78.3	−35.7%	−4.4%
	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	0.79	0.76	0.76		
	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	0.99	0.88	0.84		
The Japan Rubber Manufacturers Association	CO2 emissions (with credits)*5														188	171	181	205	195	−3.4%	−4.9%
	CO2 emissions (excluding credits)*5		201	192	189	195	192	185	196	211	217	223	215	220	201	181	192	211	209	+3.6%	−0.9%
	CO2 emissions intensity (with credits)														0.69	0.71	0.66	0.81	0.83		

Industry	(☆: target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	Compared to FY 1990(%)	Compared to FY 2010(%)
	CO2 emissions intensity (excluding credits)		1	0.90	0.88	0.92	0.85	0.85	0.86	0.88	0.86	0.82	0.75	0.77	0.78	0.78	0.73	0.85	0.93		
	Energy consumption		98.8	99.8	99.5	100.7	97.0	94.0	97.1	100.9	104.5	106.9	106.4	107.2	100.0	93.3	99.4	99.9	94.6	−4.3%	−5.3%
	Energy consumption intensity		1	1.00	1.01	1.03	0.92	0.93	0.91	0.90	0.91	0.90	0.88	0.88	0.90	0.97	0.91	0.90	0.92		
	Production activity index		1	1.01	1.00	0.99	1.06	1.02	1.09	1.14	1.17	1.21	1.23	1.23	1.12	0.97	1.11	1.12	1.04		
The Federation of Pharmaceutical Manufacturers' Association of Japan Japan Pharmaceutical Manufacturers Association	CO2 emissions (with credits)	☆ ±0%													180	163	162	185	191	+15.7%	+3.5%
	CO2 emissions (excluding credits)		166	184	186	204	203	199	205	214	218	215	208	212	195	176	174	192	209	+26.2%	+8.8%
	CO2 emissions intensity (with credits)														0.69	0.60	0.59	0.64	0.65		
	CO2 emissions intensity (excluding credits)		1	0.98	0.92	0.96	0.92	0.88	0.88	0.91	0.90	0.86	0.82	0.82	0.74	0.65	0.63	0.66	0.71		
	Energy consumption		78.4	94.9	97.2	103	100	100	101	103	106	104	103	103	98	94	94	93	95	+21.2%	+2.4%
	Energy consumption intensity		1	1.07	1.01	1.03	0.96	0.93	0.92	0.92	0.92	0.88	0.86	0.84	0.79	0.73	0.72	0.68	0.68		
	Production activity index		1	1.14	1.22	1.29	1.33	1.37	1.40	1.42	1.47	1.52	1.53	1.56	1.59	1.64	1.67	1.75	1.77		
Flat Glass Association	CO2 emissions (with credits)	☆ -22%													119	106	111	114	108	−39.5%	−5.1%
	CO2 emissions (excluding credits)		178	163	145	138	134	137	132	134	134	133	136	130	122	108	114	115	111	−37.8%	−3.7%
	CO2 emissions intensity (with credits)														1.13	1.12	1.01	1.08	0.97		
	CO2 emissions intensity (excluding credits)		1	1.15	1.17	1.09	1.10	1.11	1.11	0.97	0.98	1.03	1.03	1.09	1.15	1.15	1.03	1.09	0.99		
	Energy consumption	☆ -21%	71.4	65.0	58.8	55.4	53.8	55.1	52.3	52.2	52.3	51.7	53.5	50.5	48.2	43.2	45.5	44.5	42.4	−40.6%	−4.7%
	Energy consumption intensity		1	1.14	1.18	1.10	1.09	1.11	1.10	0.95	0.95	1.00	1.01	1.06	1.13	1.14	1.03	1.06	0.95		
	Production activity index		1	0.80	0.70	0.71	0.69	0.69	0.67	0.77	0.77	0.72	0.74	0.67	0.60	0.53	0.62	0.59	0.63		
Japan Aluminum Association	CO2 emissions (with credits)														126	117	122	133	130	−12.6%	−2.2%
	CO2 emissions (excluding credits)		148	162	152	161	163	155	161	165	163	160	154	156	135	125	131	137	140	−5.6%	+2.2%
	CO2 emissions intensity (with credits)														0.81	0.81	0.78	0.90	0.92		
	CO2 emissions intensity (excluding credits)		1	0.93	0.93	0.93	0.92	0.95	0.95	0.93	0.92	0.95	0.89	0.91	0.87	0.86	0.83	0.93	0.99		
	Energy consumption		73.4	84.5	79.8	83.1	80.8	76.8	78.4	78.6	79.1	77.3	77.2	78.0	69.2	66.5	69.5	66.7	64.7	−11.9%	−3.1%
	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	0.86	0.87	0.88		
	Production activity index	(95年比)	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	1.05	0.98	0.94		
Brewers Association of Japan	CO2 emissions (with credits)	☆ -10%													60.0	56.0	52.8	53.2	54.7	−51.4%	+2.8%
	CO2 emissions (excluding credits)		112	121	117	114	108	104	99.8	94.5	89.4	87.3	84.8	78.4	62.9	58.3	55.0	54.3	57.5	−48.9%	+5.8%
	CO2 emissions intensity (with credits)														0.57	0.54	0.52	0.54	0.55		
	CO2 emissions intensity (excluding credits)		1	0.99	0.95	0.92	0.88	0.85	0.83	0.84	0.80	0.80	0.78	0.73	0.60	0.56	0.54	0.55	0.58		
	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	29.5	27.4	27.9	−48.1%	+2.0%
	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	0.61	0.58	0.59		
	Production activity index		1	1.09	1.09	1.10	1.09	1.09	1.06	1.00	1.00	0.98	0.97	0.96	0.93	0.92	0.90	0.88	0.88		
Japan Electric Wire and Cable Makers' Association	CO2 emissions (with credits)														68.5	62.9	66.0	81.5	79.7	−19.9%	−2.2%
	CO2 emissions (excluding credits)		100	92.7	87.3	87.7	91.9	85.5	84.9	88.8	82.7	83.7	81.7	88.8	78.8	71.3	74.9	86.3	91.0	−8.6%	+5.5%
	CO2 emissions intensity (copper/aluminum) (with credits)														0.96	0.96	1.01	1.22	1.21		
	CO2 emissions intensity (copper/aluminum) (excluding credits)		1	0.97	1.04	1.12	1.07	1.11	1.10	1.17	1.10	1.07	1.01	1.10	1.10	1.09	1.15	1.29	1.37		
	CO2 emissions intensity (optical fiber)(with credits)														0.22	0.20	0.21	0.25	0.23		
	CO2 emissions intensity (optical fiber) (excluding credits)		1	0.77	0.72	0.59	0.45	0.40	0.44	0.49	0.42	0.27	0.26	0.26	0.26	0.23	0.24	0.27	0.27		
	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	37.0	35.4	33.8	−41.1%	−4.4%
	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	6.1	6.4	6.4	6.6	7.1		
	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	1.12	1.07	1.03		
	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	0.24	0.22	0.22	0.21	0.22	0.20	0.18		
	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	0.57	0.58	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	22.03	24.95	27.22		
Japan Dairy Industry Association *4	CO2 emissions (with credits)														105	101	101	107	109	+30.8%	+2.1%
	CO2 emissions (excluding credits)		83.6	93.4	95.9	100	98	100	91	109	106	108	108	112	111	106	106	110	116	+38.6%	+5.6%
	CO2 emissions intensity (with credits)														1.07	1.06	1.05	1.09	1.08		
	CO2 emissions intensity (excluding credits)		0.91	0.85	0.86	0.88	1	1.03	1.10	1.07	1.04	1.08	1.06	1.09	1.13	1.11	1.10	1.11	1.14		
	Energy consumption		39.3	47.3	49.1	50.1	48.0	49.2	42.9	50.5	49.8	49.8	50.9	52.1	52.2	51.8	52.1	50.4	51.2	+30.2%	+1.6%
	Energy consumption intensity	☆ -0.5%	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	1.12	1.06	1.04		
	Production activity index	(00年比)	1	1.20	1.21	1.24	1.07	1.06	0.91	1.12	1.12	1.09	1.11	1.12	1.07	1.04	1.05	1.08	1.11		
Japan Brass Makers Association *4	CO2 emissions (with credits)														48.0	46.5	50.0	56.8	54.6	−16.6%	−3.9%
	CO2 emissions (excluding 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	51.3	55.3	59.6	61.0	−6.9%	+2.3%

