

**KEIDANREN's  
Commitment to  
a Low Carbon Society**

**January 17, 2013**

**KEIDANREN**



## **【Table of Contents】**

<b>I . The Importance of Proactive Measures to Address Climate Change</b>	<b>1</b>
<b>1. Accomplishments of the Voluntary Action Plan</b>	<b>1</b>
<b>2. Promoting the Commitment to a Low Carbon Society</b>	<b>2</b>
<b>II . Industries and Companies Participating to Keidanren's Commitment to a Low Carbon Society</b>	<b>10</b>
<b>III . Participating Industries and Companies' Commitment to a Low Carbon Society</b>	<b>13</b>
<b>IV . Evaluation Committee Report on Keidanren's Commitment to a Low Carbon Society</b>	<b>63</b>
<b>V . Keidanren's Commitment to a Low Carbon Society</b>	<b>78</b>

---

## **I. The Importance of Proactive Measures to Address Climate Change**

### **1. Accomplishments of the Voluntary Action Plan**

(1) Combating climate change constitutes a global-scale challenge demanding exhaustive efforts from a long-range perspective by all interested groups in every nation.

Japanese industry possesses an array of world-leading energy-conservation and low-carbon technologies and is expected to actively contribute with those technologies to the achievement of a target shared by the international community at large: namely, cutting global greenhouse gas emissions in half by 2050.

(2) Prior to adoption of the Kyoto Protocol, in June 1997 Keidanren formulated a Voluntary Action Plan on the Environment under which it has demonstrated numerous accomplishments in the areas of energy conservation and CO<sub>2</sub> emission reduction.<sup>1</sup>

Among those accomplishments in the interim that warrant special mention, the plan has fostered a change of awareness within the business community regarding the seriousness of climate change, encouraged the development and widespread penetration of many new technologies,<sup>2</sup> and contributed as well to efforts in innovation.

(3) Participating industries have made their best efforts to achieve the targets they set for themselves. Some that can see that their current targets are within reach have even gone as far as setting higher targets and searching for additional ways to reduce emissions. Some industries have even begun complementing these efforts with the use of carbon credits domestically and overseas in the interest of ensuring that their targets will be met.

Keidanren has endeavoured to ensure the implementation viability and transparency of its Voluntary Action Plan through far-reaching applications of the PDCA cycle.<sup>3</sup>

---

<sup>1</sup> As an outcome of sweeping improvements in energy efficiency and despite a modest increase in production activity, in fiscal 2011 total CO<sub>2</sub> emissions by 34 industries in the industrial and energy-conversion sectors were down 10.1 percent compared to fiscal 1990 levels. In the baseline year of fiscal 1990, CO<sub>2</sub> emissions by these 34 industries accounted for approximately 44 percent of total CO<sub>2</sub> emissions in Japan and 83 percent of the total for the industrial and energy-conversion sectors. (For further information, see <http://www.keidanren.or.jp/policy/2012/084.html>.)

<sup>2</sup> These include the development and widespread implementation of coke dry quenching (CDQ) technologies, hybrid construction machinery, cogeneration, heat-pump facilities, and combined-cycle generation (a configuration using gas and steam turbines together).

<sup>3</sup> This includes public disclosure in the form of annual progress reports, and assessments and

(4) Thanks largely to such efforts, Japan's key industrial sectors have achieved levels of energy efficiency among the highest in the world. Furthermore, the Keidanren Voluntary Action Plan has been assigned importance as a key foundation for industry-led countermeasures under the Cabinet-approved Kyoto Protocol Target Achievement Plan.<sup>4</sup>

## **2. Promoting the Commitment to a Low Carbon Society**

(1) The Voluntary Action Plan has proved resoundingly successful in encouraging industry-led reductions of CO<sub>2</sub> emissions within Japan. As one result of this progress, the domestic manufacturing sector in particular now has only marginal room left to reduce emissions further in the years ahead. Conversely, emissions by the residential and other sectors have been on an uptrend<sup>5</sup> and steps to reduce emissions in those sectors will present a significant challenge to the future pursuit of domestic measures against climate change.

Overseas, CO<sub>2</sub> emission levels have demonstrated sharp growth particularly within emerging economies. Transferring to other countries the excellent technologies Japan now has at its command will be vitally important to the goal of reducing emissions on a global scale.

Achieving the international community's target of cutting global CO<sub>2</sub> emissions in half by the year 2050 will not be possible with technologies currently available. That prospect demands that efforts be accelerated to develop new and innovative technologies that will set the stage for a breakthrough.

In light of these concerns, the Japanese business community will be expected to continue making all-out efforts to reduce emissions domestically in the years ahead,

---

verifications by the Evaluation Committee. In addition, follow-up is conducted by a government council every year.

<sup>4</sup> The (revised) Kyoto Protocol Target Achievement Plan (approved by the Cabinet on 28 March 2008) contains the following statements: The Keidanren Voluntary Action Plan on the Environment is "playing a central role in countermeasures in the industrial community. The advantages of a voluntary instrument include the ease of selection of superior countermeasures for each actor based on its originality and ingenuity, the likelihood of providing incentives to pursue aggressive targets, and no procedural costs for both the Government and implementing actors. It is expected that these advantages will be further exploited in voluntary action plans by business operators."

<sup>5</sup> According to *Japan's National Greenhouse Gas Emissions in Fiscal Year 2011 (Preliminary Figures)* published by the Ministry of the Environment, CO<sub>2</sub> emissions by the "residential" and "commercial and other" sectors in fiscal 2011 rose 48 percent and 51 percent, respectively, compared to fiscal 1990.

step up foreign technology transfers and efforts to develop innovative new technologies, and contribute to the reduction of global CO<sub>2</sub> emissions from a long-range perspective.

(2) The Japanese government has indicated it will not be participating in the second commitment period of the Kyoto Protocol (2013–20) but instead will set its own medium-range targets and pursue its own measures to address climate change.<sup>6</sup>

The Keidanren Voluntary Action Plan on the Environment is scheduled to conclude at the end of fiscal 2012, with the close of the first commitment period of the Kyoto Protocol. The Japanese business community, however, will need to maintain their resolve from fiscal 2013 onwards and step up their independent and proactive efforts to address climate change utilising a “pledge and review” system.

(3) In that undertaking, it will be necessary to show fresh progress while retaining the positive features of the Voluntary Action Plan. Announced in December 2009, Keidanren’s Commitment to a Low Carbon Society was the plan conceived with these points in mind. Responding to Keidanren’s call to action, many industrial sectors and companies have drawn up action plans of their own or announced their intentions to participate.

The Commitment has the following features.

**i. Four key pillars oriented towards halving global greenhouse gas emissions by the year 2050 (Reference 1)**

Keidanren’s Commitment to a Low Carbon Society declares that, as a shared vision, the Japanese business community harnesses its technological prowess and assumes an instrumental role in the drive to halve global greenhouse gas emissions by the year 2050.

To this end, participating industries pledge to provide society with world-leading low carbon technologies while maintaining and/or improving their own levels of

---

<sup>6</sup> The Copenhagen Accord that inspired elements of the agreements at COP 16 (2010) incorporates a “pledge and review” system under which each participating country voluntarily submits and commits itself to its own emission reduction targets and action plan (pledge) and progress towards those targets is assessed internationally (review). This system has the participation of China, the US, and other countries that together account for over 80 percent of total global emissions. Each participating country has submitted reduction targets and action plans to the United Nations. This constitutes a much higher coverage rate compared to that represented by the countries participating in the second commitment period of the top-down approach-based Kyoto Protocol (approximately 15 percent of total global emissions).

energy efficiency and formulate action plans based on the following four pillars: (a) the establishment of CO<sub>2</sub> reduction targets for domestic business operations for the year 2020; (b) strengthened co-operation with consumers, customers, and other interested groups; (c) contributions on the international level, including the promotion of technology transfers to developing countries; and (d) the development of innovative technologies.

## **ii. Establishment of two categories of reduction benchmarks**

Under the Commitment to a Low Carbon Society, two types of action benchmarks for the reduction of CO<sub>2</sub> emission are developed and utilised by participating industries to achieve their respective targets.

### **(a) Reduction targets**

Participating industries establish CO<sub>2</sub> reduction targets for domestic business operations for the year 2020 that assume the best available technologies (BATs) are fully harnessed. As a commitment to society, participating industries make maximum efforts to ensure the achievement of their respective targets. Furthermore, study will be devoted to supplementary measures in the event defined targets are unlikely to be met.

Reduction targets are constantly reviewed in order for participating industries to take appropriate measures, such as raising reduction targets, in the event technological advances facilitate the adoption of updated BATs.

Additionally, reviews are conducted regarding comprehensive targets set under Keidanren's Commitment to a Low Carbon Society.

### **(b) Reduction potential**

The reduction potential available through strengthened co-operation with other interested groups, through contributions on the international level, and through the development of innovative technologies has been quantified where possible for certain hypothetical scenarios. Although consumer and customer preferences, trends in developing countries, and various other factors do not always allow corporations to realise their reduction potential solely through their own efforts, businesses can contribute to the reduction of greenhouse gas emissions on a global scale through their own operations by focusing their energy on winning maximum acceptance of their products, services, and technologies from consumers and customers in Japan and abroad.

### **iii. Reinforcement of the PDCA cycle (Reference 2)**

(a) To improve the transparency and credibility of action plans, Keidanren adopts an even-more extensive PDCA cycle.

**Plan**: Have the Evaluation Committee perform assessments and verifications of action plans for individual participating industries from the reduction target setting stage.

**Do**: At the implementation stage for a given participating industry's action plan, improve information disclosure, for example, by placing reports of implementation progress on the websites of Keidanren and the industrial sector concerned. Additionally, link Keidanren's Commitment to a Low Carbon Society page to participating industries' websites.

**Check**: In the interest of facilitating assessments and verifications that incorporate a broader diversity of perspectives, increase the number of members on the Evaluation Committee. (Expand the committee from its current seven members to ten members by adding new members from the media, nongovernmental organisations, and labour unions.) The Evaluation Committee assesses and verifies the progress of individual participating industries with their respective action plans and releases its findings in annual reports.

**Act**: Individual participating industries take the findings of the Evaluation Committee assessments and verifications into account and revise their respective action plans as necessary. In the event a participating industry is capable of adopting new BATs or appears likely to surpass its initial reduction targets, it will explore the possibility of raising its targeted reduction levels. (Improve the actual breadth and depth of reduction targets rather than trading the surplus.)

(b) In the interim fiscal year 2016, subject action plans to sweeping reviews with attention to accomplishments of efforts made during the period from fiscal 2013 to 2015.

Since the Great East Japan Earthquake, Japanese government policies on energy and the environment have lacked clarity and consistency. By contrast, the Japanese business community will not stand idle; from fiscal 2013 forward it will assume the initiative in finding solutions to the issues of climate change through its own action plans.



It is anticipated the Japanese government will at some point in the future formulate a new set of policies on climate change to supersede the Kyoto Protocol Target Achievement Plan. However, in addition to treating the Commitment to a Low Carbon Society as a foundation for those policies, and to facilitate industry efforts in this area, the government is called to pursue bold new initiatives in regulatory reform, expand tax incentives for research and development, and move forward with the formation of bilateral offset mechanisms.

Through the promotion of a highly transparent and credible PDCA cycle, Keidanren is determined to ensure that the Japanese business community reliably implements action plans and to lead the world in finding solutions to the problem of climate change.

## **Reference 1: Four Pillars of Keidanren's Commitment to a Low Carbon Society**

### **(a) Establishment of reduction targets for domestic business operations up to the year 2020**

Participating industries set CO<sub>2</sub> reduction targets for the year 2020 on the understanding that they are to make the utmost effort to implement BATs when building or updating facilities and infrastructure for their manufacturing operations, offices, logistics, services, and other aspects of their business operations.

For example, from the perspective of efficiently harnessing energy generated during their manufacturing stages, companies in the chemical and petrochemical sectors are expected to improve their energy efficiency and reduce CO<sub>2</sub> emissions by having their key processes (ethylene plants, caustic soda production facilities, and steam generation equipment) adopt as fully as possible a range of cutting-edge technologies<sup>7</sup> already in use on a commercial scale. Companies in the steel industry, moreover, are expected to adopt next-generation coke-making technology and other commercially viable cutting-edge technologies when updating their manufacturing facilities. Additionally, in the interest of fully utilising available energy sources with a minimum of waste, members of the cement industry are expected to widely adopt energy-saving technologies and facilities for improved heat recovery and reductions in electricity consumption as well as expand their use of industrial waste products as alternative sources of energy.

As another example of energy use with relatively low CO<sub>2</sub> emissions, the paper and pulp industry is expected to shift to the use of biomass energy sources and expand its utilisation of scrap wood and other industrial waste products.

### **(b) Strengthened co-operation with consumers, customers, and other interested groups**

Participating industries strengthen their ties of co-operation with a variety of other interested groups, including consumers, customers, employees, and local residents. In particular, they strive to develop and commercialise new products and services boasting the world's highest levels of energy efficiency and accordingly contribute to energy conservation and CO<sub>2</sub> emission reductions throughout product life cycles.

---

<sup>7</sup> Regarding BATs and best practice technologies (BPTs), the International Energy Agency (IEA) and other institutions present world-leading technologies and levels of reduction potential as measured on the basis of international comparisons. (Example: IEA, *Energy Technology Transitions for Industry*, 2009.)

