Keidanren
Policy & Action

KEIDANREN's Commitment to a Low Carbon Society Fiscal 2018 Follow-up Results Summary

＜Performance in fiscal 2017＞

[Final version]

-Tentative translation-

March 29, 2019

KEIDANREN

(Japan Business Federation)

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Introduction

The Paris Agreement, the new framework for global warming countermeasures took effect in November 2016, and at the 24th session of the Conference of the Parties (COP24) to the UN Convention on Climate Change (UNFCCC) held in December 2018, the Paris Agreement Work Programme was adopted for making the climate pact operational in 2020. In Japan, while taking measures toward the mid-term target (reducing greenhouse gas by 26% below fiscal 2013 levels by fiscal 2030), the government has launched discussions in fiscal 2018 on the Long-Term Strategy under the Paris Agreement as Growth Strategy with a view to the G20 Osaka Summit meeting in June 2019.

Japan's business community has actively joined the discussion on the government's long-term strategy[1] while taking measures to reduce greenhouse gas emissions both in Japan and overseas by soundly promoting Keidanren's Commitment to a Low Carbon Society (hereinafter, "Commitment"), which is considered to be a pillar of Japan's efforts towards achieving its mid-term target in the Plan for Global Warming Countermeasures (Cabinet Decision of May 2016).

Keidanren runs the PDCA cycle every fiscal year and it has promoted voluntary and proactive approaches on the part of industries and companies since it formulated the Keidanren Voluntary Action Plan on the Environment in 1997. As a result, it successfully reduced average emissions during fiscal 2008-2012 by 12.1% relative to fiscal 1990 levels, substantially overachieving the initial target (Figure A). Later in 2013, it expanded on the Keidanren Voluntary Action Plan and formulated the Commitment. According to the results of the interim review conducted in fiscal 2016, the period from fiscal 2013 through fiscal 2015 saw CO_2 emissions reduced in all four sectors, namely, the industrial, energy conversion, commercial and transportation sectors, collectively reducing emissions by approximately 4.7%. Therefore, the initiative has continued to make robust achievements (Figure B).

Furthermore, since global warming issues are not confined to national borders, they need to be resolved not only through emission reductions from domestic business operations but also through collaboration and cooperation among various actors to take

1 Keidanren has indicated its stance regarding long-term global warming countermeasures in discussions at the meeting on a Long- Term Strategy under the Paris Agreement as Growth Strategy and in the proposal below:
"Proposal on Japan's long-term growth strategy under the Paris Agreement - Business-led innovation to address challenges towards decarbonization –" (March 2019)
http://www.keidanren.or.jp/en/policy/2019/022.html

measures along value chains spread across Japan and overseas and through the development and deployment of innovative technologies. From this perspective, it has become more and more important for the Japanese business community to promote effective, transparent and reliable efforts through implementing the four pillars of the Commitment (Figure C).

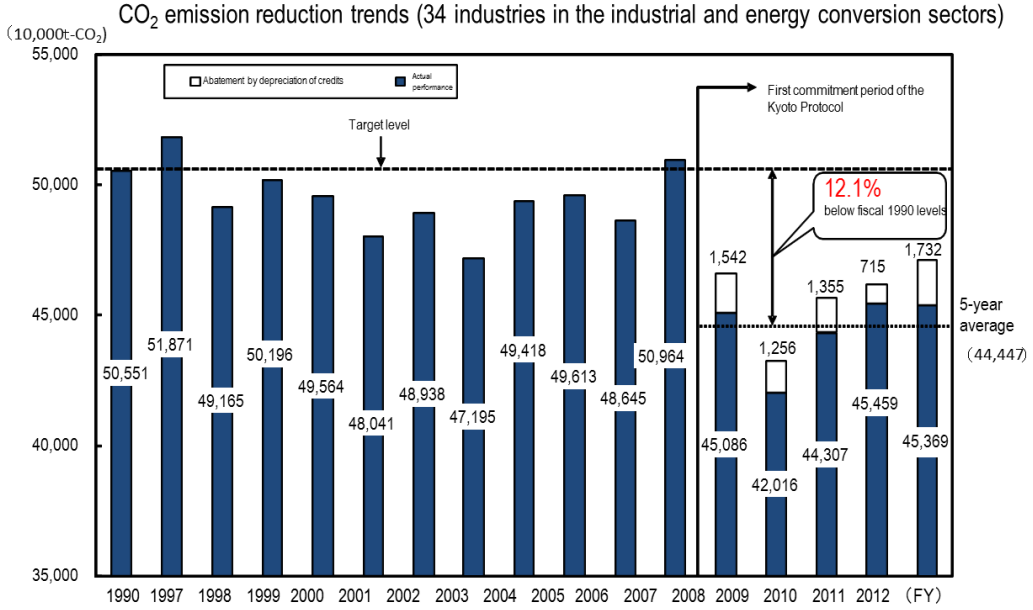
This Report [final version] will report on the follow-up results of all 62 participating industries. Details of individual efforts made by each industry can be found in the "Industry-specific Report."

Figure A. Accomplishments of the Keidanren Voluntary Action Plan on the Environment (Section on Global Warming)

— First Commitment Period of the Kyoto Protocol (2008-2012) —

◆ As a result of efforts under the Voluntary Action Plan on the Environment, emissions were reduced by 12.1% (61.04 million t-CO_2) relative to fiscal 1990 during the first commitment period of the Kyoto Protocol (fiscal 2008-2012).

CO_2 emission reduction trends (34 industries in 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.

Figure B. Accomplishments of Keidanren's Commitment to Low Carbon Society

— Fiscal 2013-2015 —

CO_2 emission trends (60 industries and companies)

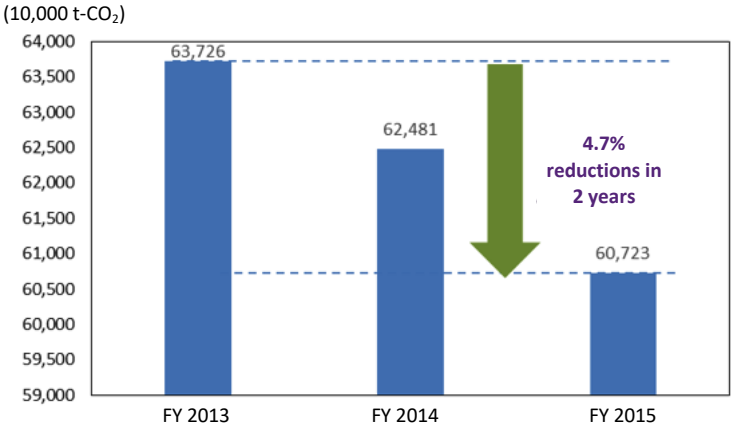


Figure C. Four pillars of Keidanren's Commitment to a Low Carbon Society

(1) 2030 emission reduction targets for domestic business operations

Participating industries establish targets based on certain assumptions including maximum deployment of BAT and proactive efforts to save energy.

<Efforts to achieve targets>

1) Introducing energy-saving facilities, processes and equipment, etc.: High-efficiency production facilities (incl. power plants), lighting and air conditioning, etc.
2) Recovery and effective use of energy: waste heat recovery, etc.
3) Fuel conversion: utilization of renewable energy, etc.
4) Operational improvements of facilities and equipment: introduction of advanced control equipment

(2) Strengthening cooperation with other interested groups

1) Participating industries also contribute to CO2 emission reductions through the provision of low-carbon products and services.

<Examples>

Improving the fuel economy of transportation equipment by utilizing lightweight and strong material (high tension strength steel, carbon fiber, etc.; promoting energy conservation in the household sector through the diffusion of high-efficiency household appliances; achieving society-wide efficiency by using ICT services, etc.

2) And also promote public campaigns to improve public awareness and knowledge of global warming.

<Examples>

Providing information on the environmental performance of a product; promoting eco-drive

(3) Promoting contribution at the international level

1) Participating industries contribute to CO2 reductions at the global level by proactively transferring Japan's advanced technologies and know-how to developing countries.

<Examples>

Emissions of approximately 0.65-1.02 billion t-CO2 (estimate) will be potentially avoided globally in 2030 due to the deployment of high-efficiency power generation by Japanese companies

2) Activity at international conferences, including cooperation towards the formulation of international standards and introduction of Japan's diverse global warming countermeasures.

(4) 2030 emission reduction targets for domestic business operations

Participating industries engage in developing and commercializing innovative technology with a medium- to long-term view reaching beyond 2030.

<Examples>

1) Developing energy-saving facilities, processes and equipment, etc.: energy-saving cement production processes, artificial photosynthesis, environment-friendly iron-making process, CCS etc.
2) Fuel conversion: biofuels, hydrogen energy, etc.
3) Developing low-carbon products and services: innovative materials (incl. utilization of biomass), ZEB/ZEH, next-generation vehicles, ITS, superconducting cables, etc.

(Reference) Developments in the Keidanren Voluntary Action Plan on the Environment and Keidanren's Commitment to a Low Carbon Society

Apr 1991	Announced the Keidanren Global Environment Charter
Jun 1992	UN Earth Summit (Rio de Janeiro)
Jul 1996	Announced the Keidanren Appeal on Environment intentions to map out Voluntary Action Plan on the Environment
Jun 1997	Announced the Keidanren Voluntary Action Plan on the Environment
Dec 1997	Adoption of the Kyoto Protocol
Dec 1998	First follow-up to the Voluntary Action Plan on the Environment (continued on an annual basis)
Jul 2002	Launched the Evaluation Committee for the Voluntary Action Plan on the Environment
Apr 2005	Cabinet Decision on the "Kyoto Protocol Target Achievement Plan"
Dec 2009	Announced the Commitment to a Low Carbon Society Phase I (Basic Concept)
Jan 2013	Formulated and announced the Commitment to a Low Carbon Society Phase I (2020 target)
Mar 2013	Interim policy on global warming (Global Warming Prevention Headquarters decision)
Apr 2013	Launched Keidanren's Commitment to a Low Carbon Society
Jul 2014	Invited industries to formulate action plans under the Keidanren Commitment to a Low Carbon Society Phase II (2030 target)
Apr 2015	Formulated and announced the Commitment to a Low Carbon Society Phase II (2030 target)
Jul 2015	Finalization of Japan's Intended Nationally Determined Contribution by the Japanese Government and submission to the UN
Dec 2015	Adopted the Paris Agreement
Nov 2016	Entry into force of the Paris Agreement

Pillar 1: Emission reductions from domestic business operations

(1) Performance in CO_2 emissions

Industries participating in the Commitment have set up and announced individual targets to reduce CO_2 emissions from their business operations. Each industry is engaged in efforts to fulfill their commitments to society.

It should be noted that since fiscal 2017, given the increasing importance of the electric power industry's follow-up on CO_2 emissions from its own business operations (electric power generation), when presenting the outcome of efforts in this report, CO_2 emissions before electric power distribution (direct emissions) are provided for CO_2 emissions from the energy conversion sector, including the electric power industry, and emissions after electric power distribution (indirect emissions) are provided for emissions from other sectors (industrial, commercial, transportation).

Furthermore, the CO_2 emission factor for electric power use (emission coefficient for electricity) used to calculate total CO_2 emissions in fiscal 2017 is a preliminary value[2].

① All sectors

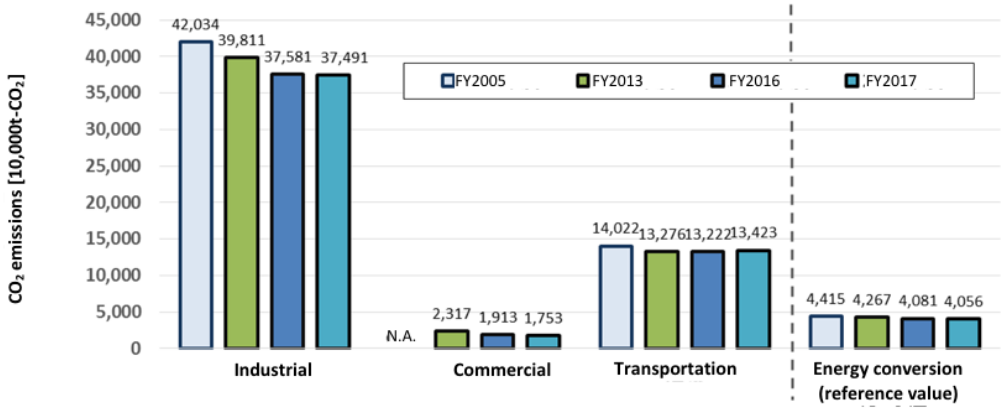
<u>CO_2 emission trends</u>

In fiscal 2017, CO_2 emissions were reduced in the industrial (-0.2%), energy conversion (-4.7%), and commercial (-8.4%) sectors, whereas emissions increased in the transportation sector (+1.5%). Relative to fiscal 2013, the baseline year for Japan's 2030 target, CO_2 emissions decreased in the industrial (-5.8%), energy conversion (-16.0%), and commercial (-24.6%) sectors, whereas emissions increased in the transportation sector (+1.1%), showing a similar trend to comparisons on a year on year basis (Figure 1).

[2] Basic emission coefficient (emission coefficient for actual emissions): 4.95t-CO_2/10,000kWh; post-adjustment emission coefficient: 4.96 t-CO_2/10,000kWh

Figure 1. CO_2 emissions by sector and rate of reduction (final count)

Emissions after electric power distribution

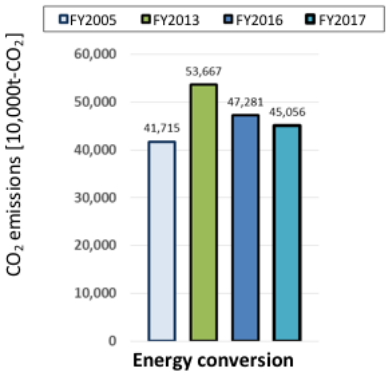


Sector	Target industries/ participating ind.	FY2017 emissions	Relative to FY2005	Relative to FY2013	Relative to previous fiscal year (FY2016)
Industrial	31/31 industries	374.91Mt-CO_2	-11.0%	-5.8%	-0.2%
Commercial	14/16 industries	17.53 Mt-CO_2		-24.6%	-8.4%
Transport	12/12 industries	134.23 Mt-CO_2	-8.2%	+1.1%	+1.5%

(NOTES)

- EMISSIONS FOR THE ENERGY CONVERSION SECTOR ARE PROVIDED FOR REFERENCE AS DIRECT CO_2 EMISSIONS BEFORE ELECTRIC POWER DISTRIBUTION ARE COUNTED FOR THE ENERGY CONVERSION SECTOR. HOWEVER, EMISSIONS AFTER ELECTRIC POWER DISTRIBUTION ARE NOT COVERED FOR THE ELECTRIC POWER COUNCIL FOR A LOW CARBON SOCIETY DUE TO THE STATUS OF DATA COLLECTION AFTER STRUCTURAL CHANGE.
- EMISSIONS FROM THE REAL ESTATE COMPANIES ASSOCIATION OF JAPAN (COMMERCIAL SECTOR) AND JAPAN BUILDING OWNERS AND MANAGERS ASSOCIATION ARE NOT INCLUDED DUE TO THE STATUS OF DATA COLLECTION.
- DATA FOR FISCAL 2005 HAVE BEEN COLLECTED BASED ON THE CALCULATION METHOD EMPLOYED UNDER THE COMMITMENT TO A LOW CARBON SOCIETY FOR COMPARISON PURPOSES. HOWEVER, EMISSIONS IN THE COMMERCIAL SECTOR IN FISCAL 2005 ARE NOT PROVIDED DUE TO THE STATUS OF DATA COLLECTION.
- CO_2 EMISSIONS REFLECTING THE DECREASE RESULTING FROM USING POST-ADJUSTMENT EMISSION COEFFICIENTS ARE PROVIDED IN ATTACHMENT.

Emissions before electric power distribution



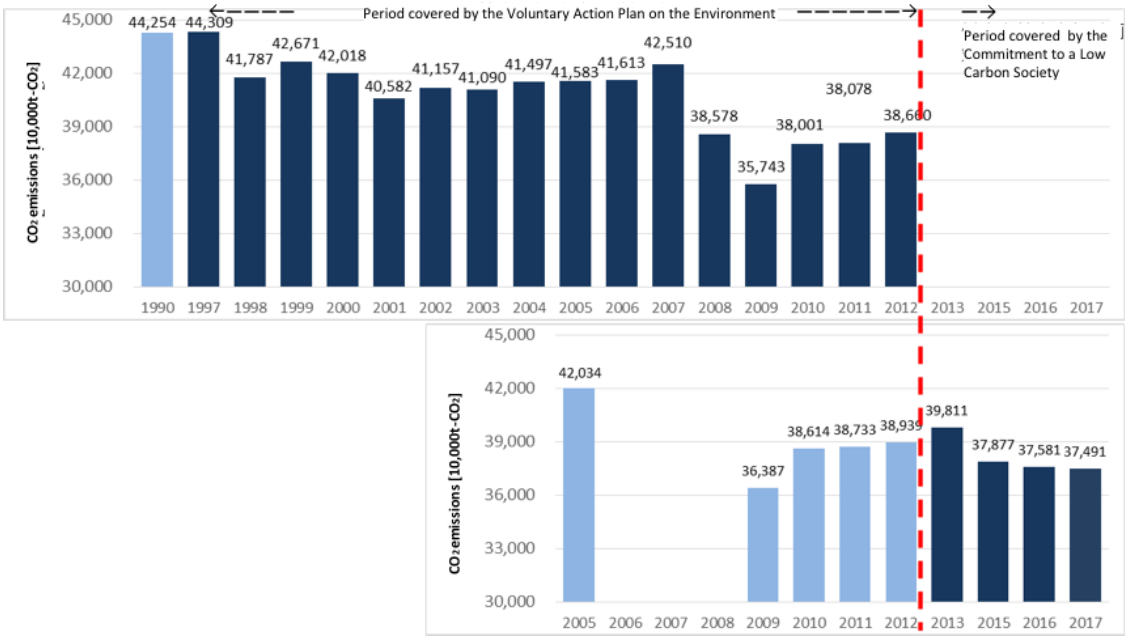
Sector	Target industries/ participating ind.	FY2017 emissions	Relative to FY2005	Relative to FY2013	Relative to previous fiscal year (FY2016)
Energy conversion	3/3 industries	450.56 Mt-CO_2	+8.0%	-16.0%	-4.7%

② Industrial Sector

CO_2 emission trends

In fiscal 2017, 374.91 million t-CO_2 of CO_2 (after electric power distribution) (11.0% below fiscal 2005 levels, 5.8% below fiscal 2013 levels, and 0.2% below previous fiscal year levels) were emitted, thus continuing to follow a downward CO_2 emission trend during the period covered by the Commitment since fiscal 2013 (Figure 2).

Figure 2. Emissions in the industrial sector
(after electric power distribution, final count)



(NOTES)

- THE KEIDANREN VOLUNTARY ACTION PLAN ON THE ENVIRONMENT COVERED THE PERIOD BEFORE FISCAL 2012, AND WAS SUCCEEDED BY KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY FROM FISCAL 2013.
- THE FIGURES FOR FISCAL 2005-2012 UNDER KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY HAVE BEEN CALCULATED AND PROVIDED AS REFERENCE. (THIS IS BECAUSE WITH THE IMPLEMENTATION OF KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY, CALCULATION METHODS, INCLUDING THOSE FOR EMISSION COEFFICIENTS FOR ELECTRIC POWER (SWITCHED FROM GENERATION-END EMISSION COEFFICIENTS TO RECEIVING-END EMISSION COEFFICIENTS) AND THOSE FOR INDUSTRIAL BOUNDARIES IN SOME INDUSTRIES, HAVE BEEN RENEWED.)