Industry	(☆: target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	Compared to FY 1990(%)	Compared to FY 2010(%)
	CO2 emissions intensity (with credits)														0.90	0.91	0.86	1.03	1.07		
	CO2 emissions intensity (excluding 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	0.95	1.08	1.20		
	Energy consumption		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	31.1	29.1	27.5	−25.7%	−5.7%
	Energy consumption intensity ☆	-9.05% (95年比)	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	0.95	0.94	0.96		
	Production activity index	(95年比)	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	0.89	0.84	0.78		
Japan Society of Industrial	CO2 emissions (with credits) ☆	-12.2% (97年比)													56.9	47.0	49.7	61.4	59.1	−6.9%	−3.8%
	CO2 emissions (excluding credits)	(97年比)	63.4	64.0	58.8	56.9	57.7	58.0	59.6	63.0	64.0	67.9	66.2	68.4	64.1	52.5	55.7	64.7	66.8	+5.4%	+3.3%
	CO2 emissions intensity (with credits)														1.00	0.87	1.00	1.17	1.15		
	CO2 emissions intensity (excluding credits)			1	1.07	1.13	1.17	1.23	1.32	1.41	1.32	1.31	1.17	1.12	1.13	1.02	1.14	1.23	1.30		
	Energy consumption		33.1	26.7	25.6	24.6	22.4	22.5	21.1	21.2	21.9	22.7	23.5	23.4	22.9	20.5	22.1	22.0	20.9	−37.0%	−5.2%
	Energy consumption intensity			1	1.08	1.13	1.11	1.17	1.20	1.22	1.18	1.14	1.05	0.95	0.98	0.94	1.04	0.97	0.93		
	Production activity index			1	0.90	0.80	0.79	0.75	0.72	0.70	0.77	0.81	0.88	0.96	0.89	0.84	0.77	0.82	0.80		
Japan Bearing Industrial Association *4	CO2 emissions (with credits)														60.4	51.2	61.9	78.0	73.9	+23.0%	−5.2%
	CO2 emissions (excluding credits)		60.1	56.5	52.5	55.3	59.2	54.8	61.0	66.5	69.6	73.0	71.5	79.8	69.0	57.8	69.9	82.4	84.0	+39.8%	+1.9%
	CO2 emissions intensity (with credits) ☆	-13% (97年比)													0.89	0.88	0.82	1.01	1.05		
	CO2 emissions intensity (excluding credits)	(97年比)		1	1.00	1.00	0.97	1.01	1.04	1.04	1.00	1.00	0.95	0.99	1.01	1.00	0.92	1.07	1.19		
	Energy consumption		35.2	35.8	34.2	34.7	35.7	33.1	35.3	36.6	39.4	40.4	40.7	42.3	37.3	33.3	40.2	40.1	37.2	+5.6%	−7.2%
	Energy consumption intensity			1	1.03	0.99	0.92	0.96	0.95	0.90	0.89	0.87	0.85	0.83	0.86	0.91	0.84	0.82	0.83		
	Production activity index			1	0.93	0.98	1.08	0.96	1.04	1.13	1.24	1.29	1.34	1.43	1.20	1.03	1.34	1.37	1.25		
Japan Sugar Refiners' Association	CO2 emissions (with credits) ☆	-22%													42.7	40.2	39.1	43.5	40.6	−30.0%	−6.7%
	CO2 emissions (excluding credits)		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	41.0	39.8	44.0	41.7	−28.2%	−5.2%
	CO2 emissions intensity (with credits)														0.89	0.85	0.84	0.93	0.90		
	CO2 emissions intensity (excluding 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	0.86	0.94	0.93		
	Energy consumption		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	19.3	20.6	19.4	−20.2%	−5.9%
	Energy consumption intensity		1	1.01	1.02	1.02	1.01	1.03	0.97	0.98	0.95	0.96	1.03	1.03	1.02	1.01	1.00	1.06	1.03		
	Production activity index		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	0.80	0.80	0.77		
Japan Sanitary Equipment Industry Association	CO2 emissions (with credits) ☆	-25%													25.4	23.3	21.3	25.5	22.7	−52.5%	−11.0%
	CO2 emissions (excluding credits)		47.8	41.5	34.8	35.5	36.4	37.2	35.3	36.3	36.1	35.0	33.3	29.8	26.9	24.6	22.6	26.3	24.5	−48.8%	−7.0%
	CO2 emissions intensity (with credits)														0.52	0.53	0.42	0.49	0.43		
	CO2 emissions intensity (excluding credits)		1	0.81	0.82	0.83	0.80	0.83	0.80	0.78	0.73	0.69	0.62	0.56	0.55	0.56	0.44	0.51	0.47		
	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	12.0	12.7	11.3	−49.7%	−11.3%
	Energy consumption intensity		1	0.89	0.91	0.91	0.86	0.86	0.82	0.77	0.73	0.70	0.65	0.59	0.59	0.63	0.50	0.52	0.46		
	Production activity index		1	1.08	0.89	0.89	0.95	0.94	0.93	0.98	1.03	1.07	1.13	1.12	1.03	0.92	1.07	1.08	1.10		
The Japan Soft Drinks Association	CO2 emissions (with credits)														100.6	99.2	100.7	110.2	114.3	+149.2%	+3.7%
	CO2 emissions (excluding credits)		45.9	65.9	68.4	74.6	80.7	85.1	88.7	94.1	100.0	103.0	104.5	108.4	106.2	104.3	106.0	113.3	122.0	+166.1%	+7.8%
	CO2 emissions intensity (with credits) ☆	-6%													1.04	1.03	0.97	1.03	1.04		
	CO2 emissions intensity (excluding credits)		1	0.98	0.99	1.02	1.07	1.04	1.09	1.10	1.08	1.17	1.14	1.11	1.10	1.08	1.02	1.06	1.11		
	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	54.7	55.8	55.3	57.1	+181.0%	+3.2%
	Energy consumption intensity		1	1.04	1.07	1.10	1.15	1.13	1.17	1.16	1.16	1.27	1.27	1.24	1.25	1.28	1.22	1.17	1.18		
	Production activity index		1	1.47	1.51	1.60	1.64	1.78	1.77	1.87	2.01	1.92	2.00	2.13	2.10	2.11	2.25	2.34	2.39		
Limestone Association of	CO2 emissions (with credits)														31.3	27.4	27.6	31.9	33.5	−25.9%	+5.3%
	CO2 emissions (excluding 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	29.6	33.0	36.3	−19.9%	+10.1%
	CO2 emissions intensity (with credits)														0.91	0.97	0.97	1.07	1.12		
	CO2 emissions intensity (excluding credits)		1	0.91	0.95	0.98	0.98	1.02	0.95	0.97	0.96	0.95	0.93	0.98	0.98	0.97	0.97	1.06	1.13		
	Energy consumption		22.6	22.0	21.1	20.9	20.9	20.6	19.0	17.2	17.1	17.1	17.1	16.9	15.7	14.0	14.2	14.3	14.8	−34.3%	+3.9%
	Energy consumption intensity ☆	-6%	1	0.96	1.01	1.02	0.99	0.99	0.92	0.92	0.93	0.91	0.90	0.91	0.92	0.93	0.93	0.93	0.92		
	Production activity index		1	1.02	0.93	0.91	0.94	0.92	0.91	0.82	0.81	0.84	0.85	0.83	0.76	0.67	0.68	0.68	0.71		
Japan Machine Tool Builders'	CO2 emissions (with credits)														25.4	15.9	21.0	27.3	28.5	+24.2%	+4.2%
	CO2 emissions (excluding credits)		22.9	20.8	22.8	20.0	20.6	19.4	18.4	20.3	22.6	24.9	26.2	30.5	29.2	18.0	23.9	29.0	32.5	+41.6%	+12.0%
	CO2 emissions intensity (with credits)														0.79	1.34	1.03	1.18	1.19		
	CO2 emissions intensity (excluding credits)			1	1.00	1.14	1.02	1.02	1.27	1.16	1.03	0.90	0.84	0.87	0.90	1.50	1.15	1.25	1.35		
	Energy consumption ☆	-6%	11.2	11.2	12.7	10.7	10.6	9.9	8.9	9.4	10.5	11.3	12.0	13.6	13.6	8.8	11.6	12.3	12.0	+7.2%	−2.6%
	Energy consumption intensity ☆	-6%		1	1.03	1.12	0.96	0.96	1.15	0.98	0.89	0.76	0.73	0.71	0.76	1.33	1.01	1.29	1.17		

