Keidanren
Policy & Action

The Commitment to a Low Carbon Society
Fiscal 2015 Follow-up Results
Summary

<Performance in fiscal 2014>

(Tentative translation)

March 25, 2016
KEIDANREN

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Introduction

The world seeks to agree on a post-2020 international framework that will apply to all countries at the twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) to be held in Paris in December 2015.

In April 2015, before Japan formulated its Intended Nationally Determined Contribution, KEIDANREN announced Phase II of the Commitment to a Low Carbon Society towards 2030, which expands on a series of measures that it has promoted since 1997, namely, the Voluntary Action Plan on the Environment and the Commitment to a Low Carbon Society Phase I. With the first pillar of the program calling for (a) "Emission reductions from domestic business operations," CO2 reduction targets were established for 2030 in addition to conventional 2020 targets. The Commitment to a Low Carbon Society comprises four pillars, the other three being: (b) "Strengthened co-operation with other interested groups" including reductions through products; (c) "Promoting contribution at the international level" including the promotion of technology transfers to developing countries; and (d) the "Development of innovative technologies." As of October 2015, 54 industries and companies have formulated action plans under the Commitment to a Low Carbon Society, incorporating the maximum efforts possible.

The Voluntary Action Plan on the Environment of KEIDANREN made significant accomplishments as a result of running the PDCA cycle every fiscal year and promoting voluntary and proactive efforts on the part of industries and companies since its formulation in 1997 (see Annex "Overview and Accomplishments of the KEIDANREN's Voluntary Action Plan on the Environment"). In particular, 34 industries of the industrial and energy conversion sectors set up the common target of "reducing average CO2 emissions from the industrial and energy conversion sectors between fiscal 2008 and 2012 to below the level of fiscal 1990" and made voluntary reduction efforts, consequently achieving "reductions by 12.1% relative to fiscal 1990 levels" and thereby substantially overachieving the target.

The Government initiated deliberations on its Intended Nationally Determined Contribution (INDC) that would include Japan's greenhouse gas (GHG) reduction target in January this year. During the deliberation process, KEIDANREN explained the efforts undertaken and the accomplishments made under the Voluntary Action Plan on the Environment and declared its continued determination to voluntarily reduce CO2 emission under the Commitment to a Low Carbon Society.

The government finalized its INDC and submitted it to the UN in July this year. The Commitment to a Low Carbon Society of KEIDANREN served as the basis for calculations of measures to be taken in the business community.

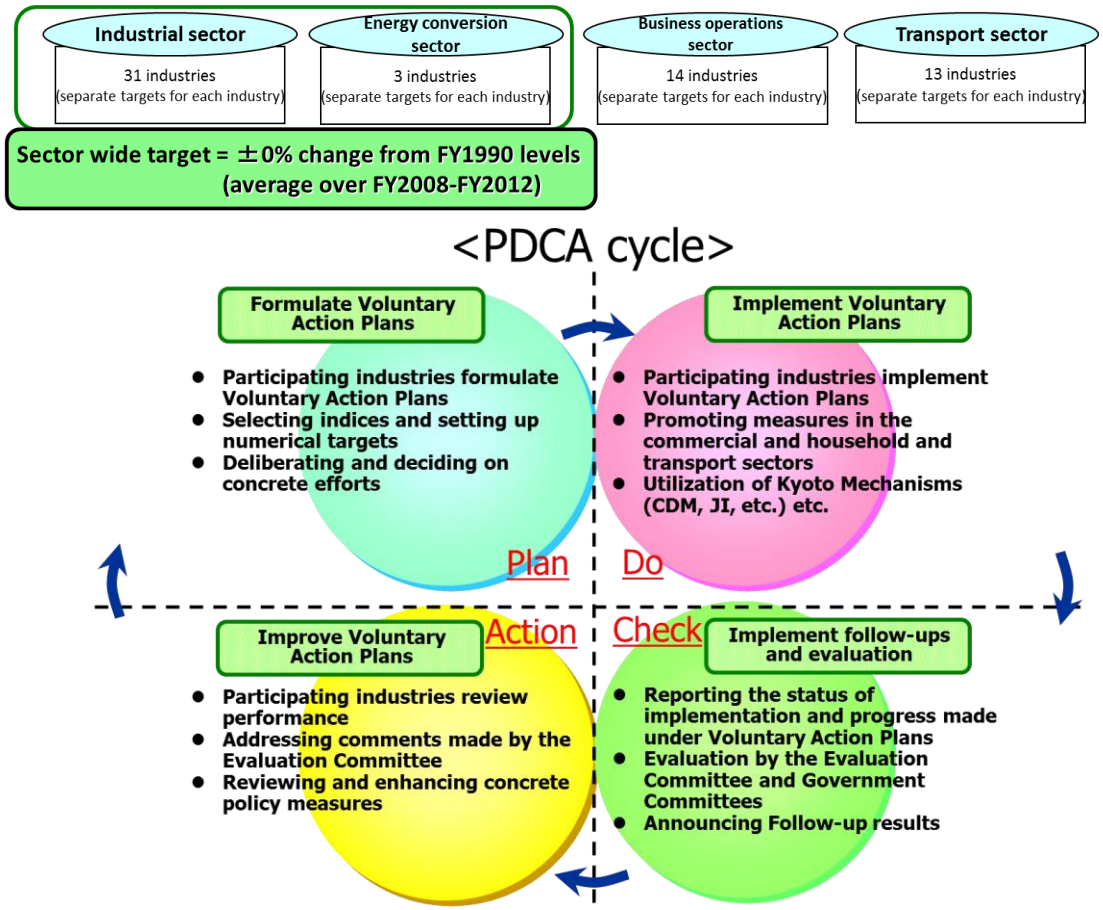
Given the increasingly large role that the Commitment to a Low Carbon Society will play

in Japanese policy, KEIDANREN must make maximum efforts to reduce CO2 emissions under the Commitment to a Low Carbon Society and continue to seek further enhancement of the program's effectiveness, transparency and reliability.

From this perspective, we have complied the Fiscal 2015 Follow-up Results (Summary) <Performance in 2014>. Details of efforts made by each industry can be found in the "Industry-specific Report" to be published in spring 2016.

〔Annex〕

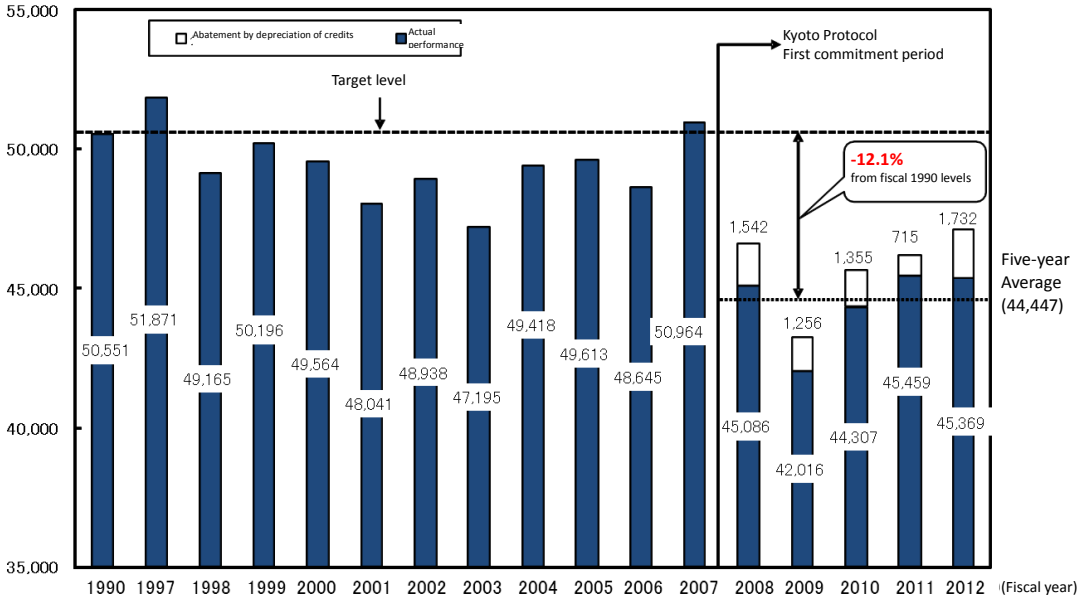
1. Overview of the Voluntary Action Plan on the Environment of KEIDANREN (Section on Global Warming Measures) (fiscal 1997-2012)



2. Accomplishments of the KEIDANREN Voluntary Action Plan on the Environment (Section on Global Warming Measures)

◆As a result of efforts made under the Voluntary Action Plan on the Environment, emissions were reduced by 12.1% from fiscal 1990 levels during the first commitment period (2008-2012) of the Kyoto Protocol

(10000t-CO2) **CO2 emission reduction trends (34 industries of the industrial and energy conversion sectors)**



*1 Figures given for actual performance in 2008 and onwards include abatement by depreciation of credits

*2 The five-year average (fiscal 2008-2012) before consideration of abatement by depreciation of credits is 9.5% below fiscal 1990 levels.

3. History of the Voluntary Action Plan on the Environment (Section on Global Warming Measures) and the Commitment to a Low Carbon Society

April 1991 Announced the KEIDANREN Global Environment Charter

June 1992 UN Earth Summit (Rio de Janeiro)

July 1996 Announced the KEIDANREN Appeal on Environment (declared the formulation of the Voluntary Action Plan on the Environment)

June 1997 **Announced the KEIDANREN Voluntary Action Plan on the Environment**

(The industrial and energy conversion sectors set up targets to "endeavor to reduce CO2 emissions from the industrial and energy conversion sectors in 2010 (later changed to average of fiscal 2008-2012) to below fiscal 1990.
=>achieved reductions by 12.1% (Fiscal 2013 follow-up results))

Dec. 1997 Adopted the Kyoto Protocol (COP3)

Dec. 1998 First follow-up to the Voluntary Action Plan on the Environment (continued on an annual basis)

July 2002 Launched the Evaluation Committee for the Voluntary Action Plan on the Environment

April 2005 Cabinet Decision on the "Kyoto Protocol Target Achievement Plan"

March 2008 Cabinet Decision on the "Kyoto Protocol Target Achievement Plan (revised)"

("the voluntary action plans of *Nippon KEIDANREN* are, in particular, playing a central role in countermeasures in the industrial community. The advantages of a voluntary instrument include the ease of selection of superior countermeasures for each actor based on its originality and ingenuity, the likelihood of providing incentives to pursue aggressive targets, and no procedural costs for both the Government and implementing actors. It is expected that these advantages will be further exploited in voluntary action plans by business operators.")

Dec. 2009 Announced the Commitment to a Low Carbon Society Phase I (Basic Concept) (2020 target)

Jan. 2013 **Formulated and announced the Commitment to a Low Carbon Society Phase I (2020 target)**

=> as of October 2015, 57 industries and companies have formulated action plans

March 2013 Interim policy on global warming (Global Warming Prevention Headquarters decision)

("In terms of sector-specific measures to cope with CO2 emissions of energy origin, voluntary approaches taken by businesses participating in the Commitment to a Low Carbon Society shall undergo evaluation and verification, and institutional measures, including the formulation, announcement and implementation of guidelines on emission regulation, and various support measures shall be promoted.")

April 2013 Launched the KEIDANREN Commitment to a Low Carbon Society

July 2014 Invited industries to formulate action plans under the KEIDANREN Commitment to a Low Carbon Society Phase II (2030 target)

April 2015 **Formulated and announced the Commitment to a Low Carbon Society Phase II (2030 target)**

=> as of October 2015, 54 industries and companies have formulated action plans

July 2015 Decision on Japan's Intended Nationally Determined Contribution by the Japanese Government

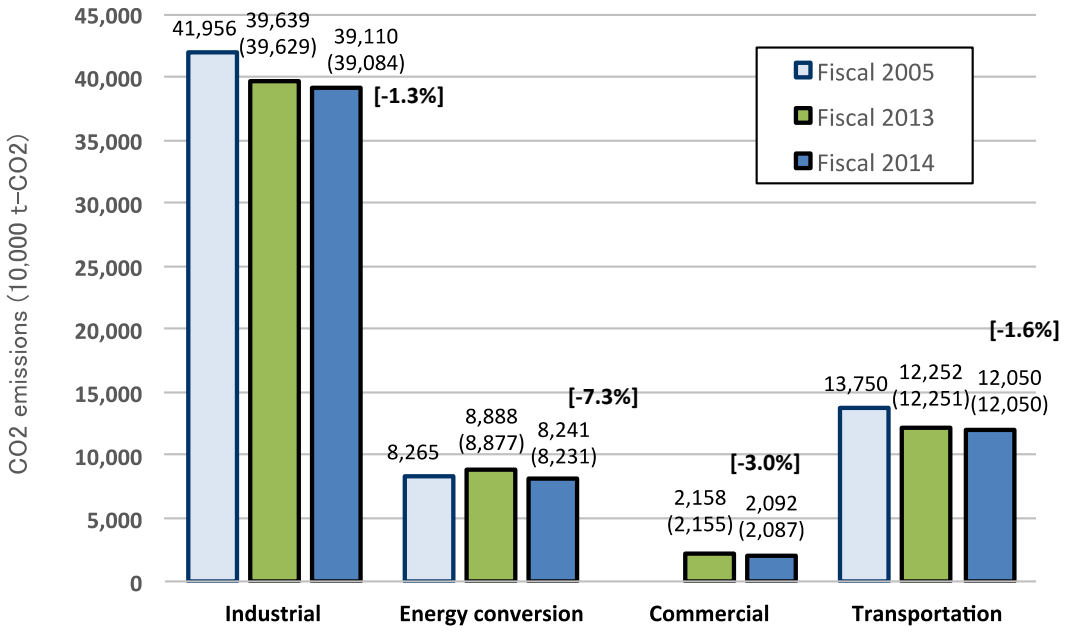
(Included the Commitment to a Low Carbon Society among "Measures which form the basis for the bottom-up calculation of the GHG emission reduction target.")

1． Pillar 1: Emission reductions from domestic business operations

The Fiscal 2015 Follow-up revealed that CO2 emissions in fiscal 2014 had amounted to 391.10 million t-CO2 [1.3% reduction relative to fiscal 2013 levels] from the industrial sector (total of 31 industries), 82.41 million t-CO2 [7.3% reduction relative to fiscal 2013 levels] from the energy conversion sector (total of 3 industries), 20.92 million t-CO2 [3.0% reduction relative to fiscal 2013 levels] from the commercial sector (total of 12 industries) and 120.50 million t-CO2 (1.6% reduction relative to fiscal 2013 levels) from the transportation sector. Therefore, CO2 emissions had been reduced in all sectors (Figure 1).

An analysis was conducted on contributing factors of increases and decreases in CO2 emissions compared with fiscal 2013 (previous fiscal year) and fiscal 2005 levels (Figures 2 and 3). As a result, it was revealed that the “change in energy consumed per unit of economic activity” (energy consumption intensity) had improved in all sectors with the exception of the industrial sector (2.9% reduction in the energy conversion sector, 1.0% reduction in the commercial sector, 5.1% reduction in the transportation sector). The industrial sector, recording a 0.1% increase, saw little change in its CO2 emissions, presumably due to difficulties in controlling CO2 emissions fixed regardless the changes in economic (production) activity that resulted from the backlash to the last-minute rush of demand prior to the consumption tax increase.

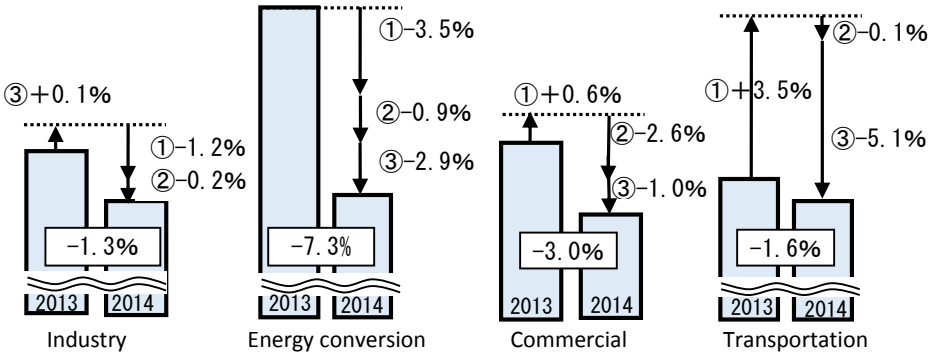
Figure 1. CO2 emissions by sector



(Notes) ・ Data for fiscal 2005 have been collected based on the calculation method employed under the Commitment to a Low Carbon Society for comparison purposes.

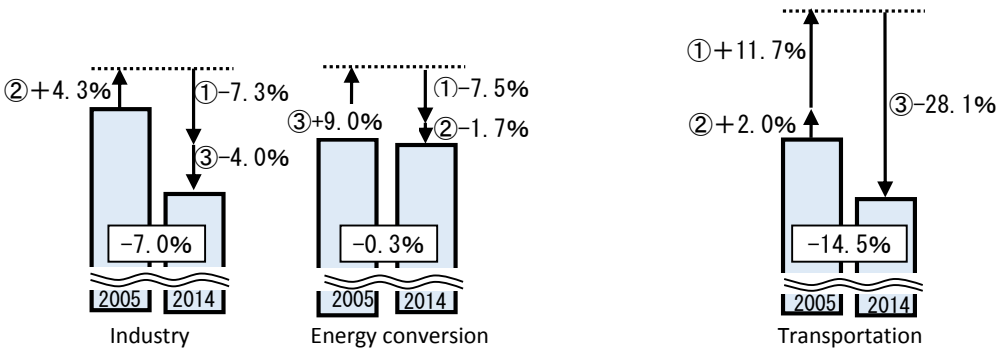
・Emissions from the commercial sector in fiscal 2005 are not provided due to unsatisfactory data collection status.
・CO2 emissions after consideration of emission abatement based on the depreciation of credits are provided in brackets.
・Figures provided in square brackets are relative to fiscal 2013 levels.

Figure 2 Factors of emission increase/decrease by sector (relative to fiscal 2013)



(Note) ①represents changes in economic activity; ②represents changes in CO2 emission coefficients; ③ represents changes in energy consumption per volume of production activity
・ As numbers have been rounded to the nearest tenth, the aggregated amount of all sectors may not be equal to the total.

Figure 3. Factors of emission increase/decrease by sector (relative to fiscal 2005)



(Note) ① represents changes in economic activity; ② represents changes in CO2 emission coefficients; ③ represents changes in energy consumption per volume of production activity
・ As numbers have been rounded to the nearest tenth, the aggregated amount of all sectors may not be equal to the total.

(1) Industrial Sector

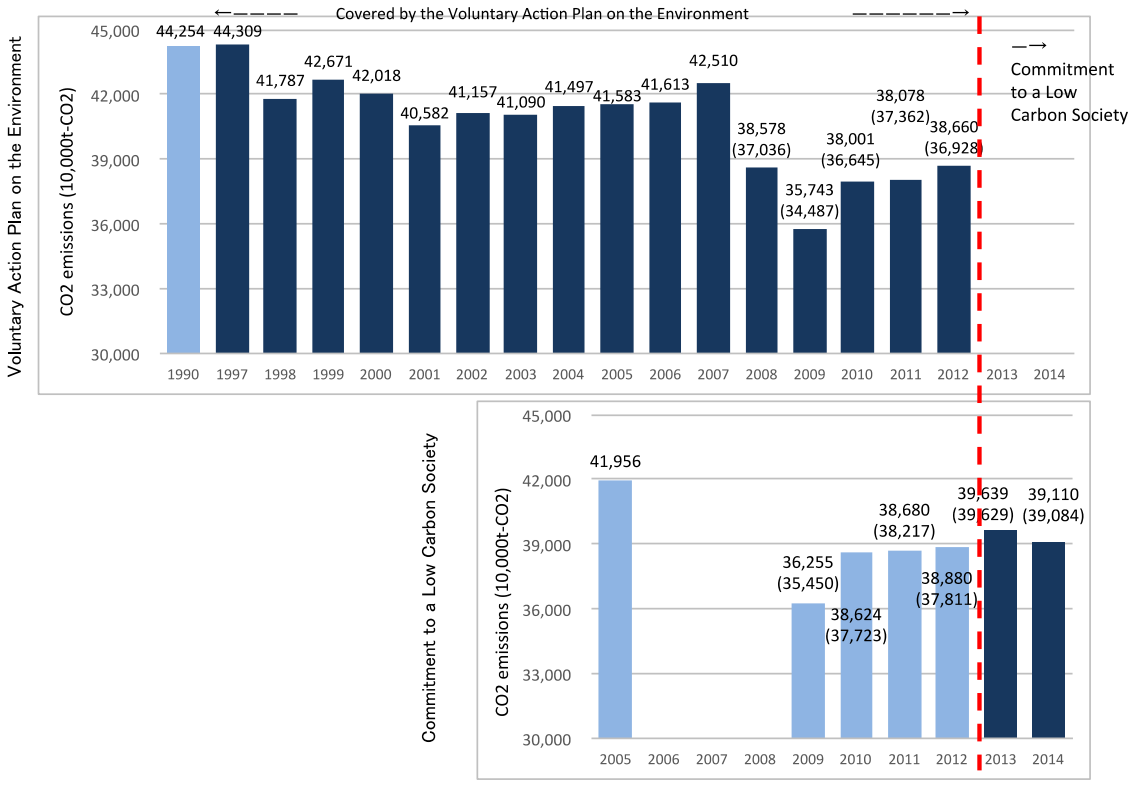
A. Performance

The Fiscal 2015 Follow-up revealed that the industrial sector emitted 391.10 million t-CO2 in fiscal 2014, representing a decrease of 1.3% (5.29 million t-CO2) compared to fiscal 2013 levels. In comparison with fiscal 2005 levels, emissions from the sector decreased by 6.8% (28.46 million t-CO2) (Figure 4.).

The industrial sector emitted 396.39 million t-CO2 in fiscal 2013, accounting for 83.3% of total emissions from Japan's industrial sector as a whole (476.05 million t-CO2 in fiscal 2013).

As provided in Figure 5, industries reported that in their efforts to reduce CO2 emissions in fiscal 2014, they introduced energy-saving/high-efficiency facilities, recovered waste heat, converted to more efficient fuels and improved operational methods (see Attachment 2 for details).

Figure 4. CO2 emissions from the industrial sector



(Notes) ・The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2005-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.

・Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. Changes include calculating emissions from power generation using a receiving end coefficient instead of a generation-end coefficient and setting revised industrial boundaries in calculating emissions from some industries.

・The CO2 emission figures for the electrical and electronics industry in fiscal 2011 and the years preceding used for emission calculations under the Commitment to a Low Carbon Society are equivalent to those used in the Voluntary Action Plan on the Environment (as the industry used receiving end coefficients in prior calculations, which did however apply different industrial boundaries). Emissions from the Shipbuilders' Association of Japan are not included in the figures representing fiscal years prior to 2012.

・CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

Figure 5. Examples of efforts made in fiscal 2014 [Industrial sector]

(1) Introduction of energy-saving and high-efficiency facilities
- Improvement of efficiency levels of motors, transformers, compressors, pumps, sterilizers and fans (replacement with high-efficiency equipment, etc.)
- Upgrading to high-efficiency factory infrastructure (improved efficiency of power generating equipment and boilers)
- Installation of inverters in equipment
- Application of thermal insulation coating to equipment and piping
- Switching to LED lighting
- Upgrading to high-efficiency air conditioning equipment
- Heat and power storage

(2) Recovery of waste heat
- Utilization and recovery of hot and cold waste heat
- Utilization of waste gas

(3) Fuel conversion
- Utilization of biomass fuels, solar power and wind power

(4) Improvement of operational methods
- Optimization of operational conditions including pressure and temperature
- Consolidation and rationalization of production lines
- Long-term continuous operation and intermittent operation of equipment; reduction of standby operation
- Reduction of time required for cleansing
- Introduction of energy monitoring facilities
- Optimization of air conditioning temperatures

(5) Other
- Application of solar control window films in factories; upgrading to double-glazed windows
- Greening of factory roofs and walls

B. Factor analysis

A factor analysis was conducted on the causes that led to a 1.3% decrease in CO2 emissions from the industrial sector in fiscal 2014, relative to fiscal 2013. It was found that decreased economic activity and a smaller CO2 emission factor contributed to reducing CO2 emissions by 1.2% and 0.2% respectively (see Table 1). Energy consumption per unit of economic activity was on a level with that of fiscal 2013, increasing by 0.1%, presumably due to having difficulties in controlling fixed CO2 emissions despite reduced economic (production) activity among major industries that had resulted from the backlash to the last-minute rush of demand prior to the consumption tax increase[1].

In contrast, relative to fiscal 2005 levels, reduced energy consumption per unit of economic activity contributed to reducing CO2 emissions by 4.0%, thus indicating that energy intensity levels have improved over the medium to long-term.

[1]In general, energy consumption (CO2 emissions) comprises an inevitable part that is required regardless of economic (production) activity levels (fixed consumption) and a part that changes in conjunction with economic activity levels (variable consumption). Despite reduced economic activity, energy efficiency levels (CO3 emission efficiency) tend to decrease as a whole due to unchanged levels of fixed energy consumption.

Table 1. Analysis of contributing factors to increases and decreases in CO2 emissions from the industrial sector in fiscal 2014 *1

	Relative to fiscal 2013	Relative to fiscal 2005
Change in economic activity *2	-1.2% (-1.1%) *6	-7.3% (-7.2%)
Change in CO2 emission factor *3*4	-0.2% (-0.3%)	+4.3% (+4.2%)
Change in energy consumed per unit of economic activity *5	+0.1% (+0.1%)	-4.0% (-4.0%)
Total	-1.3% (-1.4%)	-7.0% *7 (-7.0%)

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

*2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity in each industry.

*3 CO2 emissions per unit of heat output have been used for fuel, and CO2 emissions per unit of power output, for electricity.

*4 Fuel conversion efforts, as provided in Figure 5, have contributed to the lowering of the CO2 emission factor.

*5 Efforts including the introduction of energy-saving and high-efficiency facilities, recovery of waste energy, and improvement of operational methods, as provided in Figure 5 have contributed to the reduction of energy consumed per unit of economic activity.

*6 CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

*7 Data for the Shipbuilders' Association of Japan are not included in the figure provided relative to fiscal 2005.

(2) Energy conversion sector

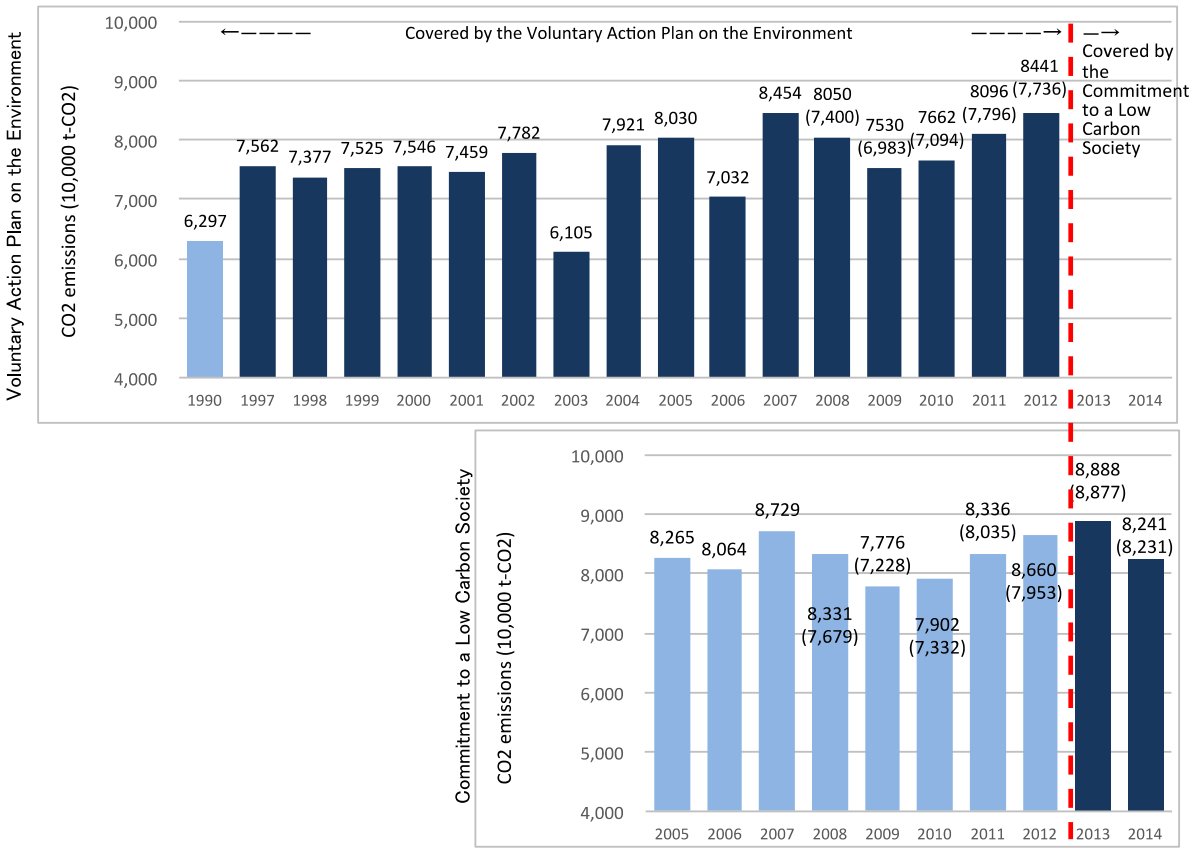
A. Performance

The Fiscal 2015 Follow-up revealed that the energy conversion sector emitted 82.41 million t-CO2 in fiscal 2014, representing a decrease of 7.3% (6.47 million t-CO2) compared to fiscal 2013 levels. In comparison with fiscal 2005 levels, emissions from the sector have decreased by 0.3% (0.24 million t-CO2) (Figure 6.).

The energy conversion sector emitted 88.88 million t-CO2 in fiscal 2013, accounting for 88.3% of total emissions from Japan's energy conversion sector (100.64 million t-CO2 in fiscal 2013) as a whole.

As provided in Figure 7, industries reported that in their efforts to reduce CO2 emissions in fiscal 2014, they introduced energy-saving/high-efficiency facilities, recovered waste heat, converted to more efficient fuels and improved operational methods (see Attachment 2 for details).

Figure 6. CO2 emissions from the energy conversion sector



(Notes) ・The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2005-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.

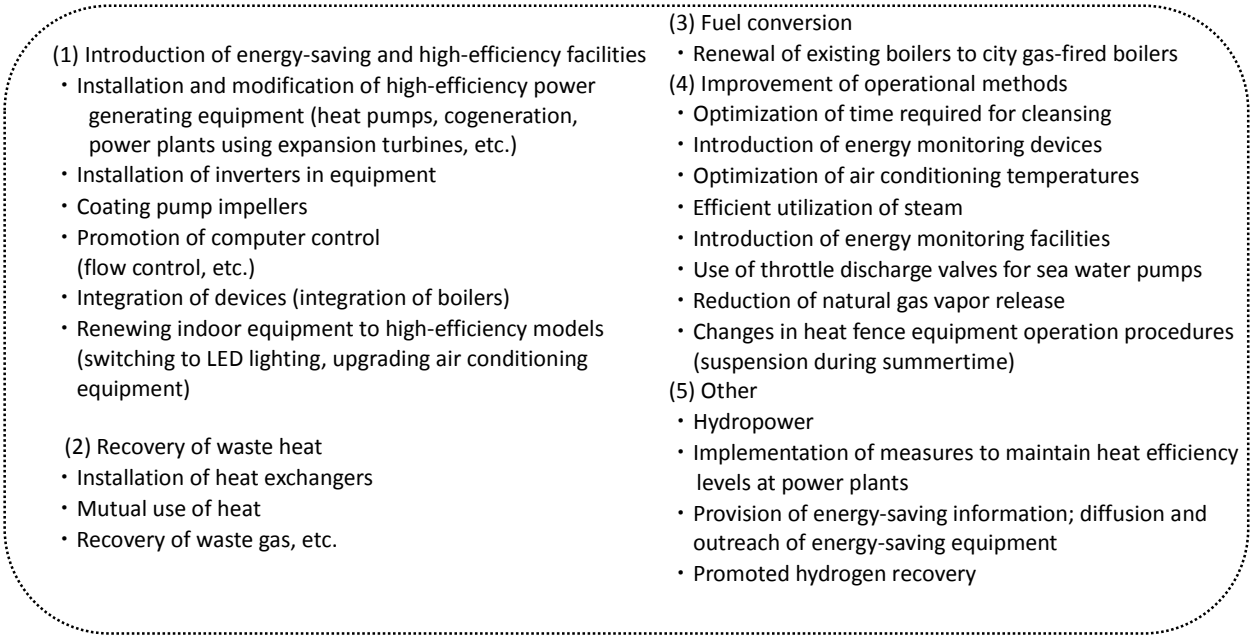
・Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. Changes include calculating emissions from power generation using a receiving end coefficient instead of a generation-end coefficient and setting revised industrial boundaries in calculating emissions from some industries.

・The CO2 emission figures for the Federation of Electric Power Companies include emissions from power used in power generation plants and transmission and distribution loss. It should be noted that these emissions are also counted in the emissions from the industrial sector.

・CO2 emission figures from the Voluntary Action Plan on the Environment (note: industrial boundaries have been revised) have been used to represent the Japan Gas Association in fiscal 2012 and the years preceding under the Commitment to a Low Carbon Society.

・CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

Figure 7. Examples of efforts made in fiscal 2014 [Energy conversion sector]



B. Factor analysis

A factor analysis was conducted on the causes that led to a 7.3% decrease in CO2 emissions from the energy conversion sector in fiscal 2014, relative to fiscal 2013. It was found that smaller economic activity, a smaller CO2 emission factor and reduced energy consumption per unit of economic activity contributed to reducing CO2 emissions by 3.5%, 0.9% and 2.9% respectively

In the energy conversion (electric power) sector, unlike in the industrial sector, despite reduced economic (energy production) activity, improvement was seen in the energy consumption per unit of economic activity. This is presumably due to the increased operating rate of newly installed high-efficiency equipment, in contrast to the reduced operation of aged equipment in response to lower energy demand.

Table 2. Analysis of contributing factors to increases and decreases in CO2 emissions from the energy conversion sector in fiscal 2014 *1

	Relative to fiscal 2013	Relative to fiscal 2005
Change in economic activity *2	-3.5% (-3.5%) *7	-7.5% (-7.5%)
Change in CO2 emission factor *3*4*5	-0.9% (-0.9%)	-1.7% (-1.9%)
Change in energy consumed per unit of economic activity *5*6	-2.9% (-2.9%)	+9.0% (+9.0%)
Total	-7.3% (-7.3%)	-0.3% (-0.4%)

*1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.
*2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity in each industry.
*3 CO2 emissions per unit of heat output have been used for fuel, and CO2 emissions per unit of power output, for electricity.
*4 Fuel conversion efforts, as provided in Figure 7, have contributed to the lowering of the CO2 emission factor.
*5 The energy input used the factor analysis include only thermal energy. Therefore, in the factor analysis, increased energy input due attributable to increased thermal power generation in response to the suspension of nuclear power plants are reflected in a smaller CO2 emission factor and increased energy consumed per unit of economic activity.
*6 Efforts including the introduction of energy-saving and high-efficiency facilities, recovery of waste heat, and improvement of operational methods, as provided in Figure 7 have contributed to the reduction of energy consumed per unit of economic activity.
*7 CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

(3) Commercial sector

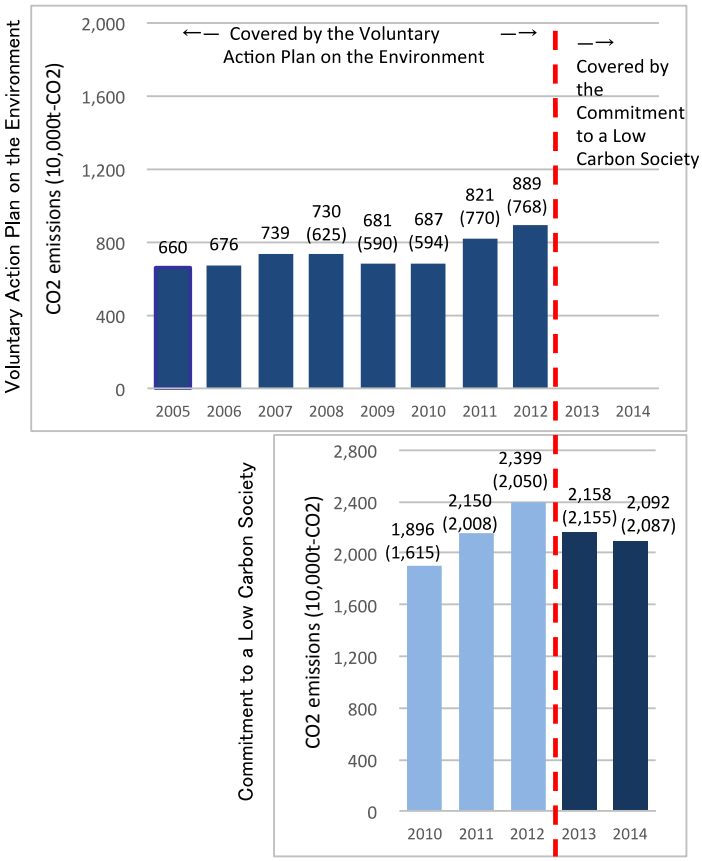
A. Performance

The Fiscal 2015 Follow-up revealed that the commercial sector emitted 20.92 million t-CO2 in fiscal 2014, representing a decrease of 3.0% (0.65 million t-CO2) compared to fiscal 2013 levels (Figure 8.).