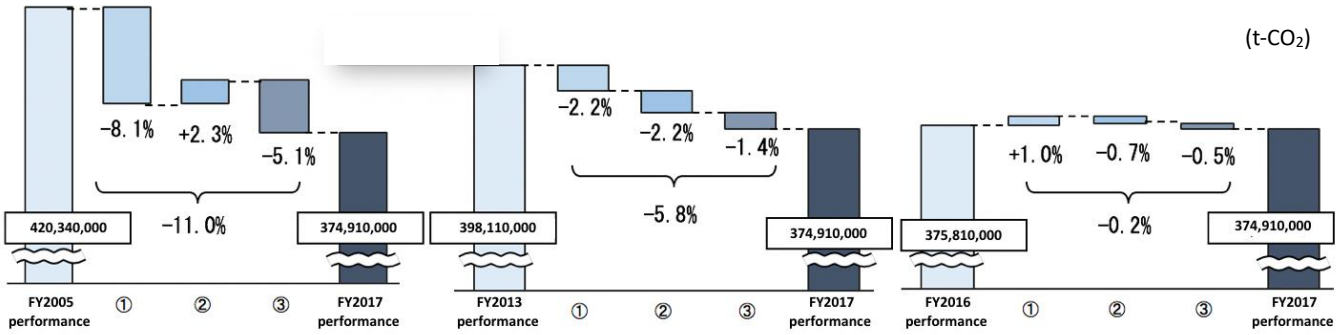
Factor analysis[3]

A factor analysis of the causes that led to changes in CO_2 emissions in the industrial sector (Figure 3) revealed that since fiscal 2005, CO_2 emissions due to "③ change in energy consumed per unit of economic activity" have followed a decreasing trend (5.1% below fiscal 2005 levels, 1.4% below fiscal 2013 levels, 0.5% below previous fiscal year levels).

Relative to previous year levels, CO_2 emissions increased due to "① change in economic activity" (+1.0%), while emissions decreased due to "② change in CO_2 emission factor" and "③ change in energy consumed per unit of economic activity" (-0.7% and -0.5%, respectively). As a result, overall CO_2 emissions were slightly reduced (-0.2%).

Figure 3. Factors of change in CO_2 emissions (after electric power distribution, final count) in the industrial sector

①Change in economic activity
②Change in CO_2 emission factor (decarbonization of energy)
③Change in energy consumed per unit of economic activity (energy savings)



(NOTE) ・ DUE TO THE ROUNDING OF VALUES TO TWO DECIMAL PLACES, TOTALS MAY DIFFER FROM THE SUM OF ①, ② AND ③ INDIVIDUAL ITEMS.

An observation of industry-specific results reveals that while increased overseas demand and automation needs due to labor shortage led to increased CO_2 emissions due to "① change in economic activity," many industries reduced CO_2 emissions due to "③ change in energy consumed per unit of economic activity" as a result of improved

3 In order to identify the factors that contributed to changes in CO_2 emissions, factors have been broken down to the following three factors in line with the Kaya Identity: "① change in economic activity," "② change in CO_2 emission factor (change in CO_2 emission factor for energy)," and "③ change in energy consumed per unit of economic activity (change attributable to energy savings)." For example, declines in values for ① would imply that CO_2 emissions were reduced due to less economic activity, declines in ② would imply that CO_2 emissions were reduced due to decarbonization of energy, and declines in ③ would imply that CO_2 emissions were reduced as a result of energy saving efforts.

efficiency with committed energy conservation and increased production, as well as the introduction of BAT equipment when refurbishing or updating facilities. Furthermore, in energy-intensive industries, such as non-ferrous metal refining industries, which are susceptible to CO_2 emission factors, emissions were also reduced due to "② change in CO_2 emission factor" as a result of the utilization of renewable energy and advancements in cutting-edge high-efficiency thermal power plants, in addition to increases in nuclear power-sourced electricity after restarting some nuclear power plants.

Major efforts made in fiscal 2017

The industrial sector's efforts include developing high-efficiency equipment, improving operations and processes, energy conversion and waste energy recovery (Table 1).

Many industries have introduced high-efficiency equipment, with many renewing existing equipment to cutting-edge high-efficiency production facilities, HVAC[4] systems, and lighting equipment. However, in terms of introducing high-efficiency equipment, some industries have reported a decline in the cost effectiveness of investment because industries have ceaselessly engaged in such efforts, and there have also been reports that the temperature rise of recent summers have inevitably increased air conditioning costs in cleanrooms where temperature and humidity management is required. In response to such circumstances, the electrical and electronics industry, for example, has taken hybrid energy saving measures, visualizing energy use through energy measurement management, introducing high-efficiency equipment, improving production processes, and building an ideal Factory Energy Management System (FEMS).

[4] Heating, Ventilation, and Air Conditioning

Table 1. Major efforts made in the industrial sector in fiscal 2017

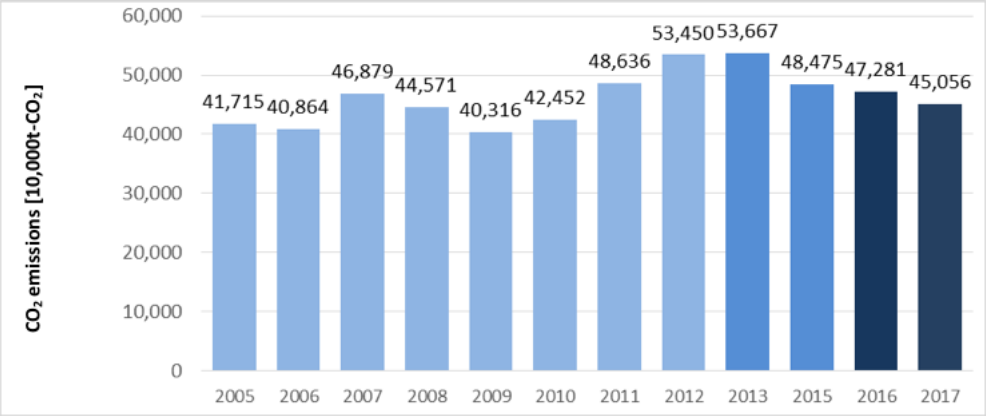
Improvement of efficiency of facilities	
・ Renewal to high-efficiency production-related facilities (transformers, motors, pumps, compressors, coke ovens, dust collectors, heavy machineries, facilities to fill cans at room temperature, etc.) ・ High-efficiency air conditioning ・ Renewal to LEDs	・ Application of thermal insulation to equipment and piping ・ Steamless / airless processes ・ Inverters (motors, fans, pumps, turbulators, etc.)
Improvement of operations and processes	
・ Reviewing facility and equipment operations and control methods (startup, suspension, scheduling, intermittent operations, number of equipment, etc.) ・ Changing baselines and settings (temperatures, frequency of ventilation, level of cleanliness, brightness, hours of operation, etc.)	・ Consolidation and reinforcement of proceses ・ Thermal insulation and prevention of water leakages and other leakages ・ Electric power monitoring ・ Improvements in pipe routing ・ Installing high-speed coating and drying facilities
Fuel conversion / recovery of waste energy	
・ City gas, LPG, propane gas ・ Utilization of waste heat and cold energy ・ Electrification ・ Biomass boilers ・ Solar and wind power generation facilities	・ Heat exchanger ・ Waste heat recovery ・ Cogeneration (Combined Heat Power)

③ Energy conversion sector

CO_2 emission trends

In fiscal 2017, the three participating industries of the energy conversion sector collectively emitted 450.56 million t-CO_2 of CO_2 (before electric power distribution) (8.0% above fiscal 2005 levels, 16.0% below fiscal 2013 levels, and 4.7% below previous fiscal year levels), thus continuing to follow a downward CO_2 emission trend (Figure 4).

Figure 4. CO_2 emissions in the energy conversion sector (before electric power distribution, final count)



(NOTES)

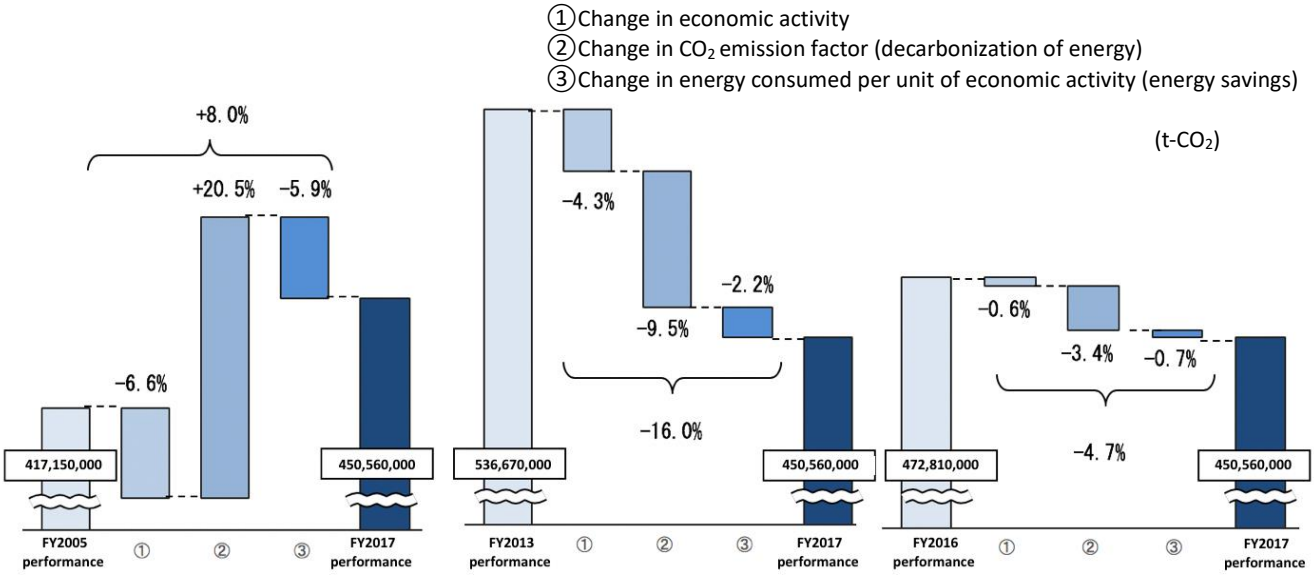
- THE PERIOD COVERED BY KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY STARTS FROM FISCAL 2013. THE FIGURES FOR FISCAL 2005-2012 ARE PROVIDED AS REFERENCE. FIGURES FOR THE KEIDANREN VOLUNTARY PLAN ON THE ENVIRONMENT ARE NOT PROVIDED AS EMISSIONS BEFORE ELECTRIC POWER DISTRIBUTION HAVE NOT BEEN CALCULATED.
- DATA FOR FISCAL YEARS THROUGH 2014 AND AFTER 2015 ARE DISCONTINUOUS DUE TO DATA DIFFERENCE (SINCE THE ELECTRIC POWER COUNCIL FOR A LOW CARBON SOCIETY WAS ESTABLISHED IN FISCAL 2015, THE DATA FOR FISCAL YEARS THROUGH FISCAL 2006 REPRESENT ONLY THE FEDERATION OF ELECTRIC POWER COMPANIES OF JAPAN (FECP), AND THE DATA FOR FISCAL 2007-2014 INCLUDE FECP AND PPS. THESE DATA ARE PROVIDED AS REFERENCE. THE FIGURES USED FOR THE JAPAN GAS ASSOCIATION THROUGH 2012 HAVE BEEN DERIVED FROM THE VOLUNTARY ACTION PLAN ON THE ENVIRONMENT WHICH COVERS DIFFERENT BOUNDARIES.

Factor Analysis

A factor analysis of the causes that led to changes in CO_2 emissions (before electric power distribution) in fiscal 2017 (Figure 5) revealed that relative to fiscal 2005, CO_2 emissions increased (+8.0%) owing mainly to "② change in CO_2 emission factor" (+20.5%). This because the electric power industry has continued to rely on the intensive operation of thermal power generation plants to secure electric power supply capacity, given the prolonged suspension of nuclear power plants after the Great East Japan Earthquake.

Relative to fiscal 2013 and to the previous fiscal year, CO_2 emissions decreased due to "② change in CO_2 emission factor" (-9.5% and -3.4%, respectively) and this contributed to overall CO_2 emission reductions (-16.0% and -4.7%, respectively). This is attributable to increased nuclear power generation as a result of restarting some nuclear power plants, the utilization of renewable energy and the deployment of cutting-edge high-efficiency thermal power generation facilities.

Figure 5. Factors of change in CO_2 emissions (before electric power distribution, final count) in the energy conversion sector



(NOTES)

- COMPARISONS WITH FISCAL 2005 AND FISCAL 2013 LEVELS ARE PROVIDED FOR REFERENCE BECAUSE OF THE DISCONTINUITY OF THE DATA DUE TO THE INCLUSION OF DIFFERENT SOURCES FOR THE ELECTRIC POWER INDUSTRY.

Major efforts made in fiscal 2017

The electric power industry promotes the decarbonization of electricity through the utilization of nuclear power on the major premise of ensured safety and the utilization of renewable energy, and the provision of energy-saving and CO_2-reducing services, such as energy efficiency consulting, and deployment of high-efficiency boilers, etc., as well as improving the efficiency of thermal power generation (Table 2).

The petroleum industry continues to compile a diversity of individual measures, including pursuing more advanced and more efficient operations and management at refining plants and utility plants, and adopting high-efficiency devices and catalysts. The industry also proactively uses government support programs for the rational use of

energy, and in fiscal 2017, six projects, including an energy-saving project that increases propane treatment at ethylene production plants.

The city gas industry promotes CO_2 emission reductions by renewing pumps and compressors and replacing conventional facilities with facilities that use LNG cold energy to generate power, as well as altering facility operations so that BOG (boil-off-gas) released from LNG storage tanks can be processed as feedstock for city gas.

Table 2. Major efforts made in the energy conversion sector in fiscal 2017

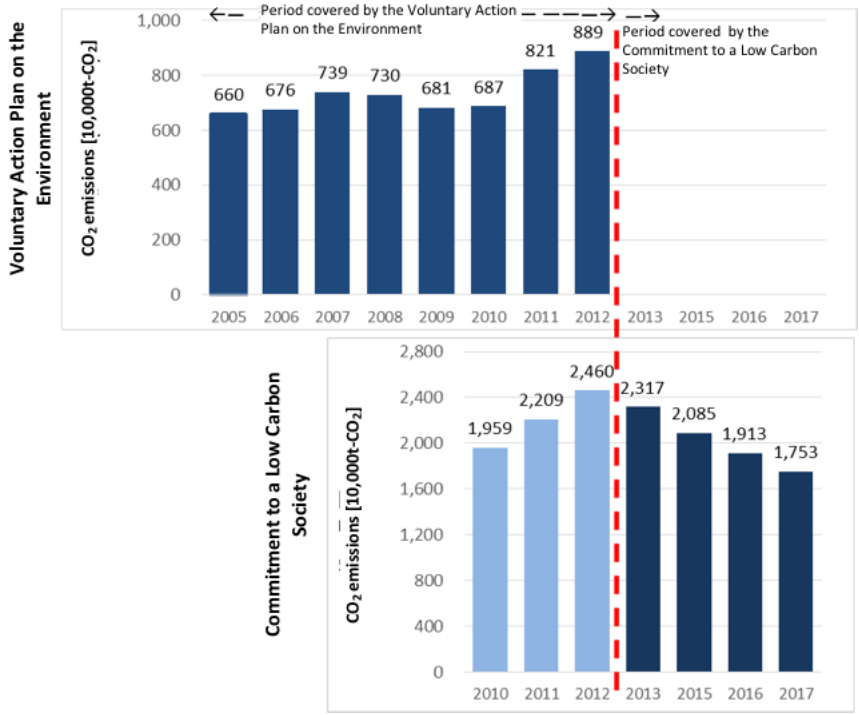
Introduction of high-efficiency facilities	
・ LNG combined cycle power generation ・ Ultra-supercritical coal-fired thermal power generation, etc. ・ Waste heat/waste energy recovery facilities	・ Open rack vaporizer (ORV) ・ Cogeneration ・ Cold heat power generation
Creation of low carbon emission or zero emission energy	
・ Nuclear power on the major premise of ensured safety	・ Hydro, geothermal, solar, wind, and biomass power generation
Improvement of operational methods	
・ Addressing wind and solar output variability ・ Highly sophisticated operation and management of refining and utility equipment at oil refineries	・ Processing BOG as feedstock for city gas ・ Reviewing the operation and use of pumps, etc.
Provision of services	
・ Environmental household account books ・ Electric power visualization service ・ Energy-saving consulting	・ Deploying high-efficiency water heaters ・ Hosting campaigns and events to raise awareness of energy conservation

④ Commercial sector

CO_2 emission trends

In fiscal 2017, the 14 participating industries of the commercial sector collectively emitted 17.53 million t-CO_2 of CO_2 (after electric power distribution) (24.6% below fiscal 2013 levels and 8.4% below previous fiscal year levels). Hence, after peaking in fiscal 2012, CO_2 emissions have followed a declining trend (Figure 6).

Figure 6. CO_2 emissions in the commercial sector (after electric power distribution, final count)



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- WITH THE IMPLEMENTATION OF KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY, CALCULATION METHODS HAVE BEEN RENEWED (EMISSION COEFFICIENTS FOR ELECTRIC POWER WERE SWITCHED FROM GENERATION-END EMISSION COEFFICIENTS TO RECEIVING-END EMISSION COEFFICIENTS; AND INDUSTRIAL BOUNDARIES WERE CHANGED IN SOME INDUSTRIES).
- EMISSIONS FROM THE REAL ESTATE COMPANIES ASSOCIATION OF JAPAN ARE NOT INCLUDED DUE TO UNSATISFACTORY DATA COLLECTION STATUS.