Industry	(☆: target defined by the industry)	target level	FY1990	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	Compared to FY 1990(%)	Compared to FY 2010(%)
	Production activity index	(対1990比)	1	1.00	1.10	0.85	0.98	0.92	0.69	0.85	1.06	1.33	1.50	1.67	1.55	0.57	0.99	1.11	1.15		
Flour Millers Association	CO2 emissions (with credits)														18.5	17.2	17.8	24.0	24.0	+42.1%	−0.1%
	CO2 emissions (excluding 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	20.7	25.7	27.9	+65.4%	+8.8%
	CO2 emissions intensity (with credits)														0.96	0.89	0.89	1.20	1.22		
	CO2 emissions intensity (excluding credits) ☆	-5%	1	1.00	0.93	0.95	0.97	0.96	1.03	1.12	0.99	1.07	1.08	1.16	1.13	1.04	1.04	1.29	1.42		
	Energy consumption		10.8	12.6	12.9	12.7	12.5	12.4	12.5	13.0	12.7	12.3	12.5	12.6	12.2	12.1	12.4	12.6	12.3	+13.6%	−2.7%
	Energy consumption intensity		1	1.06	1.04	1.02	0.99	0.98	1.00	1.02	0.99	0.98	1.00	1.00	0.99	0.98	0.98	0.99	0.98		
	Production activity index		1	1.10	1.15	1.16	1.17	1.16	1.16	1.19	1.17	1.17	1.16	1.17	1.14	1.14	1.18	1.18	1.16		
The Shipbuilders' Association of Japan The Cooperative Association of Japan Shipbuilders	CO2 emissions (with credits)														30.1	27.6	28.4	40.2	39.5	+175.9%	−1.7%
	CO2 emissions (excluding credits)		14.3				18.1	18.1	24.1	25.8	26.5	28.6	30.7	35.4	35.9	32.4	33.4	43.1	46.3	+223.4%	+7.4%
	CO2 emissions intensity (with credits)														0.79	0.67	0.68	1.01	1.10		
	CO2 emissions intensity (excluding credits)		1				0.73	0.76	1.00	0.98	0.84	0.85	0.84	0.92	0.94	0.79	0.81	1.09	1.29		
	Energy consumption		9.4				12.6	12.5	15.6	15.5	16.5	17.1	18.9	19.8	20.4	19.9	20.4	21.3	20.4	+116.9%	−4.4%
	Energy consumption intensity ☆	-10%	1				0.87	0.89	0.94	0.96	0.90	0.92	0.94	0.95	0.94	0.90	0.87	0.93	1.01		
	Production activity index		1				1.74	1.66	1.68	1.84	2.20	2.34	2.57	2.70	2.65	2.87	2.90	2.77	2.50		
Japan Industry Vehicles Association	CO2 emissions (with credits) ☆	-10%													5.7	3.8	4.2	5.3	4.7	−23.5%	−10.1%
	CO2 emissions (excluding credits)		6.2	6.1	5.7	6.1	6.1	5.4	5.7	6.0	6.1	6.6	6.5	7.3	6.2	4.1	4.6	5.5	5.2	−15.4%	−4.9%
	CO2 emissions intensity (with credits)														0.99	1.25	1.00	1.13	1.08		
	CO2 emissions intensity (excluding 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	1.09	1.18	1.19		
	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	2.5	2.7	2.4	−27.4%	−11.4%
	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	1.15	1.09	1.02		
	Production activity index		1	0.81	0.63	0.65	0.72	0.65	0.66	0.71	0.82	0.93	1.00	1.13	0.93	0.50	0.68	0.75	0.71		
Japan Association of Rolling Stock Industries	CO2 emissions (with credits) ☆	-8%													3.3	2.9	2.9	3.2	3.0	−30.9%	−7.0%
	CO2 emissions (excluding credits)		4.3	3.0	2.9	3.0	2.9	2.7	2.9	3.1	3.1	3.4	3.5	4.0	3.7	3.3	3.2	3.4	3.3	−22.0%	−0.5%
	CO2 emissions intensity (with credits)														0.48	0.38	0.42	0.52	0.54		
	CO2 emissions intensity (excluding credits)		1	0.76	0.74	0.67	0.66	0.66	0.66	0.76	0.48	0.55	0.50	0.60	0.55	0.42	0.47	0.54	0.61		
	Energy consumption		2.4	1.8	1.8	1.8	1.7	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.0	1.9	1.8	1.6	1.5	−37.5%	−8.9%
	Energy consumption intensity		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	0.49	0.48	0.49		
	Production activity index		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	1.59	1.44	1.27		
Japan Petroleum Development Association	CO2 emissions (with credits)														61.9	63.1	57.1	56.9	58.8	+164.5%	+3.3%
	CO2 emissions (excluding credits)		22.2	27.0	25.4	24.4	29.3	29.0	35.2	38.1	33.7	39.1	44.9	59.0	62.4	63.6	57.6	57.2	59.6	+168.0%	+4.1%
	CO2 emissions intensity (with credits)														0.78	0.84	0.82	0.77	0.88		
	CO2 emissions intensity (excluding credits) ☆	-20%	1	0.83	0.79	0.74	0.85	0.86	1.02	1.06	0.75	0.79	0.85	0.89	0.80	0.85	0.84	0.78	0.91		
	Energy consumption		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	9.4	9.9	10.2	+70.5%	+3.2%
	Energy consumption intensity		1	0.90	0.93	0.87	0.89	0.81	0.86	0.74	0.76	0.80	0.81	0.81	0.77	0.81	0.86	0.90	0.98		
	Production activity index		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	1.85	1.84	1.73		
Emissions from industrial processes *1	CO2 emissions		6,208	6,067	5,436	5,437	5,489	5,317	5,192	5,033	5,020	5,148	5,218	5,045	4,660	4,178	4,233	4,220	4,226		
Revisions *2	CO2 emissions (with credits)														−131	−121	−116	−145	−138		
	CO2 emissions (excluding credits)		−69	−142	−135	−122	−129	−130	−145	−165	−167	−170	−172	−198	−177	−156	−152	−169	−178		
	Energy consumption		−56	−71	−59	−60	−97	−91	−76	−82	−87	−98	−104	−112	−106	−103	−104	−99	−98		
Total	CO2 emissions (with credits)	±0%													45,086	42,016	44,307	45,459	45,369	−10.3%	−0.2%
	CO2 emissions (excluding credits)		50,551	51,871	49,165	50,196	49,564	48,041	48,938	47,195	49,418	49,613	48,645	50,964	46,628	43,272	45,663	46,174	47,101	−6.8%	+2.0%
	Energy consumption *3		16,447	17,376	16,612	16,809	16,511	15,934	16,203	15,317	16,469	16,508	16,333	17,062	15,663	14,784	15,558	15,331	15,363	−6.6%	+0.2%

(Attachment 2)

Trends in the Transportation, Commercial and Other Sectors *6

Commercial and Other Sectors

(10,000t-CO2; 10,000kl, crude oil equivalents)

Industries	(☆: 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	FY 2010	FY 2011	FY 2012	Compared to FY 1990(%)	Compared to FY 2010(%)
Japan Association of Refrigerat	CO2 emissions (with credits)														64.4	58.3	61.1	76.2	82.5	+49.3%	+8.3%
Warehouses	CO2 emissions (excluding 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	76.7	68.4	71.9	81.7	96.7	+75.0%	+18.3%
	CO2 emissions intensity (with credits)														0.85	0.76	0.79	1.02	1.07		
	CO2 emissions intensity (excluding credits)		1	0.82	0.80	0.84	0.83	0.85	0.91	0.96	0.96	1.00	0.97	1.03	1.02	0.89	0.93	1.10	1.25		
	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	43.9	40.4	42.5	+17.4%	+5.3%
	Energy consumption intensity ☆	-8%	1	0.94	0.95	0.93	0.88	0.90	0.89	0.88	0.91	0.92	0.91	0.88	0.88	0.84	0.87	0.83	0.84		
	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	1.40	1.35	1.40		
Japan LP Gas Association	CO2 emissions (with credits)														2.0	1.8	1.8	2.4	2.5	+12.5%	+2.0%
	CO2 emissions (excluding credits)		2.2						2.4	2.5	2.4	2.5	2.4	2.6	2.3	2.1	2.1	2.6	2.9	+31.9%	+11.5%
	CO2 emissions intensity (with credits)														0.87	0.83	0.84	1.10	1.21		
	CO2 emissions intensity (excluding credits)		1						0.93	0.97	0.97	1.00	0.98	1.07	1.04	0.98	0.99	1.18	1.42		
	Energy consumption		1.4						1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1.3	1.3	1.3	−11.6%	−0.8%
	Energy consumption intensity ☆	-7%	1						0.92	0.89	0.92	0.91	0.92	0.91	0.90	0.92	0.92	0.89	0.95		
	Production activity index		1						1.16	1.16	1.12	1.12	1.12	1.12	1.03	0.97	0.99	1.00	0.93		
Japanese Bankers Association	CO2 emissions (with credits)														48.2	43.2	43.2	52.0	51.3	−6.0%	−1.3%
	CO2 emissions (excluding credits)	cf. 00					54.5	55.0	56.5	58.7	56.2	55.3	53.8	60.5	57.4	50.8	50.9	55.7	60.1	10.2%	7.8%
	Energy consumption ☆	-12%					37.8	38.0	36.5	35.2	34.9	33.2	33.2	33.8	32.7	31.2	31.1	28.1	27.0	−28.6%	−4.0%
The Real Estate Companies Ass	CO2 emissions intensity (with credits)														0.83	0.76	0.75	0.85	0.81		
of Japan	CO2 emissions intensity (excluding credits)		1	0.86	0.88	0.86	1.01	0.84	0.94	0.97	0.98	1.03	0.93	1.04	0.99	0.89	0.89	0.91	0.98		
	Energy consumption ☆	-5%	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	0.91	0.81	0.79		
The General Insurance Associat	CO2 emissions (with credits)														3.3	2.9	2.9	3.2	3.3	−3.8%	+3.5%
Japan *7	CO2 emissions (excluding credits)	cf. 00					3.4	4.3	4.1	4.1	3.7	3.7	3.6	3.9	3.8	3.3	3.2	3.3	3.7	9.2%	11.2%
	Energy consumption ☆	-18%					2.3	2.6	2.4	2.3	2.2	2.1	2.1	2.1	2.0	1.9	1.8	1.6	1.6	−29.7%	0.6%
The Life Insurance Association	CO2 emissions (with credits)														10.8	10.0	10.1	12.0	11.5	+0.4%	−4.2%
Japan *7	CO2 emissions (excluding credits)	cf. 06									11.4	11.7	11.5	13.0	12.7	11.5	11.7	12.8	13.3	15.9%	3.9%
	Energy consumption ☆	-2%									6.9	6.8	6.9	7.1	7.1	6.9	6.9	6.3	5.9	−15.1%	−6.5%
NTT Group	CO2 emissions (with credits)														313	298	302	398	407	+217.9%	+2.1%
	CO2 emissions (excluding credits)		128	157	162	180	214	230	275	312	310	330	341	370	369	346	351	425	472	+269.2%	+11.0%
	CO2 emissions intensity (with credits) ☆	-35%													1.47	1.43	1.43	1.85	1.86		
	CO2 emissions intensity (excluding credits)		1	0.81	0.82	0.85	0.91	0.96	1.23	1.37	1.40	1.50	1.55	1.69	1.73	1.66	1.66	1.98	2.16		
	Energy consumption		84	118	126	132	144	155	172	182	188	194	206	204	207	208	210	209	208	+148.0%	−0.5%
	Energy consumption intensity		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	1.52	1.48	1.45		
	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	1.65	1.68	1.71		
KDDI *7	CO2 emissions (with credits) ☆	1.52Mt													64.2	67.2	63.2	94.1	83.3	+96.5%	−11.5%
	CO2 emissions (excluding credits)									42.4	42.6	53.5	64.0	75.4	76.5	78.9	74.4	100.9	97.6	130.3%	−3.3%
	Energy consumption	cf. 11								25.4	26.4	32.0	39.5	42.1	43.5	48.4	45.4	49.8	42.9	68.9%	−13.9%
	Production activity index									1.00	1.09	1.23	1.39	1.48	1.41	1.37	1.34	1.40	1.44		
Japan Foreign Trade Council, In	CO2 emissions (with credits) ☆	0.035Mt													3.7	3.5	3.5	3.9	3.7	−36.1%	−4.1%
	CO2 emissions (excluding credits)				5.8	5.9	5.6	5.5	5.6	6.3	5.5	4.6	4.3	4.6	4.4	4.1	4.1	4.2	4.3	−25.5%	4.4%
	Energy consumption				4.4	4.2	3.8	3.7	3.6	3.7	3.3	2.7	2.6	2.6	2.5	2.5	2.5	2.1	1.9	−56.2%	−6.7%
Japan Federation of Printing Inc	CO2 emissions (with credits) ☆	-7.3%													113.9	105.1	106.1	127.2	122.6	−1.1%	−3.6%
*7	CO2 emissions (excluding credits)											123.9	123.1	130.6	126.5	115.7	117.1	133.3	137.1	10.7%	2.9%
	CO2 emissions intensity (with credits)	cf. 05													0.83	0.76	0.78	0.95	0.92		
	CO2 emissions intensity (excluding credits)											1.00	0.96	0.98	0.92	0.84	0.86	1.00	1.03		
	Energy consumption											68.3	69.2	69.5	68.3	65.8	66.5	66.8	63.3	−7.4%	−5.3%
	Energy consumption intensity											1.00	0.98	0.94	0.90	0.87	0.89	0.91	0.86		
	Production activity index											1.00	1.03	1.08	1.11	1.11	1.09	1.08	1.07		