The commercial sector emitted 23.99 million t-CO2 in fiscal 2013, accounting for 7.7% of total emissions from Japan's energy conversion sector (278.75 million t-CO2 in fiscal 2013) as a whole.

Industries reported that they continued to newly install or upgrade existing equipment and appliances to high-efficiency/energy-saving models, including LED lighting, high-performance air conditioning equipment and elevators (Figure 9). They are also engaged in further enhancing thermal insulation levels and improving the efficiency of energy management in buildings. (see Attachment 2 for details).

Figure 8　CO2 emissions from the commercial sector



(Notes) ・The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2010-2012 under the Commitment to a Low Carbon Society have been calculated and provided as reference.

・Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. Changes include calculating emissions from power generation using a receiving end coefficient instead of a generation-end coefficient and setting revised industrial boundaries in calculating emissions from some industries.

・Data for the Real Estate Companies Association of Japan are not included in the graph.

・CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

Figure 9. Examples of efforts made in fiscal 2014 [Commercial sector]

(1) Introduction of energy-saving and high-efficiency facilities
- Upgrading of equipment (air conditioners, elevators) to high-efficiency models
- Improvement of efficiency levels of transformers, compressors, pumps (upgrading to high-efficiency models, etc.)
- Installation of inverters in equipment, introduction of no-load inverters
- Application of thermal insulation coating and high-insulation window panes
- Switching to high-efficiency lighting (renewal to LEDs or fluorescent bulbs)
- Construction of or moving to highly efficient buildings
- Introducing automated-control of heat sources and intake of outdoor air
- Introduction of energy management systems
- Connecting servers and routers to DC power sources
- Installation of HVAC systems without air conditioning systems at base stations.
- Introduction of heat pumps
- Conversion to small fuel-efficient vehicles

(2) Fuel conversion
- Utilization of solar power and wind power

(3) Improvement of operational methods
- Optimization of freezer temperatures
- Suspension of overdue equipment
- Streamlining of networks
- Intermittent operation of air conditioners and appliances (lighting, office appliances, commercial equipment, elevators, toilets, etc.)
- Optimization of air conditioning temperatures strict maintenance
- Optimization of brightness
- Integration of offices

(4) Other
- Promotion of energy-saving efforts through the acquisition of ISO14001 certification
- Management of working hours
- Greening of factory roofs and walls

B. Factor analysis

A factor analysis was conducted on the causes that led to a 3.0% decrease in CO2 emissions from the commercial sector in fiscal 2014, relative to fiscal 2013. It was found that increased economic activity in telecommunications and other industries, a smaller CO2 emission factor and reduced energy consumption per unit of economic activity contributed to reducing CO2 emissions by 0.6%, 2.6% and 1.0% respectively.

Table 3. Analysis of contributing factors to increases and decreases in CO2 emissions from the commercial sector in fiscal 2014 *1

	Relative to fiscal 2013
Change in economic activity *2	+0.6% (+0.6%) *6
Change in CO2 emission factor *3*4	-2.6% (-2.6%)
Change in energy consumed per unit of economic activity *5	-1.0% (-1.0%)
Total	-3.0% (-3.2%)

*1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.
*2 Indices with the closest relation to energy consumption were selected to represent each industry's economic

activity in each industry.

*3 CO2 emissions per unit of heat output have been used for fuel, and CO2 emissions per unit of power output, for electricity.

*4 Fuel conversion efforts, as provided in Figure 9, have contributed to the lowering of the CO2 emission factor.

*5 Efforts including the introduction of energy-saving and high-efficiency facilities, recovery of waste heat, and improvement of operational methods, as provided in Figure 9 have contributed to the reduction of energy consumed per unit of economic activity.

*6 CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

C. Relevant efforts made in main and local offices by non-commercial industries

Energy-saving efforts pursued in offices are not limited to industries in the commercial sector. A diversity of efforts, including strictly managing heating and cooling temperatures, conserving electric power by frequently switching off lights, and installing high-efficiency energy-saving facilities, have been made across a wide range of industries in the industrial, energy conversion and transportation industries, as provided in Attachment 2. As exhibited in Attachment 7, these efforts have led to the reduction of CO2 emissions per unit of floor area compared to fiscal 2013 levels in many industries.

(4) Transportation Sector

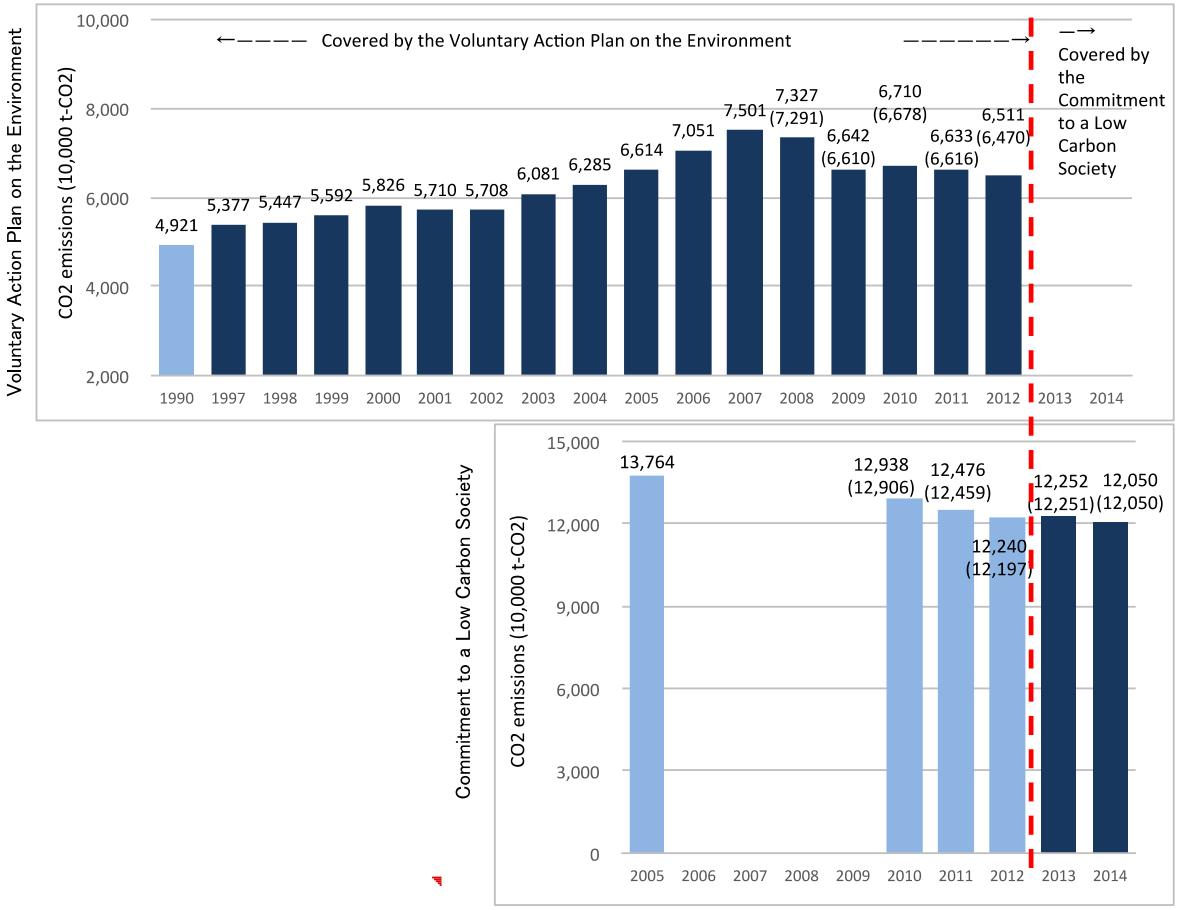
A. Performance

The Fiscal 2015 Follow-up revealed that the transportation sector emitted 120.50 million t-CO2 in fiscal 2014, representing a decrease of 1.6% (2.01 million t-CO2) compared to fiscal 2013 levels. In comparison with fiscal 2005 levels, emissions from the sector have decreased by 14.5% (17.14 million t-CO2) (Figure 10.).

The transportation sector accounted for 25.5% of total emissions from Japan's transportation sector as a whole (224.66 million t-CO2 in fiscal 2013), excluding overseas emissions.

Industries reported that they continued to newly install or upgrade existing equipment (vehicles, ships, aircrafts, etc.) to high energy-saving performance models and engaged as shown in Figure 11, in efforts to pursue increased transportation efficiency by developing larger equipment and promoting integrated shipping, combining road, rail, marine and air transport (see Attachment 2 for details).

Figure 10. CO2 emissions from the transportation sector



(Notes) ・The Voluntary Action Plan on the Environment was implemented through fiscal 2012 and succeeded by the Commitment to a Low Carbon Society from fiscal 2013. The figures for fiscal 2005-2012 under the Commitment to a Low Carbon Society have been provided as reference. (Figures for 2005 do not include data for the Association of Japanese Private Railways.) The large differences in emissions under the Voluntary Action Plan on the Environment and the Commitment to a Low Carbon Society for fiscal 2010-2012 are attributable to the increase in the number of companies reporting their emissions.

・Calculation methods have been renewed with the implementation of the Commitment to a Low Carbon Society. Changes include calculating emissions from power generation using a receiving end coefficient instead of a generation-end coefficient and setting revised industrial boundaries in calculating emissions from some industries.

・CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.

・Overseas emissions are included for the Japanese Shipowners' Association and a part of the Scheduled Airlines Association of Japan

Figure 11. Examples of efforts made in fiscal 2014 [Transportation sector]

(1) Introduction of energy-saving and high-efficiency facilities
- Installation of energy-saving vehicles, ships and aircrafts
- Upgrading to energy-saving vehicles
- Upgrading to energy-saving aircrafts
- Construction of high-efficiency ships (air lubrication systems)
- Retrofitting to high-efficiency ships (retrofitting ship bodies, hull appendages)
- Introduction of engine monitoring equipment
- Improvement of supercharger and fan efficiency (Upgrading to high-efficiency equipment)
- Introduction of abrasion-resistant paint
- Switching to LED lighting

(2) Recovery of waste heat
- Power generation utilizing recovered waste heat from engines

(3) Improvement of operational methods
- Suspension of unnecessary functions,; intermittent operations, reduction of standby time
- Reduction of time required for cleansing
- Energy-saving operations
- Appropriate routing in line with transportation demand
- Removal of unnecessary lighting
- Optimization of air conditioning temperatures
- Maintenance of equipment (cleansing, coating, propeller polishing)
- Optimization of fuel and ballast retention

B. Factor analysis

A factor analysis was conducted on the causes that led to a 1.6% decrease in CO2 emissions from the energy conversion sector in fiscal 2014, relative to fiscal 2013 (Table 4). It was found that increased economic activity, such as surface and air transport, a smaller CO2 emission factor and reduced energy consumption per unit of economic activity contributed to reducing CO2 emissions by 3.5%, 1.0% and 5.1% respectively.

Table 4. Analysis of contributing factors to increases and decreases in CO2 emissions from the transportation sector in fiscal 2014 *1

	Relative to fiscal 2013	Relative to fiscal 2013
Change in economic activity *2	+3.5% (+3.5%) *5	+11.7% (+11.7%)
Change in CO2 emission factor *3	-0.1% (-0.1%)	+2.0% (+2.0%)
Change in energy consumed per unit of economic activity *4	-5.1% (-5.1%)	-28.1% (-28.1%)
Total	-1.6% (-1.6%)	-14.5% *6 (-14.5%)

*1 Due to the rounding of values to two decimal places, totals may differ from the sum of individual items.
*2 Indices with the closest relation to energy consumption were selected to represent each industry's economic activity in each industry.
*3 CO2 emissions per unit of heat output have been used for fuel, and CO2 emissions per unit of power output, for electricity.

*4 Efforts including the introduction of energy-saving and high-efficiency facilities, recovery of waste heat, and improvement of operational methods, as provided in Figure 11, have contributed to the reduction of energy consumed per unit of economic activity.
*5 CO2 emissions after consideration of reduced emissions resulting from the use of post-adjustment emission coefficients stipulated in the Act on the Promotion of Global Warming Countermeasures are provided in brackets.
*6 Comparisons with fiscal 2005 performance do not include data for the Association of Japanese Private Railways.

C. Relevant logistics-related efforts made in non-transportation industries

Energy efficiency improvement measures pursued to reduce emissions from the logistics sector are not limited to industries of the transportation sector. As presented in Attachment 2, a wide range of industries in the industrial, energy conversion and commercial sectors are engaged in various efforts. Improvement measures for individual vehicles include applying Japan's world-leading energy efficiency technologies to achieve even higher fuel efficiency. Furthermore, industries are consolidating distribution bases and using third-party logistics (3PL) providers to improve the efficiency of distribution practices and converting to low-emission vehicles. (Outcomes can be found in Attachment 8.) These efforts will be continued in the future.

2. Pillar 2: Strengthened co-operation with other interested groups

(1) Contribution through low-carbon products and services

Companies have contributed to reducing CO2 emissions through their untiring efforts not only to reduce emissions from the manufacturing and production processes of their products but also to provide low-carbon products and services. Examples of their contribution to CO2 emission reductions through products and services are provided in Table 5 and Attachment 3. Some industries have ensured the credibility and transparency of their calculated contributions by referring to environmental guidelines adopted by industrial groups as well as publicly known standards.

Table 5. Products and services contributing to CO2 emission reductions

<table>
<tr><th>Products</th><th>Description</th><th colspan="3">CO2 emission reduction effect</th></tr>
<tr><td rowspan="4">Electrical and electronic products</td><td rowspan="4">Outcome of summing and evaluating the efforts made regarding target product categories (lighting equipment, client computers and the 19 product categories under the new methodology for fiscal 2015) by participating companies of the electrical and electronic product industry's Commitment to a Low Carbon Society.</td><td rowspan="2">Category</td><td colspan="2">Avoided emissions [10,000 t-CO2]</td></tr>
<tr><td>One year</td><td>Cumulative avoided emissions during total years of operation</td></tr>
<tr><td>Power generated</td><td>369</td><td>8,443</td></tr>
<tr><td>Household appliances</td><td>113</td><td>1,425
(*188 attributable to parts, etc.)</td></tr>
<tr><td>ICT products and solutions</td><td>109</td><td>543
(*262 attributable to parts, etc.)</td></tr>
<tr><td>High-performance steel</td><td>Despite increased energy consumption compared to ordinary steel at the production stage, energy-savings were achieved at end-use as transformers, heat-resistant boilers, etc.</td><td colspan="3">26.66 million t-CO2 as of fiscal 2014</td></tr>
<tr><td>Solar power systems</td><td>Emissions avoided by introducing solar power systems
(Assumptions)
Scale of solar power systems: under 10kW; evaluation target: solar power; reference products: utility power; amount of power generated by solar power systems: source of current status of renewable energy introduction in Japan announced by the Agency for Natural Resources and Energy; emission coefficient for utility power: 0.554[kg-CO2/kWh]</td><td colspan="3">Avoided emissions in fiscal 2014: 2.93 million t-CO2 (based on CO2 stock)

Source used for calculation: Carbon-Life Cycle Analysis of chemical products in Japan and overseas [Case studies / Fact sheet] (Japan Chemical Industry Association: March 2014)</td></tr>
<tr><td>Fuel-efficient tires</td><td>Emissions avoided by employing fuel-efficient tires (Assumptions)
Evaluation target: fuel-efficient tires; reference products: general purpose tires; target products: commercially available tires (passenger vehicles); product life: 30,000km (5 years); source of data on tires sold and diffusion level of fuel-efficient tires: Japan Automobile Manufacturers' Association</td><td colspan="3">Avoided emissions in fiscal 2014: 1.23 million t-CO2 (based on CO2 stock)

Source used for calculation: Carbon-Life Cycle Analysis of chemical products in Japan and overseas [Case studies / Fact sheet] (Japan Chemical Industry Association: March 2014)</td></tr>
<tr><td>Paper products</td><td>Use of lightweight paper</td><td colspan="3">Projected reductions: 520,000 tons nationwide
(estimations for 10% reduction of product weight)</td></tr>
<tr><td colspan="2">Cogeneration</td><td colspan="3">Fiscal 2014: approximately 180,000 t-CO2 (installed capacity: 120,000 kW)</td></tr>
<tr><td colspan="2">Household fuel cell units (Ene-Farm)</td><td colspan="3">Fiscal 2014: approximately 40,000 t-CO2 (number of units installed: 33,272 units)</td></tr>
<tr><td colspan="2">High-efficiency water heaters (Eco-Jozu, Eco Will)</td><td colspan="3">Fiscal 2014: approximately 130,000 t-CO2 (number of units installed: 600,000 units)</td></tr>
<tr><td>High-efficiency oil-fired water</td><td><Basis of calculations>
Number of units in use: 249,000 units (end of fiscal 2014)</td><td colspan="3">Fiscal 2014: approximately 49,000 t-CO2
(249,000 units×197kgCO2/year÷1000＝49,000 tCO2/year)</td></tr>
</table>

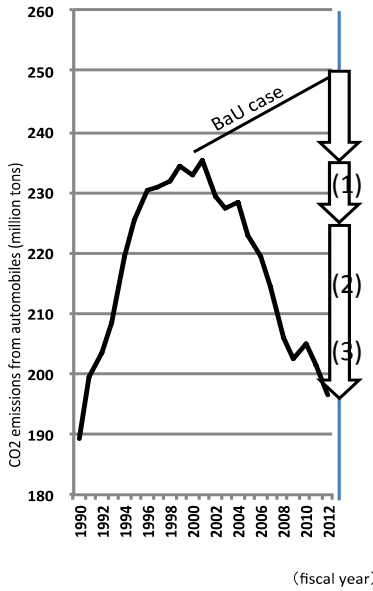
heaters (Eco Feel)	CO2 emissions avoided per unit: 197kgCO2/year (representative figure for a family of four)	*heat efficiency improved by recovering latent heat from waste heat	
Natural gas shift in industrial heat demand		Fiscal 2014: approximately 180,000 t-CO2 (Newly installed: 142 million m3 in boilers / 103 million m3 in industrial furnaces)	
Gas air conditioning systems		Fiscal 2014: approximately 40,000 t-CO2 (installed capacity: 180,000 RT)	
Natural gas vehicles		Fiscal 2014: approximately 10,000 t-CO2 (installed units: 1,075 units)	
Inhalation aerosols	Shifted from metered dose inhalation aerosols to non-fluorocarbon- based dry powder	Fiscal 2014: 1.413 million t--CO2 (CO2 equivalent)	
Multi-layered glass	Reduced heating and cooling costs by approximately 40% by replacing single-layered glass with multi-layered glass, thereby improving heat insulation properties.	Fiscal 2014: reduction effect of 241,000 t-CO2/year (estimated diffusion rate of multi-layered glass (in terms of glass coverage) in new housing is: 96.7% in stand-alone housing units and 72.2% in collective housing units)	
Concrete pavement	Improved fuel efficiency by changing asphalt pavement to concrete pavement, and thus reducing the rolling resistance of heavy-duty vehicle	CO2 emission reductions: 1.14～6.56 kg (Load capacity: 11t,100km running distance) (Fuel consumed when running the same distance: 95.4～99.2%)	
Sanitary equipment	Reduction of CO2 emissions at end-use by conserving water, etc.	Category	CO2 emission reductions (relative to conventional products)
		Energy-saving toilet seats	6.7 kg-CO2/year
		Warm water flushing toilet seat	127kg-CO2/year
		Prefabricated bath for stand-alone housing	55/167/125 kg-CO2/year (heat retaining bath tubs / hot water savings/ push plate-type faucets)
		Fitted kitchen units	2/121/88 kg-CO2/year (LED lighting/hands-free faucets/Eco Single)
		Washbasins	19/3 kg-CO2/year (Eco-handle faucets/fog-free mirror)
		Showers	132 kg-CO2 (Air in Shower: for a family of four)

Also, relevant industries have joined hands beyond industrial boundaries to reduce society-wide CO2 emissions by providing high-quality products and services.

For example, as exhibited in Figure 12, in the transportation sector, a number of industries have been in engaged in a concerted effort to reduce CO2 emissions by 1) improving the actual fuel efficiency of passenger vehicles; 2) improving the actual fuel efficiency of cargo vehicles; and 3) improving cargo shipping efficiency.

Furthermore, as presented in Figure 13, in the commercial and residential sector, improvements in the energy-saving performance of buildings, the introduction of energy management systems, and the development and diffusion of high-efficiency energy-saving equipment have contributed to reducing CO2 emissions.

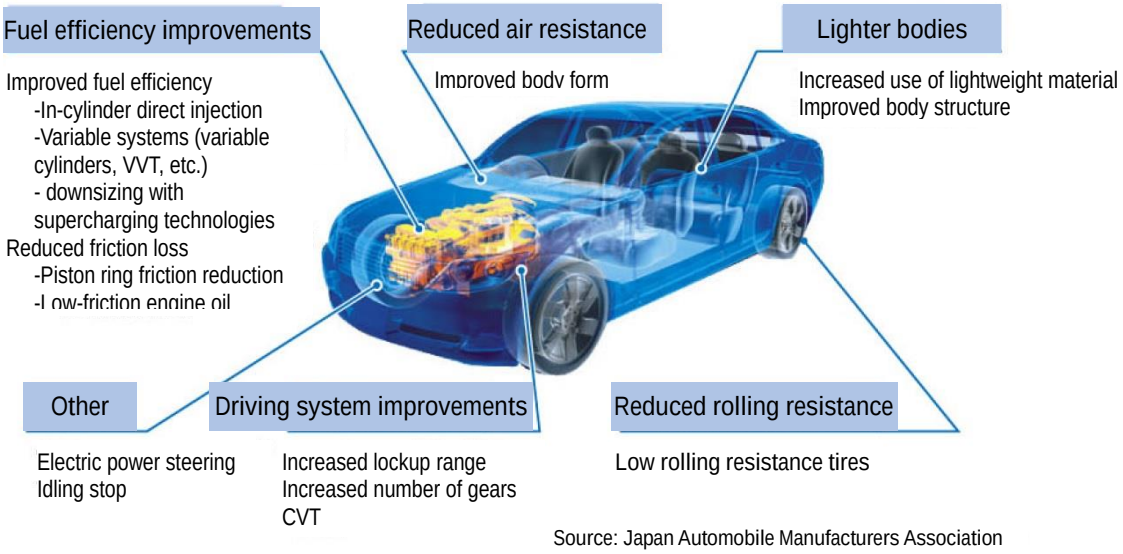
Figure 12. Inter-industrial cooperation in providing products and services that contribute to CO2 emission reductions (transportation sector)



Source: Japan Automobile Manufacturer Association

Approaches and measures			Relevant components and technologies; applications	Relevant industries
(1) Improving the actual fuel efficiency of passenger vehicles	Fuel efficiency improve-ments in automobile units	・Engine improvements (direct injection, engine downsizing with supercharging technologies, variable valve actuation system, reduced friction loss (low-friction engine oil, reduced friction in moving parts) etc. ・Driving system improvements (CVT, increased number of gears, AT neutral idle control, increased lockup range, reduced friction loss, AMT, etc.) ・Auxiliary drive unit (power charge control, electric power steering) ・No idling ・Reduced energy required in operation (reducing air resistance, reduced rolling resistance (tires / road surface), lighter bodies (materials / design)	・Heat-resistant steel with improved intensity at high temperatures ・Abrasion-resistant steel ・High tensile strength steel – thin, with strength and high workability. ・Magnetic steel sheet ・High strength steel tire cords ・Material for fuel-efficient tires (synthetic rubber, silica, etc.) ・Concrete pavement with low rolling resistance ・Carbon fiber compound material, plastics ・Lithium-ion battery material ・Super low friction hub bearing units ・Lightweight bake hardened aluminum body sheets ・Aluminum alloy used for heat exchangers	Automobile, Auto parts, Iron & steel, Chemical, Electrical &electronics, Cement, Rubber, Flat glass, Electric wire & cable, Petroleum develop-ment Aluminium, Bearing, Petroleum etc.
	Next-generation vehicles	・HEV ・Clean diesel ・EV ・PHEV		
	Traffic improve-ments	・Promotion of ITS ・Centralized traffic light control systems・LED traffic lights ・Reduced road construction ・Elimination of railroad crossing bottlenecks	・ETC、VICS ・ICT improvements ・Fast-setting material / improved durability Concrete pavement	Cement, Construction, Electrical & electronics, Telecommu-nications, etc.
(2) Improving the actual fuel efficiency of cargo vehicles	Fuel efficiency improve-ments in automobile units	・Engine improvements (engine downsizing with supercharging technologies, direct injection/improved combustion methods, reduced friction, etc.) ・Reduced energy required for operation (reduced air resistance) ・Other (no idling, AMT, etc.)	Same as (1)	Same as (1)
	Next-generation vehicles	・HEV ・CNG		
	Traffic improve-ments	In addition to (1), ・Eco-drive ・Limiting maximum speed allowed by large trucks on highways	In addition to (1), ・Eco-drive ・Speed limiters	Same as (1)
(3) Improving cargo shipping efficiency	・Shifting from trucks for private use to trucks for business use ・Promoting of joint deliveries ・Modal shifts (to railway and ships)		・Development of lightweight paper (printed and packaging material) ・Improvements in distribution systems	Trucking, Railways, Electrical & electronics, Telecommu-nications, Auto parts, etc.
(4) Non-automobile measures	・Energy efficiency improvements in railway, air and surface transport.		・Long-life uncoated / maintenance- free stainless steel ・Materials for reduced weight (carbon fiber compound material) ・Light but strong high tensile strength steel, ・Steel with high crack arrestability ・Hollow aluminum extrusions / double-skin rail cars	Railways, Airlines / Ships, Iron & Steel, Chemical, Aluminum, etc.

Fuel efficiency improvement technologies

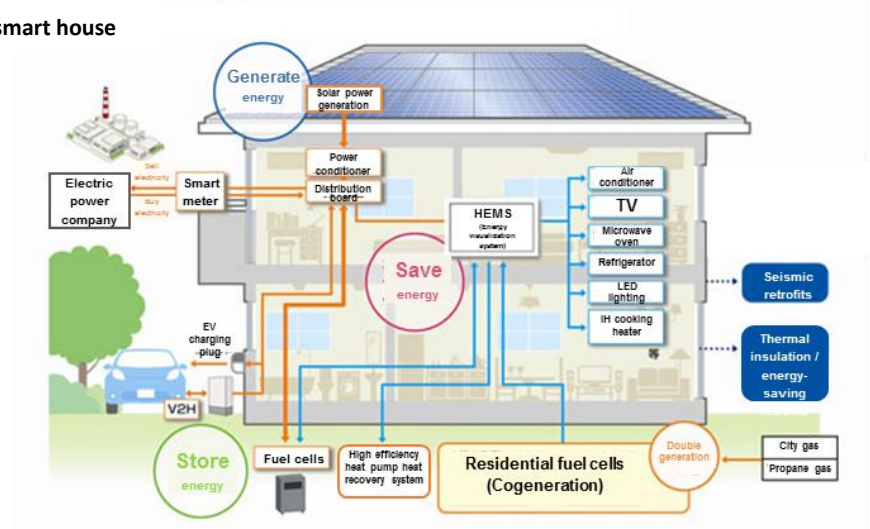


Source: Japan Automobile Manufacturers Association

Figure 13 Inter-industrial co-operation in providing products and services that contribute to CO2 emission reductions (commercial and residential sectors)

Approaches and measures			Relevant components and technologies; applications	Relevant industries
Equipment	Efficiency improvements of equipment	Lighting equipment	・inverter control, dimming control ・LED material (phosphors, sealing material, platforms) ・HVAC DC motor material (Hole elements, Hole IC) ・low torque, long-life bearings with grease seals ・Vacuum insulated material (urethane, silica, etc.) ・High-efficiency compressor, high-efficiency transformers ・High-efficiency heat pump heat recovery systems ・Reduced stand-by electricity, additional "eco-mode" functions	Electrical & electronics, Chemical, Iron & steel, Aluminum, Copper, Bearing, Real estate, Buildings, Construction, Housing, Sanitary equipment, etc.
		Heating equipment		
		HVAC equipment		
Facilities	Energy savings through application of energy-efficient design and construction material	Thermal insulation, absorption, and sheilding	・Heat-resistant steel, thermal insulation material (polyestyrene, urethane, etc.) ・Plastic sash material (polyvinyl chloride) ・Thermal insulation paint and film ・Sunlight control for blinds ・High-performance external wall insulation, installation of louvers and awnings ・High performance thermal insulation / shielding glass, double-skin facades ・Passive design (daylighting, ventilation, ground thermal, etc.) ・Greening (ground, roof, walls), automated watering systems ・Cogeneration (boilers, turbines), power generators engines, storage batteries, fuel cells, etc.) ・Fuel cell material (solid oxide fuel cell material, etc.) ・Photovoltaic and solar thermal power generation, wind generation ・Utilization of regenerated electric power	Real estate, Buildings, Construction, Housing, Electric power, Gas, Petroleum, Chemical, Iron and steel, Aluminum, Copper, Rubber, Flat glass, Electric wire and cable, etc.
		Utilization of nature		
		High-efficiency energy equipment		
	Creation and efficienct use of energy	Energy creation		
		Energy storage		
Region	Efficient use of energy through large-scale use		・Regional heat supply systems ・Inter-building power interchange systems ・Load leveling through diversified use ・Industrial exhaust heat utilization ・Unharnessed energy utilization (sewerage, rivers, underground, etc.) ・Smart house, smart city	Real estate, Buildings, Construction, Housing, Electric power, Gas, Petroleum, Cement, etc
	Utilization of unharnessed energy			
Systems	Optimal energy use	Installation of management systems (homes, buildings, areas)	・Micro-sensing technologies ・Communication technologies (wired / wireless) ・Control systems, smart meters	Electrical & electronics, Telecommuni-cations, etc.
		Sensors		
Dissemination & promotion	Energy-efficient products	Utilization of environmental performance assessment tools	・Utilization of environmental performance indices for buildings (CASBEE, BELS, etc.) / energy-saving labels for electronic and electrical labels) ・Preferential loans ・Green procurement ・Information-sharing with users and council meetings	Real estate, Buildings, Construction, Housing, Banks, Rubber, etc.
		Financial measures, procurement		
	Energy-efficient operation	Optimal settings of lighting and HVAC		
Other	Longer life	Equipment, buildings, infrastructure, etc.	・High-durability concrete, wooden fireproof buildings ・Reduced products, containers and packaging ・Recycled concrete / asphalt / plastics ・Recycling (corrugated cardboard, food waste composting, steel cans) ・Reuse of wood waste from construction, utilization of domestic forest thinnings	Construction, Housing, Cement, Paper, Food manufacturing, etc.
	3R	Reduce		
		Reuse		
		Recycle		

Conceptual drawing of a smart house

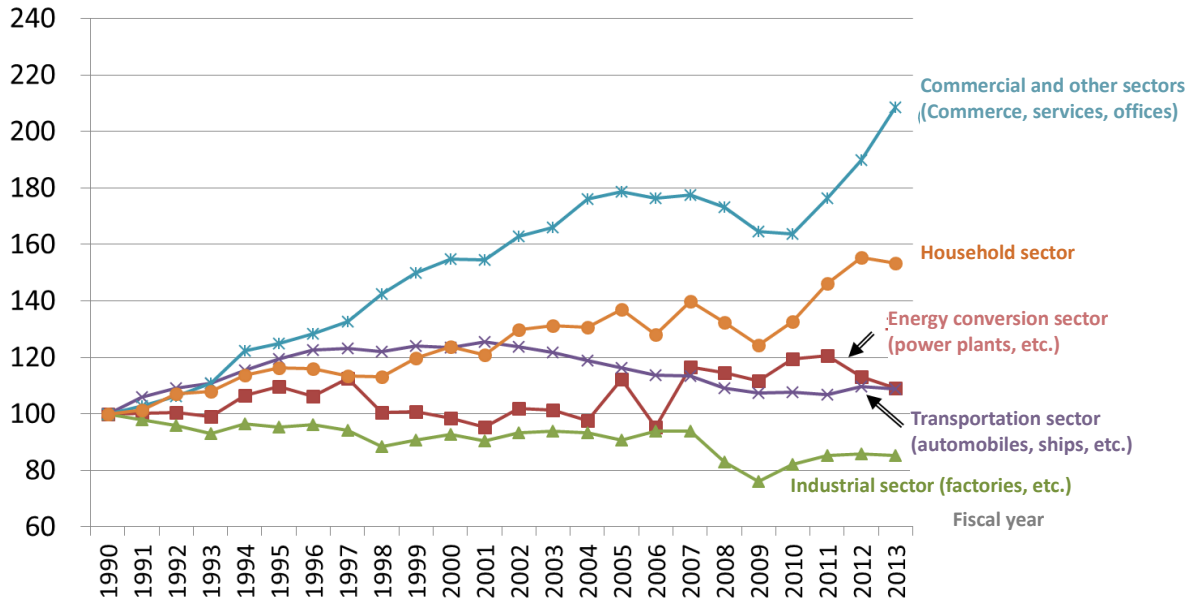


(2) Efforts leading to public campaigns

It is also essential that each individual reexamine his/her attitudes and actions towards global warming issues, and adapt his/her lifestyles accordingly with a view to resolving them. To this end, public-private cooperation in promoting public campaigns is called for (Figure 14).

As provided in Attachment 3, according to the Fiscal 2015 Follow-up results, public relations campaigns and educational activities (hosting events and expositions, environmental education outreach to students and local residents, etc.) as well as the communication of energy-saving information (by using websites, distributing pamphlets, providing product performance information at retail stores, etc.) were implemented so that increased public awareness and knowledge of global warming prevention would encourage the proactive use of energy-efficient low-carbon products and services, etc. Furthermore, the business community was engaged in continued efforts to implement a wide range of activities, including adopting casual dress codes (Cool Biz / Warm Biz), strictly controlling air conditioning and lighting, encouraging the keeping of environmental household account books, and promoting eco-commuting and refrainment from idling, in order to engage employees and their families in activities to prevent global warming on a daily basis.

Figure 14. CO2 emissions from energy consumption in Japan, by sector (fiscal 1990 =100)



Source: compiled from National Institute of Environmental Studies (NIES) “The GHGs Emissions Data of Japan”

(3) Other

A. 3Rs and global warming countermeasures

The 3Rs (reduce, reuse, and recycle) pursued in order to create a recycle-based society can also contribute to countering global warming. In the Fiscal 2015 Follow-up, some industries reported that they had reduced the energy used for transportation by reducing waste volume and developing lightweight thin-walled containers, and others reported that they had reduced CO2 emissions by utilizing waste and byproducts.

In contrast, pursuing the 3Rs can sometimes lead to increased CO2 emissions. For example, the cement industry receives waste and byproducts, including sewerage sludge, from other industries, and thus contributes to the nationwide reduction of waste volumes requiring final disposal. However, utilizing waste involves energy-consuming preliminary treatment, and consequently increases CO2 emissions. It should be noted that as such cases imply, focusing only on reducing CO2 emissions and neglecting the 3Rs would increase the total volume of waste requiring final disposal across Japan.

B. Fostering and conserving forest sinks

Global warming countermeasures also call for the fostering and conservation of forest sinks. In the Fiscal 2015 Follow-up, some industries reported that they had enhanced the utilization of domestic lumber, including tree thinning. Other industries reported that they had engaged in management operations in company-owned forests and the greening of factories and business locations, or that they had promoted afforestation projects in Japan and overseas.

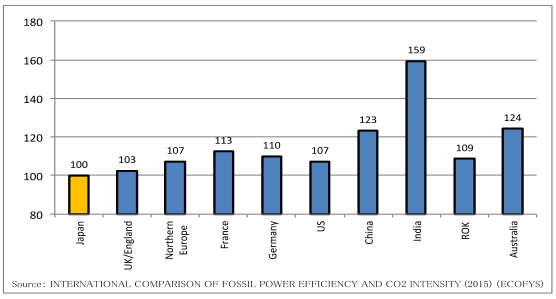
3. Pillar 3: Promoting contribution at the international level

(1) International comparison of energy efficiency

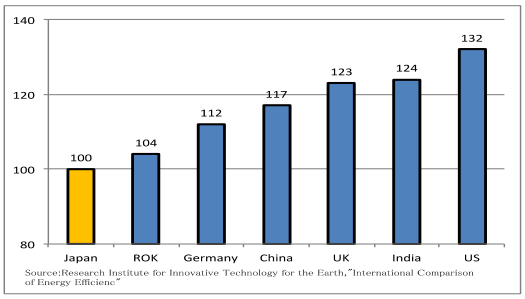
Under the Voluntary Action Plan on the Environment (Section on Global Warming Measures) and the Commitment to a Low Carbon Society, Japan's business community has endeavored to improve energy-saving technologies and energy efficiency. As a result, major industries have achieved world-leading energy efficiency levels, which continue to be maintained (Figure 15). Furthermore, oil refineries have been newly added this year to the list of technologies reaching the world's highest levels.