For example, they are expected to do their utmost to expand the market penetration of energy-saving appliances, household fuel cells, fuel-efficient automobiles, and next-generation vehicles as well as develop and promote the widespread acceptance of highly insulated homes and other products with a low carbon footprint. Furthermore, they spearhead the development of highly functional materials and components that can give new products higher levels of energy efficiency (for example, LED and solar cell materials and insulation materials for buildings).

Additional undertakings of importance that can be expected to generate synergistic benefits with other industries include the development of new tires with lower rolling resistance and a transition from asphalt- to concrete-paved roadways.

Undertakings of this kind facilitate sweeping reductions in CO<sub>2</sub> emissions over entire product life cycles, including the utilisation or consumption stages, and contribute immensely to the creation of a low carbon society.

### **(c) Contributions on the international level**

In the context of their business operations, participating industries, acting in line with international rules, proactively transfer advanced Japanese technologies and expertise to those developing countries that show an interest and thus contribute to CO<sub>2</sub> emission reductions outside Japan.

Given that China, India, and other emerging economies rely heavily on coal-fired power generation and have expanding steel and cement industries, participating industries harness bilateral offset mechanisms and other schemes to actively introduce and expand their energy-saving technologies for steel and cement production facilities abroad as well as participate in the Global Superior Energy Performance Partnership (GSEP)<sup>8</sup> and a variety of other international frameworks for the provision of support to developing countries.

---

<sup>8</sup> This is an international forum through which government officials and business communities from participating countries, in their roles as members of sector-specific working groups, put together technology and expertise transfers and other forms of assistance for emerging and developing economies. By assuming the initiative as the lead country for the working groups on steel, electricity, and cement, Japan expects to bring about outstanding reductions in greenhouse gas emissions.

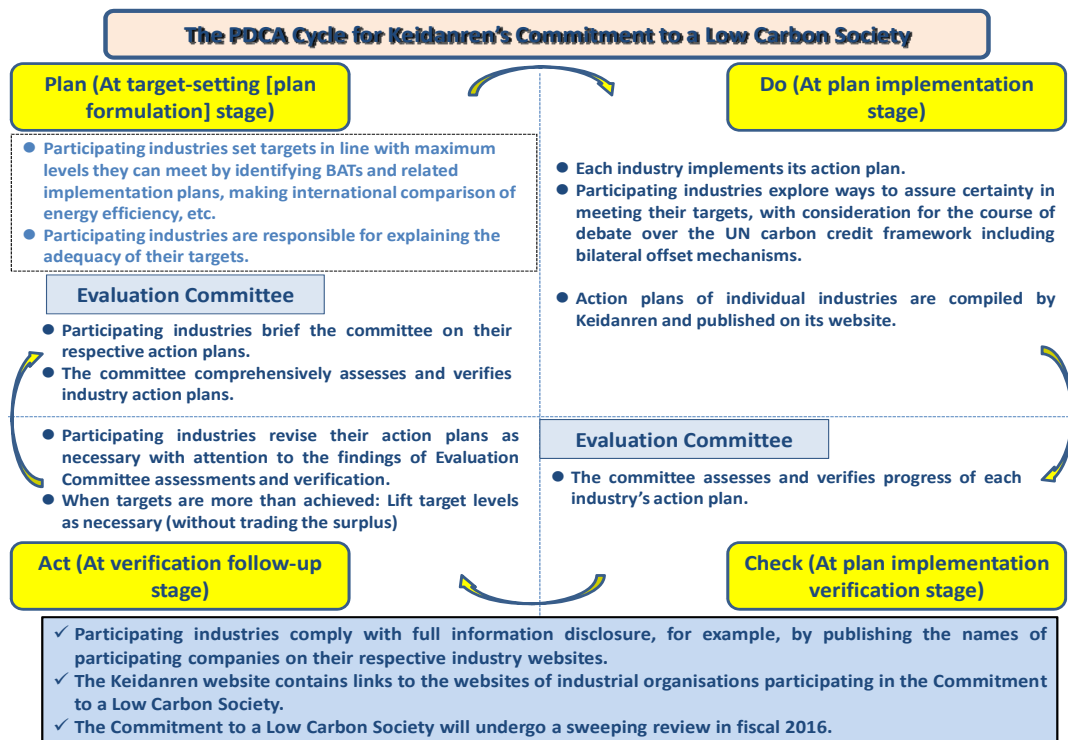
**(d) Development of innovative technologies**

Participating industries are expected to utilise collaborative ties with academia and the public sector and engage in medium- and long-range efforts to actively develop and commercialise innovative new technologies.

For example, in the interest of reducing CO<sub>2</sub> emissions from steelmaking processes with methods employing the hydrogen-based reduction of iron ore and the separation and recovery of CO<sub>2</sub> in blast furnace gases, members of the steel industry are working on an initiative called COURSE50 (CO<sub>2</sub> ultimate reduction in steelmaking process by innovative technology for Cool Earth 50).

Additionally, participating industries are expected to pursue research and development on clean coal technologies, next-generation power transmission and distribution technologies, carbon capture and storage (CCS) technologies, ultra-high-efficiency heat pumps, and other undertakings in technology development with a focus on both the supply and demand sides of electricity systems and environmental conservation.

**Reference 2: The PDCA Cycle for Keidanren’s Commitment to a Low Carbon Society**



# **II . Industries and Companies Participating to Keidanren's Commitment to a Low Carbon Society**

**\*as of November 2013**

	Name of Industries and Companies
Industries and Companies which have formulated Action Plan (43)	<p><b>【Industrial Sector】</b></p> <p>① Japan Iron and Steel Federation</p> <p>② Japan Chemical Industry Association</p> <p>③ Japan Paper Association</p> <p>④ Japan Electrical Manufacturers' Association, Japan Electronics and Information Technology Industries Association, Communications and Information network Association of Japan, Japan Business Machine and Information System Industries Association</p> <p>⑤ Japan Cement Association</p> <p>⑥ Japan Automobile Manufacturers Association (JAMA) and Japan Auto-Body Industries Association (JABIA)</p> <p>⑦ Japan Auto Parts Industries Association</p> <p>⑧ Japan Mining Industry Association</p> <p>⑨ Japan Federation of Construction Contractors</p> <p>⑩ Japan Federation of Housing Organizations (Judanren)</p> <p>⑪ Lime Manufacturing Association</p> <p>⑫ The Japan Rubber Manufacturers Association</p> <p>⑬ The Federation of Pharmaceutical Manufactures' Associations of JAPAN</p> <p>⑭ Japan Federation of Printing Industries</p> <p>⑮ Flat Glass Association</p> <p>⑯ The Japan Soft Drinks Association</p> <p>⑰ Japan Dairy Industry Association</p> <p>⑱ Japan Electric Wire and Cable Makers' Association</p> <p>⑲ Japan Petroleum Development Association</p> <p>⑳ Brewers Association of Japan</p> <p>㉑ Japan Sanitary Equipment Industry Association</p> <p>㉒ Flour Millers Association</p> <p>㉓ Japan Association of Rolling stock Industries</p> <p><b>【Energy-Conversion sector】</b></p> <p>㉔ The Federation of Electric Companies of Japan (FEPC)</p> <p>㉕ Petroleum Association of Japan</p> <p>㉖ Japan Gas Association</p>

	Name of Industries and Companies
	<p><b>【Commercial Sector】</b></p> <p>⑳ Japan Chain Stores Association (JCA)</p> <p>㉑ Telecommunications Carriers Association</p> <p>㉒ Japan Department Stores Association</p> <p>㉓ Japan Association of Refrigerated Warehouses</p> <p>㉔ Japanese Bankers Association</p> <p>㉕ The Life Insurance Association of Japan (LIAJ)</p> <p>㉖ Japan Foreign Trade Council</p> <p>㉗ The General Insurance Association of Japan</p> <p>㉘ Japan LP Gas Association</p> <p>㉙ The Real Estate Companies Association of Japan</p> <p>㉚ Japan Building Owners and Managers Association</p> <p><b>【Transportation Sector】</b></p> <p>㉛ The Japanese Shipowners' Association (JSA)</p> <p>㉜ The Scheduled Airlines Associations of Japan</p> <p>㉝ Japan Federation of Coastal Shipping Associations</p> <p>㉞ Non-governmental Railways Association</p> <p>㉟ East Japan Railway Company</p> <p>㊱ All Japan Freight Forwarders Association</p>
Industries and Companies which have expressed the will of formulating Action Plan (7)	<p><b>【Industrial Sector】</b></p> <p>① Japan Aluminum Association</p> <p>② Japan Bearing Industrial Association</p> <p>③ Japan Brass Makers Association</p> <p>④ The Shipbuilders' Association of Japan, The Cooperative Association of Japan Shipbuilders</p> <p>⑤ Japan Machine Tool Builders' Association</p> <p><b>【Commercial Sector】</b></p> <p>⑥ Japan Franchise Association</p> <p><b>【Transportation Sector】</b></p> <p>⑦ Japan Trucking Association</p>

### **III. Participating Industries and Companies' Commitment to a Low Carbon Society**



« <b>Industrial Sector</b> » .....	15
Japan Iron and Steel Federation .....	16
Japan Chemical Industry Association .....	18
Japan Paper Association.....	20
Electrical and Electronics Industries** .....	21
Japan Cement Association .....	23
Joint Action Plan for a Low-Carbon Society    Japan Automobile Manufacturers Association, Inc.    Japan Auto-Body Industries Association, Inc. ....	25
Japan Auto Parts Industries Association, .....	27
Japan Mining Industry Association .....	28
Japan Federation of Construction Contractors .....	29
Japan Federation of Housing Organizations .....	30
Lime Manufacturing Association .....	31
Japan Rubber Manufacturers Association.....	32
The Federation of Pharmaceutical Manufactures' Associations of JAPAN .....	34
Japan Federation of Printing Industries.....	35
Flat Glass Manufacturers Association of Japan.....	36
Japan Soft Drink Association.....	38
The Japan Dairy Industry Association's Low-Carbon Society Implementation Plan .....	39
The Japanese Electric Wire & Cable Makers' Association.....	40
Japan Petroleum Development Association .....	42
Brewers Association of Japan .....	43
Japan Association of Rolling stock Industries.....	44
« <b>Energy-Conversion Sector</b> » .....	45
The Federation of Electric Companies of Japan .....	46
Petroleum Association of Japan .....	48
The Japan Gas Association.....	49
« <b>Commercial Sector</b> » .....	50
Telecommunications Carriers Association.....	51
Japan Department Stores Association .....	52
The Life Insurance Association of Japan.....	53
Japan Foreign Trade Council, Inc.....	54
Japan LP Gas Association .....	55
The Real Estate Companies Association of Japan .....	56
« <b>Transportation Sector</b> » .....	58
Japan Federation of Coastal Shipping Associations.....	59
East Japan Railway Company.....	60
All Japan Freight Forwarders Association .....	61
The Scheduled Airlines Association of Japan .....	62

\*in preparation: Flour Millers Association, Japanese Bankers Association, Japan Building Owners and Managers Association, The Japanese Shipowners' Association

# «Industrial Sector»

## Japan Iron and Steel Federation

		Contents of the Plan
1.	Reduction target in domestic business operations for the year 2020	<p>The goal is a reduction of 5 million tons of CO<sub>2</sub> emissions from BAU, which is based on the maximum use of the latest technological advances and the steel production volumes.(excluding reduction from improvement in electric power emission coefficient)</p> <p>(ex)</p> <ul style="list-style-type: none"> <li>▪ if total crude steel production in Japan is 119.66 million tons                  BAU emissions at participating companies : 195.40 million tons of CO<sub>2</sub>                  →Total emission target at participating companies : 190.40 million tons of CO<sub>2</sub></li> <li>▪ if total crude steel production in Japan is 129.66 million tons                  BAU emissions at participating companies : 207.51 million tons of CO<sub>2</sub>                  →Total emission target at participating companies : 202.51million tons of CO<sub>2</sub></li> <li>▪ if total crude steel production in Japan is 109.66 million tons                  BAU emissions at participating companies : 183.31 million tons of CO<sub>2</sub>                  →Total emission target at participating companies : 178.31 million tons of CO<sub>2</sub></li> </ul> <p>※BAU emissions and emission targets are an amount of the companies participating in the voluntary action plan (90 companies)</p> <p>※BAU emissions are based on Voluntary Action Plan's emission factor of electricity (generating end).</p> <p>※A significant change in production volume may cause these figures to become more or less than the anticipated range. If this happens, the suitability of the BAU and emission reduction volumes will have to be re-examined based on actual production.</p> <p>※Guaranties to reach the target: We would provide security in some way to assure the reliability of the plan, though concrete way is not determined since the international framework and national rules of Post-Kyoto era is uncertain.</p>
	Basis of the target above	<p>○Use advanced technologies that have reached the stage of practical use when current facilities are updated or replaced (unit of figures are tons of CO<sub>2</sub>)</p> <ul style="list-style-type: none"> <li>▪ next generation coke production technology : about 0.9 million</li> <li>▪ higher efficiency for joint thermal and internal power generation :about 1.1 million</li> <li>▪ more energy-conserving equipments and higher efficiency for equipment powered by electricity : about 1 million</li> <li>▪ more chemical recycling of waste plastics and other materials at steel mills : about 2 million</li> </ul> <p>※ To use waste plastics, actions to recover and utilize them by the public sector are vital.</p>
2.	Strengthened cooperation with other interested groups (life cycle effect as of 2020)	<p>○For the five steel products for which quantitative data are available (FY 2011 production 9.14 million tons, 8.6% of Japan's total crude steel output), the uses of the finished products made of high-performance steel reduce FY2011 CO<sub>2</sub> emissions by 22.08 million tons of CO<sub>2</sub>.</p> <p>○CO<sub>2</sub> reduction from the use of finished products in FY 2020 will be estimated about 33.45 million tons of CO<sub>2</sub>.</p> <p>(Source: The Institute of Energy Economics, Japan)</p>