Transportation Sector

(10,000t-CO2; 10,000kl, crude oil equivalents)

Industries	(☆: 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	FY 2010	FY 2011	FY 2012	Compared to FY 1990(%)	Compared to FY 2010(%)
The Scheduled Airlines Associa	CO2 emissions intensity (with credits)														0.85	0.84	0.81	0.82	0.84		
of Japan	☆ CO2 emissions intensity (excluding credits)	-13.5%	1	0.91	0.90	0.89	0.90	0.89	0.87	0.89	0.88	0.88	0.87	0.87	0.85	0.84	0.81	0.82	0.84		
The Japanese Shipowners' Asso	CO2 emissions (with credits)														6,365	5,762	5,780	5,685	5,511	42.7%	−3.1%
	CO2 emissions (excluding 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	5,762	5,780	5,685	5,511	42.7%	−3.1%
	CO2 emissions intensity (with credits)														0.85	0.82	0.83	0.77	0.75		
	☆ CO2 emissions intensity (excluding credits)	-15%	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	0.83	0.77	0.75		
	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	0.83	0.77	0.75		
	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	1.79	1.91	1.89		
Japan Federation of Coastal Shi	CO2 emissions (with credits)														720	656	705	687	705	−18.0%	2.6%
Associations	CO2 emissions (excluding credits)		859	904	876	886	919	934	895	854	787	790	794	772	720	656	705	687	705	−18.0%	2.6%
	CO2 emissions intensity (with credits)														1.07	1.09	1.09	1.10	1.11		
	☆ CO2 emissions intensity (excluding credits)	-3%	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	1.09	1.10	1.11		
	Energy consumption		314	330	320	323	335	340	326	311	287	288	289	281	262	239	256	250	256	−18.4%	2.6%
	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	1.09	1.09	1.10		
	Production activity index		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	0.75	0.73	0.74		
All Japan Freight Forwarders A	CO2 emissions (with credits)	-15%													13.4	13.3	12.9	12.7	12.8	−15.9%	1.1%
*7	☆ CO2 emissions (excluding credits)	cf. 98			15.2			14.6	14.6	14.6	14.5	14.1	13.7	13.6	13.4	13.3	12.9	12.7	12.8	−15.9%	1.1%
	Energy consumption				5.7			5.5	5.5	5.5	5.5	5.3	5.2	5.1	5.0	5.0	4.8	4.8	4.8	−15.9%	1.1%
Non-governmental Railways As	CO2 emissions (with credits)														192	178	179	231	241	20.8%	3.9%
	CO2 emissions (excluding credits)		199	192	188	201	198	198	214	227	221	224	212	234	228	210	211	248	282	41.5%	13.6%
	CO2 emissions intensity (with credits)														0.81	0.74	0.75	0.98	1.00		
	CO2 emissions intensity (excluding 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	0.89	1.05	1.17		
	Energy consumption		131	144	146	147	137	137	138	136	137	134	131	131	130	129	129	123	124	−5.1%	1.1%
	Energy consumption intensity	☆ -17%	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	0.83	0.79	0.78		
	Production activity index		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	1.20	1.19	1.21		

*1 "Emissions from industrial processes" refers to CO2 emitted by non-energy sources in the course of the manufacturing process.

*2 Total CO2 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 CO2 emissions in fiscal 2011of 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-CO2 for CO2 emissions and 9.0g/㎥ for CO2 emissions intensity): CO2 emissions in FY 2012: 357,00 t-CO2 (with credits) / 394,000 t-CO2 (excluding credits) ; CO2 emission intensity: 9.4g-CO2/㎥ (with credits) / 10.4g-CO2/㎥ (excluding credits)

The Japan Rubber Manufacturers Association (target is to reduce CO2 emissions -10% compared to fiscal 1990): FY 1990 : 1.98 Mt-CO2 ; FY 2012 1.70 Mt-CO2 (with credits) / 1.92 Mt-CO2 (excluding credits).

*6 The figures regarding CO2 emissions, energy consumption, and their intensities in the tables are submitted from participating industries of commercial and transportation sectors.

*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 CO2 emissions intensity and energy consumption intensity are rounded off after the automatic calculation based on CO2 emissions, energy consumption, and production activity figures.

*9 In fiscal 2011, one company withdrew from Japan Dairy Industry Association. Since the data on that company are available only back to fiscal 2000, the data concerning the company have been eliminated based on the following:(1) for fiscal 2000 through 2009, the company's actual CO2 emissions; and (2) for fiscal 1990 through 1999, the percentage of the company's CO2 emissions in relation to the association's fiscal 2000 total emissions (2%). The percentage of the company's CO2 emissions in relation to to the total emissions by all the 34 industries was 0.4%.

*10 Because of the loss of data at offices struck by the Great East Japan Earthquake, for fiscal 1990 and thereafter the data for Japan Chemical Industry Association and for the Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association do not include data concerning one company and one place of business, respectively.

*11 The fiscal 2012 electricity carbon emission factor noted by the Federation of Electric Power Companies of Japan is projected to improve slightly to reflect credits issued following delays in UN validation, etc.

(Attachment 3)

Examples of Efforts to Achieve Targets Reported by Participating Industries

1. Industrial and Energy-Conversion Sectors

Industry	Examples of efforts made
The Federation of Electric Power Companies of Japan	1. Shift to low-carbon energy on the supply side (reduction of CO_2 emission intensity) a) Expanded use of non-fossil fuel energy ・Use of nuclear power generation with safety as a prerequisite ・Development and dissemination of renewable energy b) Improved efficiency of electric power plants ・Further enhancement of heat efficiency in thermal power generation ・Reduction of loss rates from power transmission and distribution c) International efforts ・Use of Kyoto Mechanisms ・Efforts toward sectoral approaches 2. Increased efficiency of energy use on the customer side a) Energy savings ・Diffusion of high-efficiency electrical equipment ・Use of renewable and unexploited energy sources ・Publicity and information provision on energy saving and CO_2 emission reduction ・Promotion of load leveling b) Electricity suppliers' own efforts as users ・Efforts relating to office use and own vehicle fleets 3. Research and development ・Clean coal technology, next-generation transmission and distribution networks (smart grids), and CO_2 capture and storage technology ・Ultra high-efficiency heat pumps and electric vehicle technologies
Petroleum Association of Japan	1. More advanced operational control by taking advantage of the progress of control technology and optimizing technology 2. Expanded sharing of heat between equipment, and expanded installation of waste heat and other waste energy recovery facilities 3. Increased efficiency through appropriate maintenance of facilities 4. Use of high-efficiency equipment and catalysts 5. Energy-saving measures taking advantage of energy-saving subsidy programs a) Installation of variable-speed gas compressors in equipment for heavy oil pyrolysis and cracked oil hydrodesulfurization b) Installation of HydroCOM stepless load regulation on diesel oil

	desulfurization equipment c) Motorization of condensing turbines
The Japan Gas Association	1. Promotion of energy-saving measures at city gas manufacturing plants a) Installation of cogeneration systems b) Use of LNG cold energy ・Reduction of electricity purchased by manufacturing plants through power generation using LNG cold energy ・Reduction of compressor electricity usage through boil-off gas (BOG) reliquefaction ・Use of cold energy in freezers c) Increased efficiency of facilities ・Increase in efficiency of LNG vaporizers and seawater pumps ・Reduced electricity loss though upgrading of extra-high voltage power receiving and distribution facilities ・Reduced electricity usage through installation of rev limiters on LNG cold-storage circulation pumps d) Operations optimized in accordance with demand and other factors ・Increase in power generation through achievement of maximum load for gas pressure recovery power generation equipment (by changing high-voltage mains operation) ・Use of BOG as fuel for in-house power generating facilities ・Reduced electricity usage through lower discharge pressure for BOG compressors ・Reduced boiler fuel use through effective utilization of steam from in-house power generation facilities ・Review of dry-run method for return gas blowers in preparatory state for ship's arrival
The Japan Iron and Steel Federation	1. Strengthened waste heat recovery, and increased efficiency of facilities 2. Establishment of technology for the clean use of coal, such as through desulphurization technology 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 4. Energy savings through resource recycling (waste plastic, waste tires)
Japan Chemical Industry Association	1. Improved efficiency of facilities and equipment 2. Improved operational methods 3. Recovery of waste energy 4. Rationalization of processes 5. Fuel conversion
Japan Paper Association	1. Installation of energy-saving facilities a) Dryer hood heat recovery systems b) Alterations made to presses c) Installation of inverters