Figure 15. International comparisons of energy efficiency

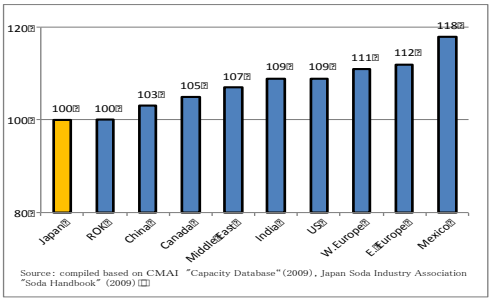
Energy required to generate 1kWh of electricity through thermal Power generation (2012)



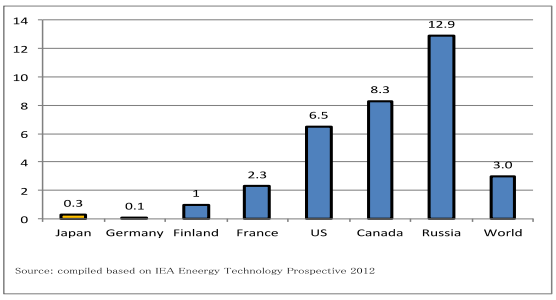
Energy required to produce 1 ton of iron (2010)



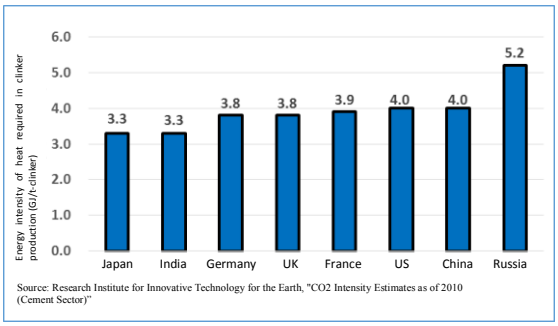
Energy required to produce 1 ton of electrolytic caustic soda (2009)



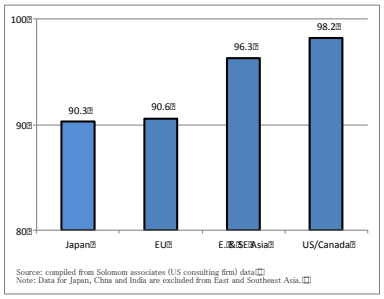
Energy-saving potential of adopting BAT in the pulp and paper industry (GJ/T)



Estimates of the energy intensity of heat required in clinker production



Comparison of energy consumption indices at oil refineries (2012)



(2) International contribution through products, equipment and technology transfer

Having achieved world-leading energy efficiency levels, Japan's business community has fostered advanced energy-saving and low-carbon technologies. It also embraces products and technologies with high energy-saving and energy efficiency performance.

However, Japan accounts for only 2.8% of the world's greenhouse gas emissions (2010). It is essential that Japan contribute to the establishment of a low carbon society through the development and diffusion of such highly energy-efficient and energy-saving low-carbon technologies and products.

In the Fiscal 2015 Follow-up, industries reported international contributions to reduce CO2 emissions, as provided in Table 6

In addition, as presented in Attachment 4, many industries reported various efforts (moving manufacturing processes overseas, exporting products, fostering human resources in developing countries, etc.) to disseminate Japan's advanced energy-efficient low-carbon technologies and products overseas.

Industries have also engaged in activities at international conferences (cooperating towards the formulation of international standards, introducing Japan's diverse global warming measures, etc.) and have contributed to the implementation of anti-pollution measures, such as those against air pollution and water contamination.

Table 6. Examples of international contributions made in fiscal 2014

<table>
<tr><th>Products, equipment, technology transfers, etc.</th><th>Description</th><th colspan="3">CO2 emission reductions</th></tr>
<tr><td rowspan="4">Electric and electronic products</td><td rowspan="4">The result of summing and evaluating the efforts made by companies participating in the electrical and electronic products industry's Commitment to a Low Carbon Society</td><td rowspan="2">Category</td><td colspan="2">Avoided emissions [10,000 t-CO2]</td></tr>
<tr><td>One year</td><td>Total years of operation</td></tr>
<tr><td>Power generated</td><td>448</td><td>15,246</td></tr>
<tr><td>Household appliances</td><td>95</td><td>947
(*389 attributable to parts)</td></tr>
<tr><td>ICT products and solutions</td><td>574</td><td>2,870
(*1,428 attributable to parts)</td></tr>
</table>

Exporting major energy-saving equipment (CDQ, TRT, byproduct gas-fired GTCC, OG gas recovery equipment, OG sensible heat recovery equipment, sintering plant waste heat recovery equipment)	Fiscal 2014: 53.40 million t-CO2
Supplying hydropower systems (Peru)	Fiscal 2014 CO2 emission reductions Huanllaca hydroelectric power plant: approx. 14,000 t-CO2/year (approx. 29,000 MWh) Pallca hydro electric power plant: approx. 46t-CO2/year (approx. 93MW, to initiate operations in Feb. 2015)
Power generation using surplus steam from waste heat boilers at waste treatment plants (Thailand)	Fiscal 2014 CO2 emission reductions: approx. 3,100 t-CO2/year (generation capacity:1,600kW)

4. Pillar 4: Development of innovative technologies

To promote measures in the above three pillars in the medium- to long-term, it is essential that participating industries develop innovative technologies. According to the results of the Fiscal 2015 Follow-up, industries have been engaged in efforts to develop innovative technologies and to work on practical application, as presented in Table 7 (see Attachment 5 for details).

Table 7. Examples of innovative technology developments in fiscal 2014

Industry	Achievements in fiscal 2014 (examples)
Japan Iron and Steel Federation	・Completed basic plans for the construction of a 10m3 trial blast furnace under the CO2 Ultimate Reduction in Steelmaking Process by Innovative Technology for Cool Earth 50 (COURSE50), sponsored by NEDO. Construction to be completed in fiscal 2015.
Japan Chemical Industry Association	・As a result of the fundamental development of ordered-nanoporous membranes for highly-refined separation technology, developed an inorganic separation membrane that will save energy by 50% in the distillation process. Pilot tests are currently being performed at actual plants. ・Developed fullerene, a nanocarbon material for use in next-generation photovoltaic power generation (OPV: organic photovoltaics). ・Completed joint pilot studies to manufacture hydrogen from sewerage sludge. ・Established manufacturing technologies to recycle carbon fiber. ・Established technologies for mass production of produce silicon carbide (SiC) epitaxial wafers with a diameter of six inches; developed photosensitive heat-resistant resist for use in transistor manufacturing processes
Japan Paper Association	・Successfully manufactured the first transparent continuous sheet of cellulose nano fiber (CNF) as a result of joint research between a member company and a diversified chemical company. Widely promoted CNF development, including the starting of operations at a pilot CNF manufacturing facility and the promotion of developing of new applications, including thickeners and packaging at one company; and the provision of samples of various CNF initiated by another company.
Japan Automobile Manufacturers Association / Japan Auto- Body Industries Association	・Trends to expand production lines employing Wet on Wet coating and “hot-metal” processes ・Newly released 32 next-generation models (EV, PHEV, HEV, FCEV), including minor model changes in fiscal 2014
Japan Soft Drink Association	・Shifted heat sources from “steam” to “methods using electrical heating. (actual performance: 33% reduction in CO2 emissions) ・Introduced a system utilizing the natural “cold heat” of LNG, following fuel conversion (projected reductions: 100t of CO2 emissions due to reduced electric power consumption in the cooling tower)
Japan Association of Rolling Stock Industries	・Major private railway companies in the Kanto area renewing rolling stock adopted VVVF inverter devices with full SiC (Silicon Carbide) suitable for use in a DC1500V electrification system, therefore succeeding in the world’s first practical application of an inverter for rolling stock employing a large-capacity 3.3kV power module rated at 1500A using only SiC.

Japan Gas Association	・Developed a compact and low-cost hydrogen generation unit with world-leading high efficiency to supply large amounts of hydrogen at hydrogen stations ・Developed gas-engine cogeneration systems to efficiently recover heated waste water from gas engines as steam.
Telecommunications Carriers Association	・Realized the word's first over-100-bit optical random access memory (RAM) by integrating ultra-small optical memories based on photonic crystal nanocavities. This technology gives hope for the development of high-speed ICT and low energy consumption technologies. ・Developed a high-voltage direct current (HVDC) electric power–feeding system and compiled and published "Technical Requirements for High-voltage DC Power Feeding Interfaces of ICT equipment (TR)."

5. Efforts made beyond the four pillars

In the Fiscal 2015 Follow-up, industries reported efforts made beyond the four pillars: (1) reducing non-CO2 GHG emissions; and (2) the status of their efforts under the Commitment to a Low Carbon Society Phase II. An outline of these efforts is provided below (see Attachment 6 for details).

(1) Reducing the emission of non-CO2 greenhouse gases

Greenhouse gases include not only CO2 but also methane (CH4), dinitrogen monoxide (N2O), sulfur hexafluoride (SF6) and fluorocarbons (HFCs and PFCs) [2], the emissions of which must be controlled in order to cope with global warming. In the Fiscal 2015 Follow-up, industries reported emission reductions of fluorocarbons through the revision of work processes, the enhancement of daily inspections, and the scheduled renewal of facilities. Other efforts, including preventing fluorocarbon leakages, thoroughly recovering and destroying fluorocarbons and considering the use of natural refrigerants, were also reported.

(2) Status of efforts under the Commitment to a Low Carbon Society Phase II

Seeking to further contribute to global warming countermeasures, in April 2015, KEIDANREN formulated and announced the Commitment to a Low Carbon Society Phase II embracing targets for 2030. At present, 54 industries and companies have set up targets for 2030 regarding emissions from domestic business operations, in addition to existing targets for 2020, and will enhance their efforts in strengthened cooperation with other interested groups, promoting contribution at the international level and developing innovative technologies.

With the perspective that 2030 targets for domestic business activities, involve long-term efforts, the assumptions supporting the targets shall be made explicit to ensure transparency, and various factors, including social and industrial structural change and technological advancements, shall be considered.

[2] Approximately 6.9% of greenhouse gas emissions in Japan are attributable to non-CO2 gases (fiscal 2013).

Conclusion

At COP21 to be held in Paris, countries seek to adopt a post-2020 international framework for climate change. It is essential that all major emitters participate in the new framework, which must be a fair and effective international framework that can also accommodate economic growth. At the negotiation table, the Japanese government should contribute to international negotiations in a way that all countries can reach agreement, while pursuing its own national interests.

Once a new framework is agreed upon at COP21, deliberation on domestic measures will begin in earnest. Regulatory approaches, including cap and trade schemes, the Tax for Climate Change Mitigation, and feed-in-tariff schemes for renewable energy should not be introduced, as they not only significantly affect national livelihood and corporate activities, they are extremely problematic from the perspective of implementing effective global warming countermeasures. Policy measures that have already been introduced should be fundamentally reviewed, with a view to their abolishment. It is critical that measures taken by the business community are explicitly centered on the Commitment to a Low Carbon Society of KEIDANREN and we will continue to request that the Government support the efforts taken by the business community under this program.

In order for the Commitment to a Low Carbon Society to gain more trust among the general public and in society, it is indispensable to ensure its effectiveness, transparency and credibility. Therefore, KEIDANREN will continue to collaborate with participating industries and pursue the PDCA cycle to soundly implement the Commitment to a Low Carbon Society. This will involve evaluation by the Evaluation Committee and addressing the comments made by the Committee.

In fiscal 2016, KEIDANREN will conduct an extensive interim review based on the achievements made from fiscal 2013 to 2015. We will also communicate in a comprehensive manner to both domestic and overseas audiences our contributions to global warming measures, including our efforts in strengthened cooperation with other interested groups, promoting contribution at the international level and developing innovative technologies.

Industry-specific trends in each sector

1. Industrial Sector

10,000t-CO2; 10,000kl crude oil equivalent; fiscal year

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
The Japan Iron and Steel Federation	CO2 emissions (actual emissions) ☆		18,844	16,799	18,917	18,638	18,996	19,451	19,192	1.8%	-1.3%
	CO2 emissions (post-adjustment*7)		18,844	16,639	18,718	18,530	18,733	19,447	19,180	1.8%	-1.4%
	CO2 emission intensity index (actual emission		0.90	0.93	0.91	0.94	0.95	0.93	0.93	3.4%	0.5%
	CO2 emission intensity index (post-adjustment*7)		0.90	0.92	0.90	0.93	0.93	0.93	0.93	3.3%	0.4%
	Energy consumption		5,902	5,261	5,933	5,776	5,813	5,921	5,842	-1.0%	-1.3%
	Energy consumption intensity index		0.90	0.92	0.91	0.92	0.92	0.90	0.90	0.4%	0.5%
	Production activity index		1.03	0.90	1.03	0.98	0.99	1.04	1.02	-1.5%	-1.8%
Japan Chemical Industry Association	CO2 emissions (actual emissions) ☆		6,821	6,170	6,376	6,307	6,218	6,317	6,238	-8.6%	-1.2%
	CO2 emissions (post-adjustment*7)		6,821	5,998	6,181	6,206	5,976	6,302	6,222	-8.8%	-1.3%
	CO2 emission intensity index (actual emission	Base year: FY2005	100.00	99.94	100.07	104.12	106.74	104.05	104.63	4.6%	0.6%
	CO2 emission intensity index (post-adjustment*7)		100.00	97.17	97.01	102.46	102.58	103.80	104.37	4.4%	0.5%
	Energy consumption		2,921	2,677	2,784	2,630	2,525	2,551	2,528	-13.4%	-0.9%
	Energy consumption intensity index	Base year: FY2005	100.00	101.28	102.07	101.41	101.25	98.13	99.03	-1.0%	0.9%
	Production activity index		100	91	93	89	85	89	87	-12.6%	-1.8%
Japan Paper Association	CO2 emissions (actual emissions) ☆		2,494	1,977	1,907	1,892	1,862	1,874	1,805	-27.6%	-3.7%
	CO2 emissions (post-adjustment*7)		2,494	1,941	1,868	1,872	1,818	1,874	1,805	-27.6%	-3.7%
	CO2 emission intensity index (actual emission		0.88	0.81	0.77	0.79	0.80	0.78	0.76	-14.0%	-2.2%
	CO2 emission intensity index (post-adjustment*7)		0.88	0.79	0.75	0.78	0.78	0.78	0.76	-14.1%	-2.2%
	Energy consumption		890	706	687	658	630	629	608	-31.7%	-3.4%
	Energy consumption intensity index		0.84	0.77	0.74	0.73	0.72	0.70	0.68	-18.8%	-1.8%
	Production activity index		1.09	0.95	0.96	0.93	0.90	0.93	0.92	-15.8%	-1.6%
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention *4	CO2 emissions (actual emissions)		1,804	1,665	1,653	1,805	1,347	1,300	1,338	-25.8%	2.9%
	CO2 emissions (post-adjustment*7)		1,804	1,467	1,451	1,704	1,181	1,299	1,335	-26.0%	2.8%
	Energy consumption		1,010	980	974	890	597	569	599	-40.7%	5.2%
	Energy consumption intensity index (reference valu						1.00	0.92	0.88		-4.2%
	Energy consumption intensity target index ☆	Base year: FY2012					1.00	0.93	0.89		-3.8%
	Production activity index						1.00	1.03	1.13		9.8%
Japan Cement Association	CO2 emissions (actual emissions)		2,188	1,755	1,662	1,712	1,769	1,807	1,775	-18.9%	-1.8%
	CO2 emissions (post-adjustment*7)		2,188	1,743	1,649	1,705	1,750	1,807	1,775	-18.9%	-1.8%
	CO2 emission intensity index (actual emission		1.00	1.01	1.00	1.00	1.00	0.98	0.98	-1.6%	0.3%
	CO2 emission intensity index (post-adjustment*7)		1.00	1.01	0.99	1.00	0.99	0.98	0.98	-1.6%	0.3%
	Energy consumption		656	525	499	510	523	541	532	-19.0%	-1.6%
	Energy consumption intensity index ☆		0.94	0.96	0.95	0.94	0.94	0.92	0.93	-1.7%	0.4%
	Production activity index		0.79	0.63	0.60	0.62	0.64	0.67	0.65	-17.6%	-2.1%
Japan Automobile Manufacturers Association, Inc. / Japan Auto-Body Industries Association, Inc.	CO2 emissions (actual emissions) ☆		800	586	616	654	740	746	714	-10.8%	-4.3%
	CO2 emissions (post-adjustment*7)		800	539	566	628	672	745	713	-11.0%	-4.4%
	CO2 emission intensity index (actual emission		0.72	0.66	0.65	0.68	0.73	0.67	0.62	-13.6%	-8.1%
	CO2 emission intensity index (post-adjustment*7)		0.72	0.60	0.60	0.66	0.66	0.67	0.62	-13.7%	-8.2%
	Energy consumption		398	317	332	313	332	331	322	-19.2%	-2.7%
	Energy consumption intensity index	Base year: FY200	0.71	0.71	0.70	0.65	0.65	0.60	0.56	-21.7%	-6.6%
	Production activity index		1.13	0.90	0.96	0.97	1.03	1.12	1.16	3.2%	4.2%
Japan Auto Parts Industries Association	CO2 emissions (actual emissions)		743	546	599	681	759	772	745	0.3%	-3.4%
	CO2 emissions (post-adjustment*7)		743	495	541	649	677	771	744	0.1%	-3.5%
	CO2 emission intensity index (actual emission ☆		0.79	0.59	0.59	0.66	0.71	0.70	0.69	-11.9%	-1.2%
	CO2 emission intensity index (post-adjustment*7)		0.79	0.53	0.54	0.63	0.63	0.70	0.69	-12.1%	-1.3%
	Energy consumption		384	299	327	323	333	335	332	-13.4%	-0.8%
	Energy consumption intensity index		0.77	0.61	0.62	0.60	0.59	0.58	0.59	-23.9%	1.6%
	Production activity index		1.24	1.22	1.32	1.35	1.40	1.44	1.41	13.8%	-2.3%
Japan Mining Industry Association	CO2 emissions (actual emissions)		395	376	374	409	444	416	414	4.8%	-0.5%
	CO2 emissions (post-adjustment*7)		395	351	348	395	408	416	414	4.8%	-0.5%
	CO2 emission intensity index (actual emission ☆		0.84	0.81	0.79	0.92	0.92	0.87	0.84	-0.2%	-3.6%
	CO2 emission intensity index (post-adjustment*7)		0.84	0.76	0.74	0.89	0.85	0.87	0.84	-0.2%	-3.6%
	Energy consumption		161	161	161	159	162	163	163	1.1%	0.1%
	Energy consumption intensity index		0.83	0.84	0.83	0.86	0.81	0.82	0.80	-3.7%	-2.9%
	Production activity index		1.14	1.13	1.15	1.09	1.17	1.16	1.20	5.0%	3.2%
Japan Federation of Construction Contractors	CO2 emissions (actual emissions)		532	462	396	398	403	411	438	-17.7%	6.5%
	CO2 emissions (post-adjustment*7)		532	450	382	391	389	411	438	-17.8%	6.5%
	CO2 emission intensity index (actual emission ☆		0.87	0.88	0.87	0.88	0.86	0.82	0.82	-5.5%	0.6%
	CO2 emission intensity index (post-adjustment*7)		0.87	0.86	0.84	0.87	0.83	0.82	0.82	-5.5%	0.6%
	Energy consumption		229	193	169	162	157	159	170	-26.0%	6.9%
	Energy consumption intensity index		0.84	0.82	0.83	0.80	0.75	0.71	0.71	-15.0%	0.9%
	Production activity index		0.64	0.55	0.48	0.48	0.49	0.53	0.56	-13.0%	5.9%
Japan Federation of Housing Organizations	CO2 emissions (actual emissions)		326	235	240	245	263	260	246	-24.5%	-5.4%
	CO2 emissions (post-adjustment*7)		326	235	240	245	263	260	246	-24.5%	-5.4%
	CO2 emission intensity index (actual emission		0.84	0.96	0.90	0.89	0.91	0.82	0.92	8.7%	11.6%
	CO2 emission intensity index (post-adjustment*7)		0.84	0.96	0.90	0.89	0.91	0.82	0.92	8.7%	11.6%
	Energy consumption		125	90	92	94	101	100	95	-24.3%	-5.3%
	Energy consumption intensity index		0.86	0.97	0.91	0.91	0.93	0.84	0.93	9.0%	11.7%
	Production activity index		0.79	0.50	0.55	0.56	0.59	0.65	0.55	-30.6%	-15.2%

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
Lime Manufacture Association	CO2 emissions (actual emissions) ☆		308	244	268	234	228	247	245	−20.2%	−0.4%
	CO2 emissions (post-adjustment*7)		308	241	265	232	223	246	245	−20.3%	−0.4%
	CO2 emission intensity index (actual emission		0.86	0.78	0.76	0.74	0.76	0.78	0.77	−10.4%	−0.6%
	CO2 emission intensity index (post-adjustment*7)		0.86	0.77	0.75	0.74	0.74	0.78	0.77	−10.4%	−0.6%
	Energy consumption		106	87	96	83	79	84	84	−20.6%	−0.6%
	Energy consumption intensity index		0.86	0.81	0.79	0.76	0.77	0.77	0.77	−10.8%	−0.8%
	Production activity index		1.00	0.88	0.99	0.88	0.84	0.89	0.89	−11.0%	0.2%
The Japan Rubber Manufacturers Association*1	CO2 emissions (actual emissions)		213	169	180	181	169	168	166	−21.9%	−1.1%
	CO2 emissions (post-adjustment*7)		213	149	158	197	187	210	203	−4.7%	−3.4%
	CO2 emission intensity index (actual emission ☆	Base year: FY2005	1.00	0.99	0.92	0.91	0.92	0.90	0.91	−9.4%	0.7%
	CO2 emission intensity index (post-adjustment*7)		1.00	0.87	0.81	0.99	1.02	1.12	1.11	10.5%	−1.7%
	Energy consumption		113	98	105	105	99	98	96	−14.4%	−1.6%
	Energy consumption intensity index	Baae year: FY2005	1.00	1.09	1.01	1.00	1.02	0.99	0.99	−0.7%	0.2%
	Production activity index		1.00	0.80	0.92	0.93	0.86	0.88	0.86	−13.8%	−1.8%
The Federation of Pharmaceutical Manufacturers' Associations of Japan	CO2 emissions (actual emissions) ☆		241	207	208	231	255	254	244	1.3%	−3.8%
	CO2 emissions (post-adjustment*7)		241	192	192	223	233	254	244	1.2%	−3.9%
	CO2 emission intensity index (actual emission		0.89	0.70	0.68	0.72	0.77	0.74	0.72	−19.3%	−2.5%
	CO2 emission intensity index (post-adjustment*7)		0.89	0.65	0.63	0.69	0.71	0.74	0.72	−19.4%	−2.6%
	Energy consumption		117	110	110	110	114	113	110	−5.4%	−2.3%
	Energy consumption intensity index		0.90	0.77	0.75	0.71	0.73	0.69	0.68	−24.6%	−0.9%
	Production activity index		1.61	1.77	1.83	1.92	1.96	2.05	2.02	25.5%	−1.4%
Japan Aluminium Association	CO2 emissions (actual emissions)		168	132	138	145	148	146	149	0	0
	CO2 emissions (post-adjustment*7)		168	124	129	140	137	146	148	−11.7%	1.8%
	CO2 emission intensity index (actual emission		0.97	0.88	0.85	0.95	1.02	1.01	0.96	−0.3%	−4.6%
	CO2 emission intensity index (post-adjustment*7)		0.97	0.82	0.79	0.92	0.94	1.01	0.96	−0.4%	−4.7%
	Energy consumption		81	69	73	69	67	65	67	−16.5%	3.3%
	Energy consumption intensity index ☆		0.94	0.93	0.90	0.91	0.92	0.91	0.88	−5.8%	−3.3%
	Production activity index		1.12	0.96	1.05	0.98	0.94	0.93	0.99	−11.4%	6.8%
Japan Federation of Printing Industries *5	CO2 emissions (actual emissions) ☆		133	125	126	144	148	145	139	4.2%	−4.4%
	CO2 emissions (post-adjustment*7)		133	113	114	137	132	145	139	4.0%	−4.5%
	Energy consumption		72	70	71	70	66	64	63	−13.3%	−2.4%
Flat Glass Manufacturers Association of Japan	CO2 emissions (actual emissions) ☆		134	110	115	117	113	117	110	−18.0%	−5.9%
	CO2 emissions (post-adjustment*7)		134	107	113	116	109	117	110	−18.0%	−5.9%
	CO2 emission intensity index (actual emission		1.03	1.15	1.03	1.10	1.00	0.94	0.94	−8.9%	0.2%
	CO2 emission intensity index (post-adjustment)		1.03	1.12	1.01	1.08	0.97	0.94	0.94	−8.9%	0.1%
	Energy consumption		52	44	46	45	43	44	42	−20.3%	−5.1%
	Energy consumption intensity index		1.00	1.14	1.03	1.06	0.95	0.87	0.88	−11.4%	1.0%
	Production activity index		0.72	0.53	0.62	0.59	0.63	0.69	0.65	−10.0%	−6.0%
Japan Soft Drink Association	CO2 emissions (actual emissions)		102	71	104	110	117	121	115	12.2%	−5.3%
	CO2 emissions (post-adjustment*7)		102	71	99	108	110	121	115	12.1%	−5.3%
	CO2 emission intensity index (actual emission ☆		1.13	0.71	0.98	1.00	1.04	0.99	0.94	−16.9%	−5.0%
	CO2 emission intensity index (post-adjustment)		1.13	0.71	0.93	0.98	0.97	0.99	0.94	−16.9%	−5.1%
	Energy consumption		48	33	54	53	54	56	54	11.0%	−4.3%
	Energy consumption intensity index		1.20	0.76	1.13	1.08	1.08	1.03	0.99	−17.8%	−4.0%
	Production activity index		1.92	2.11	2.25	2.34	2.39	2.59	2.59	35.0%	−0.3%
Japan Dairy Industry Association	CO2 emissions (actual emissions)		112	110	110	115	121	119	115	2.8%	−3.5%
	CO2 emissions (post-adjustment*7)		112	105	104	112	114	119	115	2.7%	−3.5%
	CO2 emission intensity index (actual emission		1.19	1.23	1.22	1.24	1.27	1.25	1.20	0.9%	−4.0%
	CO2 emission intensity index (post-adjustment*7)		1.19	1.17	1.16	1.21	1.20	1.25	1.20	0.8%	−4.0%
	Energy consumption		51	54	54	52	53	52	51	−1.5%	−1.7%
	Energy consumption intensity index ☆		1.16	1.26	1.26	1.19	1.17	1.14	1.12	−3.3%	−2.3%
	Production activity index		1.09	1.04	1.05	1.08	1.11	1.11	1.11	1.8%	0.6%
The Japanese Electric Wire & Cable Makers' Association	CO2 emissions (actual emissions)		91	78	82	94	99	97	92	0.5%	−4.9%
	CO2 emissions (post-adjustment*7)		91	69	72	89	87	96	92	0.3%	−5.0%
(metal (copper/aluminnum) cable)	CO2 emission intensity index (actual emissions)		1.06	1.09	1.14	1.29	1.37	1.30	1.23	15.8%	−5.5%
(metal (copper/aluminnum) cable)	CO2 emission intensity index (post-adjustment*7)		1.06	0.96	1.01	1.22	1.20	1.30	1.23	15.6%	−5.6%
(optical fiber cable)	CO2 emission intensity index (actual emissions)		0.27	0.22	0.24	0.26	0.26	0.28	0.24	−8.0%	−12.1%
(optical fiber cable)	CO2 emission intensity index (post-adjustment*7)		0.27	0.19	0.21	0.25	0.22	0.28	0.24	−8.2%	−12.2%
	Energy consumption ☆		50.3	44.8	46.8	45.3	43.4	41.7	40.6	−19.4%	−2.7%
(metal (copper/aluminnum) cable)	Energy consumption intensity index		1.00	1.06	1.12	1.06	1.03	0.96	0.93	−6.7%	−3.3%
(optical fiber cable)	Energy consumption intensity index		0.24	0.20	0.22	0.20	0.18	0.19	0.17	−29.4%	−9.8%
(metal (copper/aluminnum) cable)	Production activity index		0.73	0.57	0.57	0.58	0.57	0.59	0.60	−18.3%	1.4%
(optical fiber cable)	Production activity index		14.4	23.6	22.0	25.0	27.2	23.8	24.6	71.5%	3.6%
The Japan Bearing Industrial Association	CO2 emissions (actual emissions)		73	58	70	83	84	85	84	14.4%	−1.35%
	CO2 emissions (post-adjustment*7)		73	51	62	79	74	85	84	14.1%	−1.5%
	CO2 emission intensity index (actual emission		0.97	0.97	0.89	1.03	1.14	1.13	1.05	8.1%	−6.7%
	CO2 emission intensity index (post-adjustment*7)	Base year: FY1997	0.97	0.85	0.79	0.98	1.00	1.13	1.05	7.9%	−6.8%
	CO2 emission intensity index (fixity coefficient) ☆		0.87	0.87	0.80	0.78	0.79	0.78	0.75	−14.3%	−4.8%
	Energy consumption		40	33	40	40	37	37	37	−7.2%	0.9%
	Energy consumption intensity index	Base year: FY1997	0.85	0.88	0.81	0.79	0.80	0.78	0.75	−12.3%	−4.6%
	Production activity index		1.33	1.06	1.39	1.42	1.30	1.33	1.40	5.8%	5.8%

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
The Japan Society of Industrial Machinery Manufacturers	CO2 emissions (actual emissions)		60	49	53	60	63	63	64	6.5%	1.9%
	CO2 emissions (post-adjustment*7)		60	44	47	57	56	63	64	6.3%	1.8%
	CO2 emission intensity index (actual emission	Base year: FY2008-12 average	1.30	1.06	1.14	1.13	1.23	1.21	1.15	-11.5%	-4.8%
	CO2 emission intensity index (post-adjustment*7)		1.30	0.94	1.02	1.07	1.09	1.21	1.15	-11.7%	-5.0%
	Energy consumption		32	28	29	29	28	27	28	-10.7%	4.0%
	Energy consumption intensity index ☆	Base year: FY2008-12 average	1.11	0.96	1.03	0.95	0.95	0.94	0.89	-20.0%	-5.4%
	Production activity index		0.93	0.94	0.93	1.07	1.03	1.05	1.12	20.4%	7.1%
Japan Petroleum Development Association	CO2 emissions (actual emissions) ☆		22	27	25	23	25	25	22	-1.7%	-13.1%
	CO2 emissions (post-adjustment*7)		22	27	24	23	24	25	22	-1.6%	-13.1%
	CO2 emission intensity index (actual emission ☆		0.79	0.84	0.83	0.78	0.90	0.98	0.92	17.1%	-6.1%
	CO2 emission intensity index (post-adjustment*7)		0.79	0.83	0.81	0.77	0.88	0.98	0.92	17.2%	-6.1%
	Energy consumption		9	10	10	10	10	11	9	6.9%	-14.0%
	Energy consumption intensity index		0.80	0.80	0.85	0.89	0.97	1.09	1.01	27.4%	-7.0%
	Production activity index		1.75	2.00	1.85	1.84	1.73	1.59	1.47	-16.1%	-7.5%
Japan Copper and Brass Association	CO2 emissions (actual emissions)		42	39	42	45	47	48	46	7.6%	-4.1%
	CO2 emissions (post-adjustment*7)		42	35	37	42	42	48	46	7.4%	-4.2%
	CO2 emission intensity index (actual emission		1.00	1.10	1.05	1.21	1.35	1.29	1.21	20.8%	-6.0%
	CO2 emission intensity index (post-adjustment*7)		1.00	0.99	0.95	1.15	1.21	1.28	1.21	20.6%	-6.1%
	Energy consumption		23	22	23	22	21	21	21	-10.5%	-2.3%
	Energy consumption intensity index		1.00	1.13	1.09	1.08	1.11	1.05	1.00	0.5%	-4.2%
	Production activity index		1.00	0.83	0.93	0.87	0.82	0.87	0.89	-10.9%	2.0%
Brewers Association of Japan	CO2 emissions (actual emissions)		90	60	57	53	52	49	48	-46.6%	-2.1%
	CO2 emissions (post-adjustment*7)		90	57	54	55	54	55	53	-41.4%	-3.4%
	CO2 emission intensity index (actual emission		0.79	0.56	0.54	0.51	0.50	0.49	0.48	-39.5%	-1.2%
	CO2 emission intensity index (post-adjustment*7)		0.79	0.53	0.51	0.54	0.53	0.54	0.53	-33.7%	-2.6%
	Energy consumption		43	32	30	28	28	26	25	-41.2%	-2.9%
	Energy consumption intensity index ☆		0.79	0.62	0.60	0.57	0.56	0.54	0.53	-33.4%	-2.1%
	Production activity index		0.98	0.92	0.90	0.88	0.88	0.87	0.86	-11.7%	-0.9%
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	CO2 emissions (actual emissions)						68	65	70		6.6%
	CO2 emissions (post-adjustment*7)						60	65	70		6.5%
(hours)	CO2 emission intensity index (actual emission ☆						1.00	1.06	1.12		5.8%
(hours)	CO2 emission intensity index (post-adjustment*7)						1.00	1.20	1.27		5.7%
(quantity at completion)	CO2 emission intensity index (actual emission ☆						1.00	1.17	1.27		8.9%
(quantity at completion)	CO2 emission intensity index (post-adjustment*7)						1.00	1.33	1.45		8.8%
	Energy consumption						29.0	27.6	30.0		8.8%
(hours)	Energy consumption intensity index						1.00	1.04	1.13		7.9%
(quantity at completion)	Energy consumption intensity index						1.00	1.26	1.39		10.3%
(hours)	Production activity index						1.00	0.91	0.92		0.8%
(quantity at completion)	Production activity index						1.00	0.83	0.81		-2.1%
Limestone Association of Japan	CO2 emissions (actual emissions) ☆		22	18	19	19	20	21	21	-4.5%	0.8%
	CO2 emissions (post-adjustment*7)		22	19	19	23	25	28	28	26.2%	-1.3%
	CO2 emission intensity index (actual emission	Base year: FY2010	0.98	1.00	1.00	1.00	1.00	1.00	1.02	4.2%	1.8%
	CO2 emission intensity index (post-adjustment*7)		0.95	1.00	1.00	1.18	1.19	1.31	1.31	37.7%	-0.3%
	Energy consumption		12	10	11	11	11	12	12	-5.1%	0.0%
	Energy consumption intensity index	Base year: FY2010	0.96	0.99	1.00	0.99	0.99	0.98	0.99	3.6%	1.0%
	Production activity index		1.20	0.97	1.00	1.01	1.06	1.11	1.10	-8.3%	-1.0%
Japan Machine Tool Builders Association	CO2 emissions (actual emissions)		27	20	26	32	35	36	37	37.6%	2.0%
	CO2 emissions (post-adjustment*7)		27	17	23	30	31	36	37	37.3%	1.9%
	CO2 emission intensity index (actual emission		0.84	1.41	1.09	1.15	1.23	1.32	1.14	35.7%	-14.0%
	CO2 emission intensity index (post-adjustment*7)		0.84	0.00	0.00	0.00	0.00	0.00	0.00	-100.0%	#DIV/0!
	Energy consumption		15	11	15	15	15	15	16	10.2%	4.6%
	Energy consumption intensity index ☆		0.78	1.36	1.05	0.94	0.91	0.96	0.85	8.7%	-11.8%
	Production activity index		1.29	0.56	0.95	1.10	1.14	1.10	1.31	1.4%	18.6%
Japan Sanitary Industry Equipment Association	CO2 emissions (actual emissions) ☆		36	26	24	28	26	26	23	-36.6%	-10.0%
	CO2 emissions (post-adjustment*7)		36	24	22	27	24	26	23	-36.7%	-10.0%
	CO2 emission intensity index (actual emission		0.69	0.57	0.45	0.52	0.48	0.42	0.39	-43.5%	-8.4%
	CO2 emission intensity index (post-adjustment*7)		0.69	0.53	0.42	0.50	0.44	0.42	0.39	-43.6%	-8.4%
	Energy consumption		17	13	12	13	12	12	11	-38.4%	-8.1%
	Energy consumption intensity index		0.69	0.62	0.50	0.52	0.46	0.41	0.38	-45.0%	-6.5%
	Production activity index		1.07	0.92	1.07	1.08	1.10	1.22	1.20	12.1%	-1.7%
Flour Millers Association	CO2 emissions (actual emissions)		23	22	23	28	31	31	30	29.9%	-0.9%
	CO2 emissions (post-adjustment*7)		23	19	20	27	26	31	30	29.6%	-1.0%
	CO2 emission intensity index (actual emission ☆		1.06	1.03	1.03	1.27	1.40	1.39	1.38	30.1%	-0.8%
	CO2 emission intensity index (post-adjustment*7)		1.06	0.88	0.88	1.19	1.20	1.39	1.38	29.7%	-0.9%
	Energy consumption		13	13	14	14	13	13	13	-0.9%	1.2%
	Energy consumption intensity index		0.97	0.97	0.97	0.98	0.97	0.95	0.96	-0.8%	1.3%
	Production activity index		1.17	1.14	1.18	1.18	1.16	1.17	1.16	-0.1%	-0.1%
Japan Industrial Vehicles Association	CO2 emissions (actual emissions) ☆		7.0	4.4	4.9	5.9	5.6	4.7	4.7	-32.5%	-0.3%
	CO2 emissions (post-adjustment*7)		7.0	4.1	4.5	5.6	5.1	4.7	4.7	-32.6%	-0.4%
	CO2 emission intensity index (actual emission		1.18	1.38	1.13	1.23	1.23	1.05	1.01	-14.4%	-4.2%
	CO2 emission intensity index (post-adjustment*7)		1.18	1.28	1.04	1.17	1.11	1.05	1.01	-14.6%	-4.3%
	Energy consumption		3.6	2.4	2.7	2.8	2.5	2.1	2.1	-42.0%	1.3%
	Energy consumption intensity index		1.16	1.42	1.17	1.11	1.04	0.88	0.86	-26.4%	-2.7%
	Production activity index		0.90	0.48	0.66	0.73	0.69	0.68	0.71	-21.1%	4.1%

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2009	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
Japan Association of Rolling Stock Industries	CO2 emissions (actual emissions) ☆		3.7	3.5	3.5	3.7	3.6	3.6	3.6	−1.7%	−0.7%
	CO2 emissions (post-adjustment*7)		3.7	3.1	3.1	3.5	3.2	3.6	3.6	−1.9%	−0.8%
	CO2 emission intensity index (actual emission		0.55	0.43	0.48	0.55	0.62	0.51	0.51	−7.6%	1.4%
	CO2 emission intensity index (post-adjustment*7)		0.55	0.38	0.42	0.52	0.54	0.50	0.51	−7.8%	1.3%
	Energy consumption		2.0	2.0	2.0	1.7	1.6	1.6	1.6	−20.2%	1.4%
	Energy consumption intensity index		0.55	0.43	0.49	0.47	0.49	0.40	0.41	−25.0%	3.6%
	Production activity index		1.43	1.80	1.59	1.44	1.27	1.56	1.53	6.4%	−2.1%
industrial processes *6	CO2 emissions		5,073	4,088	4,183	4,145	4,169	4,361	4,327	−14.7%	−0.8%
Revisions *1	CO2 emissions (actual emissions)		23	24	25	44	54	53	48		
	CO2 emissions (post-adjustment*7)		23	33	34	21	19	11	12		
	Energy consumption										
Total *1, *6	CO2 emissions (actual emissions)		41,956	36,255	38,624	38,680	38,880	39,639	39,110	−6.8%	−1.3%
	CO2 emissions (post-adjustment*7)		41,956	35,450	37,723	38,217	37,811	39,629	39,084	−6.8%	−1.4%
	Energy consumption		13576	11997	12802	12334	12002	12120	12003	−11.6%	−1.0%

*1 Total CO2 emissions and enrgy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively. Figures for the Japan Rubber Manufacturers Association have been caclulated using the c oefficient forthermal power generation and a fixity coefficent for fiscal 2005 (base year) has been used to calculate actual emissions. The difference between a simple sum including relevant industries and the total is provided as "revisions".