<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<ul style="list-style-type: none"> <li>○Major energy-conserving technologies developed and applied by the Japanese steel industry have been transferred to other countries by Japanese companies, and these technologies have <u>reduced</u> about 43 million tons of CO2 emissions in FY 2011.</li> <li>○The potential for <u>reducing</u> CO2 emissions through major energy-conserving technologies, based on the current share, supply capacities of Japanese companies and other factors, Japan's contribution in 2020 is estimated about 70 million tons.</li> </ul>
<p>4. Development of innovative technologies (in the medium- to long- terms)</p>	<ul style="list-style-type: none"> <li>○COURSE50 :Ultimate CO2 Reduction process in Steelmaking by Innovative technology for cool Earth 50 <ul style="list-style-type: none"> <li>▪ The goal is to reduce total CO2 emissions by about 30% by using hydrogen to reduce iron ore and collecting CO2 from blast furnace gas.</li> <li>▪ The first practical system is to start operating by about 2030. All blast furnaces are to be switched to this technology by 2050 as blast furnace facilities are updated and replaced.</li> </ul> </li> <li>※Assumes establishment of economic basis for CO2 storage infrastructure and creation of a practical unit using these processes.</li> <li>○Development of innovative ironmaking process <ul style="list-style-type: none"> <li>▪ Partial replacement of conventional coke to “ferrocake”(alternative reducing agent made by carbonizing green briquettes of mixtures of low grade coal and low grade iron ore) could decrease reducing agent ratio of a blast furnace and contribute to energy saving and CO2 emission mitigation (39 thousands kilo liters oil equivalent for a blast furnace could be conserved annually).</li> <li>▪ Aim to introduce 5 furnaces at 2030 at maximum.</li> </ul> </li> <li>※On the assumption that energy infrastructure such as LNG supply lines is separately equipped to the steel mills (especially to the steel mills with large blast furnaces) for the process installation.</li> </ul>

## Japan Chemical Industry Association

		Contents of the Plan																																												
<p>1.Reduction target in domestic business operation for the year 2020</p>	<p>Reduction target</p>	<p>The goal is a <u>reduction of 1.5 million tons of CO<sub>2</sub> emissions from BAU as of 2020.(excluding reduction from improvement in electric power emission coefficient)</u></p> <p>■BAU set by energy consumption based on production forecast (Kiloliters of crude oil equivalent(Oe):29million KLOe)</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Actual results of FY2005</th> <th colspan="2" style="text-align: center;">BAU of FY 2020</th> </tr> </thead> <tbody> <tr> <td>Petrochemical products :</td> <td style="text-align: center;">13.75</td> <td style="text-align: center;">12.86</td> <td></td> </tr> <tr> <td>Soda products :</td> <td style="text-align: center;">1.32</td> <td style="text-align: center;">1.32</td> <td></td> </tr> <tr> <td>Chemical fibers :</td> <td style="text-align: center;">1.96</td> <td style="text-align: center;">1.41</td> <td></td> </tr> <tr> <td>Ammonia products :</td> <td style="text-align: center;">0.65</td> <td style="text-align: center;">0.63</td> <td></td> </tr> <tr> <td>Functional products:</td> <td style="text-align: center;">5.17</td> <td style="text-align: center;">6.57</td> <td></td> </tr> <tr> <td>Others :</td> <td style="text-align: center;">6.21</td> <td style="text-align: center;">6.21</td> <td></td> </tr> </tbody> </table> <p>□Effect of production index on reduction target : if production index of each sector eqally ranges by 10%</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Production index of FY2020 :</td> <td style="text-align: center;">90</td> <td style="text-align: center;">100</td> <td style="text-align: center;">110</td> </tr> <tr> <td>BAU emissions (million tons-CO<sub>2</sub>)</td> <td style="text-align: center;">60.55</td> <td style="text-align: center;">67.28</td> <td style="text-align: center;">74.01</td> </tr> <tr> <td>Total emissions target</td> <td style="text-align: center;">59.20</td> <td style="text-align: center;">65.78</td> <td style="text-align: center;">72.36</td> </tr> <tr> <td>Reduction target</td> <td style="text-align: center;">1.35</td> <td style="text-align: center;">1.50</td> <td style="text-align: center;">1.65</td> </tr> </tbody> </table>		Actual results of FY2005	BAU of FY 2020		Petrochemical products :	13.75	12.86		Soda products :	1.32	1.32		Chemical fibers :	1.96	1.41		Ammonia products :	0.65	0.63		Functional products:	5.17	6.57		Others :	6.21	6.21		Production index of FY2020 :	90	100	110	BAU emissions (million tons-CO <sub>2</sub> )	60.55	67.28	74.01	Total emissions target	59.20	65.78	72.36	Reduction target	1.35	1.50	1.65
		Actual results of FY2005	BAU of FY 2020																																											
Petrochemical products :	13.75	12.86																																												
Soda products :	1.32	1.32																																												
Chemical fibers :	1.96	1.41																																												
Ammonia products :	0.65	0.63																																												
Functional products:	5.17	6.57																																												
Others :	6.21	6.21																																												
Production index of FY2020 :	90	100	110																																											
BAU emissions (million tons-CO <sub>2</sub> )	60.55	67.28	74.01																																											
Total emissions target	59.20	65.78	72.36																																											
Reduction target	1.35	1.50	1.65																																											
	<p>Basis of the target above</p>	<p>○Energy efficiency for Japanese chemical industry has already reached the highest level in the world and has less reduction potential.However,chemical industry will make an effort to improve more energy efficiency by dissemination of BPT(Best Practice Technologies).</p> <p>○Amount of reduction potential of energy used by concrete installation of advanced technologies by 2020 (KLOe) : 0.666millionKL Oe(for 1.5million tons-CO<sub>2</sub>)</p> <ul style="list-style-type: none"> <li>▪ Energy-saving process technologies for ethylene crackers 0.151millionKLOe</li> <li>▪ Energy-saving process technologies for other chemical products 0.515millionKLOe</li> </ul>																																												
<p>2.Strengthened cooperation with other interested groups(life cycle effect as of 2020)</p>		<p>○The avoided CO<sub>2</sub> emissions were calculated through the entire life cycle from the extraction,through manufacturing, distribution, and product use , to disposal( With 2020 used as the year of analysis, the avoided CO<sub>2</sub> emissions were evaluated when the products manufactured during the year under analysis were used until the end of their life.)</p> <p>◆Total avoided emissions for 8 chemical products: 112(million tons-CO<sub>2</sub>)</p> <ul style="list-style-type: none"> <li>▪ Materials for solar power generation : 8.98(million tons-CO<sub>2</sub>)</li> <li>▪ CFRP wind turbine power generation : 8.54(million tons-CO<sub>2</sub>)</li> <li>▪ CFRP vehicle : 0.08(million tons-CO<sub>2</sub>)</li> <li>▪ CFRP aircraft : 1.22(million tons-CO<sub>2</sub>)</li> <li>▪ LED-related materials : 7.45(million tons-CO<sub>2</sub>)</li> <li>▪ Thermal insulation materials for building construction : 76(million tons-CO<sub>2</sub>)</li> </ul>																																												

	<ul style="list-style-type: none"> <li>▪ Hall-effect device/IC for DC motors : 6,400(million tons-CO<sub>2</sub>)</li> <li>▪ Piping materials : 3.30(million tons-CO<sub>2</sub>)</li> </ul>
3. Contribution on the international level (effect through transferring advanced Japanese technologies and products and expertise abroad as of 2020)	<ul style="list-style-type: none"> <li>○ Manufacturing technologies <ul style="list-style-type: none"> <li>▪ Manufacturing technologies for polycarbonate using CO<sub>2</sub> as a raw material</li> <li>▪ State-of-the-art manufacturing equipment for telephthalic acid</li> <li>▪ Manufacturing technologies for acrylamide that use biotechnologies</li> <li>▪ Caustic soda manufacturing equipment that reduces power during electrolysis through the use of an ion exchange membrane</li> </ul> </li> <li>○ Unprocessed materials/products <ul style="list-style-type: none"> <li>▪ Seawater desalination technology using reverse osmosis membranes</li> <li>▪ Control devices for the DC motors for air conditioners</li> </ul> </li> <li>○ Treatment for making three alternatives to Freon harmless <ul style="list-style-type: none"> <li>▪ Reduction in the emissions of three alternatives to Freon through the installation of exhaust gas combustion equipment</li> </ul> </li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)	<ul style="list-style-type: none"> <li>○ Innovative process development <ul style="list-style-type: none"> <li>▪ Development of innovative processes for naphtha catalytic cracking</li> <li>▪ Development of distillation and separation technology using precision separation membranes, etc.</li> </ul> </li> <li>○ Development of processes for manufacturing chemical products that do not use fossil resources</li> <li>○ Development of high-performance materials that contribute to reduce GHG emissions in terms of LCA</li> </ul>

## Japan Paper Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>Reduce CO2 emissions by 1.39 million tons-CO2 to 21.04 million tons-CO2 from BAU emissions (22.43 million tons-CO2).</p> <ul style="list-style-type: none"> <li>● BAU emissions is calculated based on annual paper and paperboard production of 28.13 million tons.</li> <li>● Improvement in electric power emission coefficient is not calculated in the reduction target.</li> </ul>
	Basis of the target above	<p>The Action Plan identifies the following three as core measures for emission reduction:</p> <ol style="list-style-type: none"> <li>1. Higher efficiency for recovered paper pulping unit</li> <li>2. Advanced technology for using waste wood and wastes as energy.</li> <li>3. High temperature and pressure recovery boiler</li> </ol> <p><u>No figures for reduction effects of each measures.</u>  <u>Reduction volume can be increased if fuel conversion from fossil fuel to biomass fuel, which has larger reduction effect, progresses further.</u></p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>The Action Plan sets the target of expanding forest plantation area owned or managed by JPA member companies at home and abroad by 525 thousand hectares from the fiscal 1990 level to 800 thousand hectares by fiscal 2020, increasing carbon sequestration in forest plantation to 149 million ton-CO2, a 112 million ton-CO2 increase (3.7 million ton-CO2 per year) from fiscal 1990.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		
4. Development of innovative technologies (in the medium- to long-terms)		<ul style="list-style-type: none"> <li>● Technology for using waste wood and wastes as energy.</li> <li>● Conversion of organic component in effluent to fuel.</li> <li>● Bioethanol production from organic component in effluent.</li> </ul>

## Electrical and Electronics Industries□

		Contents of the Plan
<p>1. Reduction target in domestic business operations for the year 2020</p>	<p>Reduction target</p>	<ul style="list-style-type: none"> <li>• Reduction target Reduce energy unit consumption by an annual average of at least 1%</li> <li>• Judgment standard 7.73% or more reduce in FY 2020 (Compared to FY 2012)</li> <li>• Commitment A participating company declares achievement of a target beforehand</li> </ul>
	<p>Basis of the target above</p>	<ul style="list-style-type: none"> <li>• Maintenance of the current status – energy unit consumption The current status of unit consumption (GHG emissions/sales amount) is maintaining the top level compared with other foreign companies in the same trade. Furthermore, an improvement of energy unit consumption will be advanced.</li> <li>• Promoting Energy Efficient Manufacturing Further promotion of energy management which utilized ICT technologies and enhanced the quality improvement / innovative production process.</li> </ul>
<p>2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)</p>		<ul style="list-style-type: none"> <li>• Development of Quantification methodology of GHG emission reductions from baseline for EE products and systems Although EE products consume energy, the EE industry is enabling other sectors to reduce larger amounts of GHG emission. Currently the claims for such GHG reduction are carried out mainly on voluntary basis. - About the following product category, to develop the Quantification methodology of the GHG emission reductions from baseline which consideration of transparency and consistency. <ul style="list-style-type: none"> <li>-- Power generation system / Renewable energy</li> <li>-- Household appliances</li> <li>-- ICT equipments, and ICT services</li> </ul> </li> <li>• Disclose the actual value of annual GHG emission reductions based on the developed quantification methodology</li> </ul>
<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>		<ul style="list-style-type: none"> <li>• International Co-operation to Reduce GHG emissions To promote the global adoption of energy efficient products, Japan and many other countries have proposed evaluation and measuring methods for energy efficiency in international markets. <ul style="list-style-type: none"> <li>-- IPEEC/SEAD (Super-efficient Equipment and Appliance Deployment)</li> <li>-- IEA Implementing Agreement - Efficient Electrical End-Use Equipment</li> <li>-- International Standardization (IEC, ITU-T, ISO)</li> <li>-- Evaluation and measuring methods for energy efficiency for</li> </ul> </li> </ul>

\* Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention  
- The Japan Electrical Manufacturers' Association / Japan Electronics and Information Technology Industries Association / Japan Business Machine and Information System Industries Association / Communications and Information Network Association of Japan / Association for Electric Home Appliances / The Japan Refrigeration and Air Conditioning Industry Association / Japan Electric Lamp Manufacturers Association / Japan Luminaires Association



	<p>EE products and system</p> <ul style="list-style-type: none"> <li>-- Quantification methodology of GHG emission reductions from baseline for EE products and systems</li> <li>-- Energy-saving cooperation in Asian countries</li> <li>• Facilitate incorporation of a GHG related target into design and development strategy of EE products and services by IEA Energy Technology Perspectives</li> </ul>
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>	<ul style="list-style-type: none"> <li>• Creating Products and Services to Build a Low-Carbon Society</li> </ul> <p>Through technological innovation, we are working to reduce the GHG emissions of our global base by promoting the adoption of energy efficient products, and converting to energy saving technologies.</p> <p>e.g.</p> <ul style="list-style-type: none"> <li>-- Combined-cycle electricity generation systems (IGCC, Further combination with SOFC)</li> <li>-- Photovoltaic power generation (Promotion of R&amp;D, Deployment and Commercialization)</li> <li>-- Creation of low-Carbon Society which utilized ICT technology (Smart Grid, Smart city, BEMS/HEMS · · · etc)</li> </ul>

## Japan Cement Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>Reduce 56,000 kiloliters of crude oil (*1) compared to overall energy consumption (*2) to produce 56.21 million tons of cement in FY 2020 estimated from FY 2010 levels.</p> <p>(*1) The conversion factor of 1PJ is 25,800 kiloliters of crude oil subject to “Act on the Rational Use of Energy”.</p> <p>(*2) [Overall energy consumption to produce cement] = [Thermal energy consumption to produce cement (*)] + [Thermal energy consumption for on-site power generation (*)] + [Electrical power energy imported from the grid]</p> <p>(*) Alternative fuels is excluded</p>
	Basis of the target above	<p>(1) Improve the energy efficiency by installing and diffusing energy conservation equipments/technologies. (Reduction of energy consumption converted into crude oil will be 7,000kiloliters.)</p> <p>(2) Reduce the thermal energy consumption by increasing alternative fuels. (Reduction of energy consumption converted into crude oil will be 39,000kiloliters).</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>&lt;CO2 emissions reduction from an improvement of mileage for heavy vehicles to drive on concrete paved road&gt;</p> <p>Fuel consumption for heavy vehicle is conserved when driving on a concrete paved road compared to asphalt since the rolling resistance of tires on the concrete paved road becomes smaller. This fuel conservation results in CO2 emissions reduction in a transport sector.</p> <p>According to a research performed by Japan Cement Association, the heavy vehicle to drive on the concrete paved road requires 95.4 to 99.2% of fuel consumption to drive for the same distance on the asphalt paved road. From this result, CO2 emissions are reduced from 1.14 to 6.56kg compared to the level on asphalt when a truck with a load capacity of 11 tons is driven for 100 km on the concrete paved road.</p> <p>Though CO2 emissions reduction per vehicle is very small, the reduction would be continuously accumulated.</p> <p>&lt;Contribution to the recycling-based society&gt;</p> <p>The cement industry in Japan has actively utilized many types of wastes and by-products from other industries and plants to produce cement (*3). This activity makes a considerable contribution to prolonging of a life of final landfill site.</p> <p>(*3) 27.073 million tons of wastes and by-products were used for cement production in FY2011 as alternative fuels and raw materials.</p>

<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<p>In order to reduce a global energy consumption to produce cement, statistical and technical information on energy consumption, diffusion of energy conservation technologies (equipments) and use of alternative fuels has been provided through the website of Japan Cement Association or dialogs in the international partnership.</p> <p>Also, the amount of wastes and by-products for cement production in Japan has been published to contribute to an establishment of the recycling-based society globally.</p>
<p>4. Development of innovative technologies (in the medium- to long- terms)</p>	

**Joint Action Plan for a Low-Carbon Society**  
**Japan Automobile Manufacturers Association, Inc. (JAMA)**  
**Japan Auto-Body Industries Association, Inc. (JABIA)**

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>2020 target for combined total volume of CO<sub>2</sub> emissions: <u>7.09 million tons (a 28% reduction from the 1990 level)</u><sup>(1-3)</sup></p> <p><sup>(1)</sup> The scope of CO<sub>2</sub> emissions reduction activities has been expanded to include offices and laboratories in addition to automobile, motorcycle and parts production lines, as well as facilities where commercial vehicles are customized.</p> <p><sup>(2)</sup> Based on current electric-power supply parameters.</p> <p><sup>(3)</sup> The target reduction rate may be revised to an even higher level (as in the case of initiatives taken independently in the past) on the basis and in consideration of future developments.</p>
	Basis of the target above	<p>According to our projections, the scale of the industry in 2020 will be similar to the fiscal 2007 level (i.e., a production volume of 11.7 million passenger cars, trucks and buses), prior to the onset of the global financial crisis in 2008.</p> <p>In 2005, the business-as-usual (BAU) forecast for 2020 was 8.74 million tons of CO<sub>2</sub> emissions.<sup>(1)</sup> We are projecting reductions as a result of a) future energy conservation initiatives (for a decline of 830,000 tons-CO<sub>2</sub>) and b) improvements in the electric power coefficient (for a decline of 820,000 tons-CO<sub>2</sub>).<sup>(2)</sup></p> <p><sup>(1)</sup> This calculation takes into account a 300,000-ton increase in CO<sub>2</sub> emissions owing to expanded production of alternative energy-powered vehicles (mostly hybrid electric vehicles), assuming an 18% adoption rate of the use of those vehicles.</p> <p><sup>(2)</sup> If projections based on anticipated power-supply parameters (currently, a reduction from 42,300 tons-CO<sub>2</sub>/10,000kWh in fiscal 2005 to 33,000 tons-CO<sub>2</sub>/10,000kWh in fiscal 2020) are revised, it will be necessary to amend the JAMA-JABIA target value for 2020 accordingly.</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>● The reduction in automobile-emitted CO<sub>2</sub> by 2020 as a result of increased vehicle fuel efficiency and the wider use of alternative energy-powered vehicles is estimated* at <u>6 to 10 million tons</u>. *JAMA estimate</li> <li>- For significant reductions in CO<sub>2</sub> emissions in the transport sector, the integrated approach to such reduction must be adopted, targeting improved fuel efficiency, smoother traffic flow, diversified fuel/energy supply and more efficient motor vehicle use, and involving all the stakeholders concerned including automobile manufacturers, the government, fuel/energy suppliers, and vehicle users. Furthermore, to encourage the wider use of alternative energy-powered vehicles, those vehicles' development must be advanced by the automobile manufacturers and purchasing/use incentive measures must be implemented by the government.</li> </ul>

<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<ul style="list-style-type: none"> <li>● Potential reductions in automobile-emitted CO<sub>2</sub> by 2020 as a result of the expanded use (overseas) of alternative energy-powered vehicles: <ul style="list-style-type: none"> <li>- Assuming that the global vehicle market in 2020 (75 million new passenger cars sold) has the same 18% ratio of hybrid electric vehicles as Japan's domestic market, the potential for CO<sub>2</sub> emissions reductions worldwide is 70 million tons.* JAMA member manufacturers' share in that total reduction volume is estimated at <u>17 million tons</u>.</li> </ul> </li> </ul> <p><small>*Based on the 2050 model established by Japan's Institute of Energy Economics</small></p> <ul style="list-style-type: none"> <li>● Potential reductions in CO<sub>2</sub> emissions at JAMA members' overseas production facilities: <ul style="list-style-type: none"> <li>- All JAMA member companies will implement the same energy conservation initiatives at their overseas production facilities as they do at their Japan-based plants. If power consumption rates at those overseas facilities are reduced by 15% (calculated on the basis of individual company statements) compared to 2005, a CO<sub>2</sub> emissions reduction of <u>1.95 million tons</u> at those facilities is anticipated (calculated on the basis of Mizuho Corporate Bank's global production volume projections [in units] and JAMA member manufacturers' overseas production data).</li> </ul> </li> </ul>
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>	<p>Maximum efforts will be made to increase automotive fuel efficiency and advance the development and diffusion of alternative energy-powered motor vehicles.</p>

## Japan Auto Parts Industries Association

		Contents of the Plan
1. 2020 Reduction target in the activities of domestic member companies	Target level	Improvement of CO <sub>2</sub> emissions intensity in 2020, with an average annual reduction rate of 1 %.
	Basis of the target setting	The scale and structure of automobile parts industry in the year 2020 are predicted to change to a great extent due to the progress of technologies for next-generation vehicles as well as the expansion of manufacturing and marketing in emerging economies and developing countries. We are recognizing the role of the automobile parts industry is to implement coexistence of economic growth and the reduction of environmental impact. In order to make the maximum reduction effort as the industry, we set the target in terms of CO <sub>2</sub> emissions intensity by continuing the energy saving effort from the past.
2. Reinforcement of the cooperation among the main constituent (Reduction as of 2020 with the spread of low-carbon products and services)		<p>《Reduction in the whole supply chain》</p> <p>The automobile parts industry of Japan consists of an entire scale of approximately 7,500 and has a large industrial structure when including merchandise resources clients. Hereafter by steadily handing down energy-saving technology and management know-how accumulated in our industrial activities, we will promote the reduction from a perspective of life cycle.</p> <p>《Contribution to improvement of automobile fuel economy》</p> <p>For fuel economy improvement by vehicle manufacturers, working together with them as parts manufacturers, we will contribute to the reduction of environmental impact by enhancing performance and efficiency of parts and components, by developing new systems and new materials, and further by promoting “MIERU-KA” meaning proactive information communization through visualization with the utilization of life cycle assessment methodology.</p>
3. Promotion of the international contribution (Overseas emissions reduction as of 2020 with the spread of energy-saving technologies)		<ul style="list-style-type: none"> <li>• When establishing automobile parts companies in emerging countries, we will endeavor to achieve further improvement of energy efficiency, with the introduction of the state-of-the-art production engineering and facilities.</li> <li>• Through technology exchanges and personnel exchanges, internationally we will disseminate the energy-saving technologies and the management know-how which have been nurtured in the automobile parts industry.</li> </ul>
4. Development of innovative technologies		<ul style="list-style-type: none"> <li>• We will steadily promote the application and expansion of innovative CO<sub>2</sub> reduction technologies.               <ul style="list-style-type: none"> <li>• High efficiency burners, high efficiency combustion systems</li> <li>• Collection and utilization of reusable energy (use in manufacturing process, use in factory, local use)</li> </ul> </li> <li>• We will promote to take maximum actions towards development and implementation of next-generation vehicles from the standpoint of the parts manufacturers.</li> </ul>

※ The number of companies and market size are based on the industrial statistics data of a survey in 2007.

## Japan Mining Industry Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>Target level ; To reduce CO2 emission (in basic unit)by 15% below the 1990 levels by 2020(CO2 emission(t-CO2)/ Non-ferrous metal production volume(t)).</p> <p>The premises are as follows</p> <ul style="list-style-type: none"> <li>▪ Non ferrous metal include Cu, Pb, Zn, Ni, Fe-Ni.</li> <li>▪ Estimated production volume in 2020 is 2.73million ton(5% above the 2008 level).</li> <li>▪ Assumed Electricity Emission factor is 0.429kg-CO2/kWh</li> </ul>
	Basis of the target above	<p>Given Business Environment</p> <ul style="list-style-type: none"> <li>▪ Facing tough global competition in securing non -ferrous metal resources.</li> <li>▪ Grade of ore is dwindling yearly (Dwindled by more than 10% by 2020).</li> <li>▪ Energy consumption increases as more recycling of non-ferrous metals is conducted in improving our own self-sufficient rate.</li> </ul> <p>Target Setting</p> <ul style="list-style-type: none"> <li>▪ Basic policy is an introduction of the latest technological advances as much as possible in the period of facility replacement.</li> <li>▪ The 0.9% of annual reduction is targeted from 2013,against the track record of 0.7% for the 10years between 1999 and 2009.</li> <li>▪ Contribution of zero-emission power generation such as geothermal power generation is taken into consideration.</li> <li>▪ Our target is equal to 14% reduce in compared to 2020BAU.</li> <li>▪ In the current LCA evaluation of copper, the domestic data shows 3.7 t-CO2/t , against 4.5 t-CO2/t/ by ICMM.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>▪ Contribution to expanding zero-emission power sources by the development of geothermal and hydro power generations.</li> <li>▪ Contribution to CO2 reduction by providing energy-saving products such as hydrogen storing alloy etc.</li> <li>▪ Contribution to enhancing visualization of CO2 emission data by providing data to carbon footprint system.</li> <li>▪ Promotion of tree planting activities at abandoned mine sites.</li> <li>▪ Promotion of green procurement.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<ul style="list-style-type: none"> <li>▪ Consideration of utilising Bilateral offset credit mechanism.</li> <li>▪ Introduction of the latest technological advances to mines in overseas and selected refining facilities etc.</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<ul style="list-style-type: none"> <li>▪ Technology development such as diversification of raw material supply sources to improve the self-sufficiency rate of non-ferrous metals.</li> <li>▪ Consideration of applying hydrogen energy .</li> </ul>