	2. Installation of high-efficiency facilities a) Improved efficiency of turbines b) Enhanced evaporators c) Upgrading to high-efficiency motors and transformers d) Use of high-efficiency lighting 3. Overhaul of processes (shortened and unified processes) 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_2 emissions 5. Enhanced controls (review of control values, reduced variation)
Japan Cement Association	1. Promotion of the spread of energy-saving facilities 2. Expanded use of energy substitute waste products 3. Higher production ratio for mixed cement
The four electrical/electronics -related groups	1. Use of new and untapped energy sources ・ Introduction of photovoltaic power generation systems 2. Use of cogeneration and heat storage ・ Introduction of cogeneration systems (LNG-fired in-house power generation) 3. Introduction of highly efficient devices ・ High-efficiency compressors ・ High-efficiency motors ・ High-efficiency transformers (super amorphous transformers, etc.) ・ High-efficiency turbo freezers ・ Small through-flow boilers ・ LED ceiling lights 4. Stricter control ・ Introduction of integrated energy management systems ・ Efforts to make energy usage more visible and energy-saving improvements based on such efforts ・ Creation of energy-saving case study database and cross-application of best practice 5. Improvements in production processes and quality ・ Improvements in production efficiency and CO_2 emissions per unit of floor area with an eye to shift to larger diameter wafers in semiconductor production and larger mother glass substrates in LCD and plasma panel production 6. Improved methods of control ・ Reduction of boiler fuel consumption through operational improvements in facilities that use steam ・ Reduction of compressed air volumes used in factories ・ Application of just-in-time methods to energy ・ Optimization of operating conditions for air conditioning and lighting ・ Improvements in operating efficiency through introduction of highly efficient through-flow boilers

	・ Inverter control of motors and compressors ・ Optimization of operations through shared cold water lines in buildings housing machinery 7. Use of waste heat ・ Use of surplus heat from boiler blowdown wastewater 8. Loss prevention ・ Reduction in compressors through measures to prevent loss of air compression in factories ・ Reduction in transfer loss through optimization of equipment location 9. Fuel conversion
Japan Federation of Construction Contractors	1. Reduction of construction soil that is hauled away and reduction of transported distances 2. Promotion of no idling and fuel-saving operation of vehicles 3. Strict enforcement of appropriate servicing of heavy equipment and vehicles 4. Promotion of the adoption of superior energy-saving methods, construction machinery, and construction vehicles 5. Promotion of the use of high-efficiency temporary electrical equipment 6. Promotion of energy-saving activities at on-site offices
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	1. Facility measures a) Measures on the energy supply side ・ Installation of high-efficiency compressors, and implementation of measures to prevent pressure losses and leakage of compressed air ・ Use of high-efficiency boilers ・ Use of energy-saving transformers ・ Efficient operation of in-house power generation facilities b) Measures regarding high energy-consumption facilities ・ Enhanced compressor shutdown, reduced air loss, and use of inverters for fans and pumps ・ Optimization of smelter and drying furnace efficiency, and waste heat recovery ・ Replacement of air conditioners (including heaters) ・ Reduction of downtime losses (line separation, etc.) ・ Use of energy-saving lighting equipment 2. Measures to increase productivity a) Use of more advanced energy supply and other operational control technology ・ Operational improvements (efficient operation, improved energy savings at work sites, etc.) ・ Reduction of air and steam supply pressure, unit control of compressor operation, and reconsideration of pipe routing ・ Reduction of air conditioner temperature in painting booths (winter) and improved furnace energy efficiency

	b) Consolidation, rationalization, etc., of production lines ・Consolidation and rationalization of painting, casting, and processing lines 3. Fuel conversion, use of ESCO services, etc. a) Conversion of fuel ・Conversion from fuel oil to city gas for the fuel of aluminum melting furnaces ・Conversion from LPG and butane gas to city gas for the fuel of heat treatment furnaces b) Energy savings through operational improvements in facilities, installation of solar power systems, etc. 4. Energy saving effects through supply chain and other coordination a) Sharing information on energy-saving examples and technologies
Japan Auto Parts Industries Association	1. Halting of no-load operation and other improvements to operational methods 2. Improved efficiency of facilities and equipment 3. Rationalization of processes 4. Cogeneration and recovery of waste energy 5. Mutual sharing of energy-saving technology, exchange of information about energy use
Japan Federation of Housing Organizations	1. Construction stage a) Improved productivity b) Promotion of reuse and recycling of waste construction materials from house-building c) Further enhancement of process management, improved efficiency in construction material distribution, and reduction in number of deliveries and removals d) Thorough implementation of no-idling policies for all delivery vehicles 2. Other stages a) Planning and design stage ・Diffusion of high-insulation, highly airtight housing (housing meeting next-generation energy-saving standards) ・Use of the housing performance indication system and the long-life quality housing system ・Development and diffusion of housing that represent such concepts as “environmentally symbiotic housing,” “self-sustaining houses that recycle energy and resources,” “LO-House,” “zero-energy housing,” and “life cycle carbon minus (LCCM) housing” ・Implementation of comprehensive environmental functionality evaluations at the design stage through CASBEE-Sumai (new single-family detached housing) ・Use of energy-creation systems such as photovoltaic power generation and high-efficiency facilities and equipment b) Creation of a quality living environment

	・Preservation of the natural environment ・Enhanced housing functionality, including earthquake resistance and energy-saving improvement work ・Improvement of the interior environment and interior and exterior greenery c) Usage stage ・Educational activities for home buyers to promote the reduction of CO_2 emissions at the usage stage d) Demolition, processing, and disposal stage ・Rigorous adherence to segregated demolition ・Promotion of the reuse of building material waste e) Promotion of long-life housing
Japan Mining Industry Association	1. Improved productivity by consolidation and scaling up of production facilities 2. Effective use of unused heat 3. Improved efficiency through the replacement of old facilities 4. Improved efficiency through facility measures 5. Reduction of energy intensity through operational ingenuity 6. Thermal recycling through shredder dust processing 7. Use of reclaimed oil and waste plastic
Lime Manufacture Association	1. Expanded use of recycled fuel 2. Improved operational methods 3. Recovery of waste energy 4. Rationalization of processes 5. Improved efficiency of facilities and machinery
The Japan Rubber Manufacturers Association	1. New and expanded installation of cogeneration systems a) New and expanded installation of high-efficiency cogeneration systems burning city gas b) Cogeneration fuel switched from fuel oil to city gas and LNG 2. Installation of high-efficiency equipment a) Installation of high-efficiency fans, motors, and lighting fixtures, and use of inverters with such equipment 3. Implementation of steady energy-saving activities as before a) Insulation of heating facilities, prevention of leakage, heat recovery b) Increased operational efficiency, such as through rotation control, intermittent operation, and scaling down 4. Increased efficiency through energy conversion a) Process improvements, such as installation of furnaces that burn waste oil and modifying furnaces and boilers to burn gas 5. Increased efficiency of air conditioning systems a) Installation of ice-based thermal energy storage, absorption refrigerators, and heat pumps 6. Increased product durability a) Significant increase in durability achieved by switching from bias tires to radial tires

	7. Technology development and deployment a) Development and widespread use of low-carbon tires and run-flat tires b) Promotion of retreads (recycled tires) 8. Introduction of tire labeling system
The Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association	1. Selection of high-efficiency equipment 2. Reconsideration of operational and control methods for facilities and equipment 3. Changes to standard and established values 4. Energy substitution 5. Reduction of radiated heat loss through insulating equipment and pipes
Flat Glass Manufacturers Association of Japan	1. Increased efficiency of production through the scrapping and consolidation of flat glass manufacturing facilities (melting furnaces) 2. Improved heat recovery efficiency through the regular maintenance of furnaces (cold maintenance) 3. Consolidation of production to reduce the loss per furnace arising from changing production items or colors 4. Development and adoption of new combustion technology with high energy efficiency (ongoing) 5. Improved operating conditions for equipment
Japan Aluminium Association	1. Improved energy efficiency through energy-saving operations and process improvements (improved yield) 2. Promotion of improvement in such areas as energy recovery, energy efficiency, productivity, and yield 3. Holding of meetings to publicize cases of energy-saving improvements and promotion of industry-wide application (posting of examples on members' website) 4. Introduction of energy-saving lighting 5. Promotion of active aluminum recycling (global program) 6. Support of vehicle weight reductions through the use of aluminum in automobiles and railroad cars (domestic program)
Brewers Association of Japan	1. Power processes a) Fuel conversion to natural gas b) Installation of cogeneration facilities c) Installation of high-efficiency refrigeration and ice-based thermal energy storage systems d) Conversion to ammonia refrigerators and other high-efficiency refrigeration facilities e) Installation of solar power facilities f) Reduced usage of type A heavy oil as boiler fuel by using mixing equipment to add waste cooking oil 2. Preparation processes a) Installation of new boiling systems b) Installation of steam recompression facilities

	c) Increased efficiency of waste heat recovery d) Introduction of thermal vapor recompression e) Reduced utility usage through review of processes 3. Processes for wastewater processing a) Installation of anaerobic wastewater treatment facilities b) Promotion of the recovery and use of methane gas from anaerobic processes c) Installation of biogas cogeneration facilities d) Installation of biogas boilers and other high-efficiency boilers e) Installation of fuel cells f) Utilization of waste heat from discharge flows g) Reduced utility usage through review of processes 4. Other processes a) Reduced utility usage through review of processes including fermentation, filtration, and packaging b) Promotion of proactive, continual energy-saving efforts through quality control (QC) and total productive maintenance (TPM) activities c) Installation of high-efficiency CO_2 recovery equipment in fermentation processes d) Efforts to switch mercury lamps in plants to electrodeless discharge lamps (enabling power savings of 50%) e) Switch lighting to LED and review of air conditioning (efforts to set temperature to 27°C and replacement of old air conditioners)
The Japanese Electric Wire & Cable Makers' Association	1. Efficient use of heat a) Measures to improve the insulation of furnaces b) Fuel conversion c) Improvement of steam traps d) Increased insulation of steam pipes e) Improvement of combustion efficiency through installation of regenerative burners 2. Installation of high-efficiency facilities a) Higher speed facilities and facilities for producing wires without joints b) Inverters installed in extruder motors and pumps c) Inverters installed in compressors, unit control of compressors 3. More efficient operation of electric power facilities a) More efficient electric power systems through layout changes b) Efficient operation of electric power facilities through the consolidation of operational facilities c) Reduction of unnecessary operation through use of equipment with auto-stop functions d) Consolidation and replacement of transformers 4. Other a) Changes in clean room and air conditioner operation b) Halting ancillary equipment when on standby