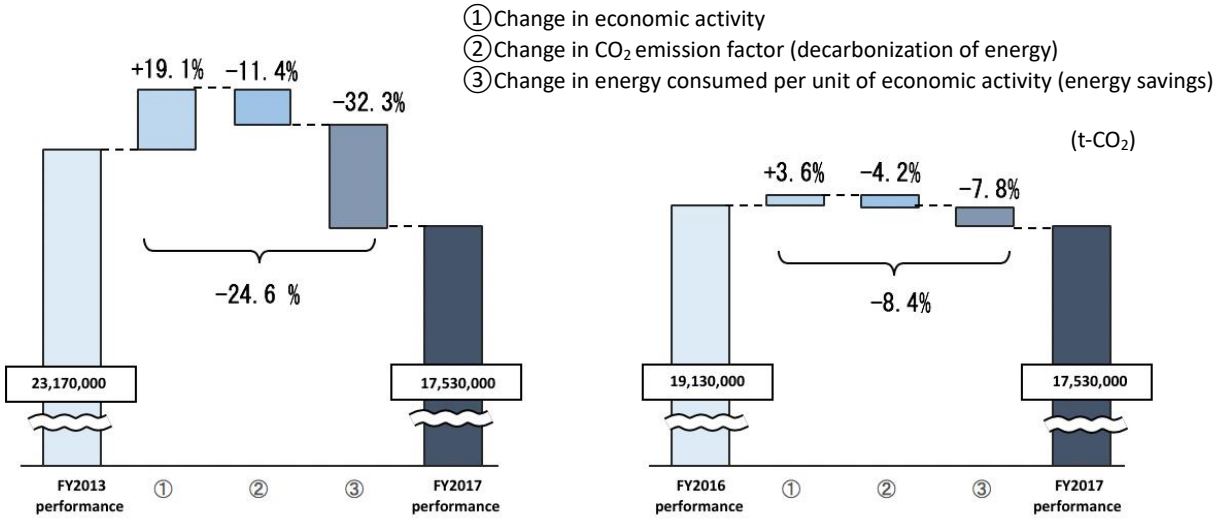
Factor analysis

A factor analysis of the causes that led to changes in CO_2 emissions in the commercial

sector in fiscal 2017 (Figure 7) revealed that since fiscal 2013 and the previous fiscal year, CO_2 emissions increased due to "① change in economic activity" (+19.1% and +3.6%, respectively). However, CO_2 emissions decreased due to "② change in CO_2 emission factor" (-11.4% and -4.2%, respectively) and to "③ change in energy consumed per unit of economic activity" (-32.3% and-7.8%, respectively). As a result, overall emission reductions in fiscal 2017 were 24.6% below fiscal 2013 levels and 8.4% below previous fiscal year levels.

Amid increasing economic activity due to the deployment of new products that require temperature management and development of local infrastructure to outsource administrative services, etc., the commercial sector has continued to take measures to save energy, including introducing LED lighting and systems that automatically turn off the lights, as well as replacing conventional air conditioning equipment with high-efficiency air conditioners. Furthermore, in addition to increased nuclear power due to the restarting of some nuclear power plants, the utilization of renewable energy and the introduction of cutting-edge high-efficiency thermal power plants have also advanced the decarbonization of electric power, thus achieving net reductions.

Figure 7. Factors of change in CO_2 emissions (before electric power distribution, final count) in the commercial sector



Major efforts made in fiscal 2017

The commercial sector has continued to engage in CO_2 emissions reduction through introducing energy-saving and high-efficiency equipment and operational improvements (Table 3).

In the telecommunications industry, the diffusion of online shopping and emerging services, such as SNS, has increased servers and routers, and thus electric power consumption is expected to continue to increase. However, the industry is taking measures to reduce electric power use by introducing direct current power sources for servers and routers, and telecommunications equipment with high energy-saving performance, as well as by efficiently operating facilities.

Furthermore, the banking industry has achieved electric power savings by not only replacing conventional lighting with LEDs and updating HVAC equipment but also renewing HVAC equipment at business centers and computer rooms.

Table3. Major efforts made in the commercial sector in fiscal 2017

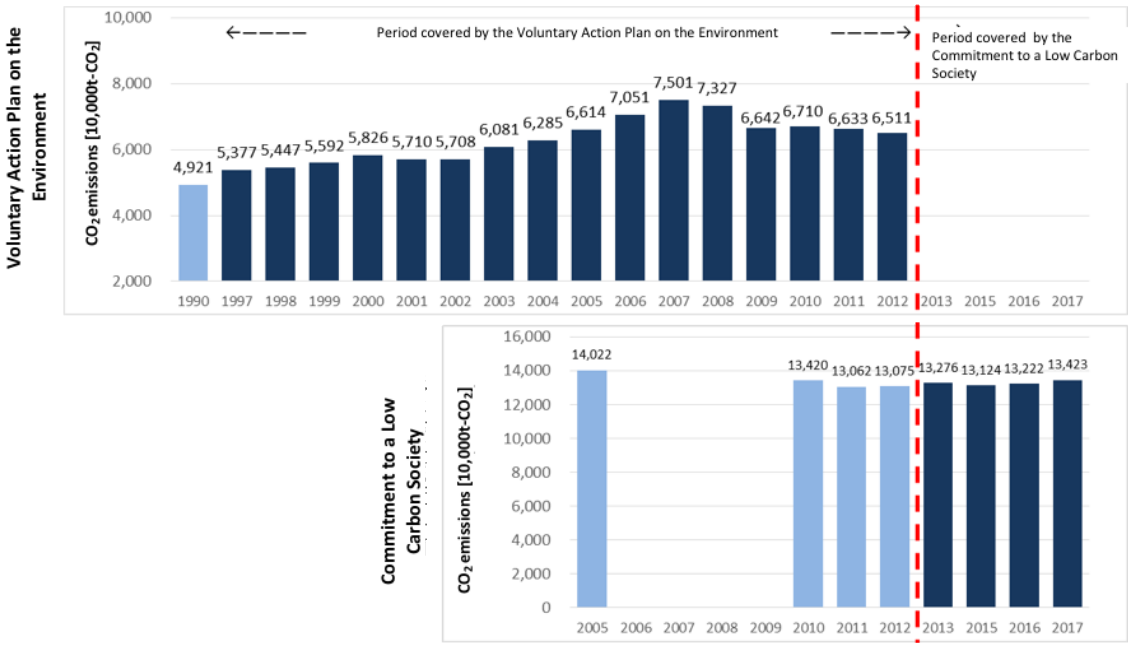
Introduction of energy-saving high-efficiency facilities	
・ High-efficiency HVAC systems ・ Exterior air barriers ・ Packaged air conditioners with air-cooled heat pumps ・ High-insulation window glass ・ Connection of servers and routers to DC power sources	・ Introduction of high-efficiency wireless bases stations ・ LED lighting ・ Automatic light control system ・ Energy-efficient elevators ・ Hybrid cars ・ High-efficiency freezers ・ Environment-friendly delivery vehicles
Improvement of operations	
・ BEMS (Building Energy Management System), smart meters ・ Introduction of automatic control systems in heat sources, air conditioning and lighting equipment ・ Improvement of air conditioning airflow ・ Shorter operation hours of perimeter air conditioning	・ Telematics devices for corporate vehicles ・ Consolidation of floor area by relocating main office ・ Energy-saving control systems for elevators
Fuel conversion	
・ Solar power generation	

⑤Transportation sector

CO_2 emission trends

In fiscal 2017, the 12 participating industries of the transportation sector collectively emitted 134.23 million t-CO_2 of CO_2 (after electric power distribution) (8.2% below fiscal 2005 levels, 1.1% above fiscal 2013 levels and 1.5% above previous year levels), continuing to follow a slightly increasing trend (Figure 8).

Figure 8. CO_2 emissions in the transportation sector (after electric power distribution, final count)



(NOTES)

- THE KEIDANREN VOLUNTARY ACTION PLAN ON THE ENVIRONMENT COVERED THE PERIOD BEFORE FISCAL 2012, AND WAS SUCCEEDED BY KEIDANREN'S 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 FISCAL 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.
- WITH THE IMPLEMENTATION OF KEIDANREN'S COMMITMENT TO A LOW CARBON SOCIETY, CALCULATION METHODS HAVE BEEN RENEWED (EMISSION COEFFICIENTS FOR ELECTRIC POWER SWITCHED FROM GENERATION-END EMISSION COEFFICIENTS TO RECEIVING-END EMISSION COEFFICIENTS; INDUSTRIAL BOUNDARIES CHANGED IN SOME INDUSTRIES).
- OVERSEAS EMISSIONS ARE INCLUDED FOR THE JAPANESE SHIPOWNERS' ASSOCIATION AND A PART OF THE SCHEDULED AIRLINES ASSOCIATION OF JAPAN

Factor analysis

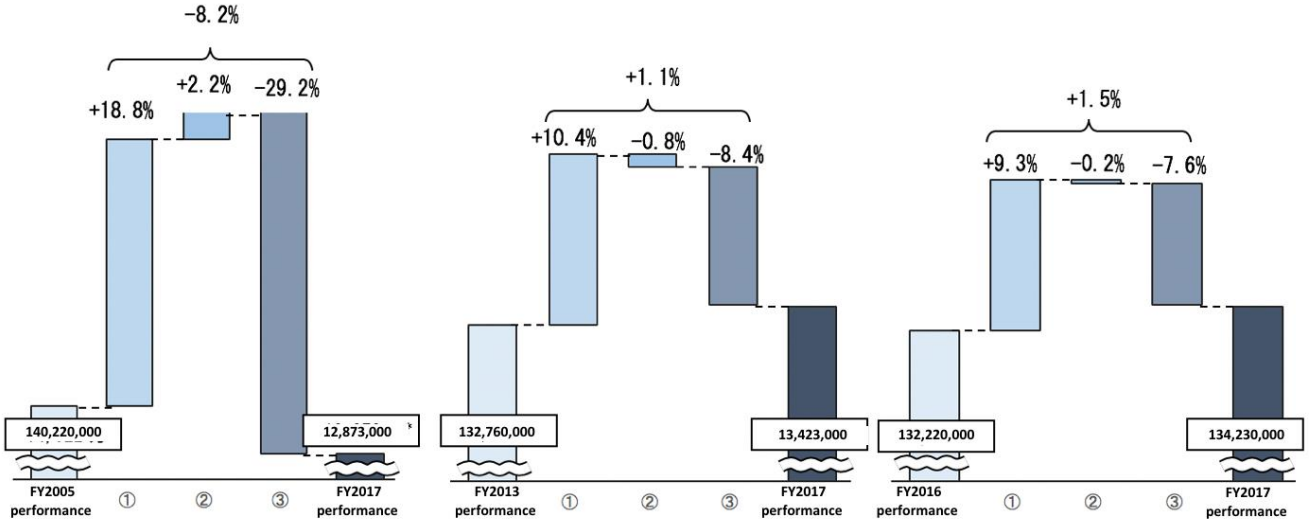
A factor analysis of the causes that led to changes in CO_2 emissions in the transportation sector in fiscal 2017 (Figure 9) revealed that relative to fiscal 2013 and the previous fiscal year, CO_2 emissions increased due to "① change in economic activity"

(+10.4% and +9.3%, respectively) while CO_2 emission reductions owing to "② change in CO_2 emission factor" (-0.8% and -0.2%, respectively) and "③ change in energy consumed per unit of economic activity" (-8.4% and -7.6%, respectively) were small; and therefore, CO_2 emissions increased (+1.1% and +1.5%, respectively).

In contrast, relative to fiscal 2005, CO_2 emissions were reduced significantly due to "③ change in energy consumed per unit of economic activity" (-29.2%); and as a result, emissions were reduced as a whole (-8.2%).

Industrial efforts to introduce energy-saving vessels and new models and equipment that contribute to CO_2 emissions reduction have led to a declining trend in CO_2 emissions attributable to "③ change in energy consumed per unit of economic activity." However, CO_2 emissions have increased due to "① increased economic activity," including increased cargo in the international shipping industry, recovery in demand in the trucking and airline industries after the Lehman Brothers collapse, and increased distances traveled in the railway industry as a result of opening new railway lines and planning train schedules in response to demand. Hence, the transportation sector as a whole is following a rising trend in CO_2 emissions.

Figure 9. Factors of change in CO_2 emissions (after electric power distribution, final count)



* Figures for fiscal 2005 do not include data for the Association of Japanese Private Railways Company.

(NOTE) ・DUE TO THE ROUNDING OF VALUES TO TWO DECIMAL PLACES, TOTALS MAY DIFFER FROM THE SUM OF ①, ② AND ③ INDIVIDUAL ITEMS.

Major efforts made in fiscal 2017

The transportation sector not only continues to introduce energy-saving vehicles and equipment and replace conventional models, it engages in CO_2 emissions reduction efforts by installing LED lighting and high-efficiency HVAC systems, etc. at station platforms and other facilities (Table 4).

Furthermore, the railway industry is advancing the introduction of railcars with inverter devices featuring SiC (silicon carbide) power semiconductors to reduce electric power loss, and the airline industry has introduced new aircraft models with high fuel efficiency. By deploying cutting-edge technologies, industries have achieved energy efficiency levels much higher than conventional equipment.

Table 4. Major efforts made in the transportation sector in fiscal 2017

Introduction and operation of high-efficiency international and domestic vessels	
・ Low frictional resistance design, coating and devices ・ High combustion efficiency engines ・ Effective use of waste heat ・ Utilization of weather routing and navigating systems ・ Slow navigation ・ Inauguration of new high-efficiency vessel	・ Cleansing vessels, coating, propeller polishing ・ Thorough maintenance and cleansing ・ Use of combustion improvers ・ Suspension of unnecessary pumps when in harbor ・ Energy-saving settings for lighting and air conditioning ・ Utilization of shorepower ・ Optimization of fuel oil and ballast water
Introduction and operation of high-efficiency vehicles	
・ CNG vehicles, hybrid vehicles ・ Devices to support no idling	・ Dashboard cameras
Introduction and operation of high-efficiency aircrafts	
・ New high fuel-efficiency aircraft models ・ Firm implementation of engine water-washing schedule	・ Reducing vessel load ・ Reviewing fuel load
Introduction and operation of high-efficiency railcars	
・ SiC semiconductors ・ Hybrid engines ・ Regeneration brakes/VVVF inverters ・ Introduction of energy-saving railway cars, energy-saving construction ・ Lightweight bogies using carbon fiber plastics	・ Use of LED for railcar interior lighting and indicators ・ Dimming of railcar interior lighting ・ Renewal of platform and station building lighting to LED ・ Introduction of ground-level facilities featuring low electric power loss

(2) Progress made toward 2020 target and probability of achievement

A survey on the rate of progress made and the probability of successfully achieving Phase I (fiscal 2020) targets (Table 5) revealed that 45 industries of the 62 participating industries find that they will be able to meet their targets.

In terms of the progress made to date, 41 industries had already achieved their targets in fiscal 2017. This is attributable to the introduction of LED and high-efficiency air conditioning, among other energy-saving equipment and cutting-edge facilities, as well as improvements in operational processes.

While 7 industries renewed their targets after the interim review in fiscal 2016, in fiscal 2018 follow-up, an additional 6 industries renewed their targets to higher values and 9 other industries are in the process of reconsidering their targets.

Some industries that achieved their targets in fiscal 2017 have not renewed their targets. This is because with the target year only 3 years away, there is limited time to set up new targets and pursue the PDCA cycle. It is also difficult to change investment plans for which decisions have already been made. These industries will maintain their current targets for fiscal 2020, but continue to take measures with a view to long-term reductions, enhancing their efforts toward their fiscal 2030 targets and reviewing their fiscal 2030 targets based on the rate of progress. Industries that have yet to reach their targets remain committed to implementing energy-saving measures, etc., amid uncertainties regarding the future business environment.

In order to ensure the effectiveness of Keidanren's Commitment to a Low Carbon Society, industries are required to implement effective measures through the PDCA cycle, analyze and account for their validity.

Table 5. Probability of Phase I (fiscal 2020) target achievement and rate of progress in fiscal 2017

Believes target can be achieved	Industrial Sector	☆ Japan Petroleum Development Association	*(173%)※*	Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention	(265%)
		☆ Limestone Association of Japan	*(132%)※*	Japan Cement Association	(218%)
		★ Japan Sanitary Equipment Industry Association	*(120%)※*	Japan Federation of Printing Industries	(215%)
		★ Japan Copper and Brass Association	*(105%)※*	Brewers Association of Japan	(189%)
		★ Japanese Electric Wire & Cable Makers' Association	*(101%)※*	Lime Manufacture Association	(175%)
		★ Flat Glass Manufacturers Association of Japan	*(75%)※*	Japan Mining Industry Association	(152%)
		* Japan Chemical Industry Association	(382%)	Federation of Pharmaceutical Manufacturers' Associations of Japan	(104%)
		* Japan Paper Association	(250%)	Japan Association of Rolling Stock Industries	(100%)
		* Japan Bearing Industrial Association	(123%)	Japan Soft Drink Association	(99%)
		* Japan Federation of Housing Organizations	(116%)	Japan Rubber Manufacturers Association	(61%)
		* Japan Industrial Vehicles Association	(115%)		
		* Japan Aluminium Association	(113%)		
		* Japan Auto Parts Industries Association	(109%)		
	Energy conversion	☆ The Japan Gas Association	*(102%)※*	Electric Power Council for a Low Carbon Society	(96%)
	Commercial	☆ Telecommunications Carriers Association	*(77%)※*	General Insurance Association of Japan	(172%)
		★ Japan Foreign Trade Council	*(147%)※*	Japan Hotel Association	(148%)
		Telecom Services Association	(863%)	Japan Chain Stores Association	(143%)
		Japan Securities Dealers Association	(297%)	Japan LP Gas Association	(119%)
		Japan Bankers Association	(227%)	Japan Association of Refrigerated Warehouses	(107%)
		Japan Department Stores Association	(212%)	Real Estate Companies Association of Japan	(101%)
		Life Insurance Association of Japan	(192%)	Japan Building Owners and Managers Association	(98%)
	Transpor-tation	* Japanese Shipowners' Association	(249%)	Shikoku Railway Company	(85%)
		* Association of Japanese Private Railways	(100%)	All Japan Freight Forwarders Association	(71%)
		Scheduled Airlines Association of Japan	(100%)		
Making maximum efforts to achieve target	Industrial sector	☆ Japan Automobile Manufacturers Association	*(94%)※*	Japan Federation of Construction Contractors	(92%)
		☆ The Japan Iron and Steel Federation	*(76%)※*	Shipbuilders' Association of Japan &	(-50%)
		☆ Japan Dairy Industry Association	*(-25%)※*	Cooperative Association of Japan Shipbuilders	(-650%)
		Japan Machine Tool Builders' Association	(307%)	(top: hour-based; bottom: ton-based)	
	Energy conversion	Petroleum Association of Japan	(121%)		
	Commercial	★ Japan Franchise Association	*(69%)※*		
	Transpor-tation	Japan Federation of Coastal Shipping Associations	(58%)	Japan Trucking Association	(32%)
Unlikely to achieve target		None			

☆: INDUSTRIES THAT RENEWED THEIR TARGETS IN THE FISCAL 2016 INTERIM REVIEW

★: INDUSTRIES THAT RENEWED THEIR TARGETS IN THE FISCAL 2018 FOLLOW-UP

*: INDUSTRIES THAT INTEND TO RENEW THEIR TARGETS (INCLUDING THOSE THAT NEED TO RENEW THEIR TARGETS)

※FOR INDUSTRIES THAT HAVE RENEWED TARGETS, THE RATE OF PROGRESS RATE AGAINST NEW TARGETS ARE PROVIDED.