## Japan Federation of Construction Contractors

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	Target during construction phase: Reduce CO <sub>2</sub> emissions per construction output by 20% on fiscal 1990 levels (28,166 kg CO <sub>2</sub> /100 mil. yen output).
	Basis of the target above	<ul style="list-style-type: none"> <li>○ Introduce low-energy lighting at work sites (temporary offices at construction sites).</li> <li>○ Improve and expand training for fuel efficient driving techniques.</li> <li>○ Introduce and spread fuel efficient driving techniques for heavy fuel oil construction equipment.</li> <li>○ Raise the fuel efficiency of vehicles and heavy equipment.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>Work together with all construction-related industries (real estate, design, equipment, electrical utilities, town planning, etc.) to promote the construction of buildings that can contribute to reduced CO<sub>2</sub> emissions.</p> <ul style="list-style-type: none"> <li>○ Actively propose replacing existing buildings with newer, more sustainable buildings.</li> <li>○ Lobby regulatory bodies for public incentives, the relaxation of regulations, and other measures, to promote the renovation of existing housing stock, which makes up most of existing floor space.</li> <li>○ In addition to improving the environmental performance of buildings, actively promote holistic building renovation so that earthquake resistance, energy efficiency, and accessibility are all also improved. This can lead to reduced construction costs and time and maximize the balance of building value and life cycle.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>Contribute to the development of a low-carbon infrastructure.</p> <ul style="list-style-type: none"> <li>○ Work toward providing packages that include both export and construction as well as operation and maintenance of such facilities as environmental facilities (water supply and sewerage, renewable energy facilities, etc.) and public transport systems (subways, high-speed trains, etc.).</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<p>Develop component technologies that can contribute to carbon reduction; introduce a variety of new technologies into buildings in a holistic and efficient way to meet a variety of needs; and quantitatively evaluate building environmental performance.</p>



## Japan Federation of Housing Organizations (Judanren)

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	Reduction targets will be established upon deliberation at Judanren's Environment Committee and its subcommittees (Environment Management Subcommittee and Global Warming Countermeasures Subcommittee) in line with reviews currently being made by the government on energy-saving standards.
	Basis of the target above	
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>Contribute to the enhancement of housing quality and living environment by communicating with citizens on future living styles including on the realization of a low carbon society through the National Promotion Council for Realization of an Affluent Living Environment set up by Judanren.</p> <p>Promote collaboration with consumers and local communities, by teaming up with other housing related organizations, in line with guidelines introduced in Judanren's publications such as "Let's Build Energy-saving Homes," "Green Housing Production Guidelines," "Points on Building Green Homes," and "Building Long-life Homes."</p> <p>Cooperate with the government and the private sector, release relevant information and carry out educational activities towards the realization of a low carbon society.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>Promote the internationalization of the housing industry in this age of globalization by increasing communication with other countries through various channels such as the International Housing Association, an international association comprising of ten leading housing bodies from the U.S., the UK, Russia and other nations.</p> <p>Work positively toward such countries that are interested in housing production and construction know-how and technologies by providing them with low carbon, energy-saving and other green technologies, including dispatch of experts overseas.</p> <p>Help promote the enhancement of living environment for local citizens, including promotion of reforestation, by guiding private corporations in formulating their business plans.</p>
4. Development of innovative technologies (in the medium- to long-terms)		<p>Promote "zero-energy" homes. (Judanren aims to realize that all new houses are "net zero-energy, zero-emissions" houses by 2020 and, eventually, lifecycle carbon minus (LCCM) houses, houses that generate negative CO2 emissions. Judanren plans to achieve these goals by enhancing insulation performance, use of better high efficiency equipment, consolidated use of PV systems, fuel cells, storage batteries and home energy management systems.)</p> <p>Enhance energy-saving home remodeling technologies. Also carry out a study to assess expected results of home remodeling in terms of green performance based on data to be collected.</p>

## Lime Manufacturing Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>The reduction target is 150 thousand tons of CO<sub>2</sub> emissions (excluding reduction from improvement in electric power emission coefficient )</p> <p>* Lime production in FY2020 is calculated at 10.77million tons. The calculation is based both on the actual lime consumption of the iron-steelmaking industry which is the largest lime user and on the forecast of crude steel production.</p> <p>* The target of the total CO<sub>2</sub> emissions is 3,006 thousand tons in FY2020, that is 3,156thousand tons of BAU minus 150thousand tons.</p>
	Basis of the target above	<p>Adoption of the next countermeasures</p> <ul style="list-style-type: none"> <li>▪ Expansion of the amount of the recycle fuel</li> <li>▪ Improvement of thermal efficiency.</li> <li>▪ Introduction of the newest energy-saving technologies as much and fast as possible</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>(1) For flue gas treatment of waste incineration plants, the use of highly reactive hydrated lime instead of normal grade one can improve the transportation efficiency, because the weight of highly reactive hydrated lime is smaller by some 40% than that of normal grade one.</p> <p>(2) Reduction of the CO<sub>2</sub> emissions by a modal shift (from truck line to marine transportation)</p> <p>(3) Quicklime calcined by a lime kiln with good thermal efficiency can contribute energy-saving in the iron-steelmaking industry, because the usual operation temperature of lime kiln is lower than that of a steelmaking furnace.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		
4. Development of innovative technologies (in the medium- to long-terms)		

## Japan Rubber Manufacturers Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>Having adopted the calculation method that the CO2 reduction effect by installing the CHP (combined and heat power system) or other is evaluable appropriately, the target is to reduce CO2 emissions per unit of output in fiscal year (FY) 2020 by 15% compared to FY 2005.</p> <p>※The following CO2 emission factors of electric power are used.  FY 1990=0.417 [kg-CO2/kWh]; FY 2005=0.423;  FY 2020=0.412 (It is same to factor of FY 2009, in which the target above was set.)</p> <p>※In the method above, the CO2 emission factor of thermal power plants whose operation is thought to be responsive to demand fluctuations, is also used for compensation.</p>
	Basis of the target above	<p>Maximum efforts in the production activities:</p> <ul style="list-style-type: none"> <li>• By installing and operating high-efficiency CHP, reflecting the reduction effect appropriately, we reduce CO2 emission per unit steadily.</li> <li>• By promoting the implementation of fuel conversion, the introduction of high-efficiency equipment, a variety of energy-saving measures in production activities, we promote the further reduction of CO2 emissions per unit.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>Contribution for reducing CO2 emissions when a vehicle runs. (Fuel economy improvement) :</p> <p>○Improvement of tyre products and other automotive parts</p> <ul style="list-style-type: none"> <li>• Improving fuel economy by the decrement of Rolling Resistance and weight saving of tyres.</li> <li>• Optimization of the tyre pressure and promotion of enlightenment activity of the eco-drive.</li> <li>• By expanding sales of run-flat tyres, dispensing with spare tyres.</li> <li>• Promotion of "Tyre Labeling System"</li> <li>• Miniaturization and weight reduction of the parts. Function improvement of the belt for engines.</li> </ul> <p>Development and supply of the parts related to energy conservation</p> <p>○Improvement of non-tire products</p> <ul style="list-style-type: none"> <li>• Reduction of the power which is operating industrial rubber products. (By using rubber belts or others with high transmission efficiency).</li> <li>• Weight-saving of rubber products that are adopted to various parts. The product improvement to adapt to the energy-saving function.</li> <li>• By the development of insulation-related building materials and by the supply of the products, we reduce electric power used for the air conditioning system and others.</li> <li>• Development and supply of the parts for energy-saving products. Such as the films for solar cells, and others.</li> </ul> <p>Efforts in each company and their factory, promotion of 3R, logistics efficiency, and evaluation from a life cycle assessment (LCA) perspective:</p> <ul style="list-style-type: none"> <li>• Efforts of tree planting in each place. Promotion of forest management activity.</li> <li>• Development of lightweight products and long-life products. Reuse of the worn-out products. Improvement of regenerated rubber technology. Activity of recycling to boiler fuel.</li> <li>• Promotion of use of retread tyres (recapped tyres).</li> <li>• Promotion of modal shift. Review of transport routes and transportation</li> </ul>

	<p>methods. Improvement of loading-efficiency. Introduction of low-carbon cars for company use. (Such as the adoption of hybrid vehicles).</p> <ul style="list-style-type: none"> <li>• From the viewpoint of LCA, we study a quantitative evaluation method for mainly tyres. Promotion of efforts that contribute to low-carbon throughout the supply chain.</li> </ul>
<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<p>Production and products:</p> <ul style="list-style-type: none"> <li>○ Overseas transfer of energy-saving production technology. (Cogeneration system, high-efficiency production equipment, production know-how, etc.) Overseas production and sales expansion of energy-saving products. (Fuel-efficient tyres, energy saving belts, heat shield effect product, etc.)</li> <li>○ Promotion of fuel-efficient tyres by "Tyre Labeling System". <ul style="list-style-type: none"> <li>• In Japan, the system has been started ahead of the world in January, 2010. By promoting the activities, it can become the model for foreign countries (Europe, United States, Korea, etc.) introducing the system.</li> </ul> </li> </ul> <p>Environmental activities:</p> <ul style="list-style-type: none"> <li>• In each of the overseas offices, promoting of environment-friendly activities. (Such as tree planting).</li> </ul>
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>	<p>Efforts to continue research and development:</p> <ul style="list-style-type: none"> <li>• Development of high efficiency manufacturing process and equipment. Research and development of the innovative material. Promotion of low-carbon emissions of the whole supply chain of the procurement, production, use, and disposal stage.</li> <li>• Efforts of tyre (Rolling resistance reduction. Promotion of the run-flat tyres. Weight saving)</li> <li>• Efforts of non-tyre (Development of high-performance products for energy conservation. Development of the auto parts for next generation automobiles.)</li> <li>• Reproduction technology of the products and the waste materials. (Such as retreading.)</li> </ul>

## The Federation of Pharmaceutical Manufactures' Associations of JAPAN

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>○The goal is to reduce total CO<sub>2</sub> emissions to 23% below the fiscal 2005 level by fiscal 2020.</p> <p>※<sup>1</sup> CO<sub>2</sub> emissions are related to energy use at the factories and laboratories of participating companies.</p> <p>※<sup>2</sup> CO<sub>2</sub> emissions are 2.23 million tons in fiscal 2005, and are expected to be 1.72 million tons (mission targets) in fiscal 2020.</p> <p>※<sup>3</sup> The emission targets in fiscal 2020 are corresponding to the reduction of 1.15 million tons of CO<sub>2</sub> compared to the BAU emissions in fiscal 2020, which is estimated to be 2.87 million tons, including the reduction from improvement in electric power emission coefficient (0.24 million tons of CO<sub>2</sub>).</p>
	Basis of the target above	<p>○The total production in fiscal 2020 is expected to increase by 50% compared with the fiscal 2005 level.</p> <p>※<sup>1</sup> The future pharmaceutical market would become 1.3 times in 2015 and 1.7 times in 2025 that in 2005, due to the influence of aging, and so on. (“New pharmaceutical products industry vision”, Ministry of Health, Labour and Welfare)</p> <p>※<sup>2</sup> The increased pharmaceutical market would sequentially require that the energy demand caused by production activities be increased in the pharmaceutical industry.</p> <p>○Participating companies endeavor to improve their own levels of energy efficiency by sharing BPT(Best Practice Technologies) and /or implementing BAT(Best Available Technologies), whenever new facilities are built or existing facilities are updated or replaced.</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>○Promotion of energy-efficient transport of pharmaceutical products, such as Co-operated delivery</p> <p>○Introduction of fuel-efficient cars for business use, and promotion of public transportation use in urban areas</p> <p>○Promotion of sharing best practice and advanced technical information among participating industry organizations and companies.</p> <p>○Promotion of employee education, and energy-saving activities across a broad spectrum of sectors from business to transport to households</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>○Transferring the most advanced Japanese energy-saving technology and expertise to other countries will contribute to reducing their environmental load and/or improving their energy efficiency, in the case of overseas production and/or licensing.</p>
4. Development of innovative technologies (in the medium- to long-terms)		<p>○Development of green sustainable chemistry technology minimizing the use of fossil resources ( e.g. organic solvents )</p>

## Japan Federation of Printing Industries

		Contents of the Plan
<p>1. Reduction target in domestic business operations for the year 2020</p>	Reduction target	<p>Current consumption level of crude oil for sales of every Yen 100 million is 21.15Kl. We aim to reduce this consumption level 1% every year to achieve 19.13Kl in 2020, thus CO2 emission will be reduced from 1.06 million ton in 2010 to 0.975 million ton in 2020.(reduction of 85,000 ton)</p> <p>These figures are based on the estimated sales volume of participating companies for the Voluntary Action Plan as 32,000 billion yen in 2020.</p> <p>[Prerequisite] In fiscal 2020, Aims to achieve the level of CO2 emissions is assumed that.</p> <ul style="list-style-type: none"> <li>① Sales volume in 2020 as 32,000 billion yen</li> <li>② Each component energy consumption ratio is the same as in fiscal 2010</li> <li>③ Conversion factor for each of the emission factor for electricity and thermal energy is the same as the fiscal year 2010</li> </ul>
	Basis of the target above	<p>In order to achieve this reduction target, improvement and replacement for air conditioning systems and power sources are planned.</p> <p>Also implement "visualization" of the energy consumption in order to encourage efficient energy use.</p>
<p>2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)</p>		<ul style="list-style-type: none"> <li>• Promotion of effective utilization of bio-resources.</li> <li>· Promote the development of high-efficiency drying equipment</li> <li>· Promote the development of energy-saving printing related materials</li> </ul>
<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>		<p>We promote international contribution through exchanges of information regarding Japanese printing industries' energy reduction scheme in international Conferences such as World Print &amp; Communication Forum (WPCF) and Forum of Asian Graphic Arts Technology (FAGAT).</p>
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>		<ul style="list-style-type: none"> <li>○ Printing facilities <ul style="list-style-type: none"> <li>Introduction of energy-saving printing facilities</li> <li>① Promote the introduction of digital printing presses</li> <li>② Promote the introduction of the high efficiency printing presses</li> </ul> </li> <li>○ Development of low-temperature drying system</li> <li>○ Energy-saving drying process <ul style="list-style-type: none"> <li>① use UV LED as light source</li> <li>② High solid ink printing</li> <li>③ Shallow Gravure Cylinder</li> <li>④ Effective use of waste heat drying</li> </ul> </li> </ul>