	c) Making energy usage more visible d) Thermal insulation paint on roofs and exterior walls e) Thermal insulation film on windows f) Reduction in number of vending machines and switching to energy-saving models g) Switching lighting and signage to LED
Japan Dairy Industry Association	1. Production divisions a) Consolidation and rationalization of plants (consolidation and improved energy intensity) b) Fuel conversion (mainly from fuel oil A to natural gas) c) Installation of cogeneration facilities (for waste heat recovery and as backup power sources) d) Increased efforts for waste heat recovery and insulation (boiler waste heat recovery, recovery of drain and blow-off water, and insulation on walls) e) Introduction of natural refrigerant, installation of high-efficiency freezers (greater chlorofluorocarbon elimination, energy savings, and air conditioning efficiency) f) Installation of high-efficiency lighting fixtures (energy savings) g) Promotion of environmental management (promotion of activities related to ISO 14001 and sharing of outcomes) h) Reduced waste through improved yield (energy savings) i) Installation of inverters and introduction of unit control (energy savings through optimized automatic operations) j) Reduced use of combustion improver for incinerators (reduced waste and increased percentage of flammable waste) 2. Business divisions a) Purchase of green electric power (indirect contribution to CO_2 emission reduction) b) Implementation of Cool Biz and Warm Biz dress codes (energy saving) c) Upgrading to high-efficiency lighting (energy saving) d) Reductions to peak electricity use (use of summer time, switching operations to weekends) e) Upgrading to high-efficiency air conditioning equipment (energy saving) f) Management of company-owned forests (CO_2 absorption) 3. Logistics divisions a) Switch to eco-cars for company vehicles (improved fuel economy) b) Enhanced load efficiency through improved order placement/acceptance systems (reduced fuel consumption) c) Enhanced load efficiency through joint deliveries and shared loads (reduced fuel consumption) d) Use of non-cooled transport for products that can be stored at room temperature (reduced fuel consumption) e) Promotion of shift to ship and rail transport (modal shift)

Japan Copper and Brass Association	1. Promotion of activities for all business facilities a) Installation of energy-saving lighting fixtures (with inverters) b) Change to energy-saving air conditioners c) Set-up of standby parking areas for transport operators to prevent idling d) Installation of more switches for segmented power-saving e) Installation of high-efficiency transformers f) Setting of workplace air conditioners to 28°C g) Screening of external portion of air conditioners from direct sunlight h) Shutoff of transformer power sources on holidays i) Energy-saving patrols j) Shutoff of spot cooling when not required k) Segmentation of lighting circuits l) Shutoff of coolant water on holidays m) Reduced load on air conditioners through use of air curtains n) Improved yields through TPM activities 2. Installation, replacement, and improvement of facilities and equipment a) Fuel conversion b) Shift to energy-saving compressors c) Introduction of raw material driers d) Replacement of mercury lamps with LED or metal halide lamps e) Improved prevention of air leakage f) Improved heat insulation for annealing furnaces g) Reuse of boiler drains 3. Improvements in process and operational control, and in operations management a) Inverters installed in coolant motors b) Inverters installed in exhaust fans c) Reduction of standby electricity d) Reduction of transformers through load adjustment e) Centralized monitoring of electricity f) Establishment of an automatic power-factor regulation system g) Reductions made to peak electricity use h) Prevention of no-load operation of drawing facilities i) Reduction of maintenance electricity through the consolidation and stopping of furnaces j) Changes in patterns of feeding materials into shaft furnaces
The Japan Society of Industrial Machinery Manufacturers	1. Transfer to machinery with inverters 2. Efficient operations through the unit control and consolidated control of compressors 3. Replacement of transformer facilities 4. Switch to high-efficiency lighting 5. Reduction of test operation time 6. Regular checking of pressurized air leakage

	7. Implementation of Cool Biz and Warm Biz programs 8. Other daily energy-saving activities 9. Efficient operation of air conditioning facilities and their replacement 10. Facility investments accompanied by fuel conversion
The Japan Bearing Industrial Association	1. Efficiency of motors increased, inverters installed in motors 2. Measures to prevent air leakage and to reduce air pressure for compressors 3. Fuel conversion and use of waste heat for heat treatment facilities 4. Installation of air conditioners using ice-based thermal energy storage, installation of gas heat pumps 5. Installation of high-efficiency lighting fixtures 6. Practice of turning off lights implemented
Japan Sugar Refiners' Association	1. Fuel conversion (higher ratio of city gas usage) 2. Installation of auto-vapor recompression concentrators 3. Installation of vacuum crystallizers with agitators 4. Installation of vacuum crystallizers with automated boiling 5. Installation of cogeneration facilities 6. Installation of steam accumulators 7. Rotational control through inverters adopted for motors 8. Recovery of boiler waste heat 9. Upgrades to turbo compressors 10. Conversion to energy-saving transformers 11. Conversion to absorption air conditioners 12. Conversion to vacuum circuit breakers 13. Insulation of steam pipes 14. Promotion of production rationalization to increase the operating rate
Japan Sanitary Equipment Industry Association	1. Upgrade of drying furnaces (replacement of old facilities) 2. Promotion of fuel conversion 3. Installation of cogeneration systems 4. Installation of evaporative radiator cooling equipment 5. Installation of energy-saving inverter equipment 6. Reduction of the weight of furnace carts 7. Increased production efficiency and improvement of the reject rate 8. Promotion of the use of solar power and other natural energy sources 9. Higher energy-saving awareness at the individual level and programs to accumulate small energy-saving actions 10. Temperature control of air conditioners, diligent practice of turning off lights
Japan Soft Drink Association	1. Use of cogeneration facilities 2. Improved boiler operation (optimization of settings for unit control, combustion switching, local air supply pressure, etc.; and replacement of burners for fire-tube boilers with high-efficiency ones when converting fuel) 3. Improved efficiency in methane gas boiler operation 4. Stable operation of anaerobic sludge facilities

	5. Compressors (unit control, new installation of inverter-controlled compressors) 6. Reduced electricity usage through introduction of wastewater anaerobic treatment facilities 7. Reduced boiler gas usage through review of steam lines (periodic inspection and replacement of steam traps, heat insulation of equipment using heat, improved heat insulation of steam pipe valves, steam drain recovery) 8. Switching PET bottle labeling from heat-shrink labels requiring steam heating to roll labels that do not require steam heating 9. Reduction in manpower at container acceptance and handling facilities through promotion of in-line blow molding 10. Improved production efficiency (reduced product changeover times, optimized cleaning times, improved sterilizer efficiency, enhanced filling performance of PET bottle lines) 11. Introduction of new energy forms including photovoltaic power generation 12. Thermal insulation paint on plant roofs to reduce air conditioner power consumption 13. Reduced energy loss through power saving and thermal/cold insulation 14. Reduced heat dissipation loss (recovery of waste heat) 15. Switch to energy-saving lighting (upgrade to LED lighting and rigorous switching off of unneeded lights) 16. Introduction of heat pump air conditioning 17. Implementation of energy-saving activities through ISO 14001 management program 18. Continual steam trap maintenance management 19. Periodic inspection to identify air leaks
Limestone Association of Japan	1. Reduced consumption of fuel (diesel fuel) a) Upsizing and optimizing heavy machinery in use b) Reorganization of transportation routes and the shortening of traveled distances c) Strict enforcement of inspections and maintenance d) Promotion of energy-saving operation 2. Promotion of the acquisition of heavy machinery with environmentally compatible engines 3. Reduction of electricity consumption (promoting the spread of energy-saving facilities, optimizing production processes) 4. Promotion of the installation of cogeneration systems 5. Promotion of energy-saving activities 6. Measure to create carbon dioxide sinks (planting greenery on former sites, promoting research on planting methods)
Japan Machine Tool Builder's Association	1. Air-conditioning-related a) Inverters installed in air conditioners and heat source pumps b) Production adjustments

	2. Lighting-related a) Switch to metal halide and other high-efficiency lighting b) Installation of electrical power saving systems c) Thorough practice of turning off unneeded lights 3. Compressor-related a) Installation of inverters b) Unit control c) Reduction of air supply pressure d) Prevention of air leakage 4. Machining processes a) Installation of inverters b) Switching off electricity to non-operating facilities c) Production adjustments
Flour Millers Association	1. Consolidation and increased operation of mills 2. Installation of cogeneration systems 3. Installation of high-efficiency motors, fans, and transformers 4. Installation of high-efficiency blowers and rotation control devices 5. Installation of compressor pressure optimization systems and unit control systems 6. Change of controls through use of inverters
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	1. Promotion of more efficient and advanced production by encouraging investments in automated facilities 2. Installation of solar power generators
Japan Industrial Vehicles Association	1. Improvements to production facilities and processes 2. Promotion of conversion to fuel with a low carbon emission factor 3. Energy-saving renovations to factory facilities (lighting, air conditioning)
Japan Association of Rolling Stock Industries	1. Measures related to energy-saving facilities a) Installation of energy-saving production facilities b) Change to energy-saving air conditioners c) Replacement of mercury lamps with fluorescent lamps (for ceiling lighting at plants) d) Replacement of mercury lamps (for ceiling lighting at plants) with ceramic metal halide lamps and fitting of high-efficiency reflective light surrounds 2. Measures related to high-efficiency facilities a) Switch to amorphous transformers b) Extensive changes to production facility layouts c) Upgrading to compressors with inverters 3. Measures related to fuel conversion a) Change of burner fuel from fuel oil to propane b) Change of hot water boiler fuel from kerosene to city gas 4. Operational improvements

	a) Adjustment of air conditioner operating times and changes to temperature settings b) Regular cleaning of air conditioner heat exchange parts c) Effective use of paper resources and reduction of paper usage d) Reduced discarding of waste materials and improved recycling rates e) Reduced plant lighting f) Shutdown of vending machines during long holidays g) Reduced electricity usage for toilet seat heating 5. Other a) Twice-yearly energy-saving campaigns b) Promotion of "energy-saving days," "no-work Saturdays," and "no overtime days"
Japan Petroleum Development Association	1. Consolidation and rationalization of inefficient facilities 2. Installation of energy-saving facilities and machinery at production plants, rationalization of systems 3. Increased efficiency of operations (reduction of internal consumption of natural gas) 4. Effective use of unused low-pressure gas 5. Burning of diffused natural gas 6. Installation of environmental management systems 7. Implementation of energy-saving programs at business offices 8. Use of natural-gas-powered vehicles 9. Installation of cogeneration systems 10. Installation of fuel cells at production plants