- THE FORMULA FOR CALCULATING THE STATUS OF PROGRESS IS PROVIDED BELOW:

  RATE OF PROGRESS (TARGET AGAINST BASELINE YEAR) = ([PERFORMANCE IN BASELINE YEAR] – [PERFORMANCE IN CURRENT YEAR]) / ([PERFORMANCE IN BASELINE YEAR]– [FISCAL 2020 TARGET]) ×100(%)

  RATE OF PROGRESS (TARGET AGAINST BAU) = ([BAU LEVEL FOR CURRENT YEAR] – [PERFORMANCE IN CURRENT YEAR]) / [FISCAL 2020 TARGET] ×100(%)

- THE TABLE DOES NOT INCLUDE NON-DISCLOSING PARTICIPATING COMPANIES (EAST JAPAN RAILWAY COMPANY, WEST JAPAN RAILWAY COMPANY, CENTRAL JAPAN RAILWAY COMPANY, KYUSHU RAILWAY COMPANY AND JAPAN FREIGHT RAILWAY COMPANY)

(3) Progress made toward 2030 target and probability of achievement

Many industries are promoting efforts with a view to long-term reductions to achieve the Phase II (fiscal 2030) target. 21 industries have already achieved their fiscal 2030 targets in fiscal 2017. 8 industries have renewed their targets based on performance in fiscal 2017 (Table 6). 9 other industries which have also achieved their fiscal 2030 targets are considering new targets and 1 industry has decided to renew its target although it has yet to achieve its current target.

Some industries that have achieved their targets do not at present intend to renew their targets for various reasons: Rates of intensity improvement are susceptible to business structure changes and other circumstances unique to each company; and therefore, some industries will seek to achieve their targets in the medium- to long-term. With CO_2 intensity expected to worsen in the near future, some industries are not ready to renew their target. Other industries have only recently conducted major refurbishments and there is less room for further reduction of electric power consumption. It is important to continue to analyze trends to consider and account for target levels that enable maximum social commitment.

Table 6. Probability of Phase II (fiscal 2030) target achievement and rate of progress in fiscal 2017

Renewed targets※	Industrial Sector	☆ Japan Automobile Manufacturers Association (87%) ☆ Japan Dairy Industry Association (82%) ☆ Japan Petroleum Development Association (68%) ☆ The Japan Iron and Steel Federation (25%) ★ Japan Sanitary Equipment Industry Association (109%)	★ Japanese Electric Wire & Cable Makers' Association (89%) ★ Japan Mining Industry Association (88%) ★ Japan Copper and Brass Association (69%) ★ Flat Glass Manufacturers Association of Japan (60%) ★ Federation of Pharmaceutical Manufacturers' Associations of Japan (40%)
	Energy conversion	☆ The Japan Gas Association (103%)	
	Commercial	☆ Telecommunications Carriers Association (38%)	★ Japan Foreign Trade Council (63%) ★ Japan Franchise Association (30%)
CONSIDERING RENEWAL OF	Industrial	Japan Chemical Industry Association (287%) Japan Machine Tool Builders' Association (194%) Japan Cement Association (173%) Japan Society of Industrial Machinery Manufacturers (129%) Japan Paper Association (122%)	Japan Industrial Vehicles Association (108%) Japan Federation of Printing Industries (101%) Japan Aluminium Association (90%)
	Transportation	Japanese Shipowners' Association (166%)	

☆: INDUSTRIES THAT RENEWED THEIR TARGETS IN THE FISCAL 2016 INTERIM REVIEW

★: INDUSTRIES THAT RENEWED THEIR TARGETS IN THE FISCAL 2018 FOLLOW-UP

※FOR INDUSTRIES THAT HAVE RENEWED TARGETS, THE RATE OF PROGRESS RATE AGAINST NEW TARGETS ARE PROVIDED. FURTHERMORE, BASED ON THE ACHIEVEMENT STATUS OF PHASE I (FISCAL2020) TARGETS, SOME INDUSTRIES PLAN TO VERIFY THE VALIDITY OF THE TARGET IN THE NEAR FUTURE.

(4) Emissions reduction efforts made at corporate headquarters and other offices and in logistics

Emissions reduction efforts made at corporate headquarters and other offices are not limited to the commercial sector. A wide variety of industries of the industrial, energy conversion and transportation sectors are engaged in not only emissions reduction from the manufacturing process but also a diversity of emissions reduction efforts, including thorough temperature control of air conditioners, introduction of LED lighting, and "Coolbiz" and "Warmbiz" campaigns. These efforts have led to per area CO_2 emission reductions in many industries (Attachment).

Furthermore, measures to reduce emissions from logistics have also been taken in the industrial, energy conversion and transportation sectors. For example, industries reported efforts to optimize means and routes of transportation, such as introducing low-pollution, low-fuel consumption vehicles, cooperative delivery with other companies and modal shifts.

(5) Status of carbon credit utilization

A survey on the use of carbon credits revealed that no industries utilized credits to meet industry-specific targets, but that some industries were considering the utilization of credits in the future should they encounter difficulties in achieving targets. On the other hand, some industries reported that they had acquired credits under J-CREDIT and JCM or had purchased Green Certificates or Green Heat Certificates.

(6) Coverage of current survey against total domestic emissions[5]

The ratio of CO_2 emissions in fiscal 2017, calculated for each sector in the current follow-up survey against total domestic sectoral CO_2 emissions in fiscal 2017 (preliminary figures)[6] was 81% for the industrial sector, 91% for the energy conversion sector (before electric power distribution), 9% for the commercial sector, and 29% for the transportation sector[7]. The industrial and energy conversion sectors have maintained a high level of coverage.

5 It should be noted that the figures in National Institute for Environmental Studies "GHG Emissions Data of Japan," the source of total domestic emissions by sector in 2017 and those of the current survey have been derived using different calculation methods and boundaries due to their different purposes and backgrounds; and therefore, the coverage ratios should be used only for reference.

6 "GHG Emissions Data of Japan" (preliminary figures for fiscal 1990-2017)

7 Coverage for the transportation sector was calculated based on domestic CO_2 emissions excluding overseas departures and arrivals.

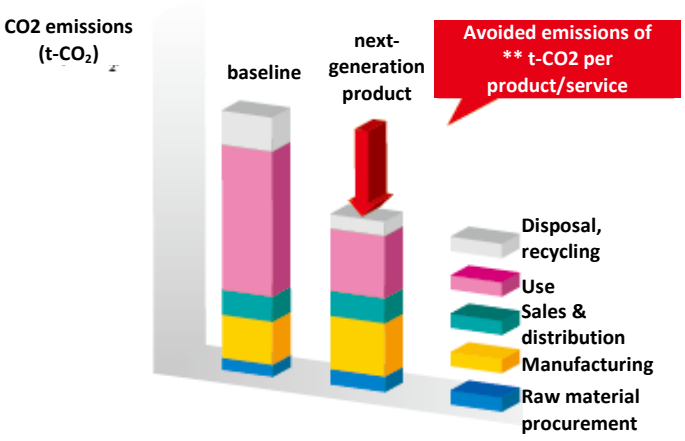
Pillar 2: Strengthening cooperation with other interested groups

In order to achieve society-wide CO_2 emission reductions, it is indispensable that CO_2 emission are reduced not only from individual corporate business operations but also across the entire life cycle of a product or service, including its use, consumption, disposal and recycling stages. To this end, participating industries are not only engaged in efforts to develop and provide low-carbon products and services but also in collaboration with various actors, transcending industrial boundaries to reach out to users, such as the residential sector and public campaigns.

(1) Efforts to reduce emissions through product and service life cycles

Many industries can not only reduce CO_2 emissions from their own business operations but from a life cycle perspective also contribute to reducing emissions along the entire value chain, from upstream (when procuring raw materials) to downstream (when using, disposing of or recycling products and services). For example, even if a manufacturer emits more CO_2 than it would for a conventional product at the development or manufacturing stages of a product that emits less CO_2 during use, if CO_2 emissions can be substantially reduced at end-use, overall CO_2 emissions can be reduced in terms of the entire product life cycle. (Figure 10)

Figure 10. Life cycle CO_2 emission reductions



SOURCE: KEIDANREN "CONTRIBUTING TO AVOIDED EMISSIONS THROUGH THE GLOBAL VALUE CHAIN - A NEW APPROACH TO CLIMATE CHANGE MEASURES BY PRIVATE ACTORS -."

Focusing on emission reductions along entire value chains, many industries have presented estimations of reductions by using effective and realistic methods based on the Ministry of Economy, Trade and Industry's "Guidelines for Quantifying GHG emission reductions of goods or services through Global Value Chain" (March 2018) and other widely known calculation methods and standards .

Furthermore, it is imagined high initial investment costs and the low public visibility of products and services that contribute to society-wide emission reductions have hindered their market diffusion.

In order to overcome such impediments, it is also critical to increase public recognition of the importance of reducing emissions through collaboration among actors throughout the product life cycle.

From this perspective, efforts are being made to appeal to society the measures taken by industries and companies as well as their products and services by quantifying and publicly communicating activities to facilitate dissemination and CO_2 emissions reduction. Keidanren has compiled a pamphlet introducing the concept of avoided emissions across the value chain and case studies of quantifying CO_2 reduction undertaken by individual industries[8], and will continue to encourage consumers and customers in Japan and overseas to increase public recognition.

An example of industry-specific efforts is a research project commissioned by the Japan Iron and Steel Federation to the Institute of Energy Economics, Japan. The iron and steel industry has formulated a methodology for calculating avoided CO_2 emissions when replacing conventional steel with high-function steel in five areas[9], including steel users. Using this methodology, total avoided CO_2 emissions in fiscal 2017 for the five areas has been calculated to be 29.73 million t-CO_2.

The Japan Chemical Industries Association quantifies CO_2 reductions in line with the international guidelines jointly formulated by World Business Council for Sustainable Development (WBCSD) Chemical sector and the International Council of Chemical Association (ICCA) and introduces in case study reports how various chemical products contribute to reducing CO_2 emissions at end use.

In the electrical and electronics industry, the Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention has developed and published

[8] "Contributing to Avoided Emissions Through the Global Value Chain - A New Approach to Climate Change Measures by Private Actors -."
http://www.keidanren.or.jp/en/policy/vape/gvc2018.pdf
It should be noted that this pamphlet does not correspond with the PDCA cycle described under the follow-up to the Commitment.

[9] Automobiles, ships, trains, electric power plant boilers and transformers

a methodology for calculating avoided CO_2 emissions. Furthermore, by calculating and publishing avoided CO_2 emissions annually, the industry highlights the contribution that it is making to reduce society-wide CO_2 emissions by providing low-carbon energy-saving products and services.

Some industries find it difficult to quantify their reduction potential due to difficulties in gaining access to end-use data for their products and services when other actors are using them, or difficulties inherent to their business model or the products and services they provide. These challenges need to be overcome by having upstream and downstream industries share the data required for calculations and by having he government collect or compile (into a database) data that the private sector (companies and industrial organizations) has limited access to.

(2) Efforts leading to emission reductions in the residential sector

"Strengthening cooperation with other interested groups" should not be limited to collaboration among industries. In order for the abovementioned low-carbon products and services to reduce emissions, it is important not only that we develop products featuring high performance in energy efficiency and those using low-carbon energy sources, but also for users to use them wisely. In other words, in order to reduce CO_2 emissions across society, including the residential sector, it is critical for individual citizens to reflect upon their own decisions, as well as their consciousness and behavior, and thus transform their lifestyles.

Working toward the 2030 target to reduce emissions from the residential sector by 40%, the Japanese business community is engaged in various efforts, including utilizing energy-saving and low-carbon products, public relations and educational activities, in collaboration with the national and local governments (Table 7).

Table 7. Examples of efforts leading to emission reductions in the residential sector

Promotion among employees and their families	
・ Diffusion of environmental household account books ・ Air conditioning temperature control, power saving ・ Provision of e-learning, hosting seminars ・ Provision of loans by employees' mutual aid association for purchasing energy-saving household appliances and eco-cars.	・ Implementation of in-house eco-points ・ Participation in the "No My Car Day (public transportation day)" campaign ・ Implementation of the "Jisa (time difference) Biz" and off-peak commuting campaigns
Collaboration with local communities and governments and educational institutions	
・ Provision of environmental education and equipment ・ Educational activities to promote recycling ・ Environmental protection activities in local communities where factories and offices are located	・ Participation in local government-led energy-saving activities ・ Welcoming site visits to store and factories; briefings on environmental activities ・ Purchasing environment-friendly products (green procurement)
Participation in public campaigns	
・ Campaigns to save electric power ・ Participation in campaigns initiated by the Ministry of the Environment: "COOL CHOICE," "Lights Down Campaign," "Fun to Share"	・ Campaigns to raise environmental awareness, such as the "Green Environmental Plan Award" and the "Green City Award."

(3) Fostering and conserving forest sinks

Dealing with global warming also calls for measures to foster and conserve forest sinks. The fiscal 2018 follow-up found that many participating industries implemented measures that lead to fostering and conserving forest sinks.

Some examples are: tree-planting and Satoyama conservation activities in which the national and local government and local residents also participated; providing grants to local governments and NPOs that engage in forest conversation and creation efforts; employees joining volunteering activities. Some industries also reported efforts to foster and conserve forest sinks that were undertaken as a part of their business operations: using paper that has acquired FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification Schemes) certification; manufacturing and selling products that use thinned wood.

Industries plan not only to continue to promote local efforts, but also to increase carbon-offsetting and carbon footprint products and improve recycling and reduction rates beyond fiscal 2018; and therefore, they promise to take their efforts further.

Pillar 3: Promoting contribution at the international level

In March 2018, the International Energy Agency (IEA) announced that global CO_2 emissions had increased by 1.4% from the previous year to approximately 32.5 billion tons. With population increase and economic growth, mainly in developing countries, global energy consumption is expected to continue to increase; and therefore, global CO_2 emissions are likely to follow an ever-increasing trend.

Under these circumstances, the Japanese business community, having successfully achieved world-leading energy efficiency levels (Figure 11) and possessing excellent energy-saving or low-carbon products and technologies, contributes to reducing not only domestic emissions but also global emissions through overseas transfer of our advanced energy-saving and low-carbon technologies and overseas deployment of our products and services.

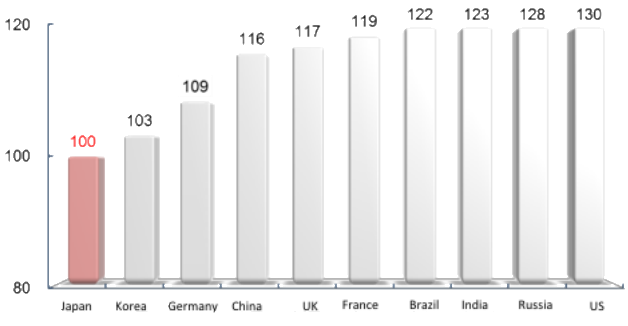
In the fiscal 2018 follow-up, industries reported as examples of contribution overseas, not only the provision of Japan's excellent low-carbon products and services, but also participation in power generation projects and efforts for the international standardization of knowhow and processes (Table 8). Some of these efforts include quantifying avoided CO_2 emissions, as done in estimating reductions under "Pillar 2: Strengthening cooperation with other interested groups," according to, or with reference to, guidelines formulated by the Ministry of Economics, Trade and Industry or guidelines developed individually by industries or international industrial organizations.

For example, the Japan Automobile Manufacturers Association calculated avoided CO_2 emissions at end-use attributable to automated vehicles (hybrid vehicles, electric vehicles) sold overseas during the period from 2000 through 2016 to be 33.90 million t-CO_2.

Such quantification efforts are increasing as effective means to help drive further overseas transfer of advanced energy-saving and low-carbon technologies and international deployment of products and services.

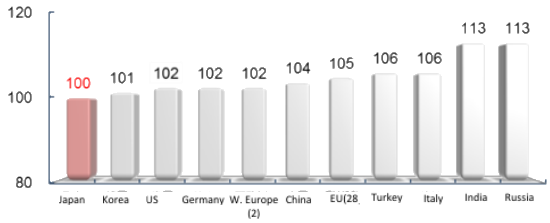
Figure 11. International comparison of energy efficiency in individual industries

Comparison of energy efficiency of the iron and steel industry in major countries (Converter steel, as of 2015) Japan=100



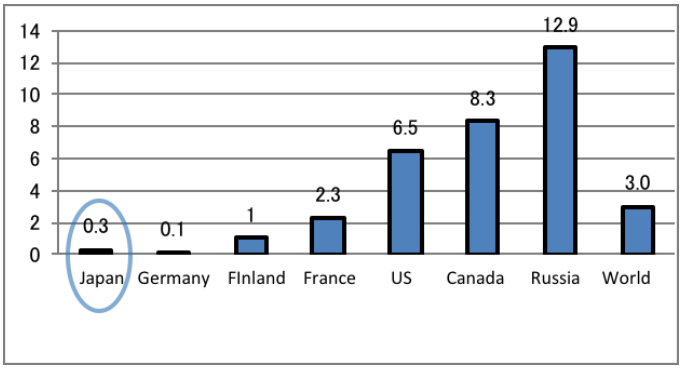
Source: Research Institute of Innovative Technology for the Earth (RITE)

Comparison of energy efficiency of the iron and steel industry in major countries (Electric arc steel, as of 2015) Japan=100



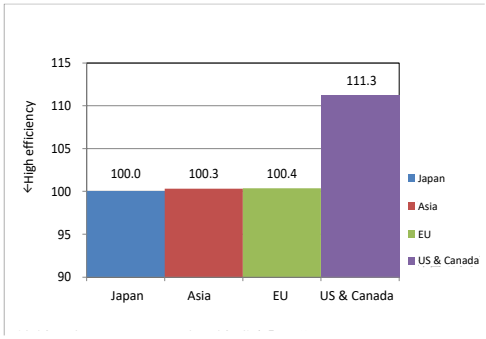
Source: Research Institute of Innovative Technology for the Earth (RITE)

Energy-saving potential of adopting BAT in the pulp and paper industry (fiscal 2012)



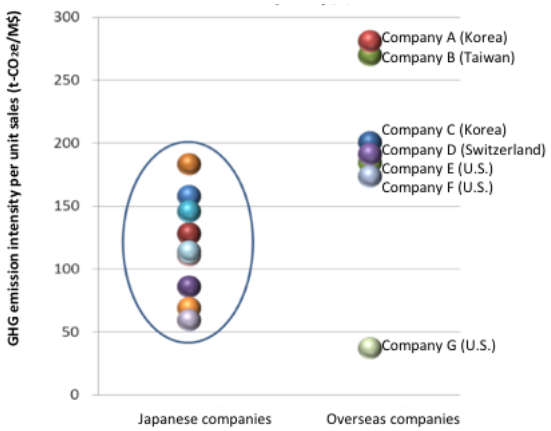
Source: compiled based on IEA "Energy Technology Perspectives 2012"

Comparison of oil refinery energy consumption indices (2016)



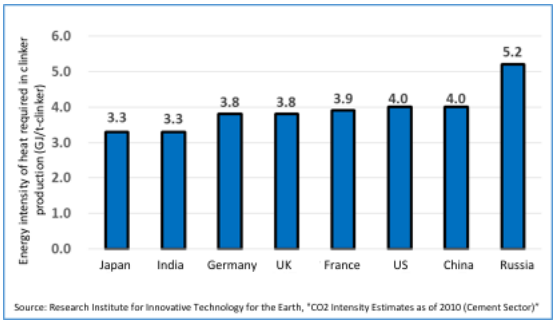
Source: compiled by the Petroleum Association of Japan based on survey results by Solomon Associates

Comparison of GHG emission intensity per unit sales of devices (FY 2014)