## Flat Glass Manufacturers Association of Japan

		Contents of the Plan
1.	Reduction target	<p>FY 2020 target &lt;total weight &gt;            1.15 million tons CO<sub>2</sub> (down 35% from FY 1990)(*)            (*Including CO<sub>2</sub> generated by manufacturing by three participating companies of flat glass for buildings, automobiles, photovoltaic cells and displays. Assuming the CO<sub>2</sub> conversion coefficient of electric power, will be equal to that of FY 2010)</p>
	Basis of the target above	<p>■Industry size in FY 2020            Calculated from the following published demand projections            Estimating increased demand for energy saving architectural glazing products resulting from policies, for promoting residential energy conservation and flat glass for photovoltaic cells.</p> <p>(Architectural: Reference material published by Nomura Research Institute (News Release), Housing start statistics by the Ministry of Land, Transport, Infrastructure and Tourism, Window 25 report, Mid-and Long term Roadmap for Global Warming Measures by the Ministry of the Environment.            Automotive: Action plan for low carbon society, JAMA            For photovoltaic cells: NEDO PV2030            For displays: Commitment to a Low Carbon Society, JEMA/ JEITA/ CIAJ/ JBMIA)</p> <p>■Specific CO<sub>2</sub> emission            Setting a target specific CO<sub>2</sub> emissions lower than that of FY 2010, assuming that improved manufacturing technology will offset increase in specific CO<sub>2</sub> emissions due to aging of furnaces.</p>
2.	Strengthened cooperation with other interested groups (life cycle effect as of 2020)	<p>In order to achieve a low carbon society, it is deemed necessary to promote wider use of high-performance insulated glazing such as ECO Glass in existing residences and significantly increase renewable energy by photovoltaic cells, etc.            These new demands will affect the production of flat glass, resulting in larger total CO<sub>2</sub> emissions than the current level of the glass industry. However, according to LCA's research result, emission of CO<sub>2</sub> is expected to decrease in society as a whole by an amount far greater than the total increase in emissions in the glass industry.</p> <p><b>[Calculation examples of life-cycle CO<sub>2</sub> emission reduction considering energy saving effect on the users' side]</b></p> <p>1) CO<sub>2</sub> reduction by use of ECO Glass in new residences because of legal compliance with residential energy saving standard:            (Housing starts) x (100% - Ratio of insulated glazing in FY 2010) x (Average window area/house) x (life-cycle CO<sub>2</sub> reduction due to ECO Glass)            = 834 thousand houses in FY 2020 x (100% - 38.1%) x 23 m<sup>2</sup>/house x 535 kg-CO<sub>2</sub>/m<sup>2</sup>·30 years =6.4 million tons</p> <p>2) CO<sub>2</sub> reduction in the residential sector due to energy saving renovation of windows:            (No. of renovated houses) x (Average window area/house) x (life-cycle CO<sub>2</sub> reduction due to ECO Glass)            = 500 thousand houses in FY 2020 x 25 m<sup>2</sup>/house x 535 kg-CO<sub>2</sub>/m<sup>2</sup>·30 years =6.8 million tons</p> <p>FGMAJ will make efforts to spread the effectiveness of energy saving products, thereby contributing to construction of low carbon society.</p>

<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<p>The glass industry is striving for global CO<sub>2</sub> reduction, by applying the CO<sub>2</sub> reduction technology for manufacturing processes developed in Japan to overseas production plants. An example is introduction of the total oxygen combustion technique to plants in China and Europe that will reduce CO<sub>2</sub> emission by about 25%.</p>
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>	<p>Although further continued technological efforts for practical use are necessary, innovative melting techniques emitting less CO<sub>2</sub> such as “in-flight melting” has been developed by each manufacturer. All of the domestic glass manufacturers, i.e., three companies have been jointly developing and operating a technique for facilitating flat glass raw material recycling of used laminated glass whose demand is increasing.</p>



## Japan Soft Drink Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	Reduce CO <sub>2</sub> emission ratio by 10% in 2020 (vs. 1990) ※ Emission ratio: CO <sub>2</sub> emission (kg)/soft drink production vol. (kl) ※ Excludes in-house package production
	Basis of the target above	<ul style="list-style-type: none"> <li>• Due to rapid increase of soft drink manufacturers' in-house production of PET bottles, it is difficult to judge the correlation of CO<sub>2</sub> emission with package manufacturers. Thus, the target was set by excluding in-house package production.</li> <li>• In-house package production did not exist in the base year 1990.</li> <li>• The target year 2020 was set in view of deployment situations of measures, such as fuel shift and equipment investment.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>• Information sharing with production equipment manufacturers</li> <li>• Inter-company collaboration (cooperative distribution, standardization of packages)</li> <li>• 3R (Reduce, Reuse, Recycle) actions for eight package and container materials (Inter-industry voluntary action plan)</li> <li>• PET bottle recycling --Bottle to Bottle (BTB) recycling</li> <li>• Reduction of petroleum-based materials by use of bio-PET (plant-based resin)</li> <li>• Introduction of modal shift</li> <li>• Introduction of eco-vehicles</li> <li>• Introduction of energy-efficient vending machines</li> <li>• Improvement of transportation efficiency of package materials by in-house package production.               <ul style="list-style-type: none"> <li>- For in-house PET bottle production, soft drink manufacturers purchase pre-forms (shaped like a small test tube), which enables greater loading capacity than PET bottles, and therefore contribute to transportation efficiency.</li> </ul> </li> <li>• Consumer enlightenment about package recycling</li> <li>• CO<sub>2</sub> reduction by promotion of recycling-oriented society</li> <li>• Continued awareness enhancement of member companies.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		TBD
4. Development of innovative technologies (in the medium- to long-terms)		TBD

## The Japan Dairy Industry Association's Low-Carbon Society Implementation Plan

		Contents of the Plan											
1. Reduction target in domestic business operations for the year 2020	Reduction target	Reduce total CO <sup>2</sup> emissions by one (1) percent per annum toward 2020.											
	Ground of the target above	<p>According to data submitted by the 10 member corporations participating in the Japan Dairy Industry Association's low-carbon society implementation plan, their investment and energy-saving accomplishments for fiscal 2011 and investment plans for 2012 and beyond are as shown in the following table. For fiscal 2011 and 2012 (estimate), there are good prospects for dramatic energy savings to be made as a result of concentrated capital investments that were made to cope with the electricity usage limits imposed after the Great East Japan Earthquake. However, for fiscal 2013 and beyond, the annual amount of energy savings would be reduced to 10,000 tons as calculated in terms of CO<sup>2</sup> emissions, as the energy-saving measures will return to ordinary levels.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Year</th> <th style="text-align: center;">Investment (thousands of yen)</th> <th style="text-align: center;">Energy-saving effect (tons equivalent to CO<sup>2</sup> emissions)</th> </tr> </thead> <tbody> <tr> <td>2011 (actual)</td> <td style="text-align: center;">873,744</td> <td style="text-align: center;">29,141 (actual)</td> </tr> <tr> <td>2012 (estimated)</td> <td style="text-align: center;">762,100</td> <td style="text-align: center;">25,417 (estimated)</td> </tr> <tr> <td>2013 through 2016 (estimated)</td> <td style="text-align: center;">1,304,689</td> <td style="text-align: center;">43,514 (estimated)</td> </tr> </tbody> </table> <p>While total annual sales of the 10 corporations stands at approximately 1,800 billion yen, their net profits are less than one (1) percent due to the maximum possible corporate efforts they have applied to absorb the rise in milk prices to support the Japanese dairy industry. Therefore, it is extremely difficult for them to make energy-saving investments larger than those shown in the above table. In particular, in the current situation where the TPP and other strategies aimed at reducing or eliminating tariffs on dairy products are emerging, these corporations would hesitate to make energy-saving or CO<sup>2</sup>-reduction-related investments in the future. Consequently, this industry has little choice but to state that its maximum annual target level for reducing CO<sup>2</sup> emissions will be one (1) percent (approx.10,000 tons) for 2013 and beyond.</p>	Year	Investment (thousands of yen)	Energy-saving effect (tons equivalent to CO <sup>2</sup> emissions)	2011 (actual)	873,744	29,141 (actual)	2012 (estimated)	762,100	25,417 (estimated)	2013 through 2016 (estimated)	1,304,689
Year	Investment (thousands of yen)	Energy-saving effect (tons equivalent to CO <sup>2</sup> emissions)											
2011 (actual)	873,744	29,141 (actual)											
2012 (estimated)	762,100	25,417 (estimated)											
2013 through 2016 (estimated)	1,304,689	43,514 (estimated)											
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>• Recycling one ton of used paper milk cartons reduces CO<sup>2</sup> emissions by approximately 0.78 tons. The industry intends to reduce CO<sup>2</sup> emissions by approximately 12,000 tons by improving the recycling rate for 16,000 tons of paper cartons in the future.</li> </ul>											
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		None											
4. Development of innovative technologies (in the medium- to long-terms)		None											

## The Japanese Electric Wire & Cable Makers' Association

		Contents of the Plan		
1. Reduction target in domestic business operations for the year 2020	Reduction Target		Result in 1990	Target for 2020
		Metal Cable Energy consumption [ $\times 10^3$ m <sup>3</sup> ] (Crude oil equivalent)	575	390
		Reduction rate based on 1990		32%
		Optical Fiber Cable Energy consumption per production amount [ $\times 10^{-3}$ m <sup>3</sup> /m] (The amount of crude oil equivalent per Fiber length)	8.32	1.71
		Reduction rate based on 1990		79%
	Basis of the target above	<p>In the electric wire &amp; cable industry, we had already made an effort for energy saving as much as possible, investing 11,638 million yen for the effective usage of the heat and electricity facilities, the innovation of the manufacturing facilities, etc until 2011 from 1997, and as a result we achieved reduction of 130,000 CO2 tons through these investments. Since the major items for reducing energy consumption has been already implemented in our industry, and since our products are merely parts of the final product, it is difficult to change the energy structure of the Society. Thus we will continue steady efforts for the energy saving in our industry.</p> <p>In the metal cable (copper, aluminium), the high value-added products such as the wire and cable with extra-fine diameters have been increasing recently, and in parallel energy consumption has also been increasing. It is highly obvious that this trend will continue in the future. In addition, we estimate that the amount of production would gradually increase in the mid-and-long term. Considering the above situation, we made the plan to reduce energy consumption in 2020, estimated based on the present conditions to a maximal degree.</p> <p>In the optical fiber cable, we project that the overseas shift of the production will still advanced and the domestic demand will decrease in the next several years. Although in this situation the energy efficiency in the optical fiber cable would be deteriorated in the future, we will make an effort to improve energy efficiency (energy consumption per production amount) as much as possible.</p>		

<p>2. Strengthened cooperation with other interested groups (Life cycle effect as of 2020)</p>	<p>The transmission loss in the power cable can be reduced by optimizing the conductor size, we will make an effort of spreading this technology to the society.</p>
<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<p>In order to spread the technologies of the conductor size optimization and the high temperature superconduction cables, which are able to reduce the transmission loss in the power cable, we will contribute to the global society by developing our technologies to the international standards.</p>
<p>4. Development of innovative technologies (In the medium- to long-terms)</p>	<p>We will continue to develop the high temperature superconducting cable which can largely reduce transmission loss (theoretically to zero).</p>