*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors

*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denomi nator. Unless otherwise specified, the base year is fiscal 1990.

*4 The Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention has implemented the Comm itment to Low Carbon Society as a new scheme independent of the conventional Voluntary Action Plan on the Environment. Therefore, data for participating industries under the Commitment to a Low Carbon Society are available for only the years following the base year (fiscal 2012). The figures provided for fiscal 1990-2011 have been derived from the Voluntary Action Plan on the Environment as reference.

*5 Emissions from industrial processes refer to CO2 emissions from manufacturing processes that are not energy-oriented.

2. Energy Conversion Sector

10,000t-CO2; 10,000kl crude oil equivalent; fiscal year

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
The Federation of Electric Power Companies	CO2 emissions (actual emissions)		37,300	36,500	41,700	39,500	35,300	37,400	43,900	48,600	48,400	45,700	+22.5%	-5.6%
	CO2 emissions (post-adjustment*6)		37,300	36,500	41,700	33,200	30,100	31,700	40,900	41,500	48,400	45,600	+22.3%	-5.8%
	CO2 emission intensity index (actual emissions)		1.01	0.98	1.09	1.06	0.99	0.99	1.22	1.37	1.37	1.33	+31.4%	-2.5%
	CO2 emission intensity index (post-adjustment*6)		1.01	0.98	1.09	0.89	0.84	0.84	1.14	1.17	1.37	1.33	+31.0%	-2.8%
	Energy consumption	(reference)	13,600	13,500	15,500	14,600	13,200	13,600	16,600	18,300	18,200	17,600	+29.4%	-3.3%
	Energy consumption intensity index		0.95	0.94	0.94	0.93	0.93	0.93	0.93	0.93	0.92	0.91	-4.6%	-1.0%
	Production activity index		1.34	1.35	1.40	1.35	1.30	1.37	1.31	1.29	1.29	1.25	-6.8%	-3.1%
	Production activity		8,830	8,890	9,200	8,890	8,590	9,060	8,600	8,520	8,490	8,230	-6.8%	-3.1%
Portion attributable to the power industry: figures used to calculate	CO2 emissions (actual emissions)		3,850	3,700	4,250	3,960	3,560	3,650	4,300	4,610	4,620	4,170	+8.3%	-9.7%
	CO2 emissions (post-adjustment*6)		3,850	3,700	4,250	3,330	3,030	3,100	4,010	3,930	4,610	4,160	+8.1%	-9.8%
	Energy consumption	(reference)	1,410	1,370	1,580	1,470	1,330	1,330	1,630	1,740	1,730	1,600	+13.5%	-7.5%
Petroleum Association of Japan	CO2 emissions (actual emissions)		4,154	4,080	4,188	4,077	3,960	4,003	3,785	3,820	4,033	3,824	-8.0%	-5.2%
	CO2 emissions (post-adjustment*6)		4,154	4,080	4,188	4,059	3,944	3,986	3,776	3,797	4,033	3,823	-8.0%	-5.2%
	CO2 emission intensity index (act		0.85	0.85	0.85	0.86	0.85	0.84	0.85	0.85	0.86	0.85	+0.1%	-1.1%
	CO2 emission intensity index (post-a		0.85	0.85	0.85	0.85	0.84	0.84	0.84	0.85	0.86	0.85	+0.1%	-1.1%
	Energy consumption ☆		1,714	1,682	1,725	1,688	1,633	1,651	1,556	1,575	1,652	1,565	-8.7%	-5.3%
	Energy consumption intensity index		0.84	0.85	0.85	0.86	0.85	0.84	0.84	0.85	0.85	0.84	-0.7%	-1.2%
	Production activity index		1.58	1.55	1.58	1.53	1.50	1.52	1.44	1.44	1.52	1.45	-8.1%	-4.1%
The Japan Gas Association *4	CO2 emissions (actual emissions)		47	38	40	37	34	34	38	40	46	48	+1.6%	+4.3%
	CO2 emissions (post-adjustment*6)		47	38	40	34	31	31	36	36	46	48	+1.4%	+4.2%
	CO2 emission intensity index (act ☆		0.17	0.13	0.13	0.12	0.11	0.11	0.12	0.12	0.13	0.13	-19.3%	+2.4%
	CO2 emission intensity index (post-a		0.17	0.13	0.13	0.11	0.11	0.10	0.11	0.11	0.13	0.13	-19.4%	+2.3%
	Energy consumption		25	21	21	20	19	19	19	18	21	22	-10.8%	+5.7%
	Energy consumption intensity indi ☆		0.18	0.14	0.14	0.13	0.13	0.12	0.12	0.11	0.12	0.12	-29.1%	+3.8%
	Production activity index		2.10	2.20	2.33	2.25	2.21	2.33	2.38	2.39	2.59	2.64	+25.8%	+1.8%
Emissions from industrial processes *5	CO2 emissions		214	246	250	256	222	214	213	190	189	200	-6.5%	+6.0%
Total *1	CO2 emissions (actual emissions)		8,265	8,064	8,729	8,331	7,776	7,902	8,336	######	######	8,241	-0.3%	-7.3%
	CO2 emissions (post-adjustment*6)		8,265	8,064	8,729	7,679	7,228	7,332	8,035	7,953	8,877	8,231	-0.4%	-7.3%
	Energy consumption		3,148	3,073	3,326	3,178	2,982	2,999	3,204	3,333	3,403	3,187	+1.2%	-6.4%

*1 Total CO2 emissions and enrgy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.
*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999, fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors.
*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denomi nator. Unless otherwise specified, the base year is fiscal 1990.
*4 The data for the Japan Gas Association in and before 2012 are based on industrial boundaries defined under the Voluntary A ction Plan on the Environment. The calculated CO2 emissions differ from the figures dervied using the marignal adjustment method (cogeneration) that the Japan G as Association has adopted as target

3. Commercial Sector

10,000t-CO2; 10,000kl crude oil equivalent; fiscal year

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Notes	2010	2011	2012	2013	2014	Relative to previous FY
Japan Chain Stores Association	CO2 emissions (actual emissions)		667	694	786	543	498	−8.3%
	CO2 emissions (post-adjustment*4)		566	647	670	543	497	−8.4%
	Energy consumption		402	338	342	233	219	−5.8%
	Energy consumption intensity index ☆	Base year: FY1996	0.91	0.78	0.77	0.76	0.77	+1.8%
Telecommunications Carriers Association	CO2 emissions (actual emissions)		426	533	578	574	574	−0.1%
	CO2 emissions (post-adjustment*4)		362	498	493	573	572	−0.2%
	Energy consumption		257	260	251	246	253	+2.6%
	Energy consumption intensity index ☆	Base year: FY2010	1.00	0.97	0.90	0.85	0.85	−0.2%
	Production activity index		1.00	1.05	1.09	1.15	1.18	+2.9%
Japan Franchise Association	CO2 emissions (actual emissions)		297	365	424	441	461	+4.5%
	CO2 emissions (post-adjustment*4)		252	340	361	440	459	+4.4%
	Energy consumption		179	178	184	189	203	+7.4%
Japan Department Store Association	CO2 emissions (actual emissions)		146	168	183	180	161	−10.2%
	CO2 emissions (post-adjustment*4)		127	158	159	179	161	−10.3%
	CO2 emission intensity index (actual emission		0.80	0.89	0.97	0.95	0.87	−9.0%
	CO2 emission intensity index (post-adjustment*4)		0.69	0.84	0.84	0.95	0.87	−9.1%
	Energy consumption		86	82	81	78	72	−8.3%
	Energy consumption intensity index ☆		0.77	0.72	0.70	0.68	0.63	−7.0%
	Production activity index		1.74	1.80	1.81	1.79	1.77	−1.3%
Japan Association of Refrigerated Warehouses	CO2 emissions (actual emissions)		80	91	107	107	104	−3.0%
	CO2 emissions (post-adjustment*4)		68	85	91	107	104	−3.2%
	CO2 emission intensity index (actual emission		0.91	1.08	1.23	1.21	1.17	−3.2%
	CO2 emission intensity index (post-adjustment*4)		0.78	1.01	1.04	1.21	1.17	−3.3%
	Energy consumption		48	44	46	46	46	−0.4%
	Energy consumption intensity index ☆		0.86	0.82	0.83	0.81	0.80	−0.6%
	Production activity index		1.40	1.35	1.40	1.43	1.43	+0.2%
Japanese Bankers Association	CO2 emissions (actual emissions)		122	131	142	140	135	−3.6%
	CO2 emissions (post-adjustment*4)		103	122	121	140	135	−3.8%
	Energy consumption		73	64	62	60	59	−1.0%
	Electric power consumption intensity (power consumption / total floor area) ☆		0.99	0.86	0.84	0.83	0.82	−1.7%
The Life Insurance Association of Japan	CO2 emissions (actual emissions)		105	112	120	115	105	−8.3%
	CO2 emissions (post-adjustment*4)		91	106	104	115	105	−8.4%
	Energy consumption ☆		61	54	53	50	47	−6.2%
	Production activity index	Base year: FY2009	0.96	0.97	0.94	0.91	0.89	−2.1%
Japan Foreign Trade Council, Inc.	CO2 emissions (actual emissions)		5.2	5.3	5.5	5.3	5.0	−5.4%
	CO2 emissions (post-adjustment*4)		4.4	4.9	4.7	5.3	5.0	−5.5%
	Energy consumption		3.1	2.6	2.4	2.3	2.2	−3.0%
	Electric power consumption intensity (power consumption poer unit floor area in entire company) ☆	Base year: FY2009	1.01	0.84	0.78	0.78	0.76	−2.6%
The General Insurance Association of Japan	CO2 emissions (actual emissions)		27	28	31	30	28	−5.8%
	CO2 emissions (post-adjustment*4)		23	27	27	30	28	−5.9%
	Energy consumption		16	14	13	13	13	−3.5%
	Electric power consumption intensity (power consumption/total floor area) ☆	Base year: FY2009	1.01	0.87	0.85	0.85	0.87	+2.0%
	Production activity index		0.98	0.98	0.97	0.95	0.91	−4.4%
Japan LP Gas Association	CO2 emissions (actual emissions)		2.4	2.9	3.2	3.1	3.0	−3.9%
	CO2 emissions (post-adjustment*4)		2.0	2.7	2.7	3.1	3.0	−4.0%
	CO2 emission intensity index (actual emission		0.97	1.16	1.39	1.45	1.37	−5.4%
	CO2 emission intensity index (post-adjustment*4)		0.83	1.08	1.19	1.44	1.36	−5.5%
	Energy consumption		1.4	1.4	1.4	1.3	1.3	−1.3%
	Energy consumption intensity index ☆		0.91	0.88	0.94	0.97	0.94	−2.9%
	Production activity index		0.99	1.00	0.93	0.87	0.88	+1.6%
The Real Estate Companies Association of Japan	CO2 emissions (actual emissions)	Base year: FY2005	0.75	0.84	0.85	0.99	0.93	−5.6%
	CO2 emissions (post-adjustment*4)		0.86	0.89	0.97	0.99	0.93	−5.6%
	Energy consumption intensity index ☆		0.88	0.79	0.79	0.78	0.74	−4.4%
Japan Securities Dealers Association	CO2 emissions (actual emissions)		19	19	20	19	18	−7.3%
	CO2 emissions (post-adjustment*4)		16	18	17	19	18	−7.4%
	Energy consumption		11	9	9	8	8	−4.8%
	Electric power consumption per unit floor area ☆	[kWh/㎡]	243	203	195	189	185	−4.8%
	* intensity index of above	Base year: FY2009	0.99	0.83	0.80	0.77	0.76	−1.3%
Total *1	CO2 emissions (actual emissions)		1,896	2,150	2,400	2,159	2,093	−3.0%
	CO2 emissions (post-adjustment*4)		1,615	2,009	2,050	2,156	2,088	−3.2%
	Energy consumption		1,138	1,047	1,045	927	923	−0.5%

*1 Total CO2 emissions and enrgy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.

*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999,fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors.

*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denomi nator. Unless otherwise specified, the base year is fiscal 1990.

4. Transportation Sector

10,000t-CO2; 10,000kl crude oil equivalent; fiscal year

Industry	(*1, *2, *3) (☆: target adopted by the industry)	Note	2005	2010	2011	2012	2013	2014	Relative to FY2005	Relative to previous FY
The Japanese Shipowners' Association	CO2 emissions (actual emissions)		5,574	5,769	5,673	5,499	5,418	5,295	−5.0%	−2.3%
	CO2 emissions (post-adjustment*5)		5,574	5,769	5,673	5,499	5,418	5,295	−5.0%	−2.3%
	CO2 emission intensity index (actual emissions) ☆		0.88	0.83	0.77	0.73	0.60	0.56	−36.6%	−7.6%
	CO2 emission intensity index (post-adjustment*5) ☆		0.88	0.83	0.77	0.73	0.60	0.56	−36.6%	−7.6%
	Energy consumption		2,012	2,083	2,048	1,986	1,889	1,847	−8.2%	−2.2%
	Energy consumption intensity index		0.88	0.83	0.77	0.73	0.58	0.54	−38.7%	−7.6%
	Production activity index		1.65	1.79	1.91	1.95	2.33	2.47	+49.7%	+5.8%
Japan Trucking Association	CO2 emissions (actual emissions)		4,720	4,337	4,094	3,850	3,832	3,655	−22.6%	−4.6%
	CO2 emissions (post-adjustment*5)		4,720	4,337	4,094	3,850	3,832	3,655	−22.6%	−4.6%
	CO2 emission intensity index (actual emissions) ☆	Base year: 1996	0.75	0.63	0.63	0.67	0.65	0.63	−16.6%	−2.7%
	CO2 emission intensity index (post-adjustment*5) ☆	Base year: 1996	0.75	0.63	0.63	0.67	0.65	0.63	−16.6%	−2.7%
	Energy consumption		1,776	1,632	1,540	1,449	1,434	1,368	−23.0%	−4.6%
	Energy consumption intensity index	Base year: 1996	0.75	0.63	0.63	0.67	0.64	0.63	−17.0%	−2.7%
	Production activity index	Base year: 1996	1.25	1.37	1.30	1.16	1.18	1.16	−7.2%	−2.0%
The Scheduled Airlines Association of Japan	CO2 emissions (actual emissions)		2,667	1,901	1,753	1,884	1,979	2,086	−21.8%	+5.4%
	CO2 emissions (post-adjustment*5)		2,667	1,901	1,753	1,884	1,979	2,086	−21.8%	+5.4%
	CO2 emission intensity index (actual emissions) ☆		0.97	0.86	0.86	0.86	0.85	0.81	−16.2%	−4.9%
	CO2 emission intensity index (post-adjustment*5) ☆		0.97	0.86	0.86	0.86	0.85	0.81	−16.2%	−4.9%
	Energy consumption		1,026	731	674	724	748	789	−23.1%	+5.4%
	Energy consumption intensity index		0.97	0.86	0.86	0.86	0.84	0.80	−17.6%	−4.9%
	Production activity index		1.60	1.29	1.19	1.27	1.35	1.49	−6.6%	+10.8%
Japan Federation of Coastal Shipping Associations	CO2 emissions (actual emissions) ☆		789	704	686	704	722	726	−8.0%	+0.5%
	CO2 emissions (post-adjustment*5) ☆		789	704	686	704	722	726	−8.0%	+0.5%
	CO2 emission intensity index (actual emissions)		1.04	1.09	1.10	1.11	1.09	1.11	+6.4%	+1.5%
	CO2 emission intensity index (post-adjustment*5)		1.04	1.09	1.10	1.11	1.09	1.11	+6.4%	+1.5%
	Energy consumption		288	256	250	256	255	256	−11.0%	+0.5%
	Energy consumption intensity index		1.04	1.09	1.09	1.10	1.06	1.07	+2.9%	+1.5%
	Production activity index		0.88	0.75	0.73	0.74	0.77	0.76	−13.6%	−1.0%
The Association of Japanese Private Railways	CO2 emissions (actual emissions)			216	258	290	288	276		−4.2%
	CO2 emissions (post-adjustment*5)			183	241	247	287	275		−4.3%
	Energy consumption			130	126	126	123	121		−1.6%
	Energy consumption intensity index	Base year: FY2010		1.00	0.98	0.97	0.94	0.93		−1.8%
	Production activity index	Base year: FY2010		1.00	0.99	1.00	1.00	1.01		+0.3%
All Japan Freight Forwarders Association	CO2 emissions (actual emissions) ☆		14.1	12.8	12.7	12.8	12.9	12.9	−8.5%	−0.3%
	CO2 emissions (post-adjustment*5) ☆		14.1	12.8	12.7	12.8	12.9	12.9	−8.5%	−0.3%
	Energy consumption		5.3	4.8	4.8	4.8	4.8	4.8	−9.0%	−0.3%
Total *1 *4	CO2 emissions (actual emissions)		13,764	12,938	12,476	12,240	12,252	12,050	−14.5%	−1.6%
	CO2 emissions (post-adjustment*5)		13,764	12,906	12,459	12,197	12,251	12,050	−14.5%	−1.6%
	Energy consumption		5,107	4,837	4,643	4,546	4,455	4,386	−16.5%	−1.5%

*1 Total CO2 emissions and energy consumption have been calculated using the receiving-end coefficient for the average of all power sources as the carbon emission factor and energy conversion coefficient, respectively.

*2 Due to revisions in energy-specific standard calorific values and carbon emission factors under the General Energy Statistics, calculations before fiscal 1999,fiscal 2000-2004, fiscal 2005-2012 and fiscal 2013 are based on different thermal conversion factors

*3 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as the denominator. Unless otherwise specified, the base year is fiscal 1990.

〔Attachment 2〕

Examples of emission reduction efforts in domestic business operations

1. Industrial Sector

Industry	Emission reduction efforts in domestic business operations
The Japan Iron and Steel Federation	**<Past efforts and efforts made in fiscal 2014>** (1) Improved the efficiency of coke ovens (2) Improved the efficiency of power generating equipment (joint thermal power plants / off-grid power systems) (3) Enhanced energy savings (4) Enhanced utilization of waste plastics, etc. (5) Developed and introduced innovative technologies
Japan Chemical Industry Association	**<Past efforts>** (1) In fiscal 1997-2012, engaged in improving energy intensity levels through energy savings and achieved an average score of 85 (15% improvement) in fiscal 2008-2012 with a score of 100 representing energy intensity levels in fiscal 1990. From fiscal 2013, engaged in efforts under the Commitment to a Low Carbon Society. **<Efforts made in 2014>** (1) Improved operation methods (2) Recovered waste energy (3) Streamlined processes (4) Improved the efficiency of equipment and appliances (5) Other (changed products)
Japan Paper Association	**<Past efforts>** (1) Made investments in energy savings (total cumulative investments of 361 billion yen from fiscal 2000) and thus reduced fossil fuels. **<Efforts made in fiscal 2014>** (1) Suspended packaged boilers for heavy oil through extraction retrofits of turbines. (2) Renewed inverters and electric motors of paper machine drives (3) Introduced high-efficiency gas turbine cogeneration plants (including fuel conversion) (4) Other ・Introduced high-efficiency equipment, including inverters, transformers and lighting and reviewed various processes ・Converted to fuel sources with low CO2 emissions **<Efforts to utilize renewable energy>** ・Effectively utilized the black liquor generated during the crafting process, the waste sheet and paper sludge generated in the paper manufacturing process, waste material and bark, and hydropower **<Acquisition of environmental management and other international standards>** ・Acquired ISO14001 certification at 94 business locations. Introduced an environmental management system of the same standards at on business location.
Japan Cement Association	**<Past efforts>** (1) Promoted the dissemination of energy saving equipment (waste heat power generation, high-efficiency clinker coolers, etc.) (2) Expanded the use of waste as an alternative energy source **<Efforts made in fiscal 2014>** (1) Promoted the dissemination of energy saving equipment (2) Expanded the use of waste as an alternative energy sources (3) Expanded the use of other waste
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention	**<Past efforts>** (1) Obligated member companies wishing to participate in the industrial action plan under the Commitment to a Low Carbon Society aiming to achieve the common target set up by the industry in order to ensure achievement of the industry-wide target (2) Enhanced the support system by sharing energy-saving practices, etc. in order to achieve the industry-wide target. **<Efforts made in fiscal 2014>**

	(1) Enhanced management (2) Installed high-efficiency appliances (3) Improved production processes or product quality (4) Improved control methods (rotation speed control, etc.) (5) Prevented loss (heat ventilation, hydration)
Japan Federation of Construction Contractors	**<Past efforts and efforts made in fiscal 2014>** (1) Reduced surplus soil volumes and shortened conveyance distance (2) Promoted no idling and high fuel efficiency driving methods (3) Encouraged the proper maintenance of heavy machinery and vehicles (4) Promoted the adoption of high-performance energy-saving construction methods, construction machines and vehicles (5) Promoted the use of high-efficiency makeshift lighting appliances, etc. (6) Promoted energy-saving activities at local offices, etc. **<3Rs and global warming>** ・Reduced and segregated waste generated in new construction projects (used precast concrete, reduced the generation of waste material by adopting alternative formwork, unitization of material) ・ Implemented measures to address construction surplus soil issues (proposed ways to reduce generation at the construction planning stage, considered the promotion of reuse at the construction site or in other construction projects, promoted the management and utilization of stock) **<Efforts to utilize renewable energy>** ・Installed solar panels on the roofs of business locations and supplied the electric power used in offices ・ Introduced renewable energy, including solar, wind, kitchen waste biogas power generation, at construction sites. ・Used the abovementioned electric power generated in streetlights and sound meters around construction sites. ・Purchased green power for utilization in construction work. ・Used biodiesel fuels in heavy machinery, vehicles and power generators. Collaborated with local communities to collect waste cooking oil. **<Acquisition of environmental management and other international standards>** ・ Approximately 90 percent of 140 member companies have acquired ISO14001 certification. ・Had the construction industry represented on the Subcommittee for Environmental Management Systems on ISO14001 revisions under the Japanese Standards Association. ・Explained and communicated the revisions made in ISO14001 to member companies.
Japan Automobile Manufacturers' Association / Japan Auto-Body Industries Association	**<Past efforts>** (1) Equipment A. Energy supply-side measures ・Introduced cogeneration equipment and improved efficiency levels ・Introduced high-efficiency compressors, reduced steam air feed pressure, etc. ・Addressed radiant heat loss in steam pipes ・Introduced and renewed to high-efficiency electric substation equipment B. Measures for energy-intensive equipment ・Developed steamless or airless processes, reduced air leaks, shortened the time required for air blow, introduced inverter-controlled ventilation and cooling fans ・Optimized the efficiency of welding ovens and drying ovens; recovered waste heat, etc. ・Saved energy in lighting equipment, etc. ・Renewed freezers for air conditioning and installed heat pumps in air conditioning equipment, etc. ・Improved processes, implemented electric power saving measures (applied high heat-insulation heat-resistant material, suspended the use of furnaces, etc.), etc. (2) Measures to improve productivity A. High-performance operation and management technologies, including energy supply methods ・Improved operations (efficient operations, etc.) (reduced energy (electric power, air)

	consumption when not in operation, consolidation of air conditioning equipment and freezers, etc.) ・Increased energy savings from the furnace body of paint booths ・Reduced the air supply pressure of air and steam, changed the compressor control and reviewed piping B. Consolidated production lines ・Consolidated and integrated equipment and production lines and consolidated heat processing ovens and casting lines, etc. ・Reviewed the painting process (no paint, shorter processes, changes in air conditioning controls, etc.) (3) Fuel conversion, ESCO projects A. Fuel conversion measures ・Heavy oil heaters: converted from heavy oil to city gas ・Ladle heater in aluminum casting: converted from city gas to electric power (far-infrared heater) B. Other ・Replaced factory lighting with LED (4) Offices, etc. A. Operation improvements ・Reduced air leaks, steam leaks, water leaks and radian heat loss to save energy; made technological and operational improvements to save energy, etc. B. Equipment improvements ・Improved the efficiency of lighting, removed unnecessary lighting, installed sensor control. (5) Energy savings through collaboration across the supply chain, etc. ・Promoted further CO2 emission reduction efforts by sharing information on good energy-saving practices and technologies among manufactures of the final product, cooperative auto-body parts manufactures, and other companies along the supply chain **<Efforts made in fiscal 2014>** (1) Improved energy supply-side and demand-side equipment (2) Improved operations and management (3) Consolidated production lines (4) Fuel conversion (5) Offices and others
Japan Auto Parts Industries Association	**<Past efforts>** (1) Improved driving methods, including stopping idling (2) Improved the efficiency of equipment and appliances (3) Streamlined processes (4) Recovered waste energy through cogeneration, etc. (5) Mutually introduced energy-saving technologies and exchanged information on energy use **<Efforts made in fiscal 2014>** (1) Saved energy by reusing exhaust from paint booths (2) Controlled the end pressure of factor air blows (3) Suspended air conditioner use during the wintertime utilizing compressor waste heat (4) Introduced high-luminance light storage guiding lights (5) Reduced the use of air by utilizing pulse blow (6) Reduced heat radiation from the heating furnace by installing thermal insulators (7) Recovered and utilized boiler drain steam (8)Renewed vending machines to energy-saving models
Japan Federation of Housing Organizations	**<Past efforts>** (1) Planning and designing ・Promoted the construction of environmentally symbiotic housing ・Improved housing performance, including retrofitting to meet quake-resistance standards and to save energy ・Promoted the adoption of high-efficiency equipment and appliances and renewable

	energy ・Created good quality built environments by promoting and disseminating high-insulation and highly airtight housing and by developing and disseminating "net zero energy houses" and “life-cycle carbon minus housing" ・Promoted longer lives for housing (2) Construction: adopted construction methods that accommodate both higher productivity of housing and environmental considerations ・Reduced construction on site and reduced waste by using precut panels and promoting industrialization ・Enhanced process management and improved the efficiency of transporting construction material and reduced the number of deliveries ・Promoted the reuse and recycling of construction waste; promoted the use of recycled material ・Ensured that delivery vehicles travelling to and from plants and construction sites refrained from idling ・Ensured the segregation of demolition debris ・Promoted the recycling of construction waste **<Efforts made in 2014>** ・Revision and publication of “Guidelines for Environmental Consideration for Housing”
Japan Mining Industry Association	**<Past efforts>** (1) Retrofitted, renewed or upgraded the efficiency of various equipment at each refining **<Efforts made in fiscal 2014>** (1) Equipment ・Upgraded boilers, blowers, fans and pumps to high-efficiency equipment ・Introduction of LED lighting ・Introduced inverter-controlled electronic equipment (2) Processes ・Recovered and used waste heat ・Optimization of production conditions and revision production processes (3) Other (copper, zinc, lead refining processes) ・Optimization of motor control methods ・Introduced inverter-controlled exhaust gas fans ・Upgraded to high-efficiency sea water pumps ・Upgraded to high-efficiency air conditioning equipment ・Mixed combustion of biomass **<3Rs and global warming countermeasures>** ・Promoted recycling, including recovering various valuable and precious metals, with a view to achieving zero emission **<Efforts to utilize renewable energy>** ・Promoted the construction of solar power generation systems and constructed water power generation facilities. Supplied local electric power companies with steam and sold power. Engaged in new development projects. **<Acquisition of environment management and other international standards>** ・Many member companies have enthusiastically acquired ISO14000, an international standard.
Lime Manufacture Association	**<Past efforts and efforts in fiscal 2014>** (1) Introduced energy-saving and high-efficiency equipment (2) Recovered waste heat (3) Fuel conversion (4) Improved operations
The Japan Rubber Manufactures Association	**<Past efforts>** (1) New or additional installation of cogeneration systems ・Newly or additionally installed high-efficiency cogeneration systems using city gas, etc. ・Converted cogeneration fuels from heavy oil to LNG (2) Introduced high-efficiency appliances ・Installed high-efficiency and inverter-controlled appliances, including fans, motors, lighting

	(3) Implemented conventional energy-saving practices ・Applied heat retention and thermal insulation, prevented leakages and recovered heat in thermal equipment ・Improved the efficiency of operations through rotation speed control, intermittent operation and downsizing of equipment (4) Improved the efficiency through energy conversion and revisions in the production process ・Improved processes by introducing waste oil furnaces and converting the fuels used in furnaces and boiler to gas ・Streamlined production by consolidating production processes and equipment by reviewing operations covered by numerous business locations (5) Improved the efficiency of air conditioning systems ・Introduced ice thermal storage, absorption-type freezer, heat pumps (6) Improved product durability ・Achieved significant improvements in product durability by converting from bias tires to radial tires ・Developed other high-durability rubber materials (7) Technological development and promotion ・Developed high fuel efficiency tires with reduced rolling resistance based on LCA; promoted sales and dissemination ・Developed and disseminated run flat tires ・Promoted efforts related to retread tires (8) Introduced a tire labeling program **<Efforts made in fiscal 2014>** (1) Converted fuel in cogeneration and production processes ・Converted fuels used in cogeneration and in the production process (boilers, etc.) from heavy oil to LNG. Introduced steam and waste heat-powered operations (2) Introduced high-efficiency appliances ・Introduced high-efficiency appliances and systems for air conditioning, lighting (LED), production equipment, pumps, compressors, motors, molding machines, transformers, boilers, etc.; introduced inverter control, etc. (3) Saved energy in production operations ・Renewed and efficiently used equipment and machinery, converted and improved processes <3Rs and global warming countermeasures> ・In the material cycle, engaged in in-house use of recycled rubber, recycled waste rubber and defective material, recycled waste plastics and paper ・In the thermal cycle, used waste rubber, waste tires and resins as fuel ・Increased recycling through enhanced waste segregation, etc. **<Efforts to utilize renewable energy>** ・Promoted solar power in factories and logistic warehouses **<Acquisition of environmental management and other international standards>** ・Acquired ISO14001(24 companies); communicated various efforts on corporate websites (CO2 emissions (16 companies); environmental management efforts (20 companies)) etc.
The Federation of Pharmaceutical Manufacturers' Associations of Japan	**<Past efforts>** (1) Energy conversion (2) Selected high-efficiency appliances, etc. (3) Recovered waste heat through heat exchange (4) Reviewed operational and control methods of equipment and appliances (5) Introduced cogeneration (6) Installed inverter control **<Efforts made in fiscal 2014>** ・In addition to the above 6 items, focused on soft measures without investment (operation of equipment and appliances, revision of control methods, etc.) **<Efforts to utilize renewable energy>** ・Used renewable energy, including solar and biomass **<Acquisition of environmental management and other international standards>**

	・Most factories and research institutions are designated factories under the Act Concerning the Rational Use of Energy. Ten companies have acquired EMS certification at their offices.
Flat Glass Manufacturers Association of Japan	**<Past efforts>** (1) Streamlined production by dismantling and consolidating flat glass manufacturing equipment (melting furnace) (2) Improved heat recovery efficiency through regular repairs of furnaces (cold repair) (3) Consolidated product types to reduce losses per oven from changing glass types and colors (4) Developed and introduced new high-efficiency burning technologies (continued) (5) Improved operating conditions of equipment <**Efforts made in fiscal 2014>** (1) Reduced the number of equipment using steam (2) Retained the oven heat during regular checkups (3) Introduced inverter-controlled equipment (4) Reduced lighting equipment and replaced existing lighting with LED **<Efforts to utilize renewable energy>** ・Main Office buildings of some member companies run entirely on renewable energy. ・Some manufacturing factories have adopted solar power generation
Japan Federation of Printing Industries	**<Past efforts>** (1) Implemented energy savings in printing machines and peripheral equipment, visualized energy use, and implemented measures in auxiliary facilities **<Efforts made in fiscal 2014>** (1) Lighting ・Introduced high frequency lighting appliances and LED, switched from general illumination to partial illumination, and introduced automatic light switch timers, etc. (2) Air conditioning ・Renewed air conditioning equipment, introduced inverter-controlled air conditioning equipment, etc. (3) Engines ・Prevented and improved air leakage ・Introduced inverter-controlled motors, etc. (4) Receiving and transforming electric power ・Renewed and improved transformers (5) Other ・Installed control meters ・Engaged in greening of rooftops and walls ・Introduced solar power systems ・Introduced energy-saving CPU ・Introduced energy management systems, etc.
Japan Aluminium Association	**<Past efforts>** (1) Improved energy efficiency by improving energy-saving operations and processes (increased yield) (2) Recovered energy and achieved higher energy efficiency; promoted operations to improve productivity and yield (3) Performed energy conversion in melting furnaces, holding furnaces and annealing furnaces; introduced regenerative burners (4) Introduced energy-saving lighting (5) Promoted the proactive recycling of aluminum (globally) (6) Supported the adoption of aluminum to manufacture lightweight automobiles and railcars (domestically) **<Efforts in fiscal 2014>** (1) Retrofitted melting furnaces and holding furnaces and improved heat recovery efficiency levels (2) Renewed existing appliances to high-efficiency energy-saving appliances. (3) Introduced energy-saving lighting (4) Introduced inverter-controlled appliances

	(5) Achieved energy savings by reviewing and optimizing operation management, etc. (6) Enhanced measures for reduced use of compressed air, etc. **<Acquisition of environmental management and other international standards>** ・All 15 domestic business locations of the 10 participating companies have acquired ISO14001 certification.
Brewers Association of Japan	**<Past efforts>** (1) Power system ・Converted from heavy oil to city gas ・Replaced existing boilers with small high-efficiency once-through boilers ・Replaced existing freezers with high-efficiency ammonia freezers ・Introduced cogeneration equipment ・Introduced methane boilers ・Installed high-efficiency inverter-controlled electric motors ・Introduced solar power systems ・Utilized biogas ・Utilized waste cooking oil (2) Preparation phase ・Introduced a vapor recompressor to the wort boiling process. ・Introduced high-efficiency waste heat recovery ・Recovered waste heat from boiling ・Introduced a new boiling system ・Introduced thermal VRC ・Improved cleansing processes (3) Drainage treatment phase ・Introduced anaerobic waste water treatment equipment and biogas cogeneration systems / biogas boilers ・Utilized waste heat from effluents ・Reduced the power required for waste water treatment by saving water in plants (4) Promoted other energy-saving operations ・Continued energy-saving operations ・Reviewed sterilizing utilities ・Proactively utilized heat pumps ・Reviewed the unit control system (compressors, boilers) ・Visualized energy use by establishing an energy management system (to gain an understanding of daily energy use and display target consumption levels and indices) ・Renewed lighting equipment used in plants to energy-saving models ・Replaced conventional mercury lamps with LEDs (enabling electric power consumption reductions by 70% compared to existing mercury lamps) and replaced indoor lighting with LEDs **<Efforts made in fiscal 2014>** (1) Reviewed boiler equipment (2) Renewed air compressors
The Japanese Electric Wire & Cable Makers' Association	**<Past efforts>** (1) Efficient use of heat ・Implemented measures to improve the thermal insulation of furnaces ・Converted fuel sources; improved steam traps ・Enhanced the heat retention performance of steam piping. ・Improved combustion efficiency levels by installing regenerative burners. (2) Introduction of high-efficiency equipment ・Introduced elongated high-speed equipment. ・Introduced inverter-controlled motors and pumps ・Introduced inverter-controlled compressors and unit control ・Introduced energy-saving stranding machines (3) Efficient operation of electric power equipment ・Established efficient electric power systems through layout changes ・Efficiently operated electric power equipment by consolidating facilities ・Reduced unnecessary operations by installing automatic suspension functions