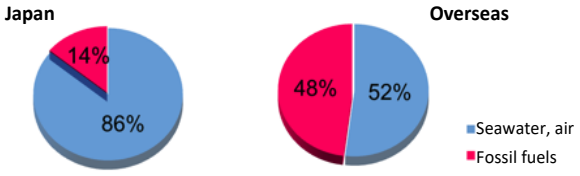
Source: compiled by the Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention based on disclosed data, including financial statements announced by individual companies, GHG emissions listed by CDP

Estimates of the energy intensity of heat required in clinker production (2010)



Source: compiled based on RITE "CO_2 Intensity Estimates as of 2010 (Cement Sector)"

LNG receiving terminals in Japan and overseas (2013): Comparison of LNG vaporizer heat sources



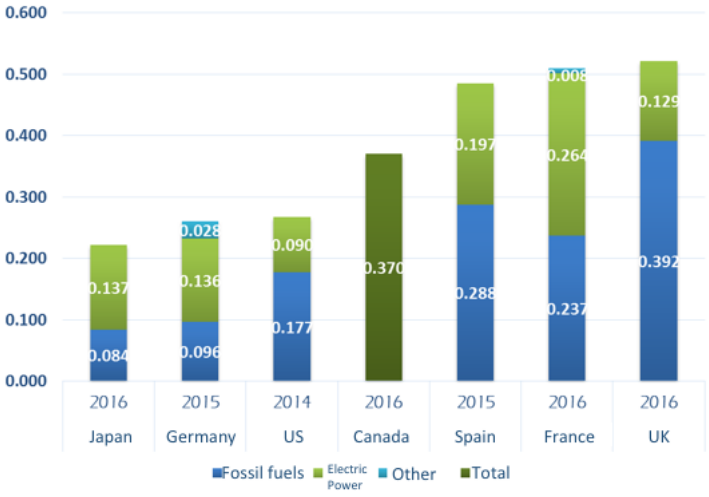
*Vaporizers that use seawater or air as their heat sources can reduce a significant amount of CO_2 emissions compared to those that use fossil fuels. (Japan has a higher ratio of LNG vaporizers that use seawater and air.)
Source: Other research institutions and the Japan Gas Association

Comparison of energy efficiency in lime calcination (2008)

		Japan	EU	US	China
CO_2 emission intensity for lime calcination (t-CO2/t-production)		0.30	0.32*3	0.64*1	N.A.
Percentage in possession by kiln type	Shaft (3.9~4.4GJ/t-CaO)	67%	85%*2	6%*2	22%
	Rotary (5.6~7.5GJ/t-CaO)	25%	15%*2	94%*2	28%
	Other (vertical, conventional, etc.)	8%	N.A.	N.A.	50%

Source: *1: National Lime Association -2008 Status Report、
*2: ZKG International No.11-2007
*3: Calculated based on *1 and *2

Energy consumption per unit production in the automobile industry (TJ/million USD)



Source: compiled by Japan Automobile Manufacturers Association based on survey by the Institute of Energy Economics, Japan

Table 8. Examples of overseas contribution to avoided emissions

Avoiding emissions through overseas transfer of Japanese technologies and knowhow
・ Energy-efficient seawater desalination technologies (Japan Chemical Industry Association)
・ Energy-efficient technologies, including CDQ (coke dry quenching) and TRT (top-pressure recovery turbine plant) (The Japan Iron and Steel Federation)
・ Hydropower generation at corporate mines (Japan Mining Industry Association)
・ Aluminium recycling (Japan Aluminium Association)
・ Permanent magnet synchronous motor technologies for railcars (Japan Association of Rolling Stock Industries)
・ LNG upstream business (natural gas development and extraction, liquefaction and shipping bases) (The Japan Gas Association)
・ CO_2 recovery from coal-fired thermal power plants and EOR (Japan Petroleum Development Association)
・ IPP (independent power producer) business using renewable energy (Japan Foreign Trade Council)
Avoiding emissions through overseas diffusion of Japan's advanced low-carbon products and services
・ Lightweight paper (Japan Paper Association)
・ High efficiency thermal power generation and renewable power generation technologies, IT products, solutions (Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention)
・ Next-generation vehicles (Japan Automobile Manufacturers Association)
・ Power cables for Superconducting Maglev (The Japanese Electric Wire & Cable Makers' Association)
・ ICT services (Telecommunications Carriers Association)

Pillar 4: Development of innovative technologies

The creation of completely new innovations is key to achieving significant greenhouse gas reductions in the medium- to long-term, focusing on the period after 2030. Drastic reductions cannot be achieved along the lines of conventional measures.

According to the results of the fiscal 2018 follow-up, industries are taking various initiatives to develop innovative technologies and to achieve their practical use (Table 9).

Some innovative technologies, including energy-related technologies, require a substantial amount of time to be elevated from the research and development stage to practical application. Given the difficulty for private companies to commit to such medium- to long-term research and development, industries have collaborated with government to engage in sustained research and development.

For example, member companies of the Electric Power Council for a Low Carbon Society participate in the New Energy and Industrial Technology Development Organization (NEDO)'s "Next Generation Floating Offshore Wind Turbine Technologies Demonstration Research" to perform various demonstrations associated with floating offshore wind turbine technologies.

With an aim to achieve targets, including "increasing the number of hydrogen stations in Japan to 160 by fiscal 2020" and "increasing the number of fuel cell vehicles (FCVs) in Japan to 40,000 units by fiscal 2020," set up under the Ministry of Economy, Trade and Industry's "Strategic Road Map for Hydrogen and Fuel Cells," the city gas industry is engaged supplying hydrogen to hydrogen stations, and in efforts to lower the costs of hydrogen production devices and increase their efficiency.

Table 9. Examples of innovative technologies and services and the timing of deployment

Timing of deployment	Innovative technologies and services (industries)
Deployment started	・ Cellulose nanofiber (Japan Paper Association) ・ Green chemistry technologies (The Federation of Pharmaceutical Manufacturers' Associations of Japan) ・ Replacing drying process UV light sources with LEDs (Japan Federation of Printing Industries) ・ Total-oxygen combustion technologies (Flat Glass Manufacturers Association of Japan) ・ Industrial FCVs (Japan Industrial Vehicles Association) ・ Smart energy networks (The Japan Gas Association) ・ Container round use system (All Japan Freight Forwarders Association)
2020 and beyond	・ Fuel cell railcars (Japan Association of Rolling Stock Industries) ・ Alternative aviation fuels (Scheduled Airline Association of Japan) ・ Creating fuels from wastewater organic constituents, bio-ethanol and bio-chemicals (Japan Paper Association) ・ Power-saving small power sources using GaN & SiC semiconductor power devices (Telecommunications Carriers Association) ・ High-strength materials with heteronano structures (Japan Copper and Brass Association) ・ High-efficiency petroleum refining technologies based on Petroleomics (Petroleum Association of Japan) ・ LNG bunkering technologies (The Japan Gas Association) ・ Serial production of pharmaceuticals (Federation of Pharmaceutical Manufacturers' Associations of Japan) ・ Improved solar panel efficiency (Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention) ・ Advanced shipbuilding processes using IoT technologies (Shipbuilders' Association of Japan and Cooperative Association of Japan Shipbuilders)
2030 and beyond	・ Innovative steelmaking process (COURSE50), ferrocoke (innovative pig iron production process) (The Japan Iron and Steel Federation) ・ Innovative heat exchange/heat control technologies (Japan Aluminium Association) ・ High-temperature superconductive cables (The Japanese Electric Wire & Cable Makers' Association) ・ Manufacturing process of energy-saving electronic devices using innovative printing technologies (Japan Chemical Industries Association) ・ Evaluation platform for next-generation energy-saving materials (Japan Chemical Industries Association) ・ Innovative cement manufacturing process (Japan Cement Association)

Controlling non-CO_2 greenhouse gas emissions (Addressing the Kigali Amendment)

Non-CO_2 greenhouse gases include methane (CH_4), nitrous oxide (N_20), sulfur hexafluoride (SF_6), and fluorinated gases (HFC, PFC, etc.), which also need to be controlled in order to counter global warming. Many participating industries inspect HVAC equipment and cooling equipment and take measures to prevent leakage pursuant to the Act for Rationalized Use and Proper Management of Fluorocarbons.

Furthermore, the Twenty-eighth meeting of the Parties to the Montreal Protocol (MOP28), adopted a proposed amendment to the Protocol to newly add HFCs to the list of regulated gases (Kigali Amendment). With the amendment having taken effect in January 2019, the recovery of HFCs and the development of new refrigerants are pressing issues; and therefore, the Japanese business community is endeavoring to improve the recovery rate of existing refrigerants, as well as to develop technologies to reduce emissions and put new technologies into practical use (Table 10).

For example, the coastal shipping industry has taken measures to replace the HFCs currently used in HVAC equipment and freezers on ships with refrigerants that have less impact on global warming. It is also taking measures to prevent refrigerant leakage.

The city gas industry promotes measures to address HFC issues by accelerating the diffusion of gas absorption chiller-heaters.

Table 10. Major efforts to address HFCs

・ Further deployment and improvement of non-HFC dry powder inhaler (Federation of Pharmaceutical Manufacturers' Associations of Japan)
・ Gas leakage inspection and maintenance of refrigerants and fire extinguishing agents (Japan Federation of Printing Industries)
・ Prevention of leakage upon the installation, inspection, and repair of equipment, recovery and reuse (Japanese Electric Wire & Cable Makers' Association, The Electric Power Council for a Low Carbon Society)
・ Promotion of the deployment of gas absorption chiller-heaters (The Japan Gas Association)
・ Replacement of refrigerants used in HVAC equipment and freezers on ships, prevention of leakage of refrigerants (Japan Federation of Coastal Shipping Associations)

Conclusion

Since the formulation of the Keidanren's Voluntary Action Plan on the Environment, the Japanese business community has taken various measures, including developing energy-saving products and technologies, to counter global warming, and is steadily promoting the Keidanren Commitment to a Low Carbon Society (hereinafter, "Commitment") with an aim to achieve the "mid-term target."

On the other hand, the Government is currently engaged in discussions toward the formulation of the "Long- Term Strategy under the Paris Agreement as Growth Strategy," and Keidanren has been an active participant in these discussions, with a view to formulating global warming countermeasures that also achieve economic growth. As the host country of the G20 Summit in 2019, Japan particularly needs not only to reduce emissions from domestic business operations but also to reduce emissions on an global scale through global value chains and to create innovation, thereby pursuing a "virtuous cycle of environment and economic growth" and contributing to global sustainable development, eventually to achieving the SDGs.

With this acknowledgement, Keidanren is determined to further strengthen its efforts under Pillars 2 (Strengthening cooperation with other interested groups) and 3 (Promoting contribution at the international level) of the four pillars constituting the Commitment in order to use the multiple advanced energy-saving low-carbon technologies embraced by Japan's business community to contribute to global reductions. This can be achieved by deploying products and services in Japan and overseas and by transferring energy-saving technologies and infrastructure systems to other countries. In 2018, Keidanren has compiled a pamphlet introducing a global value chain-based approach to avoided emissions and examples of industrial efforts to quantify avoided emissions. We will endeavor to improve understanding of this concept through communication to audiences in Japan and overseas.

Furthermore, Keidanren has invited companies and industries to consider formulating a "Long-term Vision" so that we can present both domestically and internationally, the positive attitude that many companies and industries have toward implementing long-term global warming countermeasures. At present, more than 60 companies and industries have formulated Visions and around 190 companies and industries have announced that they would consider the formulation of a Long-term Vision[10].

[10] A Long-term Vision does not constitute a part of the PDCA process under the follow-up to the Commitment to a Low Carbon Society.

Keidanren is determined to promote multidimensional efforts toward significant greenhouse gas reductions on a global scale under the Commitment and with a view to the medium- to long-term.

Furthermore, a Long-term Vision indicates “a vision for goals and major directions” and intrinsically differs from the Commitment, which embraces targets that must be steadily achieved.

The status of Long-term Visions are as provided below (as of March 1, 2019):

1. Already formulated and announced	69 companies and organizations
2. In the process of formulation	189 companies and organizations
(1) Planned by end of fiscal 2018	3 companies and organizations
(2) Planned by end of fiscal 2019	77 companies and organizations
(3) Planned in fiscal 2020 or after	48 companies and organizations
(4) Schedule yet undecided	61 companies and organizations

Keidanren’s website should be referred to for details:
“Actions by the Business Community on Long-term Global Warming Countermeasures up to 2050”
http://www.keidanren.or.jp/en/policy/2019/001.html

Industry-specific trends in each sector (*1)

1. Industrial Sector

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

Industry	(*2) (☆:target adopted by the industry)	Notes	1990	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Japan Iron and Steel Federation	CO2 emissions (actual emissions) ☆		20,230	18,844	16,802	18,913	18,627	18,985	19,443	19,192	18,426	18,278	18,125	-3.8%	-6.8%	-0.8%
	CO2 emissions (post-adjustment)		20,230	18,844	16,643	18,717	18,519	18,710	19,441	19,180	18,409	18,264	18,120	-3.8%	-6.8%	-0.8%
	CO2 emission intensity index (actual emissions)		1.00	0.90	0.93	0.91	0.94	0.95	0.93	0.93	0.94	0.93	0.93	2.7%	-0.1%	-0.1%
	CO2 emission intensity index (post-adjustment)		1.00	0.90	0.92	0.90	0.93	0.93	0.93	0.93	0.94	0.93	0.93	2.7%	-0.1%	-0.1%
	Energy consumption		6,372	5,902	5,261	5,933	5,776	5,813	5,926	5,847	5,628	5,609	5,561	-5.8%	-6.2%	-0.9%
	Energy consumption intensity index		1.00	0.90	0.92	0.91	0.92	0.92	0.90	0.90	0.91	0.90	0.90	0.6%	0.6%	-0.1%
	Production activity index		1.00	1.03	0.90	1.03	0.98	0.99	1.04	1.02	0.97	0.97	0.97	-6.4%	-6.7%	-0.7%
Japan Chemical Industry Association	CO2 emissions (actual emissions) ☆		3,463	6,854	6,229	6,424	6,348	6,258	6,363	6,268	6,124	5,970	6,029	-12.0%	-5.2%	1.0%
	CO2 emissions (post-adjustment)		3,463	6,854	6,063	6,235	6,248	6,008	6,363	6,265	6,116	5,965	6,032	-12.0%	-5.2%	1.1%
	CO2 emission intensity index (actual emissions)	Base year: FY2005	1.00													
	CO2 emission intensity index (post-adjustment)		1.00													
	Energy consumption		1,475	2,924	2,688	2,793	2,640	2,536	2,564	2,537	2,516	2,472	2,530	-13.4%	-1.3%	2.4%
	Energy consumption intensity index	Base year: FY2005		1.00	1.02	1.02	1.02	1.02	0.98	0.99	0.97	0.96	0.93	-7.3%	-5.8%	-3.1%
	Production activity index			1.00	0.91	0.93	0.89	0.85	0.89	0.87	0.89	0.88	0.93	-6.7%	4.8%	5.6%
Japan Paper Association	CO2 emissions (actual emissions) ☆		2,583	2,495	1,978	1,906	1,889	1,860	1,875	1,807	1,783	1,800	1,785	-28.4%	-4.8%	-0.8%
	CO2 emissions (post-adjustment)		2,583	2,495	1,943	1,867	1,870	1,814	1,875	1,806	1,782	1,799	1,786	-28.4%	-4.8%	-0.7%
	CO2 emission intensity index (actual emissions)	Base year: FY2005	1.13	1.00	0.91	0.87	0.89	0.90	0.87	0.86	0.85	0.85	0.84	-16.3%	-4.2%	-1.3%
	CO2 emission intensity index (post-adjustment)		1.13	1.00	0.90	0.85	0.88	0.88	0.87	0.86	0.85	0.85	0.84	-16.3%	-4.1%	-1.3%
	Energy consumption		968	890	706	687	658	630	630	609	599	605	603	-32.2%	-4.4%	-0.3%
	Energy consumption intensity index	Base year: FY2005	1.19	1.00	0.92	0.88	0.87	0.86	0.82	0.81	0.80	0.80	0.79	-20.7%	-3.8%	-0.9%
	Production activity index		0.92	1.00	0.87	0.88	0.85	0.83	0.86	0.85	0.84	0.85	0.86	-14.5%	-0.6%	0.5%
Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention *3	CO2 emissions (actual emissions)		1,113	1,813	1,675	1,659	1,804	1,352	1,297	1,336	1,350	1,405	1,439	-20.6%	11.0%	2.4%
	CO2 emissions (post-adjustment)		1,113	1,813	1,480	1,461	1,704	1,178	1,297	1,334	1,344	1,400	1,441	-20.5%	11.2%	2.9%
	Energy consumption		646	994	963	956	875	597	571	601	625	666	708	-28.8%	23.9%	6.3%
	Energy consmuption intensity index (reference value)	Base year: FY2012						1.00	0.93	0.89	0.91	0.88	0.91		-1.9%	2.9%
	Energy consumption intensity target index ☆							1.00	0.93	0.89	0.89	0.87	0.80		-14.0%	-8.0%
	Production activity index							1.00	1.03	1.13	1.15	1.26	1.30		26.3%	3.3%
Japan Cement Association	CO2 emissions (actual emissions)		2,762	2,185	1,756	1,662	1,712	1,769	1,806	1,775	1,718	1,696	1,732	-20.8%	-4.1%	2.1%
	CO2 emissions (post-adjustment)		2,762	2,185	1,744	1,650	1,704	1,749	1,806	1,774	1,718	1,696	1,732	-20.8%	-4.1%	2.1%
	CO2 emission intensity index (actual emissions)	Base year: FY2010	1.00	0.99	1.01	1.00	1.00	1.00	0.98	0.98	0.98	0.97	0.97	-2.7%	-0.9%	0.2%
	CO2 emission intensity index (post-adjustment)		1.01	1.00	1.01	1.00	1.01	1.00	0.98	0.99	0.99	0.97	0.97	-2.7%	-0.9%	0.3%
	Energy consumption		874	656	525	499	510	523	541	532	515	510	522	-20.4%	-3.5%	2.4%
	Energy consumption intensity index ☆	Base year: FY2010	1.05	0.99	1.01	1.00	0.99	0.99	0.97	0.98	0.98	0.97	0.97	-2.2%	-0.2%	0.6%
	Production activity index		1.67	1.32	1.04	1.00	1.03	1.06	1.11	1.09	1.06	1.06	1.08	-18.6%	-3.3%	1.8%
Japan Automobile Manufacturers Association, Inc. / Japan Auto-Body Industries Association, Inc.	CO2 emissions (actual emissions) ☆		990	801	587	614	650	736	747	716	666	676	665	-17.0%	-11.0%	-1.7%
	CO2 emissions (post-adjustment)		990	801	540	565	625	666	747	715	663	674	666	-16.9%	-10.9%	-1.3%
	CO2 emission intensity index (actual emissions)	Base year: FY1990	1.00	0.75	0.69	0.68	0.71	0.77	0.70	0.66	0.59	0.60	0.57	-25.0%	-19.7%	-6.2%
	CO2 emission intensity index (post-adjustment)		1.00	0.75	0.64	0.63	0.68	0.70	0.70	0.66	0.59	0.60	0.57	-25.0%	-19.6%	-5.9%
	Energy consumption		496	398	317	332	313	332	333	324	308	319	323	-18.8%	-3.1%	1.2%
	Energy consumption intensity index	Base year: FY1990	1.00	0.75	0.75	0.74	0.68	0.69	0.63	0.59	0.55	0.57	0.55	-26.7%	-12.5%	-3.5%
	Production activity index		1.00	1.07	0.86	0.91	0.92	0.97	1.07	1.10	1.13	1.13	1.19	10.8%	10.8%	4.9%
Japan Auto Parts Industries Association	CO2 emissions (actual emissions)		764	744	547	598	679	756	771	745	689	700	698	-6.2%	-9.5%	-0.3%
	CO2 emissions (post-adjustment)		764	744	497	541	647	671	771	744	686	698	699	-6.1%	-9.4%	0.1%
	CO2 emission intensity index (actual emissions) ☆		1.00	0.79	0.59	0.59	0.66	0.71	0.70	0.69	0.66	0.66	0.63	-19.7%	-9.7%	-4.3%
	CO2 emission intensity index (post-adjustment)		1.00	0.79	0.53	0.54	0.63	0.63	0.70	0.69	0.66	0.66	0.63	-19.6%	-9.6%	-3.9%
	Energy consumption		401.3	384	299	327	323	333	337	334	316	329	338	-11.9%	0.5%	2.8%
	Energy consumption intensity index		1.00	0.77	0.61	0.62	0.60	0.59	0.58	0.59	0.58	0.59	0.58	-24.5%	0.2%	-1.3%
	Production activity index		1.00	1.24	1.22	1.32	1.35	1.40	1.44	1.41	1.36	1.39	1.45	16.7%	0.2%	4.2%
Japan Mining Industry Association	CO2 emissions (actual emissions)		411	396	376	374	408	443	449	441	405	369	361	-8.8%	-19.6%	-2.2%
	CO2 emissions (post-adjustment)		411	396	352	348	394	406	449	441	404	368	361	-8.7%	-19.5%	-1.9%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY1990	1.00	0.84	0.81	0.79	0.92	0.92	0.94	0.89	0.85	0.79	0.78	-7.9%	-17.3%	-1.6%
	CO2 emission intensity index (post-adjustment)		1.00	0.84	0.76	0.74	0.88	0.84	0.94	0.89	0.85	0.79	0.78	-7.8%	-17.2%	-1.3%
	Energy consumption		170	161	161	161	159	162	163	163	154	144	144	-10.6%	-11.6%	-0.3%
	Energy consumption intensity index	Base year: FY1990	1.00	0.83	0.84	0.83	0.86	0.82	0.82	0.80	0.79	0.75	0.75	-9.8%	-9.1%	0.3%
	Production activity index		1.00	1.14	1.13	1.15	1.09	1.17	1.16	1.20	1.16	1.14	1.13	-1.0%	-2.7%	-0.6%
Japan Federation of Construction Contractors	CO2 emissions (actual emissions)		249	532	462	316	398	402	411	438	431	421	412	-22.6%	0.3%	-2.1%
	CO2 emissions (post-adjustment)		249	532	450	315	391	387	411	438	431	420	412	-22.6%	0.3%	-2.0%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY1990	1.00	3.32	3.36	2.66	3.36	3.28	3.12	3.14	3.10	3.05	3.03	-8.5%	-2.6%	-0.7%
	CO2 emission intensity index (post-adjustment)		1.00	3.32	3.26	2.64	3.30	3.17	3.12	3.13	3.10	3.05	3.04	-8.5%	-2.6%	-0.5%
	Energy consumption		160	229	193	121	162	157	159	170	168	166	164	-28.3%	3.6%	-1.3%
	Energy consumption intensity index	Base year: FY1990	1.00	2.22	2.18	1.58	2.12	1.99	1.87	1.89	1.89	1.88	1.88	-15.3%	0.6%	0.2%
	Production activity index		1.00	0.64	0.55	0.48	0.48	0.49	0.53	0.56	0.56	0.55	0.55	-15.4%	2.9%	-1.5%
Japan Federation of Housing Organizations	CO2 emissions (actual emissions)		487	326	235	240	245	262	260	240	239	242	228	-30.2%	-12.5%	-6.0%
	CO2 emissions (post-adjustment)		487	326	235	240	245	262	260	240	239	242	228	-30.2%	-12.5%	-6.0%
	CO2 emission intensity index (actual emissions)		1.00	0.84	0.96	0.90	0.89	0.91	0.82	0.90	0.87	0.85	0.83	-1.8%	0.8%	-2.4%
	CO2 emission intensity index (post-adjustment)		1.00	0.84	0.96	0.90	0.89	0.91	0.82	0.90	0.87	0.85	0.83	-1.8%	0.8%	-2.4%
	Energy consumption		184	125	90	92	94	101	100	92	92	93	89	-28.7%	-10.7%	-3.8%
	Energy consumption intensity index		1.00	0.86	0.97	0.91	0.91	0.93	0.84	0.91	0.89	0.86	0.86	0.3%	2.8%	-0.2%
	Production activity index		1.00	0.79	0.50	0.55	0.56	0.59	0.65	0.55	0.56	0.59	0.56	-28.9%	-13.2%	-3.7%