## Japan Petroleum Development Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>With regard to the GHG derived from the domestic oil / natural gas exploration, development and production activities (excluding associated CO<sub>2</sub> gas emission) at the fields,</p> <ul style="list-style-type: none"> <li>- In FY 2020, CO<sub>2</sub> emissions are planned to be reduced by 60 thousand tons of CO<sub>2</sub> (27 % reduction) from the actual amount in FY 2005.</li> <li>- In FY 2020, CO<sub>2</sub> emission per unit is planned to be reduced by 25 % from that in FY 1990.</li> </ul>
	Basis of the target above	<ul style="list-style-type: none"> <li>- Japan Petroleum Development Association (JPDA) has been promoting to explore, develop and produce oil and natural gas in order to secure stable energy supply to Japan as its mission.</li> <li>- In order to meet the increasing demand for oil and natural gas due to the economic growth and other factors in Japan compared to FY 1990, the participating companies increased production of oil and natural gas. On the other hand, the participating companies have taken measures to reduce CO<sub>2</sub> emissions, and as a result the CO<sub>2</sub> emissions have been stayed at slight increase by introducing the energy-saving facilities and equipments, flaring diffused natural gas, optimizing and replacing the low-efficiency facilities, etc. And the CO<sub>2</sub> emission per unit has been improved by the above measures for reduction as well.</li> <li>- With progress of the oil / natural gas development and production activities, target zones are generally limited to the reservoirs under the severer conditions where operations require more energy. Though CO<sub>2</sub> emission per unit may increase under such conditions, the participating companies are aiming at improvements of CO<sub>2</sub> emission per unit by taking other additional measures.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>- The participating companies plan to promote fuel shift to natural gas from other fossil fuels by increasing production of natural gas.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<ul style="list-style-type: none"> <li>- In performing exploration, development and production operations of oil and natural gas overseas, the participating companies plan to promote efficient operations utilizing the advanced ecological and energy-saving technologies.</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<ul style="list-style-type: none"> <li>- Concerning the development of technologies on Carbon Dioxide Capture and Storage (CCS) by applying oil / natural gas development technologies owned by the participating companies, the participating companies plan to promote the development toward practical use by full-scale demonstrative experiments, etc.</li> </ul>

## Brewers Association of Japan

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>◆Preconditions</p> <ul style="list-style-type: none"> <li>·Production volume and product composition ratio are assumed to be same as 2010.</li> <li>·Will not factor in impact of 2011 earthquake on the industry at this point (targets may be revised when impact is identified).</li> </ul> <p>◆Target standard</p> <p>The beer industry will reduce CO2 emissions by 50,000 tons in 2020 from the business as usual (BAU) 528,000 tons for 2020, excluding the fluctuation impact of electric power emission coefficients through its independent reduction activities.</p>
	Basis of the target above	<p>Since launching activities in line with the 1996 voluntary action plan, the beer industry has already implemented all conceivable capital investments to reduce CO2 emissions. By combining those efforts with other related activities, CO2 emissions came to 46% in 2010 compared to 1990 and CO2 emission intensity index was improved to 0.51. Further significant reduction on top of this is not feasible. The maximum level that is feasible for the industry is to reduce the energy intensity index specified by the Energy Saving Act by 1% yearly excluding the fluctuation impact of electric power emission coefficients through the beer industry's independent reduction activities.</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>We will review effective activities to reduce carbon dioxide, not only in manufacturing, but also in consideration of carbon dioxide emissions in the overall value chain extending from supply procurement to sales and consumption.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>We will transfer and teach energy conservation technologies to related overseas companies. For example, we will take energy-saving measures by improving equipment efficiency in overseas factories and enhance individual improvements by rolling out TPM.</p>
4. Development of innovative technologies (in the medium- to long-terms)		<p>We assort and build upon beer manufacturing technologies and equipment that are developed by specialized equipment engineering companies, so when new energy and cost-saving equipment is developed, we will implement these actively.</p>

## Japan Association of Rolling stock Industries

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<ul style="list-style-type: none"> <li>▪ We aim to 29,000 t CO<sub>2</sub> emissions in fiscal 2020. (Down 33% compared to fiscal 1990)</li> <li>On condition that the CO<sub>2</sub> conversion factor keep the level of the figures in fiscal 2010 and there is no big change in the socio-economic environment</li> </ul>
	Basis of the target above	<ul style="list-style-type: none"> <li>▪ To introduce possible cutting-edge technology in the practical stage when updating the facilities.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>▪ Reducing CO<sub>2</sub> emissions through the train operation process by developing smaller and lighter rail cars.</li> <li>▪ Working with the user side on the development of railway cars aimed at the reduction of the environmental impact, for example, energy-saving vehicles, hybrid vehicles etc.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<ul style="list-style-type: none"> <li>▪ Promoting international contributions for the realization of a low-carbon society by matching for sure to the regulations of foreign countries environmental impact and safety standards, and applying the environmentally conscious technologies for rolling stock developed in Japan to export vehicles.</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<ul style="list-style-type: none"> <li>▪ Actively promoting the dissemination of hybrid vehicles combined with battery and diesel engine to contribute to reduce CO<sub>2</sub> emissions through the train operation process, and working with the user on the commercialization of fuel cell vehicles aimed at substantially reducing environmental impact.</li> </ul>

# « Energy-Conversion Sector »



## The Federation of Electric Companies of Japan (FEPC)

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>The level of our reduction targets will be examined in the light of national energy and climate strategy policy, which is expected to be reviewed.</p> <p>However, FEPC will endeavour to pursue an optimal mix of energy supply, allowing us to simultaneously achieve energy security, economic efficiency and environmental conservation, on the premise of safe operation.(S+3Es) The following activities outline some features of this;</p>
	Basis for the above target	<ul style="list-style-type: none"> <li>○ Nuclear power generation is to be used, with the major premise of securing safety. <ul style="list-style-type: none"> <li>•In order to make this happen extensive safety measures for nuclear power plants will be implemented, in the light of lessons and knowledge learned from the accident at Fukushima Daiichi.</li> <li>• The Japanese electric utilities dedicate themselves to the safe and stable operation of nuclear power plants, where safety will be assured.</li> </ul> </li> <li>○ Renewable energy is to be used. <ul style="list-style-type: none"> <li>•Hydroelectric, geothermal, solar, wind, and biomass power generation will be developed.</li> <li>•R&amp;D on countermeasures to fluctuations in renewable energy generation will be promoted, including <ul style="list-style-type: none"> <li>—Examining countermeasures to the intermittency of solar power generation.</li> <li>—Examining the expansion of wind power generation by taking advantage of surplus adjustment capacity through interconnection between utilities.</li> </ul> </li> </ul> </li> <li>○ The thermal efficiency of thermal power plants will be improved. <ul style="list-style-type: none"> <li>•Best Available Technologies (BAT) are to be adopted for newly constructed thermal power plants, considering the size of capacity.</li> <li>•Proper thermal efficiency management is to be implemented for existing thermal power plants.</li> </ul> </li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>○ CO2 emissions reduction by customers is to be pursued through the diffusion of high-efficiency electric equipment and activities to promote energy conservation, in order to explore the more efficient use of electricity.</li> <li>○ Smart meters are to be introduced in order to ensure the efficient use of electricity by customers.</li> </ul>

<p>3. Contributions at the international level (result of transferring advanced Japanese technologies and expertise abroad as of 2020)</p>	<ul style="list-style-type: none"> <li>○ FEPC will contribute to low carbonisation in developing countries by transferring sector-specific Japanese technologies through analysing coal-fired plants and activities to reduce CO2 emissions, by promoting the Global Superior Energy Partnership (GSEP).</li> <li>○ FEPC will pursue a low carbon society through developing and deploying state-of-the-art and feasible power sector technologies, through the International Electricity Partnership.</li> </ul> <p>(Reference) CO2 emissions reduction potential is estimated to be 1.3 billion tons if Japanese technology is applied to existing coal-fired power plants in the US, China, and India.</p>
<p>4. Development of innovative technologies (in the medium- to long-term)</p>	<ul style="list-style-type: none"> <li>○ Low carbonisation of electricity supply, improvements in electricity consumption, and environmental conservation. These include Clean Coal Technologies, Smart Grids, CO2 Capture and Storage, Ultra-high Efficiency Heat Pumps, Electric Vehicles, etc..</li> </ul>

## Petroleum Association of Japan

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>Achieve the energy saving of 530 thousand KL (crude oil equivalent) in FY2020, with energy conservation measures since FY2010. <sup>*1,2,3</sup></p> <p>*1 Corresponds to approx. 1.4 million tons of CO<sub>2</sub> per year.</p> <p>*2 Includes measures for which government support is necessary.</p> <p>*3 In case of a large fluctuation in demand and stringent quality requirements are identified, the target is subject to reexamination. Review the target level in FY2015.</p>
	Basis of the target above	<p>Aim to maintain and improve the world's highest level of energy efficiency by the introduction of BAT (Best available technology), etc..</p> <p>[Energy conservation measures] (KL : crude oil equivalent)</p> <p>(1) Effective utilization of heat : 150 thousand KL</p> <p>(2) Introduction of advanced control system and highly-efficient equipment : 60 thousand KL</p> <p>(3) Improve the efficiency of power system : 90 thousand KL</p> <p>(4) Major refurbishment and upgrading of process : 230 thousand KL</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>(1) Transportation and supply stage of petroleum products</p> <p>a) Further efficiency improvement in distribution system (joint use of storage points, mutual accommodation of products, etc.)</p> <p>b) Introduction of LED lighting at service stations, solar power generation, etc.</p> <p>(2) Consumption stage of oil</p> <p>a) Utilization of biomass fuel</p> <p>✓ Introduce biomass fuel on the premise of the ensuring sustainability, stable and economical procurement. (Sustainability: effect of greenhouse gas reduction with LCA, competition with food, supply stability, attention to ecosystem, etc.)</p> <p>✓ Promote the use of ETBE blended biomass fuel while ensuring sustainability and stable supply in cooperation with the government, aiming at a steady introduction to meet the target amount of 500 thousand KL <sup>*4</sup> (crude oil equivalent) in FY2017 set by the Law Concerning Sophisticated Methods of Energy Supply Structures.</p> <p>*4 Approximately 1.3 million tons of CO<sub>2</sub>/year</p> <p>b) Appeal the dissemination of clean diesel vehicles</p> <p>c) Promote the high-efficiency oil burning appliance (Condensing Water Heaters “Eco-Feel”)</p> <p>d) Development and diffusion of the Oil-Based Fuel Cell</p> <p>e) Expand the high-efficiency gasoline engine oil</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>Use the knowledge and the experience of the Japanese petroleum industry that achieves the world’s highest level of energy efficiency for personnel and technical exchanges with developing countries.</p>
4. Development of innovative technologies (in the medium- to long-terms)		<p>(1) A new technology “Petroleomics” which combines molecule-based analyses on heavy oil with molecule-based reaction modeling</p> <p>(2) Carbon dioxide capture and storage (CCS)</p>

## The Japan Gas Association (JGA)

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>○Target</p> <ul style="list-style-type: none"> <li>▪ CO2 emission intensity : 9.9g-CO2/m<sup>3</sup>-city gas (89% decrease from FY 1990 level)</li> <li>▪ Energy intensity : 0.26MJ/m<sup>3</sup>-city gas (85% decrease from FY 1990 level)</li> </ul> <p>*CO2 emission intensity target figure (9.9) is based on the assumption that the grid emission factor is (0.33kg-CO2/kWh), and it is to be revised.</p> <p>*On calculating the target figure, we took the CO2 reduction effect of CHP installation which curtails the emission from marginal power generator (it is thermal power plants in Japan).</p> <p>*Energy intensity is shown as the basis of the CO2 emission intensity.</p> <p>○Backgrounds</p> <ul style="list-style-type: none"> <li>▪ Since the introduction of LNG to Japan in 1969, we have promoted the shift of raw materials for city gas, to 96% natural gas from manufactured gas at a cost of over 1 trillion yen. The gas production efficiency level, mainly by LNG re-gasification, has reached up to 99.5%, and it is close to upper limit.</li> </ul>
	Basis of the target above	<p>○Boundary</p> <ul style="list-style-type: none"> <li>▪ City gas production plants (including those of the affiliated companies)</li> </ul> <p>○Based on the actual numbers of major gas utility companies, JGA calculated the numbers of gas production volume and energy consumption amount.</p> <p>○Taking the effects of the maximum installation of highly efficient technologies like CHP into account.</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>○Emissions Reduction at customer's site (Reference year : FY2010)</p> <p>The reduction potential at customer's site is estimated to be 19 million tons of CO2 per year mainly by;</p> <ul style="list-style-type: none"> <li>▪ Promoting the diffusion of highly efficient technologies (Combined Heat and Power, Micro-CHP with Fuel Cell, Condensed Boiler, Gas Heat Pumps &amp; Absorption Chillers, Natural Gas Vehicles etc.)</li> <li>▪ Fuel switch to natural gas from oil or coal</li> <li>▪ Incorporating renewable energy into natural gas systems</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>○Business Expansion Overseas</p> <ul style="list-style-type: none"> <li>▪ Exploration and Production of LNG</li> <li>▪ Engineering businesses (LNG terminal Construction etc.)</li> <li>▪ ESCO Business</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<p>○Fuel Cell</p> <ul style="list-style-type: none"> <li>▪ Efficiency improvement of PEFC (Polymer Electrolyte Fuel Cell)</li> <li>▪ Development and efficiency improvement of SOFC (Solid Oxide Fuel Cell)</li> <li>▪ Development of SOFC combined cycle system</li> </ul> <p>○Hydrogen network system</p>