	・Consolidated and renewed transformers (4) Other ・Altered operational practices in clean rooms and air conditioning equipment ・Suspended appliance accessories during standby; replaced existing lighting with LEDs ・Visualized energy use ・Applied insulating paint to rooftops and exterior walls ・Applied thermal insulating films to windows ・Reduced the number of vending machines and replaced existing machines with energy-saving models **<Efforts made in fiscal 2014>** (1) Efficiently used heat (2) Introduced high-efficiency equipment (3) Efficiently operated electric power equipment, etc.
Japan Dairy Industry Association	**<Past efforts>** (1) Integrated and closed plants; renewed aged equipment (consolidation and intensity improvements) (2) Introduced high-efficiency lighting (LED) (3) Introduced energy-saving production facilities and converted fuel sources (introduced high efficiency transformers, sterilizer plates, heat exchangers, etc.) (4) Improved the energy efficiency of air conditioning equipment (5) Promoted environmental management (acquired ISO14001 certification and promoted relevant activities) (6) Streamlined logistics (Continued efforts to improve the loading ratio through integrated shipping and to reduce the number of operating vehicles by increasing the number of rounds) **<Efforts made in fiscal 2014>** (1) Renewed electric power receiving and distribution equipment (2) Renewed boilers and freezers (3) Introduced energy-saving manufacturing facilities (4) Installed LED lighting (5) Improved drainage equipment
Japan Copper and Brass Association	**<Past efforts>** (1) Consistently implemented energy-saving activities ・Company-wide environmental activities; measures to address air leakage, etc. (2) Consistently made energy-saving investments ・Installed LED lighting; renewed existing air conditioners to energy-saving models; installed heat insulation in heaters and preheating furnaces, etc. **<Efforts made in fiscal 2014>** (1) Conducted energy-saving activities in indirect sections (2) Introduced and renewed equipment and appliances (3) Managed controls and operations
Japan Bearing Industrial Association	**<Past efforts>** (1) Introduced high-efficiency inverter-controlled motors (2) Implemented measures against air leakage and depressurization of compressors (3) Converted fuels and utilized waste heat from thermal processing equipment (4) Introduced ice thermal storage-type air conditioning / GHP (5) Introduced high-efficiency lighting appliances (6) Turned off the lights when not in use **<Efforts made in fiscal 2014>** (1) Production equipment ・Introduced inverter control; introduced high-efficiency transformers; replaced existing equipment with high-efficiency models, etc. (2) Heat processing furnaces ・Enhanced heat insulation; optimized air to fuel ratios; converted fuel sources (to natural gas) (3) Air conditioning ・Reviewed temperature settings; renewed existing equipment to high-efficiency models; installed inverter-controlled cold and hot water pumps; converted fuel sources (to

	natural gas); adopted heat pump water heaters ・Conducted unit control, introduced inverter control, and improved air leakage (4) Lighting ・Introduced energy-saving fluorescent lights; adopted LED lights, introduced human detection sensors (5) Compressors ・Reviewed discharge pressures, installed inverter control, improved air leaks, etc. (6) Buildings ・Applied heat insulating paint and light-shielding film (7) Power sources ・Improved the efficiency of special high pressure transformers
Japan Sanitary Equipment Industry Association	**<Past efforts>** (1) Implemented measures promising large CO2 emission reductions, such as converting fuels in existing kilns **<Efforts made in fiscal 2014>** (1) Renewed transformers (2) Improved the heat retention of steam piping and shortened the piping route (3) Renewed compressors (4) Renewed boilers (5) Installed LED lighting (6) Renewed air conditioning equipment (7) Replaced hot water boilers with steam boilers (8) Updated existing equipment to high-efficiency casting machines
Japan Soft Drink Association	**<Past efforts>** (1) Conducted fuel conversion (2) Reduced electric power use by introducing anaerobic treatment equipment (3) Reduced boiler gas by reviewing steam lines (regular inspections and exchange of steam traps, heat retention in heat-using equipment, enhanced thermal insulation of steam piping valves, etc., drain steam recovery) (4) Switched from heat-shrink labels that require the steam heating of PET containers to roll labels that do not require steam heating (5) Improved production efficiency levels (shortened the time required for switching products, optimized the time required for cleansing, improved the efficiency of sterilizers, improved PET bottle filling performance) (6) Introduced renewable energy, including solar power systems (7) Reduced electric power consumption by air conditioning equipment by applying thermal insulation paint on the rooftops of plants (8) Reduced energy loss by electric power saving, heat retention and cold storage (9) Reduced radiation loss (recovered waste heat) (10) Switched to energy-saving lighting (renewed to LED lighting and made sure to turn lights off when not in use) (11) Introduced heat pump air conditioning systems (12) Promoted energy-saving operations based on ISO14001 management programs (13) Conducted regular inspections for air leakage (14) Reduced energy use for heating and cooling use by changing the flow volume of the circulating water in heat exchangers (15) Reduced energy use for heating by utilizing recovered hot water from the sterilization process of canned products **<Efforts made in fiscal 2014>** (1) Introduced energy-saving transformers (2) Renewed existing lighting to LEDs (3) Recycled heat exchanger water (reused hot waste water) (4) Switched to high-efficiency boilers (5) Installed solar power generation equipment (6) Replaced existing boilers with small high-efficiency once-through boilers (7) Introduced energy-saving dew removing processes (8) Converted to LNG (9) Renewal of aeration equipment for sewerage treatment (10) Shifted existing sewerage dryers to compressed-air models

	(11) Introduced energy-saving pumps (12) Renewed air conditioners, freezer and transformers (13) Integrated compressors (14) Installed inverter-controlled air compressors (15) Performed measures to reduce freezer load by utilizing well water cold energy (16) Retrofitted biomass boilers (17) Introduced heat recovery systems (18) Effectively used recovered drain water heat (19) Expanded the introduction of heat-insulated jackets (20) Renewed heat retention equipment of sterilizing devices **<3Rs and global warming countermeasures>** ・Developed lightweight PET containers and increased the in-house production rate of PET containers, thus reducing the energy used in transporting products ・Reduced environmental burden through bottle to bottle recycling practices of PET containers ・Used returnable glass bottles and maintained the bottle reuse system ・Reduced boiler combustion burden by hot waste water recovery and use ・Recovered and reused waste water ・Recovered waste transportation and fuel consumption through waste reduction ・Effectively used waste (waste tea leaves and coffee grounds) as fertilizer ・Used methane gas generated from fermented waste tea leaves as a heat source for boilers **<Efforts to utilize renewable energy>** ・Introduced solar power in manufacturing factories ・Installed solar power lighting and solar power emergency lights ・Stored snow for use in refrigeration and production processes ・Recovered and used methane gas by introducing industrial waste water treatment and anaerobic treatment equipment
Limestone Association of Japan	**<Past efforts>** (1) Reduced fuel (diesel) and electric power consumption ・Proactively introduced energy-saving heavy earthmoving machinery and plant equipment ・Conducted energy-saving operations ・Developed the face in a way that would reduce the number of benches, thus shorting the distance climbed by heavy equipment ・Strictly conducted inspections and improvements **<Efforts made in 2014>** (1) Replaced mercury lamps with LEDs (2) Renewed 1000kVA transformers (3) Renewed air conditioning equipment (4) Integrated power sources/ reduced transformer units (5) Introduced inverter-controlled dust collector fans (6) Renewed to energy-saving transformers (7) Improved BC efficiency through system improvements (8) Renewed screen to shorten operation time (9) Introduced eco-belts (10) Renewed heavy machinery <**Acquisition of environmental management and other international standards>** ・13 mines of the 20 mines covered by the Follow-up acquired ISO14001 certification
Japan Machine Tool Builders' Association	**<Past efforts and efforts made in fiscal 2014>** (1) Issued and revised the Environmental Operation Manual (2) Issued "Diagnoses of Environmental Performance" (3) Renewed air conditioning equipment installed in plants (4) Installed high-efficiency lighting (5) Renewed compressors
Flour Millers Association	**<Past Efforts>** (1) Consolidated factories and improved operational efficiency

	(2) Introduced cogeneration systems (3) Introduced high-efficiency motors, fans and transformers (4) Introduced high-efficiency blowers and rotation speed control devices (5) Introduced pressure optimization systems and unit control systems for compressors (6) Changed inverter control settings **<Efforts made in fiscal 2014>** (1) Renewed to high-efficiency motors (2) Renewed to energy-saving compressors (3) Introduced energy-saving lighting (4) Renewed to high-efficiency transformers (5) Renewed to high-efficiency fans (6) Improved the efficiency of blowers, etc. (7) Renewed corporate vehicles to eco-cars (8) Introduced demand monitoring systems (9) Installed photovoltaic panels
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	**<Past efforts>** **(**1) Promoted the streamlining and sophistication of production by promoting investment in automation equipment (2) Renewed existing equipment to energy-saving equipment (3) Introduced solar power systems, etc. **<Efforts made in fiscal 2014>** (1) Renewed existing lighting to energy-saving lighting, including LEDs (2) Renewed boiler equipment (3) Renewed power receiving equipment and transformers and improved operations (4) Renewed air conditioning equipment and improved operations (5) Renewed and introduced other equipment (introduced energy visualization systems, etc.) (6) Installed and operated solar power devices on factory premises and (7) Enhanced compressor management (unit control, downsizing, air leak checks, etc.) (8) Made sure that lights were turned off when not in use (9) Controlled peak power through operation process adjustments (10) Acquired ISO14001 certification (11) Promoted reuse and recycling by ensuring waste segregation (12) Engaged in environmental conservation activities in Japan and overseas (13) Participated in a offshore wind power project
Japan Industrial Vehicle Association	**<Past efforts>** (1) Improved production equipment and processes (2) Promoted conversion to low carbon emission intensity fuels (3) Renewed plant facilities (lighting, air conditioning, etc.) to energy saving models **<Efforts in fiscal 2014>** (1) Renewed energy-saving equipment, etc. (2) Renewed to LED lighting (3) Renewed air conditioning equipment (4) Improved exhaust heat (5) Converted fuel sources (6) Improved shot blasting operations (7) Applied insulating paint to factory rooftops

Japan Association of Rolling Stock Industries	**<Past efforts>** (1) Measures employing energy-saving equipment ・Introduced energy-saving production equipment ・Introduced solar power (smart grid pilot equipment) ・Expanded on introducing solar power; improved transformer efficiency (pilot equipment, aseismic reinforcement) ・Replaced existing lighting with LEDs (2) Measures employing high-efficiency equipment ・Renewed aged equipment (transformers, air conditioning equipment, lighting equipment, etc.) to high-efficiency equipment (3) Operational improvements ・Formulated Environment Vision 2020, which sets up a target for 2020, decided on a medium- to long-term plan to achieve it and implemented business location-specific target management ・Reduced CO2 emissions by improving productivity (ISO14001) ・Reduced the electric power, fuels, gas, water utility and chemical substances used ・Effectively used paper resources and reduced consumption volumes ・Reduced the amount of waste generated and improved recycling rates ・Strictly kept air conditioner cooling temperatures above 28°C and heating temperatures below 19°C; turned on the energy-saving mode on PCs; refrained from using personnel elevators ・Made sure to turn power sources off when not in use (3) Other ・Implemented a biannual energy-saving campaign ・Promoted rooftop greening ・Promoted a campaign to minimize energy loss (visualizing energy use status and reducing loss) ・Strictly engaged in energy-saving and power-saving activities at factories to achieve CO2 emission reduction targets **<Efforts made in fiscal 2014>** ・Introduced energy-saving equipment ・Expanded on introducing solar power; improved transformer efficiency (pilot equipment, aseismic reinforcement) ・Renewed transformers, air conditioners and lighting fixtures to high-efficiency models ・Promoted activities to minimize energy loss, including energy-saving patrols ・Improved air conditioning efficiency by installing air curtains and air circulators ・Strictly maintained preset air conditioner temperatures; operated automated power consumption monitoring and warning systems ・Communicated detailed guidelines on energy-saving practices to raise awareness among all employees
Japan Petroleum Development Association	**<Past efforts>** (1) Consolidated and streamlined inefficiency facilities (2) Introduced energy-saving equipment and appliances at production plants; streamlined systems (3) Improved the efficiency of operations (reduced self-consumption amounts of natural gas) (4) Effectively used unharnessed low-pressure gases (5) Conducted flaring of waste natural gas (6) Introduced environmental management systems (7) Implemented energy-saving measures at offices (8) Introduced natural gas vehicles (9) Introduced cogeneration (10) Introduced fuel cells at production plants **<Efforts made in fiscal 2014>** ・Constructed a solar power plant and engaged in a mega-solar project.

2. Energy Conversion Sector

Industry	Emission reduction efforts in domestic business operations
The Federation of Electric Power Companies of Japan	**<Past efforts>** (1) Enhanced use of non-fossil energy sources ・Utilized nuclear power with premised on ensured safety ・Utilized renewable energy (2) Improved the efficiency of electric power equipment ・Introduced high-efficiency thermal power plants (3) Provided energy-saving and CO2-reduction services ・Provided energy-saving and CO2-reducing services in the electric power retail sector **<Efforts made in fiscal 2014>** ・Reduced fossil fuel consumption by introducing hydropower ・Reduced fossil fuel consumption by taking measures to maintain heat efficiency levels at thermal power plants ・Provided energy-saving information; promoted the diffusion of energy-saving equipment **<Efforts to utilize renewable energy>** ・Developed hydro, geothermal, solar, wind and biomass power plants ・Introduced megasolar ・Utilized wind power ・Engaged in the development and introduction of new grid control systems to connect large volumes of fluctuating solar and wind power, whose output variability is largely affected by weather ・Performed mixed combustion of wood biomass at coal-fired thermal power plants
Petroleum Association of Japan	**<Past efforts>** (1) Efforts involving refinery and utility (steam and electric power) plants ・Advanced operational management supported by progress made in the development of control technologies and optimization technologies ・Enhanced mutual use of heat among different equipment and additionally installed equipment for waste heat and other waste energy recovery ・Improved efficiency levels through the appropriate maintenance and management of equipment ・Adopted high-efficiency devices and catalysts (2) Energy-saving measures drawing on subsidized projects on energy conservation **<Efforts made in fiscal 2014>** (1) Effective use of heat ・Installed heat exchangers, mutually used heat, recovered waste heat, etc. (2) Introduced high-performance control and high-efficiency appliances ・Installed heat pumps, cogeneration systems, high-efficiency power generating equipment, etc. and promoted computer control, etc. (3) Engine efficiency improvements ・Motorized engines, etc. (4) Significant improvements and advancements in processes ・Promoted hydrogen recovery, integrated different devices, consolidated boilers, fundamentally reduced the amount of steam used, etc. **<3Rs and global warming countermeasures>** ・Continued to engage in activities to reduce the volume of waste generated in business activities and formulated an industry-wide target “zero emissions of industrial waste” **<Efforts to utilize renewable energy>** ・Urged by the government, the petroleum industry achieved its voluntary target to introduce 210,000 kl-crude oil equivalent of biofuels in fiscal 2010. The industry ensures that it will endeavor to introduce 500,000 kl-crude oil equivalent of biofuels in fiscal 2017, as stipulated in the Act on Sophisticated Methods of Energy Supply Structures. **<Acquisition of environmental management and other international standards>** ・All refineries have acquired ISO14001 certification, or have established an

	environmental management system of equivalent standards. In recent years, with affiliated companies proactively introducing EMS, companies and corporate groups have been environmentally involved as company-wide or group-wide activities. ・In fiscal 2014, 146 business locations had acquired ISO14001 certification and 23 locations has established environment management systems.
The Japan Gas Association	**<Past efforts>** (1) Promoted various energy-saving measures at city gas manufacturing plants ・Introduced cogeneration ・Utilized cold energy from LNG, etc. - Reduced the amount of electric power purchased by manufacturing plants through the use of cold energy from LNG, etc. to generate power - Reduced the amount of electric power used in compressors by re-liquefying BOG - Utilized cold energy in freezers, etc.; installed high-efficiency equipment - Introduced high-efficiency LNG carburetors and salt water pumps - Reduced electric power loss by renewing special high-pressure power receiving and distribution equipment - Reduced electric power consumption by controlling the rotation speed of LNG cold insulation circulation pumps; optimized operations in accordance with demand - Increased power generation by ensuring maximum load (operational change to high- pressure lines) in top gas pressure recovery power generation plants - Utilized BOG as fuel for off-grid power generation equipment - Reduced electric power consumption by reducing BOG compressor discharge pressure - Reduced boiler fuel consumption by effectively utilizing the steam generated by off-grid power generation equipment - Reviewed methods for conducting test operations of return gas blowers while waiting for the arrival of vessels **<Efforts made in fiscal 2014>** (1) Used throttle discharge valves for sea water pumps (2) Reduced the use of SMV (3) Coated sea water pump impellers (4) Renewed air conditioning equipment on corporate premises (5) Controlled the generation of BOG during the construction of new LNG tanks (6) Installed inverter-controlled sea water pumps and introduced flow control at sea water users (7) Retrofitted expansion turbine power generation equipment (8) Reduced pump discharge and BOG by optimizing amounts kept cool in LNG pipelines (9) Changed the output pressure of steam accumulators (10) Reduced fuel consumption by changing operation procedures for heat fence equipment (suspension during summertime) (11) Conducted inverter-controlled operations of automated feed-water pumps (12) Replaced existing equipment with heating city gas boilers **<Efforts to utilize renewable energy>** ・Used electric power generated by solar and wind power systems installed on factory premises and micro-hydropower facilities installed in seawater discharge channels connected to LNG vaporizers. **<Acquisition of environmental management and other international standards>** ・In 1994, formulated and endeavored to follow the Environmental Action Guidelines, which aim for the wider diffusion of natural gas, which emits the least C02 of all fossil fuels. In the manufacturing sector, performed environmental management based on corporate standards to promote the reduction of environmental burden. ・Provided mainly small and medium-sized enterprises with support in acquiring ISO14001 certification and formulating environmental reports, seeking to boost the standards of the gas industry as a whole.

3. Commercial Sector

Industry	Emission reduction efforts in domestic business operations
Japan Chain Stores Association	**<Past efforts>** ・Member companies engaged in energy-saving practices by making the best efforts to introduce efficient appliances in new stores and promote the replacement existing appliances with efficient appliances in store renovations. **<Efforts made in fiscal 2014>** ・Replaced fluorescent lighting to LED at 19 stores, saving 2,679,694kWh of electric power consumption. ・Switched to LED lighting at 29 stores, saving 1,610,986kWh electric power consumption. ・Introduced LED at 76 stores, saving 8,810,721kWh of electric power consumption. ・Introduced inverters at 41 stores and reduced 320t-CO2 emissions. ・Renewed heat sources and air conditioning equipment at 9 stores, saving approximately 4,000,000kWh of electric power. ・Introduced CO2 Refrigeration and Freezing Systems in a total of 3 stores - one store in fiscal 2013, in 2 stores in fiscal 2014, collectively reducing CO2 emissions by an estimate of approximately 210t-CO2/year. ・Introduced CO2 as a refrigerant in new store to open in 2014, reducing CO2 emissions by 344.5 t-CO2. ・Introduced automated control devices for air conditioners at 35 stores, saving approximately 2,000,000kWh power consumption. ・Introduced BEMS in fiscal 2013 (as of the end of fiscal 2014: 83 stores). In 2014, reduced electric power consumption by 5% relative to previous year.
Japan LP Gas Association	**<Past efforts>** (1) Established an Environmental Committee to manage performance, consider energy-saving measures and exchange information (2) Promoted the consolidation of terminals **<Efforts made in fiscal 2014>** (1) Renewed air compressors (2) Renewed transformers (3) Put solar power systems in operation (4) Introduced high-efficiency equipment, including LED lighting
The Real Estate Companies Association of Japan	**<Past efforts>** (1) Environmental performance of newly built office buildings ・Reduced heat load in buildings (enhanced thermal insulation, installed high thermal insulation glass and sashes, installed louvers and canopies, introduced double-skin facades, used blinds to control sunlight, etc.) ・Proactively utilized natural energy (daylighting, natural ventilation, solar power and heat, rainwater, etc.) ・Proactively engaged in greening (greening premises, rooftops, walls, etc.) ・Introduced cogeneration systems ・Introduced high-efficiency heat sources and transmission equipment (free cooling controller, unit control of pumps, variable flow volume control, heat recovery heat pumps, thermal storage systems, ventilation and water supply systems driven by temperature difference, renewal of all heat exchanger units) ・Introduced high-efficiency ACHV systems (variable air volume fan control, outdoor cooling systems, detailed HVAC zoning systems, automatic CO2-based outdoor air control systems, radiation air conditioning systems, desiccant air conditioning systems, etc.) ・Introduced high-efficiency lighting equipment (LED, high-frequency fluorescent lighting, light dimmer control systems, lighting control, task-ambient lighting, human detection sensors, increased number of brightness levels) ・Introduced high-efficiency power receiving and transforming equipment and systems (renewal of equipment, demand-based control system, automatic power factor controller) ・Introduced high-efficiency elevators and escalators (inverter-controlled elevators, group control systems, human detection sensor-controlled escalators)

	・ Introduced high-efficiency water heaters, water supply methods, water-saving appliances, water-saving automatic faucets, automatic cleaning equipment) ・Introduced high-efficiency energy management and control systems (BEMS) ・Promoted long-life design (building design with consideration for future energy-saving retrofits, openness to alterations and improvements, measures against the degradation of building frames) ・Selected construction material accommodating considerations of the reduction of HFCs and air conditioning systems, etc. (2) Environmental performance of newly built condominiums ・Installed high thermal insulation facades and double-pane windows -Achieved energy-saving standards by enhancing the thermal insulation performance of condominium facades and window panes, thus reducing the amount of energy consumed by heating and cooling ・Introduced high-efficiency water heaters -Reduced the amount of energy consumed by water heating by introducing high-efficiency water heaters, including latent heat recovery type instantaneous gas water heaters and electric heat pump water heaters ・Introduced hot water-saving and water-saving equipment -Reduced the amount of primary energy consumed by water heating by introducing water-saving equipment, including water-saving shower heads. Also, reduced energy consumption at water supply and sewage facilities by installing water-saving toilets and faucets and utilizing rainwater and well water ・Introduced high-efficiency lighting -Reduced the amount of energy consumed by lighting by introducing high-efficiency lighting, including LED lighting and high-frequency fluorescent lighting, in private and communal areas (corridors, etc.) ・Considered the utilization of renewable energy -Considered the utilization of solar panels, solar thermal systems, and other renewable energy in development districts ・Improved living environments by introducing passive methods -Engaged in efforts to enhance energy savings and energy self-dependency levels by introducing passive methods, including taking in sunlight and wind from outdoors ・Extended the lifetime of products -Used building frames, material, equipment and appliances, etc. and applied water supply and drain piping layouts that can accommodate future retrofits ・Addressed next-generation vehicles -Considered the establishment of electric power charging stations and other equipment to accommodate next-generation vehicles, including electric vehicles and plug-in hybrid automobiles (3) Energy consumption in buildings used for business operations ・Altered work fashion by introducing Cool Biz and Warm Biz ・Introduced energy-saving appliances - Introduced desk lamps and energy-saving PC models, etc. ・Implemented energy-saving measures in daily business operations - Promoted daily energy-saving actions (presetting appropriate room temperatures and brightness, promoting water conservation, turning off the lights and controlling air conditioning when not in room - Considered improvements based on energy consumption measurements - Implemented in-house environmental education activities - Supported employees' energy-saving activities - Provided employees with information (knowhow and information on energy-saving activities), etc. **<Effort made in fiscal 2014>** (1) Renewed air conditioning equipment (2) Introduced air conditioning systems using outdoor air (3) Introduced LED lighting (4) Controlled WC lighting using human sensors

	(5) Renewed WC exhaust fans (6) Introduced water-saving toilets (7) Renewed to energy-saving elevators and escalators
The Life Insurance Association of Japan	**<Past efforts>** (1) Reduced electric power consumption by conducting power saving campaigns and introducing energy saving appliances, etc. (2) Utilized other energy consumption (3) Improved the utilization rate of recycled paper (4) Reused resources by strictly segregating and recovering waste (5) Raised awareness of environmental issues among corporate executives through in-house education programs (6) Further promoted environmental activities by sharing good practices among member companies (7) Communicated the status of efforts to address environmental issues made by the life insurance industry and member companies on the Association website. **<Efforts made in fiscal 2014>** (1) Saved electric power by adopting Cool Biz and Warm Biz dress codes, ensured lights are turned off, introduced energy-saving appliances and equipment, shortened cooling and heating hours, operated limited number of elevators during the daytime in summer, encouraged employees to leave the office early to go home, etc. (2) Reduced paper use (3) Promoted environmental conservation activities by formulating environmental policies and green procurement standards (4) Utilized solar and wind power generation.
Telecommunications Carriers Association	**<Past efforts>** (1) Introduced energy saving equipment and technologies ・Introduced high energy-saving performance ICT devices in line with the guidelines formulated by the Council for Ecology Guidelines for ICT ・Promoted energy savings by connecting IP devices, such as servers and routers, to direct current power supply systems ・Introduced high energy efficiency power units and promoted energy saving measures (suspended telecommunication power units operating for prolonged periods and inverters with no load connection) ・Introduced high-efficiency air conditioning equipment, removed air conditioning from wireless base stations; promoted energy-saving measures for air conditioning equipment (heat retention in steam piping, cold water pump exchange, air conditioning fan motor exchange, etc.) (2) Introduction of natural energy ・Introduced clean energy systems, including solar and wind power systems ・Newly introduced fuel cell equipment at various locations (3) Research and development in energy saving and clean energy fields ・Developed technologies to save the energy consumed by telecommunication equipment, including telecommunication devices and air conditioning equipment ・Reduced electric power use by achieving higher network efficiency by sharing optical cables and multiplexing ・Reduced ICT resources on local servers by using cloud technologies and virtualization technologies (4) Measures to reduce electric power use in offices ・Promoted environmental activities by expanding and renewing ISO14001certification acquisition (energy saving activities at business locations and offices) ・Promoted energy management in company-owned buildings ・Promoted the visualization of the amount of electric power used in offices ・Reduced electric power consumption related to air conditioning by implementing the Cool Biz and Warm Biz campaigns ・Applied insulation films to window glasses ・Introduced energy-saving fluorescent lamps and LED lighting; reduced the amount of electric power used for illumination by controlling the hours of use (5) Measures to reduce emissions from logistics

	・Practiced “eco-drive” on corporate vehicles and promoted the introduction of low-pollution vehicles ・Promoted a modal shift through the unified management of logistics **<Efforts made in fiscal 2014>** (1) Comprehensive electric power consumption reduction campaign (member company A) ・Introduced high energy-saving performance ICT devices in line with the guidelines formulated by the Council for Ecology Guidelines for ICT ・Promoted energy management in buildings owned by the corporate group ・Introduced high energy efficiency electric power equipment and air conditioning equipment ・Promoted energy savings by connecting IP devices, such as servers and routers, to direct current power supply systems ・Established and operated “green data centers” using state-of-the-art energy saving technologies ・Offered electric power consulting services to identify points requiring operational improvements based on data analysis ・Introduced clean energy systems, including solar and wind power systems (2) Good practices in implementing energy saving measures (member company B) ・Energy saving measures for fixed-line telecommunication operators - Slimmed down fixed-line telecommunications networks - Conducted energy saving construction work (introduced automatic heat source control, introduced cooling with outside air, etc.) - Implemented energy-saving measures in telecommunications shelters and data centers (altered refrigerator cooling water temperatures, suspended telecommunication power units operating for prolonged periods and inverters with no load connection, etc.) ・Measures targeted at mobile communications operators - Removed air conditioning from wireless base stations - Extended the life of base station batteries to 24 hours ・Initiated solar power businesses **<3Rs and global warming countermeasures>** (1) Reduce - Promoted the reduced use of paper by employing Internet billing services (2) Reuse - Reused resources by promoting the reuse of commercial equipment and implementing a mobile phone trade-in program (3) Recycle - Promoted the recycling of telecommunication equipment - Promoted the recycling of telecommunication equipment. With the cooperation of relevant companies, launched the Mobile Recycle Network to collect mobile phones and PHS bodies, batteries and battery chargers at 10,000 mobile phone stores across Japan to be recycled and for the recovery of rare metals, thus achieving almost a recycling rate of almost 100% **<Efforts to utilize renewable energy>** ・Promoted the introduction of power generation systems using solar and other natural energy sources ・Some companies implemented solar power project (total power generated: 14,403MWh) ・Installed solar panels with a capacity of 10,000KWh/year at the network center. **<Acquisition of environmental management and other international standards>** ・Acquired ISO14001 certification and engaged in the reduction of electric power consumption at communication facilities ・Optimized the temperature settings of air conditioning equipment. Proactively adopted top-runner energy-saving equipment.
Japan Franchise Association	**<Efforts made in fiscal 2014>** (1) Lighting ・Renewed store lighting to LEDs.

	・Used LED lights in advertising displays (2) Air conditioning ・Reduced the outdoor air intake of air conditioning equipment ・Introduced inverter-controlled compressors (3) Equipment ・Renewed air conditioning / refrigerating and freezing equipment ・Introduced inverter-controlled freezers for refrigerating ・Removed conventional ovens; renewed fryer equipment ・Sprinkler systems for refrigerators and freezers (4) Buildings ・Introduced solar power systems ・Introduced 99.99% light-shielding retractable screens
Japan Department Stores Association	**<Efforts made in fiscal 2014>** (1) Proactively replaced existing lighting with LEDs; made sure to turn off lights not in use; removed unnecessary lighting (2) Renewed equipment (introduced inverter-controlled air conditioning equipment, introduced high-efficiency equipment, outdoor air intake, etc.); reviewed operations of equipment; changed temperature settings of cooling and heating systems (3) Reduced the number of elevators used; introduced light-shielding film for window panes
Japan Association of Refrigerated Warehouses	**<Past efforts>** (1) Replaced and introduced energy-saving equipment and technologies ・Introduced high-efficiency transformers ・Introduced high-efficiency compressors ・Introduced devices to block outside air ・Introduced energy-saving lighting equipment ・Introduced closed decks ・Increased the use of thermal insulating material (2) Prevented wasteful use through daily maintenance ・Maintained appropriate temperatures for stored products ・Encouraged the cleansing of condensers ・Prevented cool air leakage from insulated doors (3) Utilized energy-saving manuals; formulated management standards and managed energy consumption **<Efforts made in fiscal 2014>** (1) Renewed existing lighting with LEDs (2) Adopted high-efficiency freezers (3) Replaced shipping vehicles: EV =>PL
Japan Foreign Trade Council, Inc.	**<Past efforts>** (1) Introduced energy-saving equipment, etc. ・Introduced energy-saving OA appliances, air conditioning equipment, LED lighting, thermal insulation films for windows, etc. (2) Ensured energy management ・Activated the power-save mode on PCs and copying machines; managed air conditioning temperature settings and hours; turned off the lights during lunch hour (3) Promoted educational activities ・Encouraged that lights be turned off when not in use; encouraged that the power-save mode be activated on PCs; encouraged that office appliances be turned off or plugged out when not in use; conducted environmental campaigns; hosted environmental seminars; conducted environmental e-learning, etc. **<Effort made in fiscal 2014>** (1) Introduced energy-saving equipment ・Moved corporate headquarters to buildings fully furnished with energy-saving equipment; introduced LED lighting; turned on the energy-saving mode of toilet seats; changed fan operation hours; replaced complex machines with energy-saving models. (2) Ensured energy management ・Made sure that the the last person to leave the office turned off the lights, air

	conditioner and PCs. ・Implemented measures to streamline energy use (preset room temperatures, managed the air conditioning running time, partially turned off the lights in shared spaces, implemented the Cool Biz campaign) ・Strictly managed the temperature settings of air conditioners (introduced remote control programs) ・Dimmed the lighting in work spaces, removed unnecessary lighting, turned off the lights during lunch hour, etc. (3) Promoted educational activities ・Prohibited employees from working during midnight hours; tested early morning commuting ・Posted "Switch off after use" on electrical appliances ・Promoted the Cool Biz, Warm Biz and Casual Every Day campaigns, etc.
The General Insurance Association of Japan	**<Past efforts>** (1) Developed products and services that support efforts toward a low carbon society (2) Reduced the paper use by adopting online insurance clauses and policies and employing tablets (3) Promoted the introduction of high-efficiency lighting and advanced equipment (4) Reduced energy use, including electric power use, by working shorter hours (5) Collaborated with stakeholders, including affiliates, nonlife insurance agents and NPOs, to encourage environment-friendly actions and reduce environmental burden (6) Conducted in-house education for a better understanding of the status of global environmental issues **<Efforts made in fiscal 2014>** (1) Air conditioning ・Renewed air conditioning equipment ・Replaced existing air conditioning equipment with high-efficiency air conditioning equipment (2) Lighting ・Replaced existing lighting equipment with high-efficiency lighting equipment (3) Other ・Renewed elevators and introduced inverter control ・Replaced existing power receiving equipment with high-efficiency models ・Renewed air conditioning equipment and freezers
Japanese Bankers Association	**<Past efforts>** (1) Efficient use of resources ・Promoted paperless offices ・Reduced electric power consumption by promoting energy-savings (2) Establishment of a recycling-based society ・Promoted the use of recycled paper for envelopes used for in-house correspondences, memo pads, business cards, copy paper ・Conducted the segregated collection of used paper (3) Education and awareness-raising ・Promoted in-house education programs ・Conducted lectures on environmental issues for member banks (4) Social contribution programs (5) Development of new services in response to increased environmental consciousness among customers (6) Provision of environmental information to customers **<Efforts made in fiscal 2014>** (1) Renewed aged air conditioning equipment; renewed lighting and air conditioning equipment (2) Renewed air conditioning equipment; renewed lighting and air conditioning equipment (3) Renewed freezers; performed retrofits to accommodate energy-saving technologies (4) Integrated central monitoring devices in buildings; retrofitted thermal insulation (5) Introduced LED lighting; renewed lighting equipment (6) Introduced solar power systems

	(7) Renewed electric power equipment; introduced BEMS (8) Introduced gas heat pump equipment (9) Intermittently operated air conditioners (10) Introduced demand-side equipment; introduced automated ventilation systems
Japan Securities Dealers Association	**<Past efforts>** (1) Engaged in efforts through the securities business ・Developed and provided financial products promoting investment in environment-friendly companies (2) Took measures against global warming ・Promoted paperless transactions, saved electric power, introduced power-saving electric appliances (3) Contributed to establishing a recycle-based society (4) Environmental protection activities (5) Outreach and in-house education programs **<Efforts made in fiscal 2014>** (1) Strictly managed and optimized air conditioning equipment (2) Implemented the Cool Biz and Warm Biz campaigns (3) Shortened and controlled the running hours of air conditioning equipment, performed regular maintenance (4) Replaced existing equipment with energy-saving equipment (5) Removed unnecessary lighting, turned off the lights before leaving the offices and when not in use, reduced stand-by power (6) Replaced existing equipment with energy-saving office equipment and LED lighting (7) Moved head offices to energy-efficient buildings; integrated office space

4. Transportation Sector

Industry	Emission reduction efforts in domestic business operations
The Scheduled Airlines Association of Japan	**<Past efforts>** (1) Renewed existing aircrafts to new models with higher fuel efficiency and promoted the introduction of new models (2) Improved aircraft performance through retrofits and improved fuel efficiency levels (3) Introduced new air traffic control systems, etc. in order to shorten flight paths and duration and improve navigation performance (4) Introduced Continuous Descent Operations (CDO) for higher fuel efficiency (5) Improved fuel efficiency by managing daily flights at optimum cruise altitudes and the best range speed, using simulators to reduce the time required for real aircraft training and evaluations, reducing the time required for engine tests, improving fuel efficiency through regular engine water washes **<Efforts made in fiscal 2014>** (1) Continued renewal to high efficiency equipment (reduced CO2 emissions by 20% relevant to conventional aircraft models)
The Japanese Shipowners' Association	**<Efforts made in fiscal 2014>** (1) Introduced high-efficient waste energy recovery systems to reduce CO2 emissions (2) Retrofitted container ships in service to optimal hull shapes for energy-saving operations (3) Installed hybrid electric power supply systems (4) Installed waste gas dust removal devices (5) Performed a long-term experiment to test variable turbine nozzle-type superchargers on real vessels (6) Periodically cleaned and painted ship bodies and polished propellers for improved propulsive efficiency (7) Improved fuel valves and exhaust valves in order to improve the fuel efficiency of the main engine (8) Used combustion improvers (9) Extended the hours of use and reduced consumption amounts by properly managing lubricating oil