Industry	(*2) (☆:target adopted by the industry)	Notes	1990	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2005	Relative to FY2013	Relative to previous FY
Lime Manufacture Association	CO2 emissions (actual emissions) ☆		357	308	244	268	234	227	246	246	223	225	227	−26.3%	−8.0%	0.9%
	CO2 emissions (post-adjustment)		357	308	241	265	232	223	246	246	223	225	227	−26.3%	−8.0%	0.9%
	CO2 emission intensity index (actual emissions)		1.00	0.86	0.78	0.76	0.74	0.76	0.78	0.78	0.76	0.74	0.73	−15.0%	−5.7%	−0.7%
	CO2 emission intensity index (post-adjustment)		1.00	0.86	0.77	0.75	0.74	0.74	0.78	0.78	0.76	0.74	0.73	−15.0%	−5.7%	−0.6%
	Energy consumption		123	106	87	96	83	79	84	84	76	78	80	−24.5%	−5.5%	2.4%
	Energy consumption intensity index		1.00	0.86	0.81	0.79	0.76	0.77	0.77	0.77	0.75	0.74	0.75	−12.9%	−3.1%	0.8%
	Production activity index		1.00	1.00	0.88	0.99	0.88	0.84	0.89	0.89	0.83	0.85	0.87	−13.3%	−2.4%	1.6%
The Japan Rubber Manufacturers Association*4	CO2 emissions (actual emissions)			213	169	179	180	169	170	168	161	158	155	−27.1%	−8.5%	−1.5%
	CO2 emissions (post-adjustment)			236	182	192	217	206	222	215	203	196	190	−19.6%	−14.5%	−3.1%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY2005		1.00	0.99	0.91	0.91	0.92	0.91	0.91	0.94	0.93	0.91	−9.1%	0.1%	−2.5%
	CO2 emission intensity index (post-adjustment)			1.00	0.96	0.88	0.99	1.01	1.07	1.06	1.07	1.04	1.00	0.2%	−6.5%	−4.0%
	Energy consumption			113	98	105	105	100	99	97	94	92	90	−19.7%	−8.4%	−1.2%
	Energy consumption intensity index	Baae year: FY2005		1.00	1.09	1.01	1.00	1.03	1.00	1.00	1.03	1.02	1.00	0.1%	0.2%	−2.2%
	Production activity index			1.00	0.80	0.92	0.93	0.86	0.88	0.86	0.81	0.79	0.80	−19.8%	−8.6%	1.0%
The Federation of Pharmaceutical Manufacturers' Associations of Japan	CO2 emissions (actual emissions) ☆		164	242	208	208	231	254	254	244	238	239	229	−5.3%	−9.9%	−4.0%
	CO2 emissions (post-adjustment)		164	242	193	192	222	231	254	244	237	238	229	−5.2%	−9.8%	−3.7%
	CO2 emission intensity index (actual emissions)	Base year: FY2005	1.11	1.00	0.78	0.76	0.80	0.86	0.83	0.82	0.79	0.79	0.76	−24.3%	−8.4%	−4.3%
	CO2 emission intensity index (post-adjustment)		1.11	1.00	0.72	0.70	0.77	0.78	0.83	0.82	0.79	0.79	0.76	−24.2%	−8.3%	−4.0%
	Energy consumption		78	117	110	111	110	114	114	111	111	113	111	−4.8%	−2.0%	−1.4%
	Energy consumption intensity index	Base year: FY2005	1.10	1.00	0.85	0.83	0.79	0.80	0.76	0.77	0.76	0.78	0.76	−23.9%	−0.3%	−1.8%
	Production activity index		0.61	1.00	1.11	1.14	1.19	1.22	1.27	1.24	1.25	1.25	1.25	25.0%	−1.7%	0.4%
Japan Aluminum Association	CO2 emissions (actual emissions)		156	168.1	132.4	137.8	144.4	147.6	146.2	149.2	144.6	145.3	141.7	−15.7%	−3.1%	−2.5%
	CO2 emissions (post-adjustment)		156	168.1	123.9	128.7	139.6	135.6	146.2	149.0	144.2	145.0	141.8	−15.6%	−3.0%	−2.2%
	CO2 emission intensity index (actual emissions)		1.00	0.97	0.88	0.84	0.95	1.01	1.01	0.95	0.94	0.94	0.93	−4.1%	−8.5%	−1.7%
	CO2 emission intensity index (post-adjustment)		1.00	0.97	0.83	0.79	0.91	0.93	1.01	0.95	0.93	0.94	0.93	−4.0%	−8.4%	−1.4%
	Energy consumption		77	81	69	73	69	67	66	68	67	69	69	−15.0%	4.2%	−0.2%
	Energy consumption intensity index ☆		1.00	0.94	0.93	0.90	0.91	0.92	0.92	0.88	0.88	0.90	0.90	−3.3%	−1.6%	0.6%
	Production activity index		1.00	1.12	0.96	1.05	0.98	0.94	0.93	1.01	0.99	0.99	0.98	−12.1%	5.9%	−0.8%
Japan Federation of Printing Industries	CO2 emissions (actual emissions) ☆			133	124	126	143	147	145	139	134	130	118	−11.5%	−18.7%	−9.6%
	CO2 emissions (post-adjustment)			133	113	114	136	130	145	139	134	130	118	−11.4%	−18.6%	−9.2%
	Energy consumption			72	70	70	70	66	64	63	63	62	58	−19.6%	−10.0%	−6.6%
Flat Glass Manufacturers Association of Japan	CO2 emissions (actual emissions) ☆		181	134	110	115	117	113	117	110	106	106	109	−19.1%	−7.2%	2.5%
	CO2 emissions (post-adjustment)		181	134	107	113	115	109	117	110	106	106	109	−19.0%	−7.1%	2.6%
	CO2 emission intensity index (actual emissions)	Base year: FY2005	0.97	1.00	1.12	1.01	1.07	0.97	0.91	0.91	0.85	0.87	0.87	−13.5%	−4.9%	−1.0%
	CO2 emission intensity index (post-adjustment)		0.97	1.00	1.09	0.98	1.05	0.94	0.91	0.91	0.85	0.87	0.87	−13.4%	−4.9%	−0.9%
	Energy consumption		73	52	44	46	45	43	44	42	42	42	44	−16.6%	−1.2%	3.8%
	Energy consumption intensity index	Base year: FY2005	1.00	1.00	1.15	1.04	1.06	0.95	0.88	0.89	0.85	0.89	0.89	−10.9%	1.2%	0.2%
	Production activity index		1.38	1.00	0.73	0.85	0.82	0.87	0.96	0.90	0.93	0.90	0.94	−6.5%	−2.3%	3.6%
Japan Soft Drink Association	CO2 emissions (actual emissions)		47	102	103	104	110	116	122	116	115	114	122	19.2%	0.0%	6.8%
	CO2 emissions (post-adjustment)		47	102	98	99	107	109	122	116	115	114	111	8.0%	−9.4%	−3.0%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY1990	1.00	1.13	1.03	0.97	0.99	1.03	0.99	0.95	0.91	0.88	0.91	−19.4%	−8.2%	3.6%
	CO2 emission intensity index (post-adjustment)		1.00	1.13	0.99	0.93	0.97	0.97	0.99	0.95	0.91	0.88	0.83	−26.9%	−16.8%	−5.9%
	Energy consumption		21	48	53	54	53	54	57	54	55	55	60	25.0%	6.7%	8.8%
	Energy consumption intensity index	Base year: FY1990	1.00	1.20	1.19	1.13	1.08	1.08	1.03	1.00	0.98	0.96	1.01	−15.5%	−2.0%	5.5%
	Production activity index		1.00	1.92	2.11	2.25	2.34	2.39	2.60	2.59	2.69	2.75	2.83	47.9%	8.9%	3.1%
Japan Dairy Industry Association	CO2 emissions (actual emissions)		86	112	110	109	114	121	120	116	116	112	103	−7.6%	−13.5%	−7.5%
	CO2 emissions (post-adjustment)		86	112	105	104	111	113	120	115	116	112	104	−7.5%	−13.4%	−7.3%
	CO2 emission intensity index (actual emissions)	Base year: FY2013	0.80	0.95	0.98	0.97	0.98	1.01	1.00	0.96	0.96	0.93	0.94	−0.7%	−5.8%	0.9%
	CO2 emission intensity index (post-adjustment)		0.80	0.95	0.93	0.92	0.96	0.94	1.00	0.96	0.96	0.93	0.94	−0.6%	−5.8%	1.1%
	Energy consumption		41	51	54	54	52	53	52	51	53	52	49	−5.3%	−6.4%	−5.5%
	Energy consumption intensity index ☆	Base year: FY2013	0.87	1.00	1.09	1.09	1.03	1.02	1.00	0.98	1.00	0.99	1.02	1.8%	1.9%	3.1%
	Production activity index		0.90	0.99	0.94	0.95	0.97	1.00	1.00	1.01	1.01	1.00	0.92	−6.9%	−8.1%	−8.3%
The Japanese Electric Wire & Cable Makers' Association	CO2 emissions (actual emissions)		109	91	78	82	94	99	96	92	88	86	82	−9.9%	−14.3%	−3.7%
	CO2 emissions (post-adjustment)		109	91	69	72	89	86	96	91	88	85	82	−9.7%	−14.2%	−3.3%
(metal (copper/aluminnum) cable)	CO2 emission intensity index (actual emissions)		0.94	1.00	1.03	1.08	1.21	1.28	1.22	1.15	1.14	1.14	1.07	7.1%	−12.2%	−5.8%
(metal (copper/aluminnum) cable)	CO2 emission intensity index (post-adjustment)	Base year: FY2005	0.94	1.00	0.91	0.95	1.14	1.12	1.22	1.15	1.14	1.13	1.07	7.3%	−12.0%	−5.4%
(optical fiber cable)	CO2 emission intensity index (actual emissions)		3.76	1.00	0.84	0.90	0.99	0.98	1.04	0.92	0.83	0.79	0.73	−27.1%	−29.8%	−7.2%
(optical fiber cable)	CO2 emission intensity index (post-adjustment)		3.76	1.00	0.73	0.78	0.93	0.84	1.04	0.91	0.83	0.78	0.73	−26.9%	−29.7%	−6.7%
	Energy consumption ☆		64	50	45	47	45	43	42	41	40	40	40	−20.1%	−3.7%	0.1%
(metal (copper/aluminnum) cable)	Energy consumption intensity index		1.00	1.00	1.07	1.12	1.06	1.03	0.97	0.93	0.95	0.97	0.95	−4.8%	−1.5%	−2.2%
(optical fiber cable)	Energy consumption intensity index	Base year: FY2005	4.20	1.00	0.85	0.91	0.83	0.75	0.78	0.71	0.67	0.65	0.63	−37.4%	−20.0%	−3.1%
(metal (copper/aluminnum) cable)	Production activity index		1.37	1.00	0.78	0.78	0.79	0.78	0.81	0.82	0.79	0.77	0.78	−21.6%	−2.7%	2.3%
(optical fiber cable)	Production activity index		0.07	1.0	1.6	1.5	1.7	1.9	1.7	1.7	1.9	2.0	2.0	104.9%	23.8%	3.6%
The Japan Bearing Industrial Association	CO2 emissions (actual emissions)			73	58	70	83	84	85	84	79	78	78	6.7%	−7.6%	−0.1%
	CO2 emissions (post-adjustment)			73	51	62	79	73	85	84	79	78	78	6.9%	−7.4%	0.4%
	CO2 emission intensity index (actual emissions)	Base year: FY1997		0.98	0.97	0.89	1.03	1.14	1.13	1.05	1.04	1.01	0.92	−6.3%	−18.7%	−9.1%
	CO2 emission intensity index (post-adjustment)			0.98	0.86	0.79	0.98	0.99	1.13	1.05	1.03	1.01	0.92	−6.1%	−18.6%	−8.7%
	CO2 emission intensity index (fixity coefficient) ☆			0.87	0.87	0.80	0.78	0.79	0.79	0.74	0.76	0.76	0.72	−18.0%	−9.1%	−6.0%
	Energy consumption			40	33	40	40	37	37	37	36	37	38	−4.5%	3.5%	3.7%
	Energy consumption intensity index	Base year: FY1997		0.86	0.88	0.81	0.79	0.80	0.79	0.75	0.76	0.76	0.72	−16.2%	−8.9%	−5.7%
	Production activity index			1.32	1.06	1.39	1.42	1.29	1.32	1.41	1.35	1.37	1.50	13.9%	13.7%	10.0%