2. Commercial and Other Sectors

Industry	Examples of efforts made
Japan Association of Refrigerated Warehouses	1. Shift to or introduction of energy-saving facilities and technologies a) High-efficiency transformers b) High-efficiency compressors c) Devices to shut out outside air d) Energy-saving lighting fixtures e) Use of closed-deck platforms f) Increased use of insulation, etc. 2. Prevention of energy waste through day-to-day maintenance a) Maintenance of warehouse temperatures that are appropriate for the goods stored b) Strict enforcement of cleaning of condensers c) Preventing cool air from leaking out of insulated doors, etc. 3. Use of energy-saving manuals, formulation of energy management standards, and management of energy use
Japan LP Gas Association	1. Upgrading to energy-saving equipment at LPG storage and shipping facilities (import bases/secondary bases) including installing

	inverters on seawater pumps and upgrading of power receiving and distribution facilities 2. Improvement in energy intensity through improved facility operation
The Real Estate Companies Association of Japan	1. Reduction of CO_2 and other emissions related to the design, etc., of buildings (new office buildings) a) Promotion of energy-saving and CO_2 emission reduction measures for buildings to be renovated or built (promotion of the use of designs and devices that help save energy and reduce CO_2 emissions) b) Selection of construction materials and air-conditioning systems with the view of reduction of hydrofluorocarbons, etc. c) Effective use of energy at local levels and utilization of unused energy (consideration toward realizing efficient energy management at local levels, and active utilization of unused energy [kitchen waste and other biomass resources, waste heat from waste incineration plants and substations, and temperature differences in the ocean, rivers, and sewage]) d) Effective use of renewable energy (promotion of the use of solar and other renewable energy sources in areas to be developed) 2. Reduction of CO_2 and other emissions related to the use of buildings owned by member companies (head office buildings) a) Promotion of energy-saving activities that can be carried out on a day-to-day basis (improved corporate organization to address environmental issues, installation of energy-saving equipment, and implementation of energy-saving measures in the company and within the framework of daily operations) b) Implementation of energy-saving measures for common use spaces (machine rooms, lobbies, and corridors) such as measurement and management of energy use (use of tools to manage energy intensity, introduction of building and energy management systems [BEMS], etc.), and considering efficient operations of facilities and equipment and energy-saving investments c) Implementation of energy-saving measures for spaces used by tenants (spaces rented) such as activities to raise environmental awareness among tenants, creation of systems to assist and coordinate with energy-saving activities by tenants, and provision of information to tenants (data on the use of light, heating, and water by tenants that help encourage their energy-saving activities; know-how and information concerning daily energy-saving activities; etc.) d) Creation of systems to cooperate with other industry organizations and strengthening of coordination (active use of energy-saving analysis, consulting, and ESCO services)
The Life Insurance Association of Japan	1. Reduction of electricity use through power-saving campaigns and installation of power-saving equipment

	2. Reduction of other energy use 3. Increased utilization rate of recycled paper 4. Recycling of resources through thorough separate collection of waste 5. Improved awareness of environmental issues through in-house education programs for executives and employees on environmental conservation 6. Further promotion of environmental efforts through sharing good examples of efforts made by member companies 7. Publication on the association's website of environmental efforts being made by the industry as a whole and by member companies 8. Promotion of initiatives aimed at achieving targets by identifying first-half energy usage of individual member companies and sharing their efforts to reduce energy use
The General Insurance Association of Japan	1. Further reduction of energy and resource consumption a) Further reduction in the use of paper resources b) Reduced use of energy resources such as electricity and gas at offices c) Promotion of the use of low-emission vehicles as company cars 2. In-house training and education a) In-house education on environmental conservation, including new-hire training and training according to ranks of employees b) Improved corporate organization to support employee participation in volunteer environmental activities, etc. 3. Creation of environmental management and audit systems 4. Reduction of environmental burdens through collaboration with other companies and organizations 5. Dissemination of information to the public a) Holding of seminars and public lectures on the environment b) Publication of magazines and books on the environment c) Provision of consulting 6. Efforts through the general insurance business a) Development and diffusion of insurance products that help address environmental issues and provision of relevant services b) Education on the Eco-Safe Driving techniques c) Promotion of the use of recycled parts
Nippon Telegraph and Telephone Corporation (NTT)	1. Total Power Revolution power-saving campaign a) Installation of information and communication technology (ICT) devices with high energy-saving performance (formulation of the NTT Group's guidelines on energy-saving performance) b) Promotion of energy management for around 4,000 buildings owned by the NTT Group across Japan c) Installation of energy-efficient power equipment and air conditioners d) Promotion of electricity consumption reduction through the use of direct-current power supply for servers, routers, and other Internet Protocol (IP) devices

	e) Installation of solar, wind, and other clean energy systems 2. Strengthening of measures to reduce electricity use at offices a) Promotion of visualization of electricity use at offices b) Reduction of electricity use for air conditioning through making use of Cool Biz and Warm Biz programs c) Reduction of electricity use for lighting by installing energy-saving fluorescent lamps and LED lamps and by managing the time of use 3. Promotion of driving company cars in an environmentally friendly way and of introducing low-pollution vehicles 4. Research and development in the fields of energy saving and clean energy a) Development of technologies to reduce electricity use for telecommunication facilities, including communication devices and air conditioning facilities b) Reduction of electricity use through greater network efficiency achieved by such measures as shared optical fiber and signal multiplexing c) Scaling down of ICT resources through the use of such technologies as cloud computing and virtualization for servers, etc. 5. Promotion of a modal shift through unified management of logistics
KDDI Corporation	1. Promotion of environmental activities through expansion and renewal of ISO 14001 certification (energy-saving activities at offices and other places of business) 2. Compliance with the Act on the Rational Use of Energy a) Installation of energy-saving facilities at 32 designated energy management places of business (deployment and operational management of energy-saving devices, such as upgrading to high-efficiency air conditioning systems, installation of inverters and motion sensors in lighting fixtures, renovation of cold water pumps and freezers, and use of solar control window films) 3. Installation of energy-saving equipment at mobile communication base stations across the country, such as inverters in air conditioners, switch to heat exchangers, and lightning prevention devices for high-efficiency power supply systems
Japan Foreign Trade Council, Inc.	1. Installation of energy-saving equipment a) Introduction of energy-saving office equipment b) Introduction of energy-saving vending machines c) Introduction of LED lighting d) Introduction of energy-saving air conditioning equipment (e.g., ice storage air conditioning) e) Introduction of motion sensors in corridors and restrooms 2. Thorough management of energy use a) Turning off lights during lunch breaks b) Reduction of the number of lights used

	c) Management of temperature settings and operation hours of air conditioners d) Energy-saving settings for PCs and copy machines e) Having guards on patrol check whether lights are turned off f) Implementation of "no overtime day" g) Management of energy use by location h) Reduction of the number of elevators used i) Management of operation hours for water heaters, tea dispensers, and vending machines 3. Promotion of education activities a) Strict enforcement of turning off lights when unused b) Strict enforcement of switching off and unplugging office equipment when unused c) Encouraging employees to set their PCs to energy-saving mode d) Use of intranets, group newsletters, posters, and e-mails to urge employees to cooperate e) Encouraging employees to use stairs (limiting use of elevators) f) Promotion of the reduction of overtime and weekend work g) Encouraging employees to adjust blinds
Japanese Bankers Association	1. Efficient use of resources a) Promotion of paperless work b) Reduction of electricity use through promotion of energy saving 2. Helping create a recycling society a) Promotion of the use of recycled paper for letter paper for internal use, memo pads, business cards, copier paper, etc. b) Separate collection of waste paper 3. Education and raising awareness a) Promotion of in-house education b) Holding of lectures on environmental issues for member banks 4. Activities to make contributions to society 5. Development of services in response to clients' higher environmental awareness 6. Provision of information on the environment to clients
Japan Federation of Printing Industries	1. Lighting a) Use of LED lamps b) Use of high-frequency lamps 2. Air conditioning a) Replacement of air conditioners b) Installation of inverters in air conditioners 3. Power-related equipment a) Prevention and reduction of air leakage b) Installation of inverters in motors, etc. 4. Other a) Introduction of energy management systems b) Installation of control instruments

3. Transportation Sector

Industry	Examples of efforts made
The Scheduled Airlines Association of Japan	1. Promotion of upgrading to and introduction of new, more fuel-efficient aircraft 2. Shortened flight routes and hours and improved flight accuracy through the use of new air traffic control support systems 3. Introduction of energy-efficient method of landing (continuous descent operation [CDO]) 4. Selection of optimum flight altitudes and speeds and the shortest flight routes in day-to-day operations 5. Improved fuel efficiency by carrying optimum amounts of fuel, reducing the weight of objects carried, curtailing the use of auxiliary power unit, reducing hours of flight training and evaluation in aircrafts through the use of simulators, reducing time for engine test runs, and washing engines at regular intervals 6. Improved performance through renovation of aircraft equipment 7. Implementation of demonstration flights using biofuel
The Japanese Shipowners' Association	1. Shift to newly built ships with improved energy efficiency, and adoption of electronically controlled engines and other energy-saving equipment 2. Development and introduction of eco-ships utilizing environmental technology and ships with reduced air and water pressure resistance 3. Research and adoption of navigation support systems, such as optimal route planning systems 4. Research and implementation of energy-saving drive technologies on ships, and thorough energy-saving efforts 5. Efforts to reduce fuel consumption, including improved propulsion efficiency and effective utilization of exhaust energy 6. Optimized and enlarged ship designs to improve transport efficiency
Japan Federation of Coastal Shipping Associations	1. Measures on ships and equipment a) Use of larger types of ships b) Introduction of new types of ships c) Adoption of energy-efficient devices and equipment d) Development of energy-efficient designs for ships 2. Measures concerning operations a) Improved transport efficiency b) Energy-saving diagnosis for individual ships c) Selection of optimal transportation routes
All Japan Freight Forwarders Association	1. Assistance for the introduction of low-pollution vehicles (vehicles that meet emission standards and compressed natural gas [CNG] vehicles) 2. Promotion of switching to larger vehicles
The Association of Japanese Private Railways	1. Promotion of the introduction of energy-saving railcars when increasing the number of or replacing vehicles 2. Appropriate train operations according to demand through adoption of train schedules for Saturdays, Sundays, and holidays