	(10) Thoroughly performed maintenance of main engines and auxiliary machines as well as the cleansing and maintenance of exhaust gas economizers (11) Monitored combustion status using an engine performance analysis system (12) Selected optimal nozzle rings for superchargers (13) Implemented energy-saving measures, including turning off unnecessary pumps of vessels in harbor, galley fans during non-cooking hours, and the lights in unoccupied rooms (14) Optimized the amount of fuel oil and ballast water retained on board a vessel
Japan Trucking Association	**<Past efforts>** (1) Promoted measures to encourage “eco-drive” (2) Ensured that drivers refrained from idling (3) Promoted the introduction of low-emission vehicles (4) Promoted measures to replace existing vehicles with those conforming to the most recent regulations. (5) Took measures to reduce gas emissions (6) Took measures to improve transportation efficiency (7) Promoted environmental outreach (8) Engaged in petitions, etc. **<Efforts made in fiscal 2014>** (1) Provided subsidies for the introduction of low-emission vehicles (subsidies were granted for 1,012 vehicles in fiscal 2014) (2) Provided subsidies for the introduction of air heaters and other devices to support efforts to refrain from idling (subsidies granted for air heaters: 490; subsidies granted for battery-run air conditioning devices: 308) (3) Provided subsidies for the introduction of EMS (eco-drive management system) and drive recorder equipment (14,574 drive recorders)
Japan Federation of Coastal Shipping Associations	**<Past efforts>** (1) Equipment-related measures ・Adopted larger hulls ・Introduced new models ・Adopted energy-saving ship configurations, devices and equipment (2) Operational measures ・Improved transport efficiency ・Performed energy-saving diagnosis for each individual ship ・Selected transport routes **<Efforts made in fiscal 2014>** (1) Introduced equipment with improved propulsive efficiency (hulls, propellers, etc.) (2) Introduced low-friction coating (3) Introduced LED lighting
The Association of Japanese Private Railways	**<Past efforts>** (1) Promoted the introduction of energy-saving railcars upon renewal or new purchases (2) Adopted driving methods that require less electric power consumption and appropriately operated train services in accordance with transportation demand (3) Eliminated unnecessary lighting on trains and replaced existing lighting equipment with LEDs **<Efforts made in fiscal 2014>** (1) Continued to promote the introduction of energy-saving railcars
All Japan Freight Forwarders Association	**<Past efforts>** (1) Enhanced and expanded off-rail stations (ORS), beginning with the establishment of Hanyu ORS (2) Supported the introduction of low-emission vehicles (vehicles conforming to emission standards, CNG vehicles) (3) Promoted replacement with larger vehicles **<Efforts made in fiscal 2014>** (1) Implemented the Green Logistics Promotion Subsidies Program ・Units introduced: 24 31ft containerships, etc.; 15 conforming vehicles ・Estimated investments: approximately 2,900 million yen (containerships, etc.: 900 million yen; conforming vehicles: 2,000 million yen)

〔Attachment 3〕

Examples of cooperative efforts among participating industries

1. Industrial Sector

Industry	Examples of cooperative efforts among interested parties
The Japan Iron and Steel Federation	(1)LCA–based efforts ・Iron and steel manufacturers have proactively promoted the development of high-performance products characterized by their light weight, high efficiency, long life, etc. These products contribute to energy savings at the end-use phase in society, for example, when they are used in automobiles. Renewed the "Study on contribution of steel products to energy savings in society from LCA viewpoint" which is a compilation of CO2 emission reductions at the use phase of iron material and estimated the emission reductions achieved as of fiscal 2014. The CO2 emission reductions achieved by high-performance iron material as of fiscal 2014 (fiscal 1990-2014; total of domestic and overseas reductions) were estimated to be 26.66 million t-CO2. (2) Contribution through by-products ・Replaced common cement (Portland cement), generating CO2 during the raw material calcination process, with blast furnace slag which does not require calcination, thus largely contributing to CO2 emission reduction. Emissions avoided as a result of replacement with slag is estimated to be 10.88 million t-CO2. (3) Efforts leading to public campaigns ・Implemented energy-saving activities through environmental household account books. Enhanced efforts taken in member companies, including "outreach targeted at all employees including those of group companies" and "developing an Intranet-based environmental household account book system." Approximately 18,000 households cooperated in efforts in fiscal 2014.
Japan Chemical Industry Association	(1) Performance in fiscal 2014 ・Promoted the development and dissemination of chemical products and technologies and contributed to society-wide CO2 emission reductions through the supply chain. ・Published a supplementary document for the international guidelines for calculating the avoided GHG emissions possible by chemical products published in 2013 (March 2015). Promoted the utilization of the guidelines. ・Estimated avoided CO2 emissions through products operating in fiscal 2014 were: 2.93 million tons through solar power systems; 1.23 million tons through high fuel efficiency tires; 3.28 million tons through LED light bulbs (estimated based on a comparison with reference products) (2) Contribution through low-carbon products and services ・Contributed to domestic CO2 emission reduction through a total of 74 low-carbon products, including housing-related material, automobile-related material and household appliance-related material.
Japan Paper Association	(1) Contribution through low-carbon products and services ・Promoted CO2 emission reductions by engaging in efforts to develop lightweight and thin cardboard from an lifecycle perspective beginning from the manufacturing phase at factories through to the recovery and recycling phase. Reduced the average weight of a unit area of paper by approximately 7.1% by disseminating lightweight base paper with the same performance and intensity but weighing 25% of conventional paper. (2) Efforts leading to public campaigns ・Used environmental household accounts to check the status of electricity, gas and water use in each household, thus raising public awareness regarding energy-saving. (3) Efforts to foster and conserve forest sinks ・Set up a target to increase domestic and overseas afforestation area in possession or management by a total of 425,000 ha in fiscal 2020 from 1990 levels to 700,000 ha. Performance up to fiscal 2014 was 626,000 ha (including overseas efforts).
Japan Cement Association	(1) Performance in fiscal 2014 ・Conducted research and outreach activities, including joint research and opinion

	exchange, to “reduce emissions by improving the fuel efficiency of heavyweight vehicles on concrete pavement.” ・Accepted waste and byproducts generated in other industries for utilization in cement production to “contribute to the establishment of a Sound Material-Cycle Society”. (2) Contribution through low-carbon products and services ・Collaborated with related industries (cement users) to promote measures to address the heat island phenomenon, build high-insulation housing, extend the life time of buildings, reduce the energy used in construction, etc. (3) Efforts leading to public campaigns ・Supported local environmental education and implemented environmental outreach activities in areas around business locations. (4) Efforts to foster and conserve forest sinks ・Efforts taken by member companies include greening of remaining walls of limestone quarries, forest conservation activities in water source areas of water used at plants, acquired forest certification at company-owned forests, etc.
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention	(1) Efforts made in fiscal 2014 ・In fiscal 2014, new installations and shipped products contributed to CO2 emission reductions amounting to an estimate of 3.69 million tons in power generation, 1.13 million tons in household appliances, 1.09 million tons in ICT products and solutions. ・New installations and shipped products in fiscal 2014 are projected to make lifecycle-based contributions amounting to CO2 emission reductions of 84.43 million tons in power generation, 14.25 million tons in household appliances and 5.43 million tons in ICT products and solutions. (2) Contribution through low-carbon products and services ・Contributed to the prevention of global warming and the achievement of a low-carbon society from both energy supply and demand perspectives by providing low-carbon energy-saving products and services to the domestic energy conversion and residential and commercial sectors. ・Formulated methodology to calculate avoided CO2 emissions from major products and services. Based on this method, calculated and disclosed the total avoided CO2 emissions across the industry. ・Estimated the avoided emissions attributable to semiconductors and electronic parts, as examples of products included in the calculations. (3) Efforts leading to public campaigns ・Formulated the annual “Unified Agenda for All Electrical and Electronics Organizations” and engaged in efforts to save electric power in offices and the homes of employees. (4) Efforts to foster and conserve forest sinks ・Conducted green space and Satoyama conservation and tropical forest restoration activities at domestic and overseas locations (5) Future efforts ・Announce the emissions avoided every fiscal year. Update calculation methodology as required.
Japan Federation of Construction Contractors	(1) Performance in 2014 ・Implemented surveys on “figures used in the Energy Saving Plan,” ”the status of progress with the Comprehensive Assessment System for Built Environment Efficiency (CASBEE)” and “the figures used in the CASBEE assessment.” Calculated CO2 emission reductions from operations in fiscal 2013 to be 255,000 tons. ・Collaborated with the contractees, The Real Estate Companies Association of Japan and the Japan Building Owners and Managers Association, under the Environmental Measures Research Group to conduct various activities. ・Submitted opinions regarding MLIT’s ministerial ordinances ・Participated in the Low Carbon Promotion Conference with a membership of 18 construction-related organizations (2) Contribution through low-carbon products and services ・Enhanced the introduction of renewable energy and designed, operated and constructed equipment and systems, etc. leading to highly efficiency energy use. (3) Efforts leading to public campaigns ・Participated in Eco Products 2014 (December 2014 in Tokyo)

	(4) Efforts to foster and conserve forest sinks ・Conducted afforestation and biodiversity conservation projects at branch offices and business locations of member companies ・Proposed and implemented biodiversity conservation methods that consider achieving CO2 emission reductions at the planning stage or construction stage (5) Future efforts ・Expand efforts to reduce CO2 emission in the building use phase ・Continue environmental outreach and education efforts, including participation in Eco-Products 2015
Japan Automobile Manufacturers Association, Inc. Japan Auto-Body Industries Association, Inc.	(1) Contribution through low-carbon products and services ・Engaged in inter-industrial collaboration to develop and introduce innovative technologies in raw material, parts, equipment and manufacturing methods in order to promote the decarbonization of products and services, thus contributing to the reduction of CO2 emissions in the transportation sector by improving the fuel efficiency of new vehicles and disseminating next-generation vehicles. (2) Efforts leading to public campaigns ・Engaged in educational and outreach efforts, including a Cool Biz dress code, eco-commuting, no idling, environmental management training, and promoted the use of environmental household account books. (3) Efforts to develop and conserve forest sinks ・Engaged in afforestation and forest management activities, conservation efforts for native river species, and efforts to conserve biodiversity
Japan Auto Parts Industries Association	(1) Performance in 2014 ・Encouraged energy-saving efforts by member companies by hosting seminars and visits and introducing good practices on the website. ・Conducted research on methods to quantify avoided CO2 emissions. (2) Contribution through low-carbon products and services ・Shared the energy-saving technologies accumulated by member companies and management knowhow to promote net CO2 emission reductions from the product lifecycle. ・Promoted the designing of products with consideration for LCA. Established a framework to address CO2 emission reductions in the entire supply chain. (3) Efforts leading to public campaigns ・Joined hands with administrative and educational bodies and implanted environmental education programs welcoming the participation of employees and their families
Japan Federation of Housing Organizations	(1) Efforts made in fiscal 2014 ・Given the importance of reducing CO2 emissions from the entire product lifecycle when reducing CO2 emissions from housing, particularly promoted the dissemination of highly insulated airtight housing, and the adoption of power generation equipment, including solar power systems, and high-efficiency appliances in order to contribute to the reduction of CO2 emissions during the “end-use phase” when emissions are largest. (2) Contribution through low-carbon products and services ・Developed and disseminated “net zero energy houses” and “lifecycle carbon minus housing” (3) Efforts leading to public campaigns ・Compiled and distributed environmental education booklets “Let’s live in an energy-efficient home” and “Reasons why you should live in an energy-efficient home” ・Hosts the Housing Month Central Event every October on themes related to energy efficiency (4) Efforts to foster and conserve forest sinks ・Performed tree planting and siliviculture efforts in Japan and overseas. By planting a certain number of trees in the gardens of each house constructed, some companies have planted over 10 million trees. (5) Future efforts ・Participate in Housing Month Central Event 2015

Japan Mining Industry Association	(1) Performance in fiscal 2014 ・Promoted the construction and utilization of renewable energy power plants, including hydropower and solar power. Generated 40 million kWh/year in fiscal 2014 (19,700 t-CO2 equivalent) (2) Contribution through low-carbon products and services ・Provided material, parts and services supporting the energy-saving performance of automobiles and household appliances ・Promoted and disseminated lead storage batteries that contribute to the stabilization and smoothing of output of solar power ・Harnessed exploration technologies to develop geothermal power and supplied steam and electric power. Member companies are involved in geothermal power generation in four locations amounting to a total of 15,450 kW. ・Promoted the streamlining of transportation means, including shifting from truck transportation to more efficiency surface transportation. (3) Efforts leading to public campaigns ・Promoted information sharing and opinion exchange among member companies by hosting regular meetings ・Conducted outreach activities, including hosting environmental workshops for children and their parents, publishing articles in in-house newsletters, engaging in beautification efforts and hosting factory visits. ・Contributed to the local society. For example, reduced CO2 emissions and stimulated local forestry by replacing part of the coal used as fuel and as a reducing agent with local wood pellets (4) Efforts to develop and conserve forest sinks ・Managed corporate forests; performed restoration, afforestation and greening old mining sites
Lime Manufacture Association	(1) Contribution through low-carbon products and services ・Reduced CO2 by expanding the use of high reactivity hydrated lime (reduced the energy required for manufacturing and transportation by reducing the hydrated lime use by 40%) ・Reduced CO2 by replacing limestone with calcined lime in the iron and steel industry ・Promoted modal shift (shifted from truck transport to marine transport) (2) Efforts leading to public campaigns ・Compiled a pamphlet on ways to use limestone in 2006. Compiled “The Limestone Industry: Environmental Efforts” from 2007 to 2013 to deepen public understanding about limestone. ・Hosted visits to plants and quarries for local residents. ・Engaged in outreach activities through proactive participation in prefectural and regional industrial expositions. ・Engaged in outreach activities related to efforts to reduce CO2 emissions. (3) Efforts to foster and conserve forest sinks ・Participated in forest conservation activities ・Provided funding for forest management
The Japan Rubber Manufacturers Association	(1) Performance in 2014 ・Reduced CO2 emissions through efforts made during the procurement, production, use and disposal phases. (2) Contribution through low-carbon products and services ・Under the tire labeling program initiated in January 2010, implemented a rating program for two features (rolling resistance and wet grip ratings) and presented ratings in a user-friendly manner ・From an LCA perspective, made improvements in the performance of tires and non-tire products. (3) Efforts leading to public campaigns ・Conducted activities serving to reduce CO2 emissions in the fields of local activity, forest planting and conversation, environmental education and funding. (4) Efforts to foster and conserve forest sinks ・Conduced 64 undertakings, including planted trees and distributing seedlings

The Federation of Pharmaceutical Manufacturers' Associations of Japan	(1) Efforts made in fiscal 2014 ・reduce CO2 emissions from commercial vehicles. (2) Contribution through low-carbon products and services ・Substantially reduced the use of alternative fluorocarbons (HFC), a greenhouse gas (3) Efforts to foster and conserve forest sinks ・Six companies planted 2.8ha of forest; seven companies fostered and conserved 139ha of forest by participating in forest development activities led by local (4) Efforts leading to public campaigns ・Promoted energy savings at home by introducing an in-house "eco-point" program
Flat Glass Manufacturers Association of Japan	(1) Reduction potential and performance in 2013 ・Conducted LCA of Eco-glass (multi-layered low-e glass that fulfills next-generation energy efficiency standards). The increased GHG emissions during production can be recovered in a short period of time due to reductions in air conditioning load. (2) Contribution through low-carbon products and services ・The estimated dissemination rate of multi-layered glass (in terms of glass area coverage) in new housing in fiscal 2013 was: 96.1% in stand-alone housing units and 73.2% in collective housing units. Reduced 262,000t-CO2 annually. ・Developed products that do not require scaffolding in order to promote the wider use of Eco-glass in office buildings/ (3) Efforts leading to public campaigns ・Conducted a campaign to disseminate Eco-Glass among general consumers (used travelling hands-on displays, established a logo mark, opened a special website, conducted outreach via various media) (4) Efforts to foster and conserve forest sinks ・Proactively used paper manufactured from forest thinnings ・Replaced wooden boxes for product delivery from overseas factories with returnable steel pallets in order to support tropical forest conservation
Japan Federation of Printing Industries	(1) Performance in fiscal 2014 ・Promoted the utilization of plant-derived ink ・Used waste heat from deodorizing equipment and reviewed the return rate of exhaust air ・Developed collective engine control systems, installed inverter-controlled air conditioning and engine motors, improved catalyst performance ・Initiated Green Printing certification of digital printers for factories (2) Contribution through low-carbon products and services ・Established the Printing Service Green Standard as an industrial standard for environment-friendly printing services and promoted CO2 emission reductions. ・Developed thinner packaging material, including PET bottles, etc. and engaged clients in CO2 reduction efforts. (3) Efforts leading to public campaigns ・Participate in Eco Products 2014. ・Labeled printed products manufactured using environment-friendly methods with a "GP" label. Awarded the "GP Environmental Grand Prize" to clients ordering large amounts of printed material with the GP label. (4) Efforts to foster and conserve forest sinks ・Continued domestic and overseas forest planting and conservation activities ・Proactively used FSC and PEFC-certified paper for printing (5) Future efforts ・Continue to collaborate with clients to develop energy-saving printing systems and auxiliary equipment. ・Participate in Eco Products 2015.
Japan Aluminiuim Association	(1) Efforts made in fiscal 2014 ・Continuously promoted the recycling of aluminum cans. (2) Contribution through low-carbon products and services ・Reduced CO2 emissions through the use of aluminum to manufacture more lightweight automobiles. (Reduced CO2 emissions equivalent to sixfold of emissions from the manufacturing phase when traveling 100,000 km)

	・Reduced CO2 emissions through the use of aluminum to manufacture more lightweight rolling stock. (3) Efforts leading to public campaigns ・Conducted outreach programs to promote the recycling of aluminum cans. Awarded around 100 best practices in one year. ・Promoted information provision and outreach to increase the recovery rate of aluminum cans by increasing collection routes that are not operated by the local government ・Promoted outreach and educational activities. (4) Future efforts ・Continue aluminum recycling operations to make returning cans an established activity among the general public
Brewers Association of Japan	(1) Efforts made in fiscal 2014 ・Continues to calculate CO2 emission from the entire value chain since fiscal 2013. ・Collaborated with the distribution industry to implement a campaign to promote carbon offset products ・Collaborated with other industries in discussions to reduce packaging (2) Contribution through low-carbon products and services ・Started to use lightweight returnable bottles (90g lighter per bottle) from November 2014. Plans to complete full transition to lightweight bottles in the next ten years, thus reducing 930 t-CO2/year in the manufacturing and distribution processes. (3) Efforts leading to public campaigns ・Collaborated with the administrative and distribution sectors to educate consumers regarding carbon offset efforts. (4) Efforts to foster and conserve forest sinks ・Cooperated with the national and local governments to recharge water in 18 locations covering a nationwide total of 8,000ha (as of April 2015). Plans to expand water recharge area to 12,000ha by 2020. ・Conducted CO2 absorption activities, including forest management in corporate forests (5) Future efforts ・Continue abovementioned measures based on their effectiveness.
The Japanese Electric Wire & Cable Makers' Association	(1) Efforts made in fiscal 2014 ・Promoted the Japan-led development of an IEC standard for the conductor size of the optimal electric wire and cable. ・Given that technologies to size up conductors increase energy efficiency, established a Japanese Cable and Wire Makers' Association (JCS) standard and engaged in public relations activities. (2) Efforts leading to public campaigns ・Promoted environmental household bookkeeping among employees and their families. Encouraged continued efforts by awarding good practices. (3) Future efforts ・Consider the incorporation of conductor size optimization technologies in relevant laws, enhance calculating software, engage in public relations efforts addressing users ・Aims to mainstream superconductor cables in 2020 (a 5% reduction in electric power consumption is expected from railways)
Japan Dairy Industry Association	(1) Efforts made in fiscal 2014 ・Formulated the Japan Dairy Industry Association's Voluntary Action Plan on the Environment and identified common challenges to be addressed and checked progress in the Environmental Committee and relevant working groups. (2) Contribution through low-carbon products and services ・Promoted the reuse of glass bottles and the recycling of plastic bottle caps ・Adopted thinner, lightweight packages; improved the recyclability and separatability of packages ・Performed environment-friendly design, including reducing package weight ・Reduced the energy required for transportation through cooperative transport with other companies in the industry (3) Efforts leading to public campaigns

	・Promoted milk carton recycling. ・Conducted environmental conservation activities in areas around plants and business locations ・Fully implemented Cool Biz and Warm Biz dress codes; introduced daylight savings time; promoted green procurement. (4) Efforts to foster and conserve forest sinks ・Engaged in conservation efforts in water source forests around plants ・Conserved and planted trees in corporate forests. (5) Future efforts ・Consider decarbonizing energy sources (heavy oil=> LNG, biomass, etc.) ・Improve milk carton recycling and reduction rates
Japan Copper and Brass Association	(1) Efforts made in fiscal 2014 ・Reduced CO2 emissions by introducing thinner copper sheets and thus reducing the weight of vehicle and mobile phones ・Reduced CO2 emissions by manufacturing thinner copper sheets, and thus reducing production volume ・Increased the use of recycled copper to reduce energy consumption in the copper refining process. (2) Contribution through low-carbon products and services ・Reduced emissions by 2.31 million t-CO2/year by using high-efficiency grooved copper in air conditioner heat exchangers (estimate for 2014)
The Japan Bearing Industrial Association	(1) Efforts made in fiscal 2014 ・Conducted “Research studies on the LCA of roller bearings” as in fiscal 2013. Discovered that of the material, manufacturing, transportation and use phases, CO2 emissions were largest at the use phase, in line with the previous study (2) Contribution through low-carbon products and services ・Bearings support rotation and reduce friction in automobiles, various machines and devices, and wind power generators. The product itself is energy savings-oriented. Improved performance by developing smaller and lighter low-torque bearings (3) Efforts leading to public campaigns ・Communicated corporate environmental policies to a public audience via CSR reports and other corporate reports. ・Conducted educational and outreach activities, including issuing environmental household account books, establishing an “environmental month,” and issuing an environmental newsletter (4) Efforts to foster and conserve forest sinks ・Joined hands with local governments in reforestation efforts in mountains located near plants. (5) Future efforts ・Issue a compilation of best efforts demonstrating that bearings, as product parts, contribute to energy savings.
Japan Sanitary Industry Equipment Association	(1) Efforts made in fiscal 2014 ・Employed LCA throughout the industry and promoted the development of environment- friendly products. (2) Contribution through low-carbon products and services ・Reduced CO2 emissions by developing and disseminating water-saving toilets, prefabricated bathrooms, system and kitchen units. ・Ensured that corporate vehicles engaged in environment-friendly driving (eco-drive). Based on criteria for vehicles installation, installed optimal vehicles according to mileage and frequency to reduce fuel consumption. (3) Efforts leading to public campaigns ・Continued to encourage energy savings in households by presenting an energy-savings guide in the summertime. ・Held workshops nationwide for elementary school students to learn about the importance of water. (4) Efforts to foster and conserve forest sinks

	・Planted oak seedlings in 26 locations nationwide and cleared underbush ・Hosted two *Satoyama* and wetland conservation efforts and two forest conservation efforts annually.
Japan Soft Drink Association	(1) Evaluation from an LCA perspective ・Reduced 38,300t-CO2 from the transportation phase by increasing the in-house production rate of PET bottles (2) Contribution through low-carbon products and services ・Reduced the use of fossil fuel resources and thus CO2 emissions by adopting biomass labels and PET resins of plant origin ・Adopted lightweight PET bottles that can be crushed and rolled ・Expanded business-to-business relations through mechanical recycling ・Installed more vending machines that impose less environmental burden (3) Efforts leading to public campaigns ・Introduced daylight-saving time ・Conducted environmental education programs for all employees ・Conducted environmental education programs for children ・Participated in environmental beautification efforts around business locations hosted by local governments and NPOs (4) Efforts to foster and conserver forest sinks ・Collaborated with the national and local governments in water recharge activities ・Acquired forest certification in corporate forests and conducted proper forest and mountain management ・Implemented tree-planting activities
Limestone Association of Japan	(1) Contribution through low-carbon products and services ・Made an effort to constantly supply high-quality limestone for the expanded utilization of waste fuels at cement plants. (2) Efforts leading to public campaigns ・Implemented the Cool Biz and Warm Biz campaigns; participated in the “No My Car” campaign encouraging people to refrain from driving individually (3) Efforts to foster and conserve forest sinks ・Conducted greening of limestone quarry walls and piling area ・Promoted afforestation activities and cultivated and preserved rare plants ・Participated in forest conservation activities hosted by local governments (4) Future efforts ・Take note of efforts made by the cement industry, the largest limestone user, and continue to promote the stabilization of product quality
Japan Machine Tool Builders’ Association	(1) Contribution through low-carbon products and services ・Promoted energy savings by adopting high-efficiency motors, inverter-controlled oil pressure equipment, and accumulators. ・Promoted energy savings by integrating processes conventionally done by different equipment ・Reduced electric power consumption by shifting from oil pressure to electric power and automated processes. ・Promoted energy savings by improving the precision and quality of processing
Flour Millers Association	(1) Efforts made in fiscal 2014 ・Promoted higher efficiency in logistics by shifting to lorry transport from product packaging and utilizing train and ship transport
The Shipbuilders’ Association of Japan and the Cooperative Association of Japan Shipbuilders	(1) Efforts made in fiscal 2014 ・Constructed energy-saving ships, including new bulk carriers (reducing CO2 emissions by 27% compared to conventional levels) ・Continued development of energy-saving tankers (2) Contribution through low-carbon products and services ・ Improved the propulsion system (improved propeller efficiency, etc.), the hull system (developed optimal hull shapes; reduced friction resistance), the engine system (improved diesel engine efficiency; developed waste heat recovery systems), the operation system (optimal operation system) (3) Efforts leading to public campaigns

	・Conducted environmental education, including outreach on ISO14001, for all employees ・Distributed an Environmental Planning Book to all employees, including those employed at partner companies. ・Encourage all employees to keep environmental household account books ・Promoted the “No My Car Day” (car sharing promotion) campaign. (4) Efforts to foster and conserve forest sinks ・Planted and managed trees on business location premises ・Participated in the “Corporate Forest Planting” program promoted by Hyogo Prefecture ・Performed tree-planting efforts at overseas plants (the Philippines) (5) Future efforts ・Continued to develop energy-saving ships
Japan Industrial Vehicles Association	(1) Efforts made in fiscal 2014 ・Engaged in efforts towards pilot tests, deregulation and the formulation of safety standards for the market introduction of fuel cell-powered forklifts which do not emit CO2. ・Improved the fuel efficiency of engine-powered forklifts (improvements by 15-30%) ・Developed and disseminated high-efficiency battery-powered forklifts to encourage the replacement of engine-powered forklifts (2) Efforts leading to public campaigns ・Conducted environmental education ・Participated in local outreach activities to raise environmental awareness (3) Efforts to foster and conserve forest sinks ・Performed tree-planting and forest conservation efforts
Japan Association of Rolling Stock Industries	(1) Efforts made in fiscal 2014 ・Exchanged opinions with major rolling stock and component manufacturers and user railway companies (2) Contribution through low-carbon products and services ・Reduced the weight of rolling stock through the widespread use of lightweight stainless steel cars and lightweight aluminum cars ・Introduced LED lighting ・Promoted the introduction of operation support systems that provide information on energy-saving operations ・Formulated standards for “product assessment” and promoted environment-friendly design meeting the standards ・Conducted LCA-based evaluations of products with high CO2 reduction potential during the produce use phase. (3) Efforts leading to public campaigns ・Established a recycling training facilities at a manufacturing plant. All employees were engaged in promoting the segregated disposal and recycling of waste. ・Conducted environmental education activities at educational institutions around plants ・Raised energy-saving consciousness among employees via in-house newsletters and lectures and having them attend courses. ・Saved electric power by keeping lights on for a limited time and managing room temperatures; promoted Cool Biz and Warm Biz dress codes (4) Efforts to foster and conserve forest sinks ・Continued efforts to increased green spaces on factory premises ・Joined hands with local governments to plant trees and manage forests. ・Engaged in environmental education efforts by planting trees and conserving Satoyama with local elementary school students
Japan Petroleum Development Association	(1) Contribution through low-carbon products and services ・Reduced CO2 emissions in the user phase by increasing natural gas production ・Contributed to the acceleration of natural gas introduction by constructing LNG and GTL production plants, developing catalysts for hydrogen production, and manufacturing cells for fuel cells ・From an LCA perspective, reduced GHG emissions by expanding the natural gas pipeline network and enabling the distribution of LNG to distant users by employing tank lorries

	・Promoted the recycling of waste (steel pipes, waste oil and metal scrap (2) Efforts leading to public campaigns ・Purchased products meeting green procurement standards, provided support for customers in their energy-saving efforts and gave lectures at universities and academic meetings (3) Efforts to foster and conserve forest sinks ・Promoted afforestation activities (UAE, Indonesia, Australia, Niigata Prefecture, Hokkaido Prefecture, etc.)

2. Energy Conversion Sector

Industry	Examples of cooperative efforts among interested parties
The Federation of Electric Power Companies	(1) Efforts made in fiscal 2015 ・Engaged in efforts to disseminate Japan's advanced technologies, including high-efficiency electric appliances, such as heat pumps. ・Engaged in efforts towards achieving the government of "introducing smart meters in all households and plants in the early 2020s" (2) Efforts leading to public campaigns ・Proactively promoted efforts that would serve to promote energy savings and CO2 reductions among customers ・Provided customers with energy-saving information on websites ・Distributed calendars and household account books introducing energy-saving ideas. ・Hosted exhibitions on energy-saving proposals and seminars on energy-saving; implemented educational activities on the environment and energy ・Visited customers' homes to measure the electric current of electric appliances and provide advice on contracts and energy-saving practices ・Implemented environmental education programs for employees, including an Environmental Trainer Program and "e-learning" (3) Efforts to foster and conserve forest sinks ・Participated in environmental conservation efforts, including tree-planting and forest conversation ・Engaged in efforts to recharge water sources and performed environmental education by utilizing corporate forests. ・Conducted demonstration tests of the mixed combustion of wood biomass in coal-fired thermal power plants utilizing unharnessed domestic forest resources (timber harvest residues), used paper made from tree thinnings for environmental reports, business cards, fans, boardwalk, etc., and utilized driftwood
Petroleum Association of Japan	(1) Efforts made in fiscal 2014 ・Proactively engaged the development and dissemination of high-efficiency oil appliances (latent heat recovery-type oil water heater Eco-feel, high-efficiency commercial boilers, etc.) in order to promote global warming countermeasures in the household and commercial sectors, where petroleum products are used (2) Contribution through low-carbon products and services ・Promoted the introduction of biomass fuels ・Improved fuel efficiency by developing sulfur-free fuels for use in vehicles ・Developed fuel-efficient engine oil. ・Continued to make efforts to reduce waste generated from business operations and set up a "industrial waste zero-emission" target unique to the industry. (3) Efforts leading to public campaigns ・Promoted environmental education activities ・Implemented the "Cool Biz" and "Warm Biz" campaigns. ・Saved electric power by dimming lights or taking out some fluorescent lights ・Purchased environment-friendly products ・Conducted forest and *Satoyama* conservation activities (4) Efforts to foster and converse forest sinks ・Engaged in domestic forest conservation activities with local governments

	・Engaged in tropical forest conservation projects and the Silk Road greening project overseas (5) Future efforts ・In order to sell 1 million units of latent heat recovery-type oil water heater Eco-feel by fiscal 2020, cooperated with other industries to promote dissemination
The Japan Gas Association	(1) Reduction potential and performance in 2013 ・Advanced towards Gas Vision 2030 by promoting and disseminating cogeneration, establishing Ene-farm Partners, and supporting the development of human resources specializing in fuel conversion. (2) Contribution through low-carbon products and services ・Promoted the dissemination and expansion of natural gas cogeneration systems in the industrial and commercial and other sectors. ・In the household sector, engaged in efforts to disseminate fuel cells for households, gas engine-type water heaters, and latent heat recovery-type water heaters, as energy savings in water heating, a large source of household energy consumption. ・Promoted the introduction of natural gas vehicles (3) Efforts leading to public campaigns ・Encouraged electric power savings in summer and winter and implemented a Cool Biz dress code ・ Conducted environmental education through lectures and awards; utilized environmental household account books ・Implemented the “No My Car” campaign (refraining from driving one’s own car to work); implemented “eco-drive” workshops ・Conducted environmental education through various events ・Implemented energy-saving diagnosis for households (4) Efforts to foster and conserve forest sinks ・Engaged in various afforestation and tree-planting activities in collaboration with local governments and NPOs

3. Commercial and other sectors

Industry	Examples of cooperative efforts among interested parties
Japan Chain Stores Association	(1) Contributions through low-carbon products and services ・Sold MSC-certified, ASC-certified, and FSC-certified private brand products ・Sold products that serve to reduce the use of air conditioning, such as bedding and thermal insulation curtains using material with chilling effects and moisture-absorbent heat-generating material, at all stores ・Sold toilet paper made from recycled paper (sales of 1.31 million packs during the past year) and LED light bulbs (sales of 326,000 bulbs during the past year) ・Promoted the sales of refill products, such as shampoos and body soaps, with less packaging. Also sold cooked foods in paper bags that impose less environmental burden ・Used domestic tree thinnings in private brand *harusame* bean-starch noodle soup containers (three items); newly sold a private brand hand soap (using recycled PET fiber, including those collected at stores ・Sold private brand carbon footprint and carbon offset products and environment-friendly products jointly developed with customers ・Encouraged the unpackaged sales of vegetables and fruits in the fresh foods department and fried foods in the deli department. Continued to sell unpackaged fresh fish and meat and provision of non-tray items. ・353 stores stopped offering free plastic shopping bags. As a result, 81.7% of customers declined plastic bags (80.3% in fiscal 2013), and the number of plastic bags consumed was reduced by 1.007 billion bags, or 12.6% from fiscal 2013 level. ・107 stores stopped offering free plastic shopping bags. The ratio of customers with their own shopping bag increased from 70.1% to 72.3% collectively in all stores. Reduced the use of plastic bags to 92.8% of the previous fiscal year in fiscal 2014. ・Donated 3 yen per one customer declining plastic shopping bags to environmental

	organizations and local governments. ・Awarded customers declining plastic shopping bags points at all stores. Number of plastic shopping bags declined: 23,652,206 bags; ratio of plastic shopping bags declines to total number of customers: 33.28% ・Performed simple wrapping at 86 stores offering gift wrapping services. The wrapping paper consumed amounted to 86.9% of the previous year. ・Encouraged customers to accept eco-wrapping (simple wrapping) for summer and year-end gifts (*chugen* and *seibo*) ・Increased sales of liquids in two-liter PET bottles at room temperature ・Reduced the number of sales promotion monitors at 52 stores (2) Efforts leading to public campaigns ・Invited employees to participate in the annual "Eco Challenge," involving a) energy savings during work (energy-saving use of lighting and air conditioning); b) energy savings at home (electric power saving, fuel-efficient driving, carrying portable shopping bags), etc. ・Hosted eight environmental seminars given by external lecturers annually (150 participants in fiscal 2014) ・Encouraged energy-saving resource-saving campaigns and Cool Biz and Warm Biz dress codes among all employees to make them more aware of electric power saving and waste segregation ・Implemented eco-learning programs for social studies excursions for elementary school students and workplace experiences for junior high school students at each store ・Contributed to environmental education by distributing booklets on collecting recyclables at stores to elementary school students visiting stores. ・Offered "environmental learning programs" for elementary school students at stores. 5164 people from 102 organizations participated in fiscal 2014.
Japan LP Gas Association	(1) Efforts made in fiscal 2014 ・Engaged in efforts to promote and disseminate high-efficiency LP gas appliances (residential fuel cells, high-efficiency water heaters, etc.) (2) Contribution through low-carbon products and services ・Reduced CO2 emissions through solar cell sales and production ・Developed energy-saving products ・Sold energy-saving appliances (3) Efforts leading to public campaigns ・Participated in the "Lights Down" campaign. ・Implemented an in-house Eco-Point program and Eco-Challenge campaign. ・Conducted an environmental photo contest ・Performed outreach efforts addressing consumers through newsletters ・Performed outreach efforts on saving energy through environmental education addressing employees (4) Efforts to foster and conserve forest sinks ・Managed corporate forests, engaged in Satoyama conservation efforts and participated in creating and managing flower beds in parks ・Promoted the planting of trees and other plants on factory premises and main office buildings ・Conducted mangrove planting in the Philippines (equivalent to emission reductions of 71.5t-CO2)
The Real Estate Companies Association of Japan	(1Efforts made in fiscal 2014 ・Cooperated with tenants to adjust air conditioning and lighting and visualize energy consumption ・Introduced MEMS in condominiums ・Developed longer life buildings, utilized recycled material, promoted green procurement, reused existing building frames, promote energy savings in construction and demolition of buildings by utilizing energy-saving methods, construction machinery and vehicles ・Utilized various environmental assessment tools, including CASBEE (2) Contribution through low-carbon products and services

	・Introduced environmental indicators including PAL and ERR, for newly built office buildings, and promoted CO2 emission reductions at the management stage. (3) Efforts leading to public campaigns ・Joined environmental events including the water sprinkling project and Lights Down campaign. ・Implemented Cool Biz and Warm Biz dress codes ・Implemented various power saving measures ・Implemented educational activities for tenants and employees ・Conducted outreach activities addressing tenants and employees (4) Efforts to foster and conserve forest sinks ・Promoted greening and conducted periodical conservation activities ・Planted local native tree species ・Hosted events and invited the participation of employees, building users and local residents; establishing an eco-community organization ・Promoted the use of products with natural environment and biodiversity-related certification or appraisal ・Made donations to volunteer organizations, etc.
The Life Insurance Association of Japan	(1) Efforts made in fiscal 2014 ・Increased awareness of environmental issues among corporate executives through in-house educational programs ・Communicated the status corporate activities addressing environmental issues on websites and in disclosure report ・Visited elementary schools to give lectures on wetland nature and biodiversity ・Hosted “A Classroom in the Forest” to teach children in elementary school the functions of a forest ・Hosted “Forest Explorers,” an event in which participants can experience forest management operations in nature ・Provided funds for the Nationwide Environmental Children’s Drawing Contest for Elementary and Junior High School Students ・Had sales staff distribute leaflets introducing ways to save energy at home (2) Efforts leading to public campaigns ・Conducted afforestation and tree-planting activities and made donations to environmental conservation organizations. ・Supported volunteer activities by offering holidays and funds for volunteer work ・Conducted outreach efforts addressing the residential sector by providing information on saving energy and offering opportunities to experience forest management activities (3) Efforts to foster and conserve forest sinks ・While engaging in efforts to reduce paper consumption, 13 companies engaged in tree-planting and afforestation efforts and other companies supported environmental protection organizations and sent volunteers to participate in tree-planting efforts (4) Efforts to conserve the environment through life insurance business operations ・Renovated buildings owned for investment purposes into environment-friendly buildings ・Introduced preferential interest rates for companies involved in environmental conservation. ・Promoted the shift towards paperless application documents and insurance policies
Telecommunications Carriers Association	(1) Efforts made in fiscal 2014 ・Five telecommunications-related organizations launched the Council for Ecology Guidelines for ICT and formulated guidelines for energy savings in ICT appliances. Guidelines are reviewed annually. (2) Contribution through low-carbon products and services ・Utilized ICT services to achieve higher efficiency in production activities, reducing the transportation of people and goods, and contributing to the reduction of society-wide electric power use and CO2 emissions. ・Implemented an environmental labelling program for ICT solutions ・Promoted paperless services (switched from paper billing to web-based billing; offered cloud-based operation manuals).

	・Offered environment-friendly working environments, including “telework” which enables working from home, and “mobile work” which enables working outside the office. ・Conducted computation on network servers and integrated servers at a large data center to achieve comprehensive reductions in electricity consumption ・Engaged in solar power business on company-owned idle land (3)3Rs and global warming countermeasures ・[reduce] Promoted the reduction of paper use by employing internet billing services ・[reuse] Reused resources by promoting the reuse of telecommunication equipment and trade-ins of cell phones ・[recycle] Promoted the recycling of telecommunication equipment. With the cooperation of relevant companies, launched the Mobile Recycle Network to collect used cell phones, PHS phones, batteries and storage batteries at approximately 10,000 shops nationwide specializing in cell phones. Recovered rare metals for reuse in electronics parts. (4) Efforts leading to public campaigns ・Collaborated with local residents, local governments and schools to conduct environmental cleanups ・Conducted various environmental activities to reach out to employees and their families ・Implemented campaigns to promote the recycling of mobile phones ・Participated in Fun to Share and supported the efforts of individual employees ・Encouraged Cool Biz and Warm Biz dress codes (5) Efforts to foster and conserve forest sinks ・Promoted afforestation and tree-planting activities at various locations
Japan Franchise Association	(1) Contribution through low-carbon products and services ・Sold products (beer) with emission allowances; provided CO2 offset services
Japan Department Stores Association	(1) Contribution through low-carbon products and services ・Environment-friendly taxi stands (offsetting the C02 emitted in the first 2km driven from participating stores) ・Carbon offset buses (offsetting the CO2 emitted from tours by asking customers to pay 150 yen/day) ・Sold environment-friendly products
Japan Association of Refrigerated Warehouses	(1) Contribution through low-carbon products and services ・Managed and maintained optimal storage temperatures to prevent the unnecessary generation of energy in preserving the freshness of food products (2) Efforts leading to public campaigns ・Educated employed by encourage the acquisition of green management certification
Japan Foreign Trade Council, Inc.	(1) Contribution through low-carbon products and services ・Implemented various energy-saving, environment-friendly and low environmental burden projects (BEMS pilot projects, diffusion of energy management systems harnessing IT, development of low-carbon condominiums, increased sales of steel products that ensure low environmental burden, lithium development project, lithium-ion batteries project, development and sales of LED lighting and backlights, manufacturing bioethanol and biomass fuels, increased sales of bio-PET, etc.) ・Produced bioethanol and biodiesel, implemented a car-sharing program employing low fuel efficiency vehicles, expanded sales of biomass PET, etc.) ・Mainstreamed logistics (promoted modal shifts, consolidated logistics hubs; introduced low energy cars, etc.) (2) Efforts leading to public campaigns ・Educational efforts addressing employees; promoted eco-drive and the use of public transportation; engaged in tree-planting and greening efforts, etc. ・Offered tree-planting and greening activities for employee families and implemented the Environment-friendly Household Practice Campaign, etc. ・Promoted the use of environmental household account books ・Offered environmental lectures at universities and seminars for member companies, etc.

	(3) Efforts to foster and conserve forest sinks ・Conserved corporate forests and joined hands with local governments to perform forest conservation ・Promoted forest environment management through investment and participation in wood biomass power generation ・Conducted tropical forest reforestation, mine greening, and ecosystem conservation activities in various countries overseas ・Imported and sold environment-friendly products
The General Insurance Association of Japan	(1) Contribution through low-carbon products and services ・Offered automobile insurance discounts for automobiles with advanced environmental features; sold environment-friendly fire insurance. ・In the area of non-insurance products and services, sold weather derivatives and investment trusts that invest in environment-friendly companies. (2) Efforts leading to public campaigns ・Implementation of a carbon offsetting mechanism that combines carbon-offsetting options with insurance products and accident response services ・Provided environment-friendly automobile insurance and fire insurance products using web-based insurance clauses ・Implemented environmental outreach and education to raise awareness (help public workshops and seminars, held permanent exhibits on company premises, gave lectures at elementary schools, awarded elementary schools, participated in the Lights-Down campaign) ・Promoted green procurement ・Declared the “Eco-First Promise” to the Minister of the Environment ・Implemented the Eco-safety Driving campaign ・Participated in the Cool Biz and Warm Biz campaigns ・Implemented the Lights Down campaign. ・Hosted public workshops and seminars on environmental issues ・Utilized recycled products (3) Efforts to foster and conserve forest sinks ・Engaged in various forest conservation activities (implementation of agreements concluded with local governments on forest management, forest conservation and silviculture in afforested areas, restoration of tropical forests and agricultural technology training in Indonesia, removal of introduced species and cleaning for the biodiversity conservation in wetlands) ・Implemented projects in collaboration with NPOs to create environments friendly to living creatures ・Donated profits gained through goods and services contributing to the reduction of environmental burden to the Green Belt campaign (tree-planting effort) ・Made donations to projects encouraging the utilization of local wood in areas affected by the Great East Japan Earthquake ・Planted mangrove forests in 9 countries, including in Southeast Asia and engaged in efforts to restore tropical forests in Indonesia ・Purchased J-VER credits from forest management projects
Japanese Bankers Association	(1) Efforts made in fiscal 2014 ・Engaged in efforts to moderate air conditioning temperatures to the extent possible, reduced the amount of paper used in various services, offered environment-friendly products and services to individual clients, and promoted environment-friendly loans to support business operators practicing environment-friendly business management (2) Contribution through low-carbon products and services ・Offered products that address global environmental issues (with the exception of loans) and “no-passbook” savings account services ・Offered preferential interest rates for housing loans for housing with solar power and for loans for low-emission vehicles ・Provided clients with information on environmental issues (3) Efforts leading to public campaigns ・Promoted energy-saving efforts (switching off lights when not in use, encouraging

	employees to work in casual clothing, removing unnecessary lighting and leaving some turned off, managing temperature settings of air conditioning equipment) ・Conducted CSR activities addressing global environmental issues ・Conducted in-house environmental education programs ・Updated the "Japan Bankers Association eco map", a website providing environmental information. Hosted a wall newspaper competition for elementary school children. (4) Future efforts ・Introduce loans that harness the Agency for Natural Resources and Energy's Energy Use Rationalization Business Support Program ・Introduce loans that are eligible for the Ministry of the Environment's subsidized interest payments . ・Develop unique products based on environmental studies.
Japan Securities Dealers Association	(1) Efforts made in fiscal 2014 ・Promoted reduced paper use, saved electric power, introduced energy-saving appliances, implanted resource-saving and energy-saving measures ・Promoted the reduction of environmental burden and the reuse of resources by using paper manufactured in processes with reduced environmental burden, ensuring segregated waste collection, etc. ・Conducted environmental outreach by harnessing intra-company networks and in-house campaigns ・Announced efforts to address environmental issues on website, thus communicating efforts to investors and the entire society (2) Low-carbon products and services ・Developed and sold funds addressing to global warming countermeasures and environmental protection and supported investment in companies promoting environmental business (3) Efforts leading to public campaigns ・Participated in social contribution efforts for environmental protection implemented by local communities and organizations ・Suggested ways to utilize information on efforts addressing environmental issues and investment ideas ・Participated in the Earth Hour and Lights Down campaigns ・Aired commercials on environmental protection (4) Efforts to foster and conserve forests ・Implemented tree-planting projects (5) Other efforts ・Engaged in efforts toward the acquisition of certification of international standards such as ISO14001

4. Transportation Sector

Industry	Examples of cooperative efforts among interested parties
The Japanese Shipowners' Association	(1) Efforts made in fiscal 2014 ・Based on requests by shippers seeking to reduce CO2 emissions, promoted CO2 emission reductions by efficiently operating ships under close collaboration (2) Efforts leading to public campaigns ・Implemented environmental education programs for employees. ・Implemented environmental conservation campaigns ・Provided cooperation and support for environmental surveys and research
The Scheduled Airlines Association of Japan	(1) Efforts made in fiscal 2014 ・In light of shortening flight distance and duration, collaborated with domestic and overseas air traffic control authorities to introduce efficient flight methods and engage in "eco-flights" that will maximize CO2 emission reductions. (2) Contribution through low-carbon products and services ・Developed eco-tours linked with afforestation activities near airports and coral planting in Okinawa.

	・Offered customer carbon offsetting programs ・Introduced electric vehicles for use within airports (3) Efforts leading to public campaigns ・Implemented measures to lower window shades during parking to prevent internal temperatures from rising ・Gave environmental classes for children taught by pilots ・Engaged in awareness-raising activities by posting environmental efforts made by the airline industry on the website (4) Efforts to foster and conserve forest sinks ・Conducted tree-planting activities around airports ・Invited customers to give charity support to NGO-led forest protection in the Asia-Pacific region and coastal forest restoration in the Tohoku region of Japan (5) Other efforts ・In order to enable the collection of CO2 concentration data on various aviation routes around the world, jointly developed a new instrument for the continuous measurement of CO2 concentration and installed the instrument on aircrafts used for international flights to conduct new atmospheric observations ・Cooperated in reducing the adverse impacts of forest fire based on reports on forest fire in Siberia, Alaska and Indonesia from flight attendants on operating flights
Japan Trucking Association	(1) Contribution through low-carbon products and services ・Contributed to the reduction of CO2 emissions by proactively introducing heavyweight vehicles that have achieved the fiscal 2015 fuel economy standards. Number of introduced vehicles meeting the fiscal 2015 fuel economy standards in 2014* = 69,034 units *Model codes: TKG-, TPG-, SPG-, QKG-. QPG-, LPG- (2) Efforts to foster and conserve forest sinks ・Designate a piece of land covering approximately 1 ha to implement the “Forest Creation by Trucks” program.
Japan Federation of Coastal Shipping Associations	(1) Efforts made in fiscal 2014 ・Promoted a modal shift from transporting cargo over long distances over land to more energy-efficient surface transport to reduce CO2 emissions from the transportation sector as a whole (2) Contributions through low-carbon products and services ・Engaged in awareness-raising activities by using pamphlets targeted at the shipper industry and advocated the current status of coastal shipping and its advantages in terms of energy efficiency. (2) Efforts leading to public campaigns ・Distributed material at local “Marine Festivals” to raise public awareness that coastal shipping is a an energy-saving means of transport by
The Association of Japanese Private Railways	(1) Efforts made in fiscal 2014 ・Implemented efforts to promote railway use and increase public awareness regarding environmental issues (2) Contribution through low-carbon products and services ・Implemented the “Take the train to be eco-friendly” campaign. ・Formulated “Environmental Accounting Guidelines for Private Railway Businesses” and introduced environmental accounting based on these guidelines ・Implemented environmental education programs for employees. ・Sold carbon-offsetting train tickets ・Installed screens displaying the amount to electricity generated and used at a station. ・Built parking lots for vehicles and bicycles close to the station. (3) Efforts to foster and conserve forest sinks ・Promoted *Satoyama* conservation and afforestation by cooperating with local governments in managing company-owned *Satoyama* and performing tree thinning operations, as well as participating in tree planting activities along railway lines ・Promoted greening activities, including covering the outer walls of stations and track grades with vegetation and trees, not only for environmental conservation but for beautification (4) Future efforts

	・Continue efforts to promote railway use and increase environmental consciousness
All Japan Freight Forwarders Association	(1) Efforts made in fiscal 2014 ・Participated in various events, including the New Environmental Exposition, to encourage the public to reduce CO2 emissions through a modal shift to rail freight transport. ・Also implemented a rail freight transport trial campaign to promote modal shifts. (2) Contribution through low-carbon products and services ・Promoted modal shifts from other means of transport to rail freight transport (3) Efforts leading to public campaigns ・Participated in environmental expositions, including Logis-Tech Tokyo (Tokyo), the Eco-Technology Exhibition (Kita Kyushu), and Messe Nagoya (Nagoya)

〔Attachment 4〕

Examples of efforts to promote international contribution by participating industries

1. Industrial Sector

Industry	Efforts to promote international contribution
The Japan Iron and Steel Foundation	・Engaged in efforts towards resuming the Japan-China Steel Industry Environmental Protection and Energy Conservation Technology Conference that has been suspended since 2011 ・Conducted steel plant diagnoses at 7 steel plants in India and ASEAN countries by harnessing ISO14404, an international standard for CO2 emission calculation methods formulated under Japanese initiative in March 2013. ・Hosted the Fourth Public and Private Collaborative Meeting between the Indian and Japanese Iron and Steel Industry to consider ways to promote energy savings by introducing Japanese technology in India, where the iron and steel industry is growing substantially ・Held the Japan-ASEAN Public and Private Collaborative Meeting on Iron and Steel with the 6 ASEAN countries and share information on support measures for introduction energy-saving technology in the ASEAN region. ・Introduced the energy-saving experiences and innovative technology development of the Japanese iron and steel industry at the GSEP Iron and Steel Working Group meeting.
Japan Chemical Industry Association	(1) Efforts made in fiscal 2014 Contributed to GHG emission reductions in Asia, the Middle East and North Africa, Russia, Europe and North America through a wide range of manufacturing technologies, material and products, and the detoxification of HFCs, PFCs and SF6. a. Examples of contribution in manufacturing processes ・Poultry feed additive manufacturing technologies (target: world) ・Graphite and carbon electrodes (poles) manufacturing technologies (target: US) ・Solvent thinner and stripping solution manufacturing methods (targets: North America, China) ・Synthetic rubber manufacturing technologies for energy-saving tires (target: Asia) ・Polyester recycling (target: China) ・Automatic coke oven heating systems (target: China) ・Non-woven fabric manufacturing technologies (target: Indonesia) b. Examples of contributions through low-carbon products ・Poultry feed additive manufacturing technologies (target: world) ・Synthetic rubber manufacturing technologies for energy-saving tires (target: world) ・Viscosity index improvers for engine oil (target: Asia) ・Solar control film for laminated windshield glass (target: world) ・Rare earth magnetic alloys (target: China) ・Bulk molding compound [engine sealing application] (targets: China, Thailand) ・Aluminum hammered products (target: Asia) ・Graphite and carbon electrodes (poles) manufacturing technologies (targets: China, US) ・Aluminum electrolytic foil [for high-capacity capacitors] (target: China) ・CFRP[carbon fiber reinforced plastics] carbon fiber for aircrafts (target: world) ・CFRP[carbon fiber reinforced plastics] carbon fiber for automobiles (target: world) ・RO membranes for the desalination of seawater (target: world) ・Thin paper diapers (target: world) ・Heat-resistant piping parts, parts for piping and coupling parts (target: US, Europe) ・Resin window frame parts (target: US, Europe) ・Secondary battery parts for electric vehicles [heat-resistant separator] (target: US, Europe) ・Material for lithium ion batteries (target: world) ・Material for semiconductor manufacturing (target: world)

<table>
<tr><td></td><td>・Material for liquid crystal manufacturing (target: world)</td></tr>
<tr><td>Japan Paper Association</td><td>(1) International contribution in water environmental technologies
・ The pulp and paper industry has developed supported by water resources. Accumulated afforestation efforts, technologies related to water recharge and water resource utilization, and technologies related to waste water treatment and reuse in water-intensive paper manufacturing, in Japan and overseas.
・In order to harness such technologies related to water business, one member company established the Water Environment Research Laboratory, which will contribute to water-related infrastructure projects, including water supply and sewerage systems, and the treatment of waste water from factories, effluent from industrial waste treatment processes, livestock effluent, and agricultural irrigation water in Japan, Asia, Oceania, and South and North America.)</td></tr>
<tr><td>Japan Cement Association</td><td>(1) Efforts made in fiscal 2014
・Disclosed information to an overseas audience via websites regarding the status of energy consumption for cement production, the status of energy saving technologies (facilities), the status of using waste as alternatives to energy, the status of waste utilization.
(2) Efforts to mitigate and reduce emissions in developing countries
・Efforts by individual companies
Energy-saving and environmental engineering projects in China
(3) Activities at international conferences
・Cooperated in formulating an international tool for calculating CO2 emissions from the cement industry</td></tr>
<tr><td>Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention</td><td>(1) Provision low-carbon product and services
・Converted energy sources in pursuing global business expansion and provided low-carbon energy-saving products (services) to the household and commercial sectors, thus contributing to both the preventing global warming and achieving a low-carbon society at a global level and the achievement of a low carbon society in terms of both energy supply and demand.
<table>
<tr><th>Categories of target products</th><th>●Avoided emissions
emissions avoided due to newly installed or shipped products in fiscal 2014 (one year)</th><th>●Avoided emissions
Cumulative avoided emissions during total years of operation (use) of products newly installed or shipped in fiscal 2014 (one year)</th></tr>
<tr><td>Power generation</td><td>4,480,000t-CO2</td><td>152,460,000 t-CO2</td></tr>
<tr><td>Household appliances</td><td>950,000t-CO2</td><td>9,470,000t-CO2
[*3,890,000t-CO2 attributable to parts]</td></tr>
<tr><td>ICT products and solutions</td><td>5,740,000t-CO2</td><td>28,700,000t-CO2
[* 3,890,000t-CO2 attributable to parts]</td></tr>
</table>
(2) International cooperation for the dissemination of low-carbon and energy-saving products
・Participated in international frameworks that consider methods to introduce policies for the dissemination of high-efficiency equipment and to appropriately evaluate energy-saving performance. Promoted proactive proposals and positive approaches as an industry.
(4) Efforts to control and reduce emissions in developing countries
・Given the Japanese government’s proposal of introducing a Joint Crediting Mechanism (JCM)/Bilateral Offset Credit Mechanism (BOCM) in the Asian region, evaluated and announced the feasibility of possible global warming countermeasures to be taken in developing countries by the industry for its adoption.
(4) Future efforts
・While the Commitment to a Low Carbon Society is in effect, announce the estimated avoided emissions every year. Also add target products covered by the calculation method and revise the method as required.</td></tr>
</table>

Japan Federation of Construction Contractors	(1) Efforts made in fiscal 2014 ・Submitted a paper on “global warming strategies adopted during the construction phase” to the American Society of Civil Engineers ・Considered the overseas expansion of fuel-saving driving of dump trucks and construction machinery (issued English translations material on fuel-efficient driving, etc.)
Japan Automobile Manufacturers Association, Inc. (JAMA) Japan Auto-Body Industries Association, Inc. (JABIA)	(1) Efforts made in fiscal 2014 ・Promoted energy savings at members’ overseas production facilities and ensured improvements in energy intensity ・Introduced wind and solar power generation systems, promoted the replacement of diesel-powered systems with natural gas cogeneration, dispatched energy efficiency diagnosis teams to overseas facilities, promoted energy-saving efforts at manufacturing plants, reduced the air pressure when not in use, implemented the 3-wet painting system which does not require a middle coat (2) Activities at international conferences ・Provided support for the The International Conference On Global Environment, Carbon Reduction, And Eco-Drive: As A Solution Towards Sustainability hosted by UN WAFUNIF. JAMA stressed and explained the importance of eco-drive as a part of comprehensive measures for CO2 emission reductions. ・Participated in the World Forum for the Harmonization of Vehicle Regulations (WP29) (3) International contribution using environmental technology and know-how to counter air and water pollution ・Reused more than 90% of waste water and prevented the depletion of groundwater ・Cooperated with cement manufacturers to recycle paint sludge and sewage sludge from painting and waste water treatment processes into cement (India). ・Advanced technologies for reducing VOC emissions from the painting process (developed low-VOC paints) and introduced them to overseas plants. ・Communicated technologies to reduce VOC emissions by reconsidering the thinners employed in the painting equipment ・Prevented air pollution by introducing deodorizing equipment (Thailand, China, Mexico) ・Acquired ISO14001 certification in all global business units. ・Introduced low-VOC paints in the painting process, introduced new treatment equipment for VOC reduction ・Introduced deodorizing equipment in relation with air pollution (4) Future efforts ・Continue past efforts
Japan Federation of Housing Organizations	(1) Efforts made in fiscal 2014 ・Participated in the International Housing Association (IHA) Annual Meeting and exchanged information on environmental issues, etc. with member countries (2) Efforts to control and reduce emission in developing countries ・Communicated information to willing developing countries on Japan’s advanced housing production technologies in accordance with local circumstances ・Provided low-carbon and energy-saving technologies and considered dispatching the appropriate experts for their promotion ・Engaged in overseas afforestation activities as each company expanded their business overseas, with an aim to improve the livelihood of local citizens
Japan Mining Industry Association	(1) Efforts made in fiscal 2014 ・Constructed a 4500KW off-grid hydroelectric generating plant at the Huanzala Mine in Peru in 1986 and supplies approximately 400KW to the local community free of cost. Uses the electricity in mining and ore processing. In fiscal 2014, reduced CO2 emissions by 14,234t annually. ・In 2007, connected to the national grid to establish a system enabling the purchase of electric power from the grid during the dry season in times of power shortage due to water level declines. ・Constructed a 1000KW hydroelectric plant to replace diesel generators at the Pallca Mine in Peru. In fiscal 2014, reduced CO2 emissions by 46t annually.

	・In October 2012, started electric power generation at a waste treatment facility in Thailand utilizing excess steam from a waste heat boiler. In fiscal 2014, reduced CO2 emissions by approximately 3100t. (2) Efforts to control and reduce emissions in developing countries ・Introduced an energy-saving nickel refining process, HPAL (High Pressure Acid Leach) and low-quality nickel oxide ore treatment at two locations in the Philippines. Furthermore, conducted efforts to restore land developed for refining projects to its natural state. ・Sought to save power and energy and reduce environmental burden in copper refining ・Educated local people about pursuing energy-saving low-carbon goals by transferring copper foil manufacturing technologies in Taiwan and metal recycling technologies in Shanghai, China. (3) Activities at international conferences ・At a meeting hosted by the International Council on Mining and Metals (ICMM), delivered a presentation on the status of resource acquisition and CO2 emissions, and exchanged opinions. (4) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Implemented precious metals recovery projects, home appliances recycling projects, and industrial waste treatment projects, thus contributing to environmental conservation (5) Future efforts ・Continue to survey energy consumption at overseas mines and propose energy-saving solutions using state-of-the-art energy-saving technologies. ・ Contribute to environmental conservation using state-of-the-art environmental technologies ・Consider the introduction of a Joint Crediting Mechanism (JCM)/ Bilateral Offset Credit Mechanism (BOCM) for overseas CO2 emission reductions
Lime Manufacturing Association	(1) Activities at international conferences ・Compared the energy efficiency of Japan’s lime manufacturing processes and relevant CO2 emissions and joined the International Lime Association to seek new global warming prevention-related technologies and continued to exchange information. At the annual meeting of the International Lime Association, 3 Japanese companies introduced good energy-saving practices in lime manufacturing
Japan Rubber Manufacturers Association	(1) Efforts made in fiscal 2014 ・Transferred energy-saving production technologies (cogeneration systems, high-efficiency production facilities, know-how on production) overseas ・Increased overseas production and sales of energy-saving products (high fuel efficiency tires, energy-saving belts, products for insulation, etc.) (2) Efforts to control and reduce emissions in developing countries ・Contributed by performing high-efficiency production at local plants and disseminating energy-saving products as provided in (1) (3) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Engaged in efforts to reduce environmental burden in the EU, etc. (4) Future efforts ・Continue to promote international contribution through high-efficiency production practices and energy-saving products; promote a tire labeling scheme for the dissemination of such products
The Federation of Pharmaceutical Manufacturers’ Associations of Japan	(1) Efforts made in fiscal 2014 ・Japan leads the world in reducing the use of HFCs in metered dose inhalation aerosols and can contribute to global GHG emission reductions by introducing relevant technologies overseas ・ In accordance with the globalization of the pharmaceuticals market, overseas production of pharmaceuticals is expected to increase. Contribute to reducing environmental burden and energy consumption overseas by introducing the most advanced domestic pharmaceutical manufacturing technologies.

Flat Glass Manufacturers Association of Japan	(1) Efforts made in fiscal 2014 ・ Introduced CO2-reducing production technologies, including the total oxygen combustion method (reducing CO2 emissions by around 25%) developed in Japan, overseas (China, Europe) in order to contribute to global CO2 reductions.
Japan Federation of Printing Industries	(1) Efforts made in fiscal 2014 ・Promoted information exchange, including introducing energy-saving efforts at the World Printing Congress, the Forum of Asian Graphic Arts Technologies (FAGAT), etc. ・Standardized deinked pulp at ISO/TC130 WG11 (environment) (2) Efforts to control and reduce emissions in developing countries ・Conducted tree-planting activities in Vietnam (3) Activities at international conferences ・ Introduced environmental and paper recycling efforts at the World Printers & Communication Forum (June 2015, Portugal) and exchanged opinions (4) Future efforts ・Continue to exchange opinions on the environment at international conferences Forum of Asian Graphic Arts Technologies, etc. ・Considered the development of ISO standards for paper recycling and deinking
Japan Aluminium Association	(1) Efforts made in fiscal 2014 ・Communicated information on reducing environmental burden through the use of aluminum products via websites, etc. in cooperation with the International Aluminium Institute (IAI), The Aluminum Association of the US, the European Aluminum Association, etc. (2) Efforts to control and reduce emissions in developing countries ・Implemented environment-friendly business management practices fostered in Japan at overseas locations (3) Activities at international conferences ・Exchanged information at meetings of the IAI and introduced best practices ・Introduced new state-of-the-art aluminum recycling processes developed in Japan at the Aluminum Forum hosted by the China Nonferrous Metals Industry Association ・Introduced the JIS standards for aluminum dross for iron and steel. Supported the reduction of aluminum dross quantities of final disposal
Brewers Association of Japan	(1) Efforts made in fiscal 2014 ・Initiated measurements of Scope 3 emissions at overseas group affiliates ・Implemented an energy saving diagnosis at a brewery in Brazil employing Japanese (Agency for Natural Resources and Energy) subsidies (2) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Developed technologies to extract bioethanol ・ Cooperated in a project to support the establishment of a pollution control management(PCM) system in Vietnam and hosted environmental training programs for Vietnamese engineers at factories in Japan. (3) Future efforts ・Accept additional requests to support the development of a Vietnamese PCM systems
The Japanese Electric Wire & Cable Makers' Association	(1) Efforts made in fiscal 2014 ・Promoted the Japan-led development of an IEC standard for the conductor size of the optimal electric wire and cable. ・The Japan Atomic Energy Agency received an order for approximately 30 tons of superconductive cable for the ITER (International Thermonuclear Experimental Reactor) under construction in France. Deliveries will be made in February to October 2015. (2) Efforts to control and reduce emissions in developing countries ・Promoted the development of high-temperature superconductive cables enabling the reduction of transmission loss and massive transmissions for use in developing electric power grids in developing countries (3) Future efforts ・Continue to promote the development of an IEC standard for the conductor size of the optimal electric wire and cable. Also compile an English pamphlet.

	・Installed a high temperature superconductive cable system developed in Japan in a pilot test implemented by the US Department of Energy for the practical application of the Grid2030 concept of developing an superconductive transmission cable network covering the entire North American continent by 2030. Accelerated the development of superconductive transmission networks.
Japan Copper and Brass Association	(1) Efforts made in fiscal 2014 ・Installed state-of-the-art energy-saving facilities and technologies in new overseas operations (2) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Installed state-of-the-art energy-saving facilities and technologies in new overseas operations
Japan Bearing Industrial Association	(1) Efforts made in fiscal 2014 ・Installed inverter control in compressors ・Installed timers in air conditioning equipment ・Replaced existing lighting to LEDs (2) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Recycled wastewater from factories in Thailand and China to the maximum extent possible with the aim of operating zero-wastewater discharge factories
Japan Soft Drink Association	(1) Past efforts ・Provided support for the introduction of lightweight PET bottles in the French soft drink business. ・Compiled a database on environmental data regarding overseas affiliates and established a support system for CO2 emission reductions ・Supported a Sri Lankan tea plantation in acquiring Rainforest Alliance certification. ・Shared energy- and water-saving technologies developed in Japan to support the reduction of environmental burden in Asia where shifts to multiproduct manufacturing are occurring
Japan Machine Tool Builders' Association	(1) Efforts made in fiscal 2014 ・Machine tools manufactured in Japan feature world-class machining performance and efficiency and contribute to achieving higher efficiency in overseas factories. ・Contributed to reducing CO2 emissions overseas by disseminating high environmental performance Japanese machine tools.
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	(1) Efforts made in fiscal 2014 ・Constructed energy-saving ships, including new bulk carriers reducing CO2 emissions by 27% compared to conventional levels ・Continued development of energy-saving tankers (2) Efforts to control and reduce emissions in developing countries ・Abided by regulatory targets for air and water quality and reduced CO2 emissions at overseas plants. ・Implemented integrated diesel and biomass-fired power generation projects covering engineering, construction, operation and maintenance (3) Activities at international conferences ・Proactively participated in CO2 emission reduction efforts under the International Maritime Organization (IMO) and the International Standardization Organization (ISO) as a member of the Japanese delegation. (4) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Promoted the prevention of pollution and global warming through products and services based on green innovation activities ・Made international contributions by selling environment-friendly products, including wastewater treatment equipment, desulfurization and denitrification equipment and bag filters. ・Implemented measures to reduce CO2 emissions from ships ・Performed business operations towards the installation of ballast water management equipment

	・Developed large-scale diesel engines for ships in light of IMO's upcoming Tier III requirements for NOx emissions (5) Future efforts ・Continue development of environment-friendly ships to reduce CO2 emissions from international maritime transport.
Japan Industrial Vehicles Association	(1) Efforts made in fiscal 2014 ・ Introduced potentiometers in electric induction furnaces in overseas parts manufacturing plants and reduced electric power consumption by 5.1% per 1t of dissolved iron (2) Activities at international conferences ・ In ISO/TC110 (industrial vehicles), participated in international discussions on formulating an international standard on measurement methods for the fuel economy of industrial vehicles that will lead to the visualization of energy savings. ・In IEC/TC105/WG6 (Fuel cell system for propulsion and auxiliary power units), led the formulation of standards for methods to test the safety and performance of fuel cell systems for industrial vehicles including forklifts. (3) Future efforts ・Continue to make efforts to disseminate technologies and products meeting strict domestic environmental regulations overseas
Japan Association of Rolling Stock Industries	(1) Efforts made in fiscal 2014 ・Contributed to the achievement of modal shifts in other countries by exporting rolling stock ・Exported rolling stock using lightweight aluminum alloys ・Launched the "Eco Challenge for a Greener Tomorrow" campaign in 2010 targeted at US and EU ・Launched environmental communications with China in 2012, in line with those with the US and EU (2) Efforts to control and reduce emissions in developing countries ・Engaged in mangrove conservation and afforestation activities in Thailand ・Performed tree-planting activities in China (3) Future efforts ・Transport lightweight stainless steel rolling stock to Thailand ・Contribute to CO2 emission reductions in other countries by exporting environment-friendly rolling stock
Japan Petroleum Development Association	(1) Efforts to control and reduce emissions in developing countries ・In petroleum and natural gas development projects, implemented GHG reduction measures (utilization of associated gas, injection of associated gas utilization of waste heat, afforestation, reduction of diffuse gas, reduction of residual gas through combustion (reuse)) in conformity with standards of the host country and region and partner companies. (2) Activities at international conferences ・ Participated in and cooperated with IEA-GHG, an international research and development program on CO2 capture and storage (CCS) technologies. ・Participated in and cooperated with the Global CCS Institute, an organization led by the Australian government to promote CCS demonstration projects. (3) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・ In accordance with environmental standards of oil producing countries and HSE management standards of partner companies, engaged in various efforts (improvements in water quality, biodiversity conservation, promotion of recycling, introducing energy-saving equipment, etc.) ・Conducted tree-planting activities in UAE, Indonesia and Australia, etc.、

2. Energy Conversion Sector

Industry	Efforts to promote international contribution
The Federation of Electric Power Companies of Japan	(1) Efforts to mitigate and reduce emissions in developing countries a. Participated in the Global Superior Energy Performance Partnership(GSEP) ・GSEP comprises 6 working groups, of which the Power WG aims to contribute to promoting energy savings and achieving CO2 emission reductions at a global level through proposals for improvements in operation and maintenance technologies that serve to improve heat efficiency at coal-fired thermal power plants and the sharing of advanced technologies and know-how in power generation, transmission and distribution. ・In a workshop aiming to share information on best practices regarding power transmission and distribution and demand management technologies, actively exchanged ideas by taking full advantage of public-private cooperation and visiting overseas thermal power plants to peer reviews on operation and maintenance (O&M) technologies based on seminars on power transmission and distribution and demand management technologies and facility diagnosis and analysis of operational data, conducted mainly by Japanese power generation engineers. ・Will continue to support the decarbonization of developing countries by transferring and providing Japanese electric power-related technologies under GSEP, which embodies the Japan-led sectoral approach. b. Efforts related to overseas business operations ・Conducted feasibility studies and demonstration projects under the Joint Crediting Mechanism (JCM)/ Bilateral Offset Credit Mechanism (BOCM) and participated and cooperated in other overseas projects in order to engage in efforts to save energy and reduce CO2 emissions.
Petroleum Association of Japan	(1) Efforts made in fiscal 2014 ・The petroleum industry, in collaboration with the Japan Cooperation Center, Petroleum (JCCP) and other relative organizations, engaged in petroleum-related technological cooperation, including energy saving, air and water conservation, waste management, etc., with oil producing countries and Asian countries by continuously dispatching technicians and accepting trainees. ・In fiscal 2014, implemented projects with Middle East oil producers, Vietnam and China, to dispatch experts, accept trainees, improve infrastructure and conduct joint research, and host the Joint GCC-Japan Environment Symposium. (2) Efforts to control and reduce emissions in developing countries ・Engaged in petroleum-related technological cooperation in the areas of energy saving, air and water conservation, waste management, etc., with oil-producing countries and Asian countries by continuously dispatching technicians and accepting trainees via relevant organizations. (3) Activities at international conferences ・A member of the International Petroleum Industry Environmental Conservation Association (IPIECA), which addresses environmental issues challenging the petroleum industry, the Petroleum Association of Japan attends relevant international conferences. ・In terms of global warming countermeasures, participated in conferences and workshops hosted by the IPIECA to introduce efforts including the Commitment to a Low Carbon Society formulated by the Japanese petroleum industry to counter global warming and to exchange views on measures taken by the petroleum industry in each country. (4) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Engaged in petroleum-related technological cooperation, including environmental technologies serving the purpose of countering air pollution and water contamination. ・In fiscal 2014, dispatched experts of water resource management to UAE and mutually

	further understanding of the issue.
The Japan Gas Association	(1) Efforts made in fiscal 2014 ・For industrial clients in Southeast Asia, implemented fuel conversion energy services, energy-related projects and accompanying studies, development and investment ・Provided energy services that enable the introduction of natural gas equipment without making initial investments and solely by paying fees determined in accordance with energy consumption ・Participated in meetings of the International Gas Union (IGU) and the World Business Council for Sustainable Development (WBCSD) to discuss ways to properly assess the environmental advantages of city gas. ・In China, verifying the effects of activated carbon fibers (ACF) in cleaning air pollution (2) Efforts to control and reduce emissions in developing countries ・Engaged in technology transfer and exchange regarding the effective use of natural gas and environmental improvement in developing countries. Implemented projects in Singapore and Thailand. ・Provided support for the development of human resources that will lead city gas businesses contributing to the global environment as well as businesses (3) Activities at international conferences Participated in the following international conferences and discussed ways to properly assess the environmental advantages of city gas <International Gas Union (IGU)> ・Held two PGCA (sustainability) meetings and reported to the Executive Committee and Coordination Committee of the International Gas Union (IGU) ・Compiled the four reports (Environment Reports on CCS, biogas, LCA and shale gas) to be presented and reported at the World Gas Conference 2015 ・Reviewed papers for the World Gas Conference ・Planned a session at the World Gas Conference ・Participated in the Environment Committee (PGCA) Participated in the Working Group on “Life Cycle Assessment of LNG” held in Finland and Russia in 2014. The WG conducts LCAs of pipeline gas and LNG from production to consumption <World Business Council for Sustainable Development (WBCSD)> ・Participated in the Energy and Climate cluster and other meetings at the annual Council Member Meeting held in Atlanta, U.S. (November 2014) and shared information on business methodology, including carbon prices and commercializing CCS. (4) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Used carbon material technologies to clean the air In order to purify NOx emissions from boiler and automobile exhaust gas, used activated carbon fiber (ACF) to develop an air cleaning technology using only airflow and no electric power at atmospheric temperatures of 0-40℃ to remove only NOx. Verifying the effects of ACF in the Chinese atmospheric environment. (5) Future efforts ・Scheduled to initiate feasibility surveys for an energy solution project with PetroVietnam ・Scheduled to build a local representative office of Tokyo Gas Asia in Thailand by the end of 2015. Will contribute to building energy solutions in factories and commercial establishments and energy infrastructure in Thailand. ・Will participate in the St Charles natural gas-fired thermal power generation project under construction in Maryland in the U.S.. Will contribute to electric power supply in the D.C. area through natural gas-fired thermal power generation (high-efficiency combined cycle with 58% energy efficiency) ・Will install a 32MW gas turbine cogeneration system using natural gas (16MW×2; equipped with reheating boiler) and supply electric power and steam.

3. Commercial and 0ther Sectors

Industry	Efforts to promote international contribution
Japan Chain Stores Association	(1) Efforts made in fiscal 2014 ・Member companies endeavored to introduce low energy consumption equipment, including LED lighting, when opening new overseas stores
Japan LP Gas Association	(1) Efforts made in fiscal 2014 ・Participated in the World LPG Association (WLPGA) and introduced Japan's high-efficiency LPG equipment and state-of-the-art automobile technologies (combined combustion of liquid fuels in diesel engines) at international conferences. ・Collected PET bottle caps to provide vaccination to children around the world. (2) Activities at international conferences ・Hosted symposiums. Hosted lectures given by research fellows from group affiliates on the scenario planning conducted at group affiliates.
The Real Estate Companies Association of Japan	(1) Efforts made in fiscal 2014 ・Proactively acquired environmental certification by promoting energy savings and decarbonization in buildings and condominiums when engaging in urban development projects abroad. ・Engaged in periodical efforts to plant and conserve forests overseas.
The Life Insurance Association of Japan	(1) Efforts made in fiscal 2014 ・Participated in the UN Global Compact ・Implemented a coral reef conservation project in Fiji. ・Held a Global Volunteer Day, involving all group affiliates. ・Participated in Ramsar site conservation efforts. ・Participated in (signed to) CDP (Carbon Disclosure Project)
Telecommunications Carriers Association	(1) Efforts made in fiscal 2014 ・The ICT Ecological Guideline Council, composed of telecommunications operators and vendors, has been engaged in formulating international standards for telecommunications equipment that will serve to reduce CO2 emissions. ・In fiscal 2013, proposed energy efficiency metrics and measurement methods for packet optical networking platforms (telecommunication devices with both packet and TDM functions) to the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) SG5. A revision of "Recommendation ITU-T L.1310: Energy efficiency metrics and measurement methods for telecommunication equipment" including the newly added Chapter 14 on packet optical networking systems, was issued on August 22, 2014. (2) Efforts to control and reduce emission in developing countries ・Under the Global Warming Mitigation Technology Promotion Project for which the Ministry of Economy, Trade and Industry publicly called for proposals for the achievement of the Joint Crediting Mechanism (JCM), a survey proposal seeking to reduce GHG emissions by increasing mobile phone base stations (efficiently utilizing "three electric power sources," namely solar power, fuel cells, and conventional commercial power) in Indonesia, was adopted. In November 2014, invited people engaged in telecommunications and others in construction from Indonesia to seminars and visits to base stations in order to further understanding about base station technologies. (3) Activities at international conferences ・Through efforts towards the international standardization of environmental impact assessment methods at the ITU-T, continuously promoted the environmental impact assessment of ICT equipment, networks and ICT services based on the Recommendation with the aim to allow companies providing or installing products or ICT services to consider not only performance and prices but also environmental indices, including CO2 emission reductions. (4) Future efforts ・ Continue to promote the development of international standards for telecommunication via the ICT Ecological Guideline Council, in order to contribute to CO2 emission reductions

	・Continue efforts to mitigate and reduce emissions in developing countries and activities at international conferences
Japan Franchise Association	(1) Efforts made in fiscal 2014 ・Introduced CO2 refrigerant equipment for 14 stores in Indonesia.
Japan Foreign Trade Council, Inc.	(1) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・For air pollution, conducted afforestation projects (Brazil, New Zealand, Chile, Australia, Vietnam), optimized operations of incinerators and boilers by expanding sales of continuous monitoring systems of dioxins and PCB and flue gas analyzers, expanded sales of diesel exhaust filters ・For water pollution, developed waste water, recycled water and sewerage treatment systems (Mexico, China Czech).
The General Insurance Association of Japan	(1) Efforts made in fiscal 2014 ・Promoted the Zero Accident campaign and the Eco-Safety Drive campaign at overseas affiliates and bases ・Donated used clothes to refugee regions. ・Contributed to and participated in launching the Pacific Catastrophe Risk Insurance Pilot program jointly established by the World Bank and the Japanese government. ・Provided weather index-based insurance, which mitigates climate change-induced damages in developing countries, in northeastern Thailand. ・Planted mangroves in 9 Southeast Asian countries. ・Donated profits from products and services contributing to the reduction of environmental burden to the Green Belt campaign (afforestation efforts). ・Continuously engaged in tropical forest restoration efforts and provided guidance on agricultural technology in Indonesia with an aim to offer a model for creating a sustainable society where local residents can coexist with the forest. ・Collaborated with group affiliates in conservation efforts in Ramsar sites. ・Explained environmental efforts at the Insurance School of Japan (ISJ) and raised awareness among international participants. (2) Efforts to control and reduce emissions in developing countries ・Donated money to an NGO engaged in reforestation activities in the Philippines in accordance with the number of eco-insurance certificates and web policy clauses selected. ・Planted mangroves in 9 Southeast Asian countries. (3) Activities at international conferences ・Became a signatory to the UNEP FI (United Nations Environment Programme Financial Initiative) ・As a group, became a signatory to the UN Global Compact. ・Attended COP 11 as chairman of the Keidanren Committee on Nature Conservation. ・Gave a speech at the Sixth EE+CR seminar held in New York in October 2014. ・In March 2015, co-hosted Third UN World Conference on Disaster Risk Reduction (WCDRR) Public Forum events with the Geneva Association and held a keynote session and three panel discussions. ・Participated in a high-level meeting hosted by the UNFCCC Secretariat. ・Hosted a side event at the Twelfth Conference of the Parties to the Convention on Biological Diversity held in Korea in October 2014 and reported on afforestation efforts in Indonesia. (4) Future efforts ・Scheduled to make international contributions in disaster risk reduction through the UNISDR, UNEP FI and the Geneva Association ・Acquire approval for new weather index-based insurance in Southeast Asia.
Japanese Bankers Association	(1) Efforts made in fiscal 2014 ・Promoted to the extent possible, “support for overseas environmental projects such as renewable energy development projects through loans and project finance, etc.” and “consideration of impacts on the local society and natural environment that may be induced by a project, when participating in a project finance scheme”. (2) Efforts to control and reduce emissions in developing countries

	・ Enhanced environment business networks by concluding Memorandums of Understanding with the purpose of introducing Japanese companies possessing environmental technologies to emerging countries, financing environmental projects, and providing know-how on emissions trading. ・Purchased World Bank Green Bonds (bonds issued to support projects implemented in developing countries for the purpose of preventing global warming). (3) Activities at international conferences ・Signed the UNEP Finance Initiative (UNEP FI) ・As a member of the Equator Principles Association Steering Committee, participated in the decision-making process of decisions. ・Signed the Natural Capital Declaration at Rio+20 and participated in WGs that discuss ways to incorporate natural capital in products and services, etc. ・Participated in the the GRI (Global Reporting Initiative) Global Conference as a member of the G4 multi-stakeholder committee (4) Future efforts ・32 banks will “continue current efforts”. 16 banks are determined to “make additions to and reinforce current efforts.” Some banks have listed engagement in “international project finance in renewable energy.”
Japan Securities Dealers Association	(1) Efforts made in fiscal 2014 ・Maintained ISO14001 certification ・Addressed EU ETS issues ・Planted trees in parks ・Cleaned beaches and parks (2) Efforts to control and reduce emissions in developing countries ・Supported afforestation and wind power projects in developing countries

4. Transportation Sector

Industry	Efforts to promote international contribution
The Scheduled Airlines Association of Japan	(1) Efforts made in fiscal 2014 ・Cooperated with domestic and overseas air traffic control authorities in proactive efforts to introduce advanced aircraft operations with high fuel efficiency (2) Efforts to control and reduce emissions in developing countries ・Other than reducing fuel consumption by aircrafts, promoted awareness raising among employees working at overseas branches by encouraging low-key emission mitigation and reduction efforts, including recycling and saving electric power. (3) Activities at international conferences ・Participated in environmental conservation division meetings of international airline industry organizations, including IATA, ICAO, and AAPA (Association of Asia Pacific Airlines), and made constructive proposals as a representative of East Asia, thus proactively promoting contribution to efforts to counter global warming. (3) International contribution employing environmental technologies and know-how to solve air and water pollution and other pollution issues ・Ensured promotion of introducing new aircraft models in international flights, which fly over national borders in the airspace of other countries.
The Japanese Shipowners’ Association	(1) Efforts made in fiscal 2014 ・Provided funds for the IMO GHG Study and continued to provide information for studies and research projects for CO2 emission reduction (2) Activities at international conferences ・Led the world in its first introduction of CO2 emission regulations for international maritime transport. Ships newly constructed in 2013 and beyond are required to meet CO2 emission standards separately determined according to vessel type. Regulations are to be gradually enhanced. ・Considered measures to reduce GHG emissions from international maritime transport in the IMO. The IMO will continue to collaborate with Japan and other governments in formulating effective reduction measures

〔Attachment 5〕

Examples of efforts to develop innovative technologies by participating industries

1. Industrial Sector

Industry	Examples of innovative technology development
The Japan Iron and Steel Federation	(1) Efforts made in fiscal 2014 ・ Promoted the CO2 Ultimate Reduction in Steelmaking Process by Innovative Technology for Cool Earth 50 (COURSE50) for iron ore reduction using hydrogen and the sequestration and capture of CO2 ・ Promoted the development of an innovative iron-making process that replaces a certain amount of ordinary coke with ferrocoke (an alternative reduction agent to coke that is produced by dry distillation of a molded mixture of low-grade coal and low-grade iron ore) in place of ordinary coke
Japan Chemical Industry Association	(1) Efforts made in fiscal 2014 ・Developed a inorganic separation membrane that will enable energy savings of more than 50% in the distillation process and conducted demonstration tests at real plants. In the future, the replacement of 13% of the distillation process at chemical plants is estimated to lead to energy savings of approximately 550,000 KL of crude oil equivalent (reductions by 1.46 million t-CO2e). ・Continued energy carrier projects addressing hydrogen manufacturing, transportation, storage and utilization, based on energy carrier technology (technology that enables transformation into liquid hydrogen and organic ammonia hydrides) ・ Developed fullerene, a nanocarbon material used in next-generation photovoltaic power generation, “organic photovoltaics (OPV)”. ・Continued facilitating the business development of resource-saving crop cultivation systems contributing to increased crop yield and quality and reduced environmental burden ・Completed joint pilot studies with other companies to manufacture hydrogen from sewerage sludge. ・Utilized high-purity semiconducting carbon nanotubes (CNT) Achieved world-leading mobility in single-walled carbon nanotube thin film transistors (CNT-TFT). Maximized semiconducting characteristics by combining single-walled semiconducting CNT with semiconductor polymers. ・Jointly developed with other companies non-edible bioplastics made from cellulose. Promoted efforts to develop chemical products made from biomass. ・Developed biopolymers of 100% plant origin ・Developed carbon fiber material for fuel cell vehicles a. Developed carbon fiber reinforced thermo plastics (CFRTP) for automobile parts; b. developed carbon paper for fuel cell stack electrodes; c. developed high-intensity carbon fiber for high-pressure hydrogen tanks ・ Established manufacturing technologies through the development of carbon fiber recycling technologies ・SiC semiconductors which represents next-generation power electronics a. Established technologies for mass production of SiC epitaxial wafers with a diameter of six inches b. Developed photosensitive heat-resistant resists for use in SiC transistor manufacturing processes
Japan Paper Association	(1) Efforts made in fiscal 2014 ・Successfully manufactured the first transparent continuous sheet of cellulose nano fiber (CNF) as a result of joint research between a member company and a diversified chemical company. Widely promoted CNF development, including the starting of operations at a pilot CNF manufacturing facility and the promotion of developing new applications, including thickeners and packaging at one company; and the provision of samples of various CNF initiated by another company. ・The local industrialization of nanocellulose led to the establishment of a local working

	group seeking to create a local industry. The WG comprises relevant ministries and agencies and local governments and
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention	(1) Efforts made in fiscal 2014 ・Promoted technology development for thermal power plants designed to operate at higher temperatures [gas turbines and coal gasification] and with higher efficiency by combining fuel cells. ・Participated in the Floating Offshore Wind Turbine Demonstration Project (Fukushima: 2MW and 7MW) and promoted efforts towards its commercialization. ・Promoted the establishment of a high efficiency social system using ICT (e.g. smart grids, ITS and BEMS/HEMS), developed a next-generation high efficiency lighting system and improved the energy efficiency at data centers
Japan Cement Association	(1) Efforts made in fiscal 2014 ・Implemented the Innovative Cement Manufacturing Process Fundamental Technology Development project under the initiative of member companies ・For the establishment of innovative energy-saving technologies that will enhance industry-wide competitiveness in the domestic cement industry, conducted joint research and development with the participation of 4 member companies on “energy-saving clinker production technology,” “simulation analysis of clinker production processes,” and “element technologies for developing clinker production process measuring technologies” from fiscal 2010 through fiscal 2014 in order to establish innovative fundamental technologies centered on lowering the temperature and reducing the amount of time required in the clinker production process, which consumes more than half of the total energy required in cement production.
Japan Automobile Manufacturers’ Association / Japan Auto-Body Industries Association	(1) Efforts made in fiscal 2014 ・Newly released 32 next-generation models (EV, PHEV, HEV, FCEV), including minor model changes ・Trends to expand production lines employing Wet on Wet coating and “hot-metal” processes (2) Future efforts ・Enhance efforts to expand charge stations and hydrogen stations, etc. for the diffusion of next-generation vehicles
Japan Mining Industry Association	(1) Efforts made in fiscal 2014 ・Launched the development of electrolytic copper recycling processes that will enable significant reductions in electric power consumption. The target is to reduce electric power consumption in the electrolytic refining process from 2,200kWh/t→300kWh/t. As copper production currently amounts to approximately 10,000t/year, 9,000 t-CO2/year of CO2 emissions will be reduced. (*) (2) Future efforts ・Continue energy-efficient electrolysis technology development by member companies and study ways to use hydrogen energy.
Japan Federation of Construction Contractors	(1) Efforts made in fiscal 2014 ・Formulated “Guidelines for biodiesel fuel use in the construction industry” for the industry-wide promotion of biodiesel as an alternative to light oil. ・Promoted the use of official comprehensive environmental assessment indices such as CASBEE; and surveyed the status of use among member companies and disclosed survey results. ・Compiled a report on “The status of promotion of environment-friendly design (construction) among member companies of the Japan Federation of Construction Contractors” and made it available to the public in a press release (February 25, 2015) and on the website. ・Compiled and distributed best practices in building design and construction applying element technologies for the decarbonization of buildings and quantitative assessment of environmental performance (CASBEE and energy saving performance) in “Best Practices of Sustainable Building.” In fiscal 2014, added 41 practices, thus providing a total of 323 practices. (2) Future efforts ・Engage in efforts to disseminate biodiesel as an alternative to light oil.

	・Engage in discussion on the wide promotion of low-carbon concrete. ・Develop element technologies for the decarbonization of buildings and promote activities to comprehensively and efficiently introduce various state-of-the-art technologies in buildings ・Further enhance the “Best Practices of Sustainable Building”
Japan Federation of Housing Organization	(1) Efforts made in fiscal 2014 ・Promoted Net Zero Energy Houses (ZEH) ・Supported and promoted the development of element technologies that will serve to improve the performance (higher intensity, higher durability) and extend the lifetime of housing
The Japan Rubber Manufacturers Association	(1) Efforts made in fiscal 2014 ・Contributed to fuel efficiency improvements by reducing vehicle tire noise and improving aerodynamic performance ・Reduced environmental burden by extending the life of conveyor belts and developing recycling technologies (2) Future efforts ・Decarbonize the entire supply chain including the procurement, manufacturing, use and disposal phases by developing high-efficiency production processes and facilities, and conducting studies on innovative material ・Tires: reduce rolling resistance, run-flat tires, lightweight tires ・Non-tire: develop energy-saving high-performance material, next-generation auto parts ・Apply retreading and other technologies to recycle products and waste
The Federation of Pharmaceutical Manufacturers’ Associations of Japan	(1) Efforts made in fiscal 2014 ・Shortened and optimized the reaction process in order to reduce the amount of raw material, reagents, solvents and energy used ・Downsized test analysis using organic solvents (liquid chromatography)
The Japan Aluminium Association	(1) Efforts made in fiscal 2014 ・Promoted collaboration among industry, academia and government for the application of horizontal aluminum recycling systems in automobile recycling, as such systems employing high-speed automatic sorting equipment using transmission X-rays, fluorescent X-rays and lasers have already been applied in sash recycling. (2) Future efforts ・Continue development of new aluminum recycling processes.
Japan Federation of Printing Industries	(1) Efforts made in fiscal 2014 ・Pursued higher efficiency in printing equipment (introduced high-efficiency motors and UV-LED curing light source) (2) Future efforts ・Check the status of operations regarding the effective use of waste heat from curing
Flat Glass Manufactures Association of Japan	(1) Efforts made in fiscal 2014 ・Renewed melting furnaces for higher efficiency in heat recovery; consolidated production by integrating kilns ・Continued corporate efforts to minimize energy loss by improving combustion technologies and combustion equipment. Applied new technologies including the partial use of Oxyfuel in burners for melting furnaces at member companies for higher combustion efficiency (2) Future efforts ・Develop fundamental state-of-the-art technologies including in-flight melting technologies that reduce CO2 emissions
Japan Soft Drink Association	(1) Efforts made in fiscal 2014 ・Shifted heat sources from “steam” to “methods using electrical heating”. (actual performance: 33% reduction in CO2 emissions) ・Introduced a system utilizing the natural “cold heat” of LNG, following fuel conversion (projected reductions: 100t of CO2 emissions due to reduced electric power consumption in the cooling tower)
Japan Dairy Industry	(1) Efforts made in fiscal 2014

Association	・Tested and considered the introduction of technology to operate CIP at lower temperatures ・Conducted field tests on new energy-saving equipment to check effectiveness prior to introduction (2) Future efforts ・Introduce technologies to operate CIP at lower temperatures ・Introduce energy-saving equipment once assured of their performance and optimize production facilities
The Japanese Electric Wire & Cable Makers' Association	(1) Efforts made in fiscal 2014 ・Conducted pilot tests on technologies that enable the effective use of electric power in superconducting cable systems. ・As niobium tin superconducting cables used for superconducting magnets are vulnerable to strain, their performance can be lowered when the flow of electricity is impeded. Therefore mitigated performance degradation by developing superconducting magnets made by winding superconducting into a coil which is heat-treated.
The Japan Bearing Industrial Association	(1) Efforts made in fiscal 2014 ・Developed bulbs and pressure reducing valves to supply high-pressure hydrogen to fuel cell vehicles (FCV) ・Developed system products for electric vehicles (EV) using motor control technologies. ・Developed and introduced bearings for the new series E7 and W7 railcars of the Hokuriku Shinkansen, thus contributing to improved energy efficiency.
Japan Petroleum Development Association	(1) Future efforts ・Develop technologies related to oil and natural gas development; conduct pilot tests; and construct and operate manufacturing plants ・Engage in efforts for the practical application of GTL (Gas to Liquids) and DME (Dimethyl Ether) technologies ・Conduct research on sustainable carbon circulation using methane production technologies
Japan Association of Rolling Stock Industries	(1) Efforts made in fiscal 2014 ・In May 2013, sold SiC (silicon carbide) -SBD (Schottky barrier dioide) power semiconductor modules for household appliances, industrial equipment, and railcar devices. In fiscal 2014, major private railway companies in the Kanto area renewing rolling stock adopted VVVF inverter devices with full SiC (Silicon Carbide) suitable for use in a DC1500V electrification system, therefore succeeding in the world's first practical application of an inverter for rolling stock employing a large-capacity 3.3kV power module rated at 1500A using only SiC. (2) Future efforts ・Further disseminated hybrid railcars and fuel cell-driven railcars ・Provide inverters using SiC power modules for railcars to railroad companies ・Seek commercialization in the next five years by optimizing the entire main circuit system to achieve a smaller, lighter and more energy-efficient system .

2. Energy Conversion Section

Industry	Examples of innovative technology development
The Federation of Electric Power Companies	(1) Future efforts ・Engage in technology development from the viewpoint of stable supply of electric power in the long term, the establishment of a nuclear fuel cycle will serve the purpose of effectively using energy resources and reduce environmental burden by reducing nuclear waste volumes. ・Develop IGCC (integrated coal gasification combined cycle), which promises higher power generation efficiency and a wider choice of coal types compared to conventional coal-fired thermal power generation. ・Proactively cooperate in large-scale pilot test led by the government an promote CCS-related technology development. By investing in Japan CCS CO., Ltd., which conducts

	feasibility studies and pilot tests, continue to cooperate in the government-led large-scale pilot test (CO2 Reduction Technology Demonstration Project). ・Promoted research and development for the establishment of next-generation power transmission and distribution networks, such as the smart grid, with government cooperation in assessing the impacts the large-scale introduction of solar power would have on the entire grid and verifying measures to stabilize the grid system. ・Promoted research and development for efficiency improvements in heat pump water heaters using CO2 refrigerants (Eco Cute) ・Conducted other measures for efficiency improvements and the downsizing of heat pump technologies and heat and electric power storage technologies ・Engaged in efforts to improve the user-friendliness of electric vehicles by performing test runs, developing chargers, and domestically and internationally standardizing fast chargers; and promoted the introduction of electric vehicles and plug-in hybrid vehicles in corporate fleets for business use.
Petroleum Association of Japan	(1) Efforts made in fiscal 2014 ・Promoted the development of Petroleomics technology, for the advanced use of heavy oil and applied the elemental technologies gained in improving existing equipment (e.g. analysis of the behavior of asphaletene which can cause the process to become stuck or reduce catalytic performance)
The Japan Gas Association	(1) Efforts made in fiscal 2014 ・Developed a compact and low-cost hydrogen generation unit (HYSERVE=300) with world-leading high efficiency to supply large amounts of hydrogen at hydrogen stations ・Developed gas-engine cogeneration systems to efficiently recover heated waste water from gas engines as steam. ・Developed a gas cogeneration system that efficiently recovers warm waste water from the gas engine as steam ・Developed “Ene-farm,” a residential fuel cell unit that has a new “grid-independent mode” capable of generating electricity even during power outages and supply power to household through a special outlet for use during power outages ・Developed a new “Ene-farm” residential fuel cell model for single-family homes by simplifying the system to reduce the number of parts assembled by 15% compared to conventional models, and thus reduce cost. ・In the development of a 250kW Solid Oxide Fuel Cell (SOFC)-Micro Gas Turbine. (MGT) hybrid system, conducted test runs using improved SOFC cells and acknowledged that higher output could be gained compared to conventional systems. (2) Future efforts ・Achieve efficiency improvements and cost reduction in cogeneration and fuel cells

3. Commercial Sector

Industry	Examples of innovative technology development
Telecommunications Carriers Association	(1) Efforts made in fiscal 2014 ・Realized the world’s first over-100-bit optical random access memory (RAM) by integrating ultrasmall optical memories based on photonic crystal nanocavities. This technology gives hope for the development of high-speed ICT and low energy consumption technologies. ・Developed a high-voltage direct current (HVDC) electric power‐feeding system. Compiled and published “Technical Requirements for High-voltage DC Power Feeding Interfaces of ICT equipment (TR).” (2) Future efforts ・Promote the development of technologies to save the electric power used by telecommunications equipment and ACHV facilities with an aim to reduce electricity consumption in telecommunication networks as a whole. Promote research on high-speed high-capacity technologies and high-efficiency operation technologies by

	converting to innovative fiber optics for further energy savings ・Promote the development of cloud technologies and high-efficiency technologies to feed power into telecommunications equipment with an aim to save energy at data centers and in telecommunications buildings ・Enhance the promotion to spread solid oxide fuel cells ・Contribute to the formulating the “best energy mix” by engaging in natural energy-based power generation, not limited to solar power but also including biomass and geothermal energy, for the stable supply of electric power
The General Insurance Association of Japan	(1) Efforts made in fiscal 2014 ・Sold pay-per-mile automobile insurance and contributed to the promotion of safe driving and reduced car accidents by utilizing Telematics (system that provides services and information by employing car navigation and GPS systems installed in cars and wireless telecommunication systems), thus reducing environmental burden. ・Led the industry in developing and disseminating web-based insurance clauses
Japan LP Gas Association	(1) Efforts made in fiscal 2014 ・Supported the development of CCS (Carbon dioxide Capture and Storage) technologies by investing in a research firm specializing in CCS
The Real Estate Companies Association of Japan	(1) Efforts made in fiscal 2014 ・Adopted district heating ・Interchanged energy among buildings ・Introduced renewable energy ・Shared information among buildings; held meetings on saving energy ・Addressed heat island issues by greening a wide area
Japan Securities Dealer Association	(1) Efforts made in fiscal 2014 ・Promoted the development and sales of funds linked with global warming countermeasures and environmental protection as a way from the Securities Industry to contribute to CO2 emission reductions (2) Future efforts ・Each company will continue to pursue existing efforts and consider new undertakings as required.

4. Transportation Sector

Industry	Examples of innovative technology development
The Japanese Shipowners’ Association	(1) Efforts made in fiscal 2014 ・Cooperated with the shipbuilding / marine industry in developing innovative technologies including LNG-fueled ships
The Scheduled Airlines Association of Japan	(1) Efforts made in fiscal 2014 ・Continuously renewed aircrafts to new models in accordance with their development by aircraft manufacturers ・Conducted pilot tests to operate aircrafts on next-generation bio-jet fuel (2) Future efforts ・Continue to reduce CO2 emission intensity by gradually renewing aircrafts to new models ・Proactively participate in working groups for committees under the Ministry of Economy, Trade and Industry and the Ministry of Land, Transport and Infrastructure on the introduction of bio-jet fuels.
The Association of Japanese Private Railways	(1) Future efforts ・Introduce electric power storage equipment that can change the kinetic energy of a car into electric power and temporarily store it.

Efforts made by participating industries beyond the four pillars

1. Industrial Sector

Industry	Efforts made by participating industries beyond the four pillars <Efforts to reduce non-CO2 emissions>
Japan Chemical Industry Association	・Reduced emissions of the four fluorocarbon alternatives by 20 million tons from 1995 levels
Japan Paper Association	・Engaged in management and reduction efforts in accordance with corporate status
Japan Cement Association	・Destroyed fluorocarbons at some cement plants
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention	・Promoted international inter-industry cooperation in the semiconductor and liquid crystal areas at the World Semiconductor Council (WSC) and the World LCD Industry Cooperation Committee (WLICC) ・ Achieved the target of controlling SF6 emissions "within 3% of net purchased volume of gas by 2005" through efforts to prevent leakage and improve recovery of electric insulation gas SF6 in accordance with JEMA's voluntary action plan
Japan Federation of Construction Contractors	・Used specialized companies to recover and destroy fluorocarbons
Japan Automobile Manufacturers Association, Inc. Japan Auto-Body Industries Association, Inc.	・Set the 2020 target GWP value at 850 for passenger vehicles and formulated a voluntary action plan which promoted the development and early introduction of air conditioning systems using new refrigerants. Also continued to prevent leaks when filling vehicles with gas.
Japan Federation of Housing Organizations	・Promoted the proper treatment of fluorocarbons
Lime Manufacture Association	・Decomposed fluorocarbons in lime burning furnaces
The Japan Rubber Manufacturers Association	・Prevented SF6 emissions and promoted the use of alternative gases for PFC and SF6
The Federation of Pharmaceutical Manufacturers' Associations of Japan	・Significantly reduced the use of HFCs in inhalation aerosols
Japan Federation of Printing Industries	・Continued checkups for HFC and PFC gas leaks and maintenance. Properly treated gases no longer required pursuant to relevant laws. ・Continued checkups for dielectric gas SF6 gas leaks and maintenance
Brewers Association of Japan	・Shifted to operations using non-fluorocarbon refrigerants (already achieved at 2 plants)
The Japanese Electric Wire & Cable Makers' Association	・Made efforts to prevent leakage and promote the recovery and reuse of SF6 and HFC in equipment checkups and repairs
Japan Dairy Industry Association	・Renewed equipment using fluorocarbons to non-fluorocarbon equipment. ・Set up organizational systems to perform maintenance and recordings of fluorocarbon leakings
Japan Sanitary Equipment Industry Association	・Gradually replaced 5.5 gases with fluorocarbon alternatives and non-fluorocarbon gases ・Promoted the use of high-efficiency gases in gas heat pumps and kilns. Initiated measurements of methane and N2O emitted during incineration.

Japan Soft Drink Association	・Adopted ammonia freezers and maintained stable operations ・Continued the deployment of non-fluorocarbon heat-pump vending machines ・Appropriately recovered and destroyed the fluorocarbons used in vending machines
The Shipbuilders' Association of Japan / The Cooperative Association of Japan Shipbuilders	・Continued not to use alternative fluorocarbons; properly treated fluorocarbons from air conditioners. ・Encouraged shifts to alternative fluorocarbons ・Adopted low-VOC coating
Japan Association of Rolling Stock Industries	・Prevented fluorocarbon leakages when performing regular checkups of equipment using specified fluorocarbons required by law. ・Performed proper treatment of alternative fluorocarbons. ・Ensures the performance of simplified check-ups of air conditioning and freezing/refrigerating equipment and regular check-ups; established operational rules.
Japan Petroleum Development Association	・Installed recovery equipment at tank truck shipping facilities ・Optimized crude oil storage tank operation procedures.

2. Energy Conversion Sector

Industry	Efforts made by participating industries beyond the four pillars <Efforts to reduce non-CO2 emissions>
The Federation of Electric Power Companies	・Formulated the Voluntary Action Plan for the Reduction of SF6 Emissions from Electric Power Business (April 1998) to reduce emission and recycle SF6 used in gas insulation equipment, etc.; and made efforts to reduce emissions. ・To address refrigerants used in in air conditioning equipment, engaged in efforts to reduce HFC emissions by preventing leakage and recovering and reusing HFCs when installing and repairing equipment which are used as ・Estimated N2O emissions from fuel combustion at thermal power plants to be 3% of total N2O emissions in Japan. Made every effort to reduce emissions by improving power generation efficiency.
The Petroleum Association of Japan	・Engaged in efforts to reduce N2O emissions by improving combustion efficiency.
The Japan Gas Association	・Promoted the diffusion of gas absorption water coolers/heaters that do not emit fluorocarbons.

3. Commercial Sector

Industry	Efforts made by participating industries beyond the four pillars <Efforts to reduce non-CO2 emissions>
Japan Chain Stores Association	・Controlled HFC emissions by taking measures to prevent leakage of refrigerants when performing check-ups of equipment, under the cooperation of equipment manufacturers and companies specializing in fluorocarbon recovery. ・Ensured the recovery of refrigerant when disposing equipment using HFC refrigerants.
Japan LP Gas Association	・Controlled CH4 and N2O emissions by installing floating roof tanks for volatile oil. ・Controlled NOx emissions by managing boilers and heating furnaces
The Real Estate Companies Association of Japan	・Properly treated fluorocarbon refrigerants and thermal insulation material using fluorocarbons.
Japan Foreign Trade Council, Inc.	・Conducted commercial recycling of fluorocarbon refrigerant gases ・Promoted sales of carbohydrate refrigerants to replace fluorocarbons.

4. Transportation Sector

Industry	Efforts made by participating industries beyond the four pillars <Efforts to reduce non-CO2 emissions>

Japan Federation of Coastal Shipping Associations	・Engaged in efforts to adopt refrigerants with small global warming impact and to prevent leakage of fluorocarbon refrigerants (used in air conditioning equipment and freezers on ships). ・Complied with domestic laws adopted based on IMO provisions
The Association of Japanese Private Railways	・As some train car control equipment and air conditioning equipment still use fluorocarbon refrigerants, replaced them with devices using water-based heat pipes when introducing new train car models. Also renewed equipment used in existing cars to non-fluorocarbon refrigerants. ・Promoted the adoption of heat pipes not using GHGs in cooling equipment for electric devices at substations

〔Attachment 7〕

Results of efforts made in head and local offices in non-commercial industries

Industry	Energy consumption per unit of floor area 〔1/㎡〕			
	FY2012	FY2013	FY2014	Relative to precious year
Japan Iron and Steel Federation	30.8	30.0	28.6	-4.7%
Japan Paper Association	23.8	24.3	23.3	-4.2%
Japan Cement Association	—	—	18.7	—
Lime Manufacture Association	26.4	25.2	23.5	-6.6%
The Federation of Pharmaceutical Manufacturers' Associations of Japan	31.9	31.8	30.9	-2.6%
Japan Aluminum Association	24.8	24.4	24.6	0.7%
Japan Soft Drink Association	38.2	37.6	37.7	0.1%
Japan Dairy Industry Association	52.6	50.4	41.2	-18.2%
The Japanese Electric Wire & Cable Makers' Association	29.4	27.6	28.1	1.7%
The Japan Bearing Industrial Association (fixed coefficient *1)	25.8	24.9	22.9	-7.9%
Japan Petroleum Development Association	36.0	38.9	37.0	-5.0%
Japan Copper and Brass Association	23.8	23.6	24.7	4.7%
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders	51.3	32.9	31.0	-5.8%
Limestone Association of Japan	34.5	33.0	32.4	-1.7%
Flour Millers Association	30.0	30.1	26.1	-13.6%
Japan Association of Rolling Stock Industries	30.6	29.5	28.9	-2.3%
The Japan Gas Association	45.9	44.4	38.9	-12.5%
The Association of Japanese Private Railways	40.4	37.7	36.0	-4.4%

*1 CO2 emission coefficient of electricity=3.05[t-CO2/10000kWh]

〔Attachment 8〕

Results of Logistics-related Efforts in non-Transportation Industries

Industry	Energy consumption per unit of volume transported [1/t-km]			
	FY2012	FY2013	FY2014	Relative to previous year
The Japan Iron and Steel Federation	0.0157	0.0155	0.0155	-0.1%
Japan Paper Association	0.0202	0.0201	0.0203	1.1%
Japan Automobile Manufacturers Association, Inc. Japan Auto-Body Industries Association, Inc.	0.0376	0.0378	0.0370	-2.0%
Japan Dairy Industry Association	0.0513	0.0512	0.0501	-2.1%
Limestone Association of Japan	0.0149	0.0149	0.0155	3.5%

〔Attachment 9〕

Members of the Evaluation Committee for

Keidanren's Commitment to a Low Carbon Society

as of March 15, 2016

Committee Chair

Dr. Yoji Uchiyama (Professor Emeritus, University of Tsukuba)

Members

Dr. Tadashi Aoyagi (Director and Technical Advisor, Universal Energy Institute, Inc.)

Ms. Kiyoe Asada (Member, Women's Energy Network (WEN) / consumer life advisor

Mr. Michio Ushioda (Guest Editor, The Mainichi Newspapers)

Mr. Kazuya Kojitani (Executive Director and Secretary General, Green Purchasing Network)

Ms. Yuko Sakita (Journalist and Environmental Counselor)

Mr. Nobuyuki Shintani (Assistant General Secretary, Japanese Trade Union Confederation)

Mr. Ikufumi Niimi (Professor, School of Law, Meiji University)

Dr. Ryuji Matsuhashi (Professor, Graduate School of Engineering, The University of Tokyo)

Dr. Kanji Yoshioka (Professor Emeritus, Keio University)