Industry	(*2) (☆:target adopted by the industry)	Notes	1990	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Japan Society of Industrial Machinery Manufacturers	CO2 emissions (actual emissions)			59	45	49	58	59	58	58	55	54	53	−9.5%	−8.3%	−1.9%
	CO2 emissions (post-adjustment)			59	41	44	55	52	58	58	55	54	53	−9.3%	−8.2%	−1.5%
	Energy consumption			31	25	28	28	26	25	26	25	25	26	−17.5%	2.1%	1.7%
	Production activity index	Base year: FY2005		1.00	1.08	1.07	1.11	1.08	1.06	1.13	1.22	1.14	1.17	17.4%	11.0%	3.3%
Japan Petroleum Development Association	CO2 emissions (actual emissions) ☆		16	22	27	25	23	25	25	22	22	21	20	−9.1%	−20.3%	−3.9%
	CO2 emissions (post-adjustment)		16	22	27	24	23	24	25	22	22	21	20	−9.0%	−20.3%	−3.7%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY2005	1.27	1.00	1.08	1.06	0.99	1.15	1.26	1.18	1.18	1.13	1.04	4.0%	−17.3%	−7.7%
	CO2 emission intensity index (post-adjustment)		1.27	1.00	1.05	1.03	0.98	1.11	1.26	1.18	1.18	1.13	1.04	4.0%	−17.3%	−7.5%
	Energy consumption		6	9	10	10	10	10	11	9	9	10	10	11.4%	−10.5%	−0.8%
	Energy consumption intensity index	Base year: FY2005	1.26	1.00	1.01	1.07	1.12	1.23	1.37	1.28	1.33	1.34	1.27	27.4%	−7.2%	−4.7%
	Production activity index		0.57	1.00	1.14	1.06	1.05	0.99	0.91	0.84	0.82	0.84	0.87	−12.5%	−3.6%	4.1%
Japan Copper and Brass Association	CO2 emissions (actual emissions)			43	39	41	44	47	48	46	42	45	40	−6.0%	−16.1%	−11.6%
	CO2 emissions (post-adjustment)			43	35	37	42	42	48	46	42	45	40	−5.8%	−16.0%	−11.2%
	CO2 emission intensity index (actual emissions)	Base year: FY2005		1.00	1.10	1.05	1.20	1.34	1.28	1.21	1.24	1.21	1.22	21.6%	−5.2%	0.2%
	CO2 emission intensity index (post-adjustment)			1.00	0.99	0.95	1.15	1.19	1.28	1.21	1.23	1.21	1.22	21.8%	−5.1%	0.6%
	Energy consumption			23	22	23	22	21	21	21	20	21	20	−15.0%	−7.8%	−8.9%
	Energy consumption intensity index ☆	Base year: FY2005		1.00	1.13	1.09	1.08	1.11	1.06	1.01	1.06	1.06	1.10	9.9%	4.1%	3.3%
	Production activity index			1.00	0.83	0.93	0.87	0.82	0.87	0.89	0.81	0.88	0.77	−22.7%	−11.4%	−11.8%
Brewers Association of Japan	CO2 emissions (actual emissions) ☆		117	90	60	57	53	52	49	48	47	47	46	−48.7%	−6.0%	−0.7%
	CO2 emissions (post-adjustment)		117	90	58	54	55	54	55	53	51	50	49	−45.8%	−10.5%	−2.2%
	CO2 emission intensity index (actual emissions)		1.00	0.79	0.56	0.54	0.51	0.50	0.49	0.48	0.47	0.47	0.47	−40.1%	−2.1%	1.2%
	CO2 emission intensity index (post-adjustment)		1.00	0.79	0.54	0.52	0.54	0.53	0.54	0.52	0.51	0.50	0.50	−36.7%	−6.9%	−0.3%
	Energy consumption		56	43	32	30	28	28	26	25	25	25	24	−43.7%	−7.0%	−0.6%
	Energy consumption intensity index		1.00	0.79	0.62	0.60	0.57	0.56	0.54	0.53	0.52	0.51	0.52	−34.2%	−3.2%	1.3%
	Production activity index		1.00	0.98	0.92	0.90	0.88	0.88	0.87	0.86	0.86	0.85	0.83	−14.4%	−3.9%	−1.9%
The Shipbuilders' Association of Japan and the Cooperative Association of Japan Shipbuilders (hours) (quantity at completion) (quantity at completion) (hours) (quantity at completion) (hours) (quantity at completion)	CO2 emissions (actual emissions)							68	65	69	69	71	67		3.6%	−4.5%
	CO2 emissions (post-adjustment)							59	65	69	69	70	67		3.3%	−4.5%
	CO2 emission intensity index (actual emissions) ☆							1.00	1.05	1.12	1.00	1.01	1.00		−4.6%	−0.8%
	CO2 emission intensity index (post-adjustment)							1.00	1.21	1.28	1.15	1.15	1.17		−3.3%	1.4%
	CO2 emission intensity index (actual emissions) ☆							1.00	1.17	1.27	1.26	1.38	1.33		13.7%	−3.6%
	CO2 emission intensity index (post-adjustment)							1.00	1.34	1.46	1.44	1.58	1.52		13.7%	−4.0%
	Energy consumption							29	28	30	31	32	31		12.4%	−4.1%
	Energy consumption intensity index							1.00	1.04	1.13	1.04	1.08	1.10		5.3%	1.8%
	Energy consumption intensity index							1.00	1.15	1.28	1.31	1.48	1.43		23.7%	−3.6%
	Production activity index							1.00	0.91	0.92	1.02	1.03	0.97		6.8%	−5.8%
	Production activity index							1.00	0.83	0.81	0.81	0.75	0.75		−9.1%	−0.5%
Limestone Association of Japan	CO2 emissions (actual emissions) ☆			25	20	21	24	27	28	28	27	27	26	4.9%	−7.0%	−1.2%
	CO2 emissions (post-adjustment)			25	19	19	23	24	28	28	27	27	26	5.0%	−6.9%	−0.8%
	CO2 emission intensity index (actual emissions)	Base year: FY2010		1.00	1.01	1.02	1.14	1.22	1.22	1.22	1.22	1.21	1.17	17.4%	−3.7%	−3.2%
	CO2 emission intensity index (post-adjustment)			1.00	0.94	0.93	1.09	1.10	1.22	1.22	1.21	1.21	1.18	17.5%	−3.5%	−2.9%
	Energy consumption			12	10	11	11	11	12	12	12	11	12	−4.5%	0.6%	1.6%
	Energy consumption intensity index	Base year: FY2010		1.00	1.04	1.04	1.04	1.03	1.03	1.04	1.06	1.07	1.07	6.9%	4.3%	−0.5%
	Production activity index			1.00	0.81	0.83	0.85	0.89	0.93	0.92	0.89	0.87	0.89	−10.6%	−3.5%	2.2%
Japan Machine Tool Builders Association	CO2 emissions (actual emissions)		25	27	20	26	32	35	36	37	36	34	34	24.2%	−7.4%	0.4%
	CO2 emissions (post-adjustment)		25	27	17	23	30	31	36	37	35	33	34	24.4%	−7.3%	0.9%
	CO2 emission intensity index (actual emissions)		1.00	0.84	1.41	1.09	1.15	1.23	1.32	1.13	1.04	1.06	0.93	10.9%	−29.4%	−12.2%
	CO2 emission intensity index (post-adjustment)		1.00	0.84	1.24	0.96	1.08	1.07	1.32	1.13	1.04	1.05	0.93	11.1%	−29.3%	−11.7%
	Energy consumption		15	15	11	15	15	15	16	16	16	15	16	10.3%	4.5%	4.8%
	Energy consumption intensity index ☆		1.00	0.78	1.36	1.05	0.94	0.91	0.96	0.85	0.81	0.84	0.77	−1.6%	−20.3%	−8.3%
	Production activity index		1.00	1.29	0.56	0.95	1.10	1.14	1.10	1.31	1.36	1.26	1.44	12.0%	31.1%	14.3%
Japan Sanitary Equipment Industry Association	CO2 emissions (actual emissions) ☆		50	36	26	24	28	26	26	23	20	20	20	−45.9%	−23.4%	0.4%
	CO2 emissions (post-adjustment)		50	36	24	22	27	24	26	23	20	20	20	−45.9%	−23.3%	0.7%
	CO2 emission intensity index (actual emissions)	Base year: FY1990	1.00	0.69	0.57	0.45	0.51	0.47	0.43	0.39	0.34	0.32	0.33	−51.6%	−21.7%	2.7%
	CO2 emission intensity index (post-adjustment)		1.00	0.69	0.54	0.42	0.50	0.44	0.43	0.39	0.34	0.32	0.33	−51.5%	−21.6%	3.0%
	Energy consumption		23	17	13	12	13	12	12	11	9	9	10	−43.7%	−16.7%	3.0%
	Energy consumption intensity index	Base year: FY1990	1.00	0.69	0.62	0.50	0.52	0.46	0.41	0.38	0.34	0.33	0.35	−49.6%	−14.9%	5.4%
	Production activity index		1.00	1.07	0.92	1.07	1.08	1.10	1.22	1.20	1.18	1.22	1.19	11.7%	−2.1%	−2.3%
Flour Millers Association	CO2 emissions (actual emissions)		19	23	22	23	28	31	30	30	29	28	27	13.9%	−12.5%	−3.4%
	CO2 emissions (post-adjustment)		19	23	19	20	26	26	30	30	29	28	27	14.1%	−12.3%	−2.8%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY2013	0.72	0.77	0.74	0.74	0.92	1.01	1.00	0.99	0.93	0.90	0.86	12.2%	−13.8%	−3.7%
	CO2 emission intensity index (post-adjustment)		0.72	0.77	0.64	0.64	0.86	0.86	1.00	0.99	0.93	0.89	0.86	12.5%	−13.6%	−3.2%
	Energy consumption		12	13	13	14	14	13	13	13	13	13	13	−3.6%	−1.5%	0.8%
	Energy consumption intensity index	Base year: FY2013	1.05	1.02	1.02	1.02	1.03	1.02	1.00	1.01	0.98	0.97	0.97	−4.9%	−3.0%	0.4%
	Production activity index		0.86	1.00	0.98	1.01	1.01	1.00	1.00	1.00	1.01	1.01	1.01	1.4%	1.5%	0.4%
Japan Industrial Vehicles Association	CO2 emissions (actual emissions) ☆		6.6	7.0	4.4	4.9	5.9	6.0	4.8	4.7	4.4	4.3	4.2	−39.4%	−11.8%	−1.4%
	CO2 emissions (post-adjustment)		6.6	7.0	4.1	4.5	5.6	5.4	4.8	4.7	4.4	4.3	4.2	−39.4%	−11.7%	−1.0%
	CO2 emission intensity index (actual emissions)	Base year: FY2005	0.85	1.00	1.18	0.96	1.03	1.12	0.91	0.86	0.80	0.81	0.76	−24.2%	−16.3%	−6.7%
	CO2 emission intensity index (post-adjustment)		0.85	1.00	1.09	0.88	0.99	1.00	0.91	0.86	0.80	0.81	0.76	−24.1%	−16.2%	−6.4%
	Energy consumption		3.5	3.6	2.4	2.7	2.8	2.7	2.1	2.1	2.0	2.0	2.1	−43.1%	−2.9%	1.8%
	Energy consumption intensity index	Base year: FY2005	0.86	1.00	1.22	1.01	0.95	0.96	0.77	0.74	0.71	0.74	0.71	−28.8%	−7.8%	−3.8%
	Production activity index		1.11	1.00	0.54	0.73	0.81	0.77	0.76	0.79	0.79	0.76	0.80	−20.1%	5.4%	5.7%

Industry	(*2) (☆:target adopted by the industry)	Notes	1990	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2005	Relative to FY2013	Relative to previous FY
Japan Association of Rolling Stock Industries	CO2 emissions (actual emissions) ☆		4.6	3.7	3.5	3.5	3.6	3.6	3.6	3.6	3.4	3.4	3.5	−4.9%	−3.5%	2.9%
	CO2 emissions (post-adjustment)		4.6	3.7	3.2	3.1	3.5	3.2	3.6	3.6	3.4	3.4	3.5	−4.7%	−3.4%	3.4%
	CO2 emission intensity index (actual emissions)	Base year: FY1990	1.00	0.56	0.43	0.48	0.55	0.61	0.50	0.51	0.44	0.49	0.45	−18.9%	−10.6%	−8.0%
	CO2 emission intensity index (post-adjustment)		1.00	0.56	0.38	0.42	0.52	0.54	0.50	0.51	0.44	0.49	0.45	−18.7%	−10.4%	−7.6%
	Energy consumption		2.6	2.0	2.0	2.0	1.7	1.6	1.6	1.6	1.6	1.6	1.7	−15.2%	7.3%	6.6%
	Energy consumption intensity index	Base year: FY1990	1.00	0.55	0.43	0.49	0.47	0.49	0.40	0.41	0.36	0.41	0.40	−27.7%	−0.5%	−4.7%
	Production activity index		1.00	1.43	1.80	1.59	1.44	1.27	1.56	1.53	1.69	1.50	1.68	17.2%	7.9%	11.9%
Emissions from industrial processes *5	CO2 emissions		6,049	5,108	4,111	4,212	4,181	4,207	4,462	4,429	4,240	4,239	4,277	−16.3%	−4.1%	0.9%
Revisions *4	CO2 emissions (actual emissions)			23	24	25	43	53	52	48	43	39	34			
	CO2 emissions (post-adjustment)															
Total *6	CO2 emissions (actual emissions)		40,437	42,034	36,387	38,614	38,733	38,939	39,811	39,269	37,877	37,581	37,491	−11.0%	−5.8%	−0.2%
	CO2 emissions (post-adjustment)		40,437	42,034	35,589	37,743	38,267	37,818	39,814	39,251	37,834	37,550	37,487	−11.0%	−5.8%	−0.2%
	Energy consumption		12,340	13,562	12,008	12,743	12,327	12,011	12,148	12,024	11,722	11,719	11,786	−13.3%	−3.0%	0.6%

*1 Due to the rounding off, totals may differ from the sum of individual items.

*2 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as 1. Unless otherwise specified in remarks (BAU baseline etc.), the base year is fiscal 1990.

*3 The Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention has implemented the Commitment to Low Carbon Society as a new scheme independent of the conventional Voluntary Action Plan on the Environment. Therefore, data for participating industries under Keidanren's 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.

*4 Figures for the Japan Rubber Manufacturers Association have been caclulated using the coefficient for thermal power generation and a fixity coefficent for fiscal 2005 (base year) has been used to calculate actual emissions. The difference between a simple suminclusing relevant industries and the total is provided as "Revisions".

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

*6 The rate of change from fiscal 2005 to fiscal 2016 is calculated except for industries with no data for fiscal 2005.

2. Energy Conversion Sector

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

Industry	(*1) (☆:target adopted by the industry)	Notes	2001	2002	2003	2004	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Electric Power Council for a Low Carbon Society *2	CO2 emissions (actual emissions)		31,000	34,000	36,100	36,200	37,300	36,100	38,200	44,600	49,400	49,400	47,000	44,400	43,200	41,000	+9.9%	−17.0%	−5.1%
	CO2 emissions (post-adjustment)		31,000	34,000	36,100	36,200	37,300	30,800	32,500	41,600	41,700	49,300	46,900	44,100	43,000	41,100	+10.2%	−16.6%	−4.4%
	CO2 emission intensity index (actual emissions ☆		0.90	0.97	1.04	1.00	1.01	0.99	0.99	1.22	1.36	1.36	1.33	1.28	1.24	1.19	+17.1%	−12.8%	−4.5%
	CO2 emission intensity index (post-adjustment		0.90	0.97	1.04	1.00	1.01	0.85	0.84	1.14	1.15	1.36	1.32	1.27	1.24	1.19	+17.4%	−12.4%	−3.8%
	Energy consumption intensity index		0.94	0.94	0.94	0.94	0.95	0.92	0.92	0.92	0.92	0.91	0.90	0.90	0.90	0.89	−5.8%	−2.4%	−0.6%
	Production activity index		1.25	1.28	1.27	1.31	1.34	1.33	1.40	1.33	1.32	1.32	1.29	1.26	1.27	1.26	−6.1%	−4.8%	−0.7%
Petroleum Association of Japan	CO2 emissions (actual emissions)		4,062	4,032	4,075	4,054	4,154	3,960	4,003	3,785	3,820	4,033	3,824	3,834	3,845	3,808	−8.3%	−5.6%	−1.0%
	CO2 emissions (post-adjustment)		4,062	4,032	4,075	4,054	4,154	3,945	3,987	3,776	3,795	4,033	3,823	3,833	3,844	3,808	−8.3%	−5.6%	−0.9%
	CO2 emission intensity index (actual emissions	Base year: FY1990	0.88	0.88	0.88	0.87	0.85	0.85	0.84	0.85	0.85	0.86	0.85	0.83	0.83	0.83	−2.0%	−3.2%	−0.6%
	CO2 emission intensity index (post-adjustment		0.88	0.88	0.88	0.87	0.85	0.84	0.84	0.84	0.84	0.86	0.85	0.83	0.83	0.83	−2.0%	−3.2%	−0.6%
	Energy consumption		1,657	1,650	1,665	1,665	1,714	1,633	1,651	1,556	1,575	1,652	1,565	1,574	1,590	1,571	−8.4%	−4.9%	−1.2%
	Energy consumption intensity index	Base year: FY1990	0.87	0.87	0.87	0.86	0.84	0.85	0.84	0.84	0.85	0.85	0.84	0.83	0.83	0.83	−2.0%	−2.5%	−0.9%
	Production activity index		1.48	1.47	1.49	1.50	1.58	1.50	1.52	1.44	1.44	1.52	1.45	1.48	1.48	1.48	−6.5%	−2.5%	−0.3%
The Japan Gas Association *3	CO2 emissions (actual emissions)		73	66	59	54	47	34	34	38	40	46	48	45	46	45	−3.4%	−0.5%	−1.3%
	CO2 emissions (post-adjustment)		73	66	59	54	47	32	31	36	36	46	48	44	46	45	−3.3%	−0.4%	−0.9%
	CO2 emission intensity index (actual emissions ☆	Base year: FY1990	0.33	0.28	0.24	0.21	0.17	0.12	0.11	0.12	0.12	0.13	0.13	0.13	0.12	0.12	−25.5%	−5.3%	−0.0%
	CO2 emission intensity index (post-adjustment		0.33	0.28	0.24	0.21	0.17	0.11	0.10	0.11	0.11	0.13	0.13	0.13	0.12	0.12	−25.4%	−5.1%	+0.4%
	Energy consumption		38	34	30	28	25	19	19	19	18	21	22	21	22	22	−8.7%	+8.2%	+1.7%
	Energy consumption intensity index	Base year: FY1990	0.35	0.29	0.25	0.22	0.18	0.13	0.12	0.12	0.11	0.12	0.12	0.12	0.12	0.12	−29.6%	+3.1%	+3.0%
	Production activity index		1.62	1.76	1.82	1.94	2.10	2.21	2.33	2.38	2.39	2.59	2.64	2.60	2.76	2.72	+29.7%	+5.0%	−1.3%
Emissions from industrial processes *4	CO2 emissions		233	220	229	225	214	222	214	213	190	189	200	196	190	203	−5.1%	+7.5%	+6.9%
Total (Emissions before electric power distribution)	CO2 emissions (actual emissions)		35,368	38,318	40,462	40,533	41,715	40,316	42,452	48,636	53,450	53,667	51,071	48,475	47,281	45,056	+8.0%	−16.0%	−4.7%
	CO2 emissions (post-adjustment)		35,368	38,318	40,462	40,533	41,715	34,998	36,732	45,625	45,721	53,567	50,971	48,174	47,080	45,157	+8.3%	−15.7%	−4.1%
	Energy consumption		19,349	19,670	19,527	20,233	20,731	19,941	21,021	19,932	19,774	19,741	18,920	18,667	18,625	18,384	−11.3%	−6.9%	−1.3%

*1 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as 1. Unless otherwise specified in remarks (BAU baseline etc.), the base year is fiscal 1990.
*2 Because the Electric Power Council for a Low Carbon Society was established in fiscal 2015, the data for fiscal years through fiscal 2006 represent only the Federation of Electric Power Companies, and the data for fiscal 2007 - 2014 include the Federation of Electric Power Companies and PPS.
*3 The data for the Japan Gas Association in and before 2012 are based on industrial boundaries defined under the Voluntary Action Plan on the Environment. The calculated CO2 emissions differ from the figures dervied using the marignal adjustment method (cogeneration) that the Japan Gas Association has adopted as target indices.
*4 Emissions from industrial processes refer to CO2 emissions from manufacturing processes that are not energy-oriented.