# 《 Commercial Sector 》

## Telecommunications Carriers Association

		Contents of the Plan
1. Reduction target in domestic business operations towards the year 2020	Reduction target	More than 1 %, in comparison with the year 2010, for an electricity consumption basic unit per number of the contracts,
	Basis of the target	<ul style="list-style-type: none"> <li>○ Introduction of the highest technologies at the time of facilities renovation accommodating energy saving devices such as communication facilities and the air conditioners</li> </ul>
2. Strengthen the cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>○ Acquire "the eco-ICT mark" determined by "an Ecology Guidelines Council in the field of ICT" and, based on the guidelines, promote the procurement of a device having high energy saving performance.</li> <li>○ ICT services bring an efficiency of the production activity, and resultant reduction of the physical movement of the human beings and the goods, is expected to reduce electricity consumption and CO2 emissions to the whole Society. Service solutions activities to reduce the electricity consumption and CO2 emissions by the customers and the society and promotions activities to visualize the effect of reduction of electricity consumption and CO2 emissions, contributes to the substantial reduction to whole society.</li> </ul>
3. Promotion of the international contributions (introduction effect of less energy consumption technology in the abroad as of 2020)		<ul style="list-style-type: none"> <li>○ Contribution to the world wide efforts in reduction of electricity consumption and CO2 emissions under global expansion of the ICT by realizing energy saving such as the communication and data facilities, or reduction of electricity consumption and CO2 emissions from the business activities.</li> <li>○ Contribution to an international standardization of the environmental assessment method in the ITU-T (International Telecommunications Union telecommunications standardization section) to compare and verify the CO2 reduction effect by the ICT at each service.</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		<ul style="list-style-type: none"> <li>○ Development of the technologies for power saving relating to the whole communication network in the communication facilities such as communications equipment and air conditioners . In addition, to introduce further power saving devices, research and investigations to the technologies for ultra-speed transmissions or the high efficiency operation technologies.</li> <li>○ Development of electric power saving technology of the communications equipment at offices and home, and the development of the direct current power feeding technology at home.</li> <li>○ Development of high efficient power feeding technologies to the data facilities or the communication building to realize the energy saving circumstances.</li> </ul>

## Japan Department Stores Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	Based on the basic unit of energy consumption of stores (floor area x energy consumption per operating hours) as an indicator, <u>achieve 20% reduction versus the base year (FY1990) by the target fiscal year (FY2020)</u> throughout the industry.
	Basis of the above target	<ul style="list-style-type: none"> <li>- There is the potential of recording an increase in overall volume due to various factors such as store area expansion and the extension of operating hours. From the perspective of balancing the environment and economy, energy consumption per production activity volume (floor area x operating hours) will be established as a target value so that individual reduction efforts will be reflected.</li> <li>- There are many department stores with considerably old facilities in terms of the age of the building. Some of these lag behind in updating heat source equipment, air conditioning systems and other relevant facilities. To this end, efforts will be made to achieve goals by promoting various measures such as actively upgrading old equipment with highly efficient equipment, reviewing operation systems and making improvements during large-scale renovations.</li> <li>- Promote energy-saving initiatives, including the review of business days and hours of operation.</li> <li>- Since the ratio of individually owned company buildings accounts for roughly 50%, measures will be carried out together with authorized owners of main facilities.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>- Initiatives to moderate air conditioning temperatures in stores</li> <li>- Encouraging the use of public transportation when visiting stores (Park &amp; Ride, etc.)</li> <li>- Development and expansion of handling environmentally conscious products</li> </ul> <p>Note: Transportation Department will endeavour to reduce delivery vehicles by promoting joint delivery (delivery representative system) and the shift toward using natural gas vehicles for making deliveries. As a means of increasing logistics efficiency, introduce a uniform clothes hanger for department stores while also helping to reduce the disposal of hangers.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		None
4. Development of innovative technologies (in the medium- to long-terms)		None

## The Life Insurance Association of Japan (LIAJ)

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	Under consideration.
	Basis of the target above	
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>✓ The LIAJ and member companies make efforts to raise the awareness of environmental issue through education program for the executives and employees with respect to the conservation and protection of the environment, while the LIAJ itself also aims at raising member companies' awareness of environmental issue.</li> <li>✓ The LIAJ and member companies aim at raising customers' and counterparties' awareness of environmental issues by informing the public of the life insurance industry's approach to the environmental issue.</li> <li>✓ The LIAJ and member companies engage in social service activities for the conservation and protection of the environment as well as taking part in the activities conducted by the community and other interested groups, and also promote and help its executives and employees to take part in these activities.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<ul style="list-style-type: none"> <li>✓ The LIAJ and member companies engage in social service activities for the conservation and protection of the environment as well as taking part in the activities conducted by the community and other interested groups, and also promote and help its executives and employees to take part in these activities (including environmental conservation activities conducted in overseas).</li> </ul>
4. Development of innovative technologies (in the medium- to long-terms)		No comment.



## Japan Foreign Trade Council, Inc.

Contents of the Plan	
1.Reduction target in domestic business operations for the year 2020	<p style="text-align: center;">Reduction target</p> <p>Numerical Target: Reduction of energy usage to 29,000 kiloliters in 2020 (crude oil equivalent)</p> <ul style="list-style-type: none"> <li>•A reduction to 29,000 kiloliters in terms of a crude oil equivalent is a feasible target to set for energy usage in 2020. This would represent a 9% reduction from the energy usage in 2009 (reference year), which was compiled based on all available information.</li> <li>•In order to calculate the volume used for both the actual and target bases, we collected the records of energy usage from participating companies. These records were mainly the electricity and gas consumed in their major office buildings.</li> <li>•The target is based on the information from 19 companies that have set targets for 2020 among the members of our Global Environment Committee (as of Feb 24, 2012). As we encourage more cooperation from our regular member companies, the target volume may be upwardly revised at a higher level in accordance with increased number of participating companies.</li> </ul>
	<p style="text-align: center;">Basis of the target above</p> <ul style="list-style-type: none"> <li>• Trading companies (Shosha) have made exceptional efforts to reduce energy usage for many years. Their challenging targets were determined at the highest reachable level and backed up with relentless reduction efforts.</li> <li>• We believe that we will be able to achieve our target through comprehensive actions by each individual company such as the installation and usage of energy saving facilities and equipment, strict and effective control of energy usage, and educational activities to increase awareness of climate change.</li> </ul>
2. Strengthened cooperation with other interested groups	<p>Trading companies (Shosha) are committed to making contributions towards building a low carbon society. Our members set specific targets for their offices and operational units, which must be achieved with intensive efforts. They are striving for enduring achievement in their business activities by launching low carbon goods and services and introducing new energy-saving technologies to be promoted decisively for broader use not only in Japan but also in other countries. There is also a focus on further research and development for such technologies. Furthermore, dedicated efforts should be made to successfully foster awareness of this critical challenge amongst trading company employees and members of the community.</p>
3. Contributions on the international level	
4. Development of innovative technologies	

## Japan LP Gas Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>(1) Based on the basic unit of CO<sub>2</sub> emissions (kg-CO<sub>2</sub>) per the aggregate annual LPG throughput quantity (Ton) at the LPG import terminals and at the LPG secondary terminals as well, the target is to reduce CO<sub>2</sub> emissions (kg-CO<sub>2</sub>/Ton) by 22% against the base year (FY1990) by FY2020.</p> <p>(2) In the transportation sector where tank trucks transport LPG, we make efforts to improve efficiency of the transportation further and reduce the basic unit of CO<sub>2</sub> emissions in this sector as “Dedicated Transporters” of Energy Conservation Act.</p>
	Grounds of the target above	<p>(1) On the basis of the condition that coefficient of CO<sub>2</sub> emissions at the point of electricity generation is to be reduced to 0.33kg-CO<sub>2</sub>/kWh by FY2020 from 0.417kg-CO<sub>2</sub>/kWh in FY1990, which is equivalent to 20.86% reduction, we are to reduce CO<sub>2</sub> emissions (kg-CO<sub>2</sub>/Ton) by 22% based on the basic unit of CO<sub>2</sub> emissions (kg-CO<sub>2</sub>) per the aggregate annual LPG throughput quantity (Ton) at the LPG import terminals and at the secondary terminals.</p> <p>By introducing high efficient LPG appliances, fuel cells and electricity generators using renewable energy to the LPG import terminals and the LPG secondary terminals and by merging the terminals, we are to achieve the targets.</p> <p>(2) The member companies of Japan LP Gas Association (JLPGA) comply thoroughly with Energy Conservation Act.</p>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>(Contribution by promoting Low Carbon Appliances and services) To contribute to the creation of Low Carbon Society, we promote sales of the high efficient LPG appliances. The number of the stocks of each appliance by FY2020 is estimated respectively as follows;</p> <ul style="list-style-type: none"> <li>• Fuel cell (for domestic use): equivalent to 150Mkw</li> <li>• High efficient water boiler(ECO-JOZU):5,400 thousand families</li> <li>• GHP (Gas Engine Type): equivalent to 1,300Mkw</li> <li>• CHP (Co-generation for Commercial and Industrial use): equivalent to 770Mkw</li> </ul> <p>By this promotion, it is estimated that 1,400 thousand tons of CO<sub>2</sub> emissions will be reduced by FY 2020 compared with FY 2010. The members of JLPGA are not directly involved in selling the appliances, but the members make efforts to educate the retail companies in their groups and their dealers to promote the sales of the appliances.</p>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>As a member of World LP Gas Association (WLPGA) which the LPG related companies, associations and other entities worldwide belong to, JLPGA has introduced the Japanese high efficient LPG appliances, such as CHPs, GHPs and fuel cells, to other members worldwide. The WLPGA members are interested in these appliances. Japanese manufacturers are beginning to contact them in the North America, the South America and Europe.</p>
4. Development of innovative technologies (in the medium- to long-terms)		<p>As of now, we do not have any plans.</p>

## The Real Estate Companies Association of Japan

		Contents of the Plan
1. Reduction target for the year 2020 in domestic business operations	Reduction target (scheduled to be revised during fiscal 2012 based on review of energy conservation standards by the government)	<p>[Reference] Target in Current Voluntary Action Plan</p> <p>○<u>Newly Built Office Buildings</u>: It is a level surpassing the Act on the Rational Use of Energy “Standards of Judgment for Construction Clients” by 10% or more (both PAL and ERR). For those with larger scale, (regarding ERR), it is a level that surpasses the standards by 20% or more (established in 2008).</p> <p>○<u>Newly Built For-Sale Condominiums</u>: “Life Cycle CO<sub>2</sub>” under CASBEE for New Construction to surpass the “reference value.” Further, aiming at 5 years in the future, CASBEE for New Construction “operation stage” to be 5% or more and surpass the “reference value” (established in 2009).</p> <p>○<u>Reducing the Energy Consumption of Buildings Used by Member Companies</u>: For member companies using buildings for their own work, aim to make the average specific energy consumption per floor area from fiscal 2008 to fiscal 2012, 5% lower than the level of fiscal 1990.</p>
	Grounds for setting the target	<p>In the environmental voluntary action plan (March 2008) of the RECAJ, due to the nature of business to provide office space for tenant companies to conduct business activities in, or provide living space for condominium unit purchasers, the total amount of energy consumption and specific energy consumption will vary greatly depending on the business activity or style of living. Therefore, it is difficult to set reduction targets for both total amount and unit specific energy consumption, but using the action target which member companies voluntarily respond to, it has been set at the energy-saving performance of newly built offices and condominiums as the target value.</p> <p>Moreover, for the reduction in energy consumption of a building that a company uses, rather than directly making it subject to the CO<sub>2</sub> emissions that are greatly affected by changes in the CO<sub>2</sub> emission coefficient of the electric power company, adopt the specific energy consumption units that owners and users of office buildings can control.</p>
2. Strengthen cooperation with other interested groups (reduction as of 2020 through the spreading of low-carbon products and services)		<p>Work on green innovation partnership activities (zero emission structures, implementation of investigative research and innovative technologies concerning residences, promotion of transference) to office buildings and condominiums in cooperation with Japan Building Owners and Managers Association, Japan Federation of Construction Contractors, Tokyo Electric Power Company, Incorporated, Tokyo Gas Co., Ltd. etc. Proactive information transmission will be performed for these efforts and their results.</p> <p>In addition to the “residential eco-guide (condominium version),” which is currently being distributed, the creation of an eco-guide, etc. for office building tenants will be considered in preparation for work style and lifestyle reforms. In addition, efforts will be made to enhance and strengthen environmental enlightenment activities such as posting on the homepage and widely transmitting to society.</p>

<p>3. Promotion of contributions on an international level (reduction of energy overseas as of 2020 through the spreading of energy-saving technologies, etc.)</p>	<p>By packaging the Japanese strengths of advanced environmental technologies, urban regeneration and know-how of city creation and providing these to East Asian countries such as China, new growth strategies for real estate industries will be drawn up and we believe that contributions can be made to global environmental problems in Asian regions where CO<sub>2</sub> emission levels are expected to see the greatest increase.</p>
<p>4. Development of innovative technologies (efforts in the medium- to long- term)</p>	<p>In addition to introducing highly efficient equipment and planning and promoting products that give consideration to comfort and health for high energy consuming facilities in offices and condominiums such as air conditioning, ventilation, lighting, hot-water supply, and office automation equipment, efforts that will likely effect the conversion of tenant and resident lifestyles, such as task ambient air conditioning and lighting and visualization of energy consumption, will be promoted.</p> <p>Lastly, not only will energy-saving in individual structures be advanced but also regional cooperation among buildings and cities will be promoted.</p>

# 《Transportation Sector》

## Japan Federation of Coastal Shipping Associations

		Contents of the Plan
<p>1. Reduction target in domestic business operations for the year 2020</p>	Reduction target	2020 targets 5,900,000 ton/CO <sub>2</sub> ( ▲31% in comparison with 1990 level)
	Basis of the target above	<p>1. Maximum introduction of leading energy saving technologies in the phase of practical usage on the occasion of