(Attachment 4)

Results of Efforts Related to Offices and Other Operational Units

Industry	Electricity/energy consumption	CO_2 emission reductions	CO_2 emissions per unit of floor area
The Federation of Electric Power Companies of Japan	FY 2008: 0.89 bil. kWh → FY 2012: 0.71 bil. kWh		
The Japan Iron and Steel Federation	Base year (FY 2003–2005 average): 711 TJ → FY 2012: 510 TJ	6,000 t-CO_2	Base year (FY 2003–2005 average): 63 kg/m^2 → FY 2012: 54 kg/m^2
Japan Paper Association	FY 2008: 11,500 kl → FY 2012: 10,400 kl	1,000 t-CO_2	
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	FY 2008: 28,300 kl → FY 2012: 20,700 kl	44,000 t-CO_2	FY 2008: 70.9 kg/m^2 → FY 2012: 67.6 kg/m^2
Japan Auto Parts Industries Association	FY 2008: 334.7 MJ → FY 2012: 304.1 MJ	40,000 t-CO_2	FY 2008: 102.8 kg/m^2 → FY 2012: 89.8 kg/m^2
Lime Manufacture Association	FY 2008: 700 kl → FY 2012: 500 kl	100 t-CO_2	
The Federation of Pharmaceutical Manufacturers' Associations of Japan and Japan Pharmaceutical Manufacturers Association	FY 2008: 21,800 kl → FY 2012: 19,500 kl		
Flat Glass Manufacturers Association of Japan	FY 2008: 16,393,293 MJ → FY 2012: 13,631,532 MJ	236 t-CO_2	FY 2008: 73.98 kg/m^2 → FY 2012: 62.94 kg/m^2

Japan Copper and Brass Association	FY 2008: 520 kl → FY 2012: 220 kl	480 t-CO_2	FY 2008: 0.106 t/m^2 → FY 2012: 0.042 t/m^2
The Japan Bearing Industrial Association	FY 2008: 1,300 kl → FY 2012: 1,200 kl		
Japan Sugar Refiners' Association			FY 2008: 73.1 kg/m^2 → FY 2012: 68.5 kg/m^2
Limestone Association of Japan	FY 2008: 66 kl → FY 2012: 51 kl		
Japan Machine Tool Builders' Association	FY 2008: 138,000 GJ → FY 2012: 84,000 GJ	2,000 t-CO_2	FY 2008: 0.08 t/m^2 → FY 2012: 0.05 t/m^2
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders [*1]	FY 2008: 4,000 kl → FY 2012: 3,300 kl	1,000 t-CO_2	FY 2008: 153.4 kg/m^2 → FY 2012: 111.3 kg/m^2
Japan Association of Rolling Stock Industries	FY 2008: 1,000 kl → FY 2012: 900 kl		
Japan Petroleum Development Association	FY 2008: 1,000 kl → FY 2012: 900 kl		
Japan LP Gas Association	FY 2008: 13,422,000 MJ → FY 2012: 13,192,000 MJ		
The Life Insurance Association of Japan	FY 2008: 37,000 kl → FY 2012: 30,300 kl		FY 2008: 74.3 kg/m^2 → FY 2012: 71.6 kg/m^2
The General Insurance Association of Japan	FY 2008: 20,300 kl → FY 2012: 16,000 kl	400 t-CO_2	FY 2008: 59.5 kg/m^2 → FY 2012: 58.9 kg/m^2

Japan Foreign Trade Council, Inc.	FY 2008: 25,000 kl → FY 2012: 19,000 kl		FY 2008: 45.8 kg/m^2 → FY 2012: 45.5 kg/m^2
KDDI	FY 2008: 7,000 kl → FY 2012: 5,200 kl	400 t-CO_2	FY 2008: 58.5 kg/m^2 → FY 2012: 56.5 kg/m^2
Japanese Bankers Association	FY 2008: 343,800 kl → FY 2012: 280,100 kl		
The Association of Japanese Private Railways	FY 2008: 12,100 kl → FY 2012: 10,100 kl		

[*1] The figures in the table do not include the results of efforts made by the Cooperative Association of Japan Shipbuilders.

(Attachment 5)

Results of Efforts Related to Distribution Operations

Industry	Energy consumption	CO_2 emission reductions	CO_2 emissions per unit of cargo transported	Energy consumption per unit of cargo transported
The Federation of Electric Power Companies of Japan	FY 2008: 25,500 kl → FY 2012: 22,200 kl	86,000 t-CO_2		
The Japan Gas Association	FY 2008: 4,300 kl → FY 2012: 4,200 kl	1 mil. t-CO_2		
The Japan Iron and Steel Federation	FY 2008: 633,000 kl → FY 2012: 587,000 kl	121,000 t-CO_2		
Japan Chemical Industry Association	FY 2008: 505,000 kl → FY 2012: 449,000 kl	146 t-CO_2		FY 2008: 0.024 l/km → FY 2012: 0.023 l/km
Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association	FY 2008: 29,800 kl → FY 2012: 28,600 kl	33,000 t-CO_2	FY 2008: 0.115 t/t-km → FY 2012: 0.102 t/t-km	
Japan Auto Parts Industries Association			FY 2008: 134.8 kg/t-km → FY 2012: 110.7 kg/t-km	
Flat Glass Manufacturers Association of Japan	FY 2008: 616,312,317 MJ → FY 2012: 502,283,004 MJ	8,000 t-CO_2	FY 2008: 18.7 kg/block → FY 2012: 14.5 kg/block	
Japan Copper and Brass Association	FY 2008: 760 kl → FY 2012: 610 kl	400 t-CO_2		

Japan LP Gas Association	FY 2008: 1,433,659,000 MJ → FY 2012: 1,223,509,000 MJ	16,000 t-CO_2	FY 2008: 90 g/t-km → FY 2012: 83 g/t-km	FY 2008: 1.24 MJ/t-km → FY 2012: 1.19 MJ/t-km
Limestone Association of Japan	FY 2008: 2,200 kl → FY 2012: 1,700 kl	1,420 t-CO_2		

(Attachment 6)

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) (2010)

Japan	U.K.	Nordic countries	Germany	U.S.A.	China	France	India
100	98	104	111	113	125	126	159

Source: ECOFYS, "International Comparison of Fossil Power Efficiency," 2013.
The lower the number, the larger the amount of electricity produced per unit of energy input.

Comparison of CO_2 emissions intensity for the electric power industry ("generating-end")(2010)

Japan	France	Canada	Italy	U.K.	Germany	U.S.A.	China	India
100	23	49	108	115	118	136	195	239

Source: IEA, "Energy Balances of OECD Countries 2012" and "Energy Balances of Non-OECD Countries 2012."
Federation of Electric Power Companies indexed the original figures.

Since France has a high proportion of nuclear power generation (approx. 80%) and Canada has a high proportion of

○ 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 (2010)

Japan	South Korea	Germany	China	U.K.	India	U.S.A.	Russia
100	104	112	117	123	124	132	136

Source: Research Institute for Innovative Technology for the Earth (RITE) "International Comparison of Energy Efficiency, 2010.

○ Chemicals (Japan Chemical Industry Association)

Electric power consumed in relation to production of electrolytic caustic soda (2009)

Japan	South Korea	China	Canada	Middle East	India	U.S.A.	Western Europe	Eastern Europe	Mexico
100	100	103	105	107	109	109	111	112	118

Source: CMAI, "Capacity Database 2009"; and Japan Soda Industry Association, "*Soda Gijutsu Handobukku 2009"* (Soda Technology Handbook 2009).

○ 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).

Potential for Energy Savings if Global Best Available Technologies (BAT) Were Introduced

○ Paper (Japan Paper Association)

Potential energy savings in major countries' pulp and paper industries if BAT were introduced (Unit: GJ/t)

Japan	Germany	Finland	France	U.S.A.	Canada	Russia	Global
0.3	0.1	1	2.3	6.5	8.3	12.9	3.0

Source: IEA, "Energy Technology Perspectives 2012."

○ Cement (Japan Cement Association)

Potential energy savings if BAT were introduced (Unit: GJ/t)

Japan	Brazil	India	Europe (OECD members)	China	Korea	U.S.A.	Global
0.4	0.5	0.6	0.8	0.9	1.3	1.4	0.9

Source: IEA, "Energy Technology Perspectives 2010."

(Attachment 7)

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 11 follow-up surveys (fiscal 2002–2012) 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 11 times.

4. Members of the Evaluation Committee (as of October 2013)

Chairman: Yoji Uchiyama (Professor, Faculty of Engineering, Information and Systems, University of Tsukuba)
Members: Tadashi Aoyagi (Corporate Adviser, Mitsubishi Research Institute)
Kiyoe Asada (President, Women's Energy Network)
Kazuya Koujitani (Secretary-General, Green Purchasing Network)
Masaki Mashita (Councillor, Japan Forestry Association)
Ryuji Matsuhashi (Professor, School of Engineering, The University of Tokyo)
Kanji Yoshioka (Professor Emeritus, 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, 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, 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_2 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, Keidanren 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. 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.