3. Commercial Sector

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

Industry	(*1) (☆: target adopted by the industry)	Notes	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY2013	Relative to previous FY
Japan Chain Stores Association	CO2 emissions (actual emissions)		646	668	692	783	540	496	395	292	227	-58.0%	-22.4%
	CO2 emissions (post-adjustment)		552	569	646	662	540	495	393	291	227	-58.0%	-22.0%
	Energy consumption		389	402	338	342	233	219	181	138	112	-52.0%	-19.0%
Telecommunications Carriers Association	CO2 emissions (actual emissions)		453	427	532	576	571	566	555	522	500	-12.4%	-4.3%
	CO2 emissions (post-adjustment)		387	364	497	487	571	565	552	520	501	-12.2%	-3.7%
	Energy consumption		273	257	260	251	246	251	254	247	247	+0.4%	+0.2%
	Energy consumption intensity index ☆	Base year: FY2013		2.38	1.92	1.47	1.00	0.77	0.53	0.35	0.26	-73.9%	-25.6%
	Production activity index			0.44	0.55	0.69	1.00	1.33	1.97	2.86	3.85	+284.9%	+34.7%
Japan Franchise Association	CO2 emissions (actual emissions)			297	364	422	438	459	451	449	429	-2.0%	-4.4%
	CO2 emissions (post-adjustment)			253	340	357	438	458	449	447	430	-1.8%	-3.8%
	Energy consumption			179	178	184	189	203	207	212	212	+12.3%	+0.1%
Japan Department Store Association	CO2 emissions (actual emissions)		171	157	178	194	190	172	160	152	133	-29.8%	-12.3%
	CO2 emissions (post-adjustment)		151	138	168	169	190	172	159	152	134	-29.7%	-11.9%
	CO2 emission intensity index (actual emissions)		0.87	0.85	0.94	1.01	1.00	0.92	0.84	0.81	0.76	-24.0%	-6.5%
	CO2 emission intensity index (post-adjustment)		0.77	0.75	0.88	0.88	1.00	0.92	0.84	0.81	0.76	-23.8%	-6.1%
	Energy consumption		99	91	87	86	83	77	74	72	65	-21.4%	-9.0%
	Energy consumption intensity index ☆	Base year: FY2013	0.84	0.81	0.75	0.74	0.72	0.68	0.64	0.63	0.61	-14.8%	-3.0%
	Production activity index		1.85	1.74	1.80	1.81	1.79	1.77	1.79	1.77	1.66	-7.7%	-6.2%
Japan Association of Refrigerated Warehouses	CO2 emissions (actual emissions)		76	80	90	106	106	103	98	96	90	-15.3%	-5.8%
	CO2 emissions (post-adjustment)		65	68	84	90	106	103	98	95	90	-15.1%	-5.2%
	CO2 emission intensity index (actual emissions)	Base year: FY1990	0.88	0.92	1.08	1.22	1.20	1.15	1.09	1.06	1.00	-16.9%	-5.7%
	CO2 emission intensity index (post-adjustment)		0.76	0.78	1.01	1.03	1.20	1.15	1.09	1.05	1.00	-16.8%	-5.1%
	Energy consumption		46	48	44	46	46	46	45	45	45	-3.0%	-1.4%
	Energy consumption intensity index ☆	Base year: FY1990	0.83	0.86	0.82	0.83	0.81	0.79	0.78	0.78	0.77	-4.9%	-1.3%
	Production activity index		1.39	1.40	1.35	1.40	1.43	1.45	1.45	1.45	1.45	+2.0%	-0.1%
Japanese Bankers Association	CO2 emissions (actual emissions)		121	122	130	141	139	134	127	120	111	-20.2%	-7.3%
	CO2 emissions (post-adjustment)		104	104	122	119	139	134	126	119	111	-20.0%	-6.8%
	Energy consumption		73	73	64	62	60	59	58	57	55	-8.5%	-3.0%
	Electric power consumption intensity (power consumption / total floor area) ☆	Base year: FY2009	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.8	-8.5%	-2.3%
The Life Insurance Association of Japan	CO2 emissions (actual emissions)		104	101	108	116	111	102	96	85	79	-28.2%	-6.9%
	CO2 emissions (post-adjustment)		90	88	102	99	111	102	96	85	80	-28.1%	-6.4%
	Energy consumption		61	60	53	51	48	45	44	40	39	-18.8%	-2.7%
	Production activity index	Base year: FY2009	1.00	0.96	0.97	0.94	0.91	0.89	0.89	0.88	0.86	-5.4%	-1.6%
Japan Foreign Trade Council, Inc.	CO2 emissions (actual emissions)		5.1	5.3	5.4	5.6	5.4	5.1	4.5	4.1	3.7	-31.2%	-10.1%
	CO2 emissions (post-adjustment)		4.4	4.5	5.0	4.8	5.4	5.1	4.5	4.1	3.7	-31.1%	-9.6%
	Energy consumption		3.1	3.1	2.6	2.5	2.3	2.3	2.1	2.0	1.8	-21.8%	-6.1%
	Electric power consumption intensity (power consumption poer unit floor area in entire company) ☆	Base year: FY2013	1.23	1.26	1.06	1.02	1.00	0.98	0.94	0.90	0.90	-10.0%	+0.0%
The General Insurance Association of Japan	CO2 emissions (actual emissions)		26	26	27	29	29	27	25	24	21	-25.8%	-10.7%
	CO2 emissions (post-adjustment)		23	22	26	25	29	27	25	24	21	-25.7%	-10.2%
	Energy consumption		16	15	13	13	12	12	11	11	11	-15.7%	-6.7%
	Electric power consumption intensity (power consumption/total floor area) ☆	Base year: FY2009	1.00	1.01	0.88	0.86	0.84	0.86	0.82	0.83	0.81	-4.2%	-2.9%
	Production activity index		1.00	0.98	0.98	0.97	0.95	0.91	0.89	0.87	0.84	-12.0%	-4.0%
Japan LP Gas Association	CO2 emissions (actual emissions)		2.4	2.4	2.9	3.2	3.1	3.0	2.8	2.8	2.7	-13.2%	-3.1%
	CO2 emissions (post-adjustment)		2.0	2.0	2.7	2.7	3.1	3.0	2.8	2.8	2.7	-13.0%	-2.5%
	CO2 emission intensity index (actual emissions)	Base year: FY2010	1.00	1.00	1.19	1.43	1.48	1.40	1.45	1.36	1.34	-9.2%	-1.4%
	CO2 emission intensity index (post-adjustment)		1.00	1.00	1.30	1.41	1.73	1.64	1.69	1.59	1.58	-9.0%	-0.8%
	Energy consumption ☆		1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3	-0.6%	+1.4%
	Energy consumption intensity index	Base year: FY2010	0.90	0.90	0.87	0.93	0.95	0.93	0.99	0.96	0.99	+4.0%	+3.2%
	Production activity index		1.0	1.00	1.02	0.94	0.88	0.89	0.82	0.86	0.84	-4.4%	-1.8%
The Real Estate Companies Association of Japan	CO2 emission intensity index (actual emissions)	Base year: FY2005	0.87	0.86	0.89	0.97	1.00	0.94	0.87	0.87	0.85	-14.7%	-1.8%
	CO2 emission intensity index (post-adjustment)		0.76	0.75	0.84	0.85	1.00	0.93	0.87	0.86	0.85	-14.8%	-1.7%
	Energy consumption intensity index ☆		0.89	0.88	0.79	0.79	0.79	0.76	0.75	0.74	0.75	-5.8%	+0.6%
Japan Building Owners and Managers Association	Energy consumption [MJ/m2 year]		2,019.2				1,833	1,743	1,722	1,754	1,722	-6.1%	-1.9%
	Energy consumption intensity index		1.00				0.91	0.86	0.85	0.87	0.85	-6.1%	-1.9%
Japan Securities Dealers Association	CO2 emissions (actual emissions)		19	19	19	20	19	18	17	16	15	-24.4%	-8.9%
	CO2 emissions (post-adjustment)		16	16	18	17	19	18	17	16	15	-24.2%	-8.4%
	Energy consumption		12	11	9	9	8	8	8	8	7	-13.4%	-4.7%
	Electric power consumption per unit floor ☆	[kWh/㎡]	241	243	203	195	189	185	180	174	170	-10.4%	-2.6%
Japan Hotel Association	CO2 emissions (actual emissions)			56	59	63	63	61	58	55	54	-15.1%	-2.8%
	CO2 emissions (post-adjustment)			51	56	57	63	61	57	55	54	-15.0%	-2.4%
	Energy consumption			35	32	32	32	31	30	30	29	-6.7%	-0.4%
	Energy consumption intensity index ☆	Base year: FY2010		1.00	0.95	0.93	0.91	0.88	0.86	0.86	0.85	-6.2%	-0.5%
	Production activity index			1.00	0.99	1.02	1.04	1.04	1.05	1.05	1.05	+0.8%	+0.1%
Telecom Services Association	CO2 emissions (actual emissions)						102	96	90	90	81	-20.8%	-9.8%
	CO2 emissions (post-adjustment)						102	96	89	89	81	-20.6%	-9.3%
	Energy consumption						44	43	41	42	40	-9.3%	-5.6%
	Energy consumption intensity index ☆	Base year: FY2013					1.00	0.97	0.94	0.96	0.91	-8.8%	-5.1%
	Production activity index						1.00	0.99	1.00	1.00	1.00	-0.5%	
Japan Internet Providers Association	CO2 emissions (actual emissions)								6	5	6		+10.9%
	CO2 emissions (post-adjustment)								6	5	6		+10.9%
	Energy consumption								3	3	3		+10.9%
	Energy consumption intensity index ☆	Base year: FY2015							1.00	0.83	0.84		+1.9%
Revisions	CO2 emissions (actual emissions)												
	CO2 emissions (post-adjustment)												
	Energy consumption												
Total *1	CO2 emissions (actual emissions)		1,624	1,959	2,209	2,460	2,317	2,243	2,085	1,913	1,753	-24.6%	-8.4%
	CO2 emissions (post-adjustment)		1,395	1,679	2,066	2,089	2,317	2,239	2,073	1,906	1,756	-24.5%	-7.9%
	Energy consumption		972	1,175	1,082	1,080	1,006	998	960	907	868	-13.7%	-4.3%

*1 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as 1. Unless otherwise specified in remarks (BAU baseline etc.), the base year is fiscal 1990.

4. Transportation Sector

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

Industry	(*1) (☆:target adopted by the industry)	Note	2005	2009	2010	2011	2012	2013	2014	2015	2016	2017	Relative to FY1990	Relative to FY2005	Relative to FY2013	Relative to previous FY
The Japanese Shipowners' Association	CO2 emissions (actual emissions)		5,574	5,751	5,769	5,673	5,499	5,539	5,417	5,215	5,258	5,402	+40.1%	-3.1%	-2.5%	+2.7%
	CO2 emissions (post-adjustment)		5,574	5,751	5,769	5,673	5,499	5,539	5,417	5,215	5,258	5,402	+40.1%	-3.1%	-2.5%	+2.7%
	CO2 emission intensity index (actual emissions) ☆	Base year: FY1990	0.88	0.82	0.83	0.77	0.73	0.62	0.57	0.59	0.61	0.52	-48.0%	-40.8%	-15.6%	-15.3%
	CO2 emission intensity index (post-adjustment)		0.88	0.82	0.83	0.77	0.73	0.62	0.57	0.59	0.61	0.52	-48.0%	-40.8%	-15.6%	-15.3%
	Energy consumption		2,012	2,076	2,083	2,048	1,986	1,931	1,889	1,821	1,836	1,887	+35.5%	-6.2%	-2.3%	+2.8%
	Energy consumption intensity index	Base year: FY1990	0.88	0.82	0.83	0.77	0.73	0.59	0.55	0.57	0.59	0.50	-49.8%	-42.7%	-15.5%	-15.3%
	Production activity index		1.65	1.81	1.79	1.91	1.95	2.33	2.48	2.28	2.22	2.70	+169.7%	+63.6%	+15.6%	+21.4%
Japan Trucking Association	CO2 emissions (actual emissions)		4,720	4,470	4,337	4,161	4,101	4,079	4,100	4,091	4,068	4,087	-18.3%	-13.4%	+0.2%	+0.5%
	CO2 emissions (post-adjustment)		4,720	4,470	4,337	4,161	4,101	4,079	4,100	4,091	4,068	4,087	-18.3%	-13.4%	+0.2%	+0.5%
	CO2 emission intensity index (actual emissions) ☆	Base year: 1996	0.75	0.71	0.63	0.63	0.71	0.69	0.71	0.73	0.70	0.70	-30.2%	-7.4%	+1.4%	-0.5%
	CO2 emission intensity index (post-adjustment)		0.75	0.71	0.63	0.63	0.71	0.69	0.71	0.73	0.70	0.70	-30.2%	-7.4%	+1.4%	-0.5%
	Energy consumption		1,776	1,682	1,632	1,566	1,543	1,527	1,534	1,531	1,523	1,530	-18.7%	-13.9%	+0.2%	+0.5%
	Energy consumption intensity index	Base year: 1996	0.75	0.71	0.63	0.63	0.71	0.68	0.70	0.72	0.70	0.69	-30.5%	-7.9%	+1.4%	-0.5%
	Production activity index		1.25	1.26	1.38	1.31	1.16	1.18	1.16	1.13	1.16	1.17	+17.0%	-6.5%	-1.3%	+0.9%
The Scheduled Airlines Association of Japan	CO2 emissions (actual emissions)		2,667	2,106	1,901	1,753	1,884	1,979	2,086	2,218	2,305	2,388	+39.0%	-10.5%	+20.7%	+3.6%
	CO2 emissions (post-adjustment)		2,667	2,106	1,901	1,753	1,884	1,979	2,086	2,218	2,305	2,388	+39.0%	-10.5%	+20.7%	+3.6%
	CO2 emission intensity index (actual emissions) ☆	Base year: 2005	1.00	0.93	0.88	0.88	0.89	0.88	0.84	0.85	0.82	0.79	-23.3%	-20.9%	-10.2%	-3.3%
	CO2 emission intensity index (post-adjustment)		1.00	0.93	0.88	0.88	0.89	0.88	0.84	0.85	0.82	0.79	-23.3%	-20.9%	-10.2%	-3.3%
	Energy consumption		1,026	810	731	674	724	748	789	839	872	903	+36.8%	-11.9%	+20.7%	+3.6%
	Energy consumption intensity index	Base year: 2005	1.00	0.93	0.88	0.88	0.89	0.87	0.82	0.83	0.80	0.78	-24.5%	-22.2%	-10.2%	-3.3%
	Production activity index		1.00	0.85	0.81	0.74	0.79	0.84	0.93	0.98	1.06	1.13	+81.3%	+13.2%	+34.4%	+7.1%
Japan Federation of Coastal Shipping Associations	CO2 emissions (actual emissions) ☆		789	655	704	686	704	722	726	704	713	703	-18.1%	-11.0%	-2.7%	-1.5%
	CO2 emissions (post-adjustment)		789	655	704	686	704	722	726	704	713	703	-18.1%	-11.0%	-2.7%	-1.5%
	CO2 emission intensity index (actual emissions)	Base year: FY1990	1.04	1.09	1.09	1.10	1.11	1.09	1.11	1.09	1.11	1.09	+8.6%	+4.1%	-0.7%	-1.7%
	CO2 emission intensity index (post-adjustment)		1.04	1.09	1.09	1.10	1.11	1.09	1.11	1.09	1.11	1.09	+8.6%	+4.1%	-0.7%	-1.7%
	Energy consumption		288	239	256	250	256	255	256	249	252	248	-20.9%	-13.8%	-2.6%	-1.5%
	Energy consumption intensity index	Base year: FY1990	1.04	1.09	1.09	1.09	1.10	1.06	1.07	1.05	1.07	1.05	+4.9%	+0.8%	-0.6%	-1.7%
	Production activity index		0.88	0.70	0.75	0.73	0.74	0.77	0.76	0.75	0.75	0.75	-24.6%	-14.5%	-2.0%	+0.3%
The Association of Japanese Private Railways	CO2 emissions (actual emissions)				216	258	289	286	274	263	257	245			-14.3%	-4.6%
	CO2 emissions (post-adjustment)				184	240	244	286	274	261	256	245			-14.1%	-4.0%
	Energy consumption				130	126	126	123	121	120	121	121			-1.8%	-0.2%
	Energy consumption intensity index	Base year: FY2010			1.00	0.98	0.97	0.94	0.93	0.92	0.92	0.93			-1.9%	+0.2%
	Production activity index				1.00	0.99	1.00	1.00	1.01	1.01	1.01	1.01			+0.1%	-0.4%
Shikoku Railway Company	CO2 emissions (actual emissions)		8	8	7	7	8	8	8	8	8	7	-21.1%	-11.2%	-7.2%	-2.8%
	CO2 emissions (post-adjustment)		8	7	7	7	7	8	8	8	8	7	-21.0%	-11.1%	-7.1%	-2.5%
	CO2 emission intensity index (actual emissions)	Base year: FY2010	1.05	0.98	1.00	1.04	1.13	1.14	1.11	1.09	1.08	1.05	-21.8%	-0.3%	-7.8%	-2.8%
	CO2 emission intensity index (post-adjustment)		1.11	0.98	1.00	1.07	1.11	1.20	1.17	1.15	1.13	1.10	-21.8%	-0.2%	-7.7%	-2.5%
	Energy consumption ☆		4	3	3	3	3	3	3	3	3	3	-18.5%	-15.1%	-1.2%	-0.9%
	Energy consumption intensity index	Base year: FY2010	1.03	0.97	1.00	0.97	1.00	1.00	0.99	0.98	0.99	0.98	-19.3%	-4.7%	-1.8%	-0.9%
	Production activity index		1.07	1.06	1.00	0.96	0.95	0.95	0.93	0.95	0.95	0.95	+1.0%	-10.9%	+0.6%	+0.0%
All Japan Freight Forwarders Association	CO2 emissions (actual emissions) ☆	Base year: FY2009	14.1	13.3	12.8	12.7	12.8	12.9	12.9	12.7	12.5	12.3		-12.7%	-4.9%	-1.4%
	CO2 emissions (post-adjustment)		14.1	13.3	12.8	12.7	12.8	12.9	12.9	12.7	12.5	12.3		-12.7%	-4.9%	-1.4%
	Production activity index															
Revisions *2	CO2 emissions (actual emissions)		249	520	474	512	578	650	632	613	601	579			-11.0%	-3.6%
	CO2 emissions (post-adjustment)		249	459	416	486	529	628	626	608	598	579			-7.9%	-3.2%
Total *3	CO2 emissions (actual emissions)		14,022	13,521	13,420	13,062	13,075	13,276	13,255	13,124	13,222	13,423		-8.2%	+1.1%	+1.5%
	CO2 emissions (post-adjustment)		14,022	13,460	13,330	13,019	12,982	13,254	13,249	13,117	13,218	13,423		-8.2%	1.3%	+1.6%
	Energy consumption		5,219	4,920	4,944	4,794	4,763	4,739	4,745	4,715	4,758	4,843		-10.4%	+2.2%	+1.8%

*1 Intensity indices have been calculated by having each industry set a base year, the figure for which is used as 1. Unless otherwise specified in remarks (BAU baseline etc.), the base year is fiscal 1990.
*2 The total value of closed participant companies (East Japan Railway Company, West Japan Railway Company, Central Japan Railway Company, Kyushu Railway Company, Shikoku Railway Company, Japan Freight Railway Company) lists it in Revisions.
*3 The rate of change from fiscal 2005 to fiscal 2016 is calculated except for industries with no data for fiscal 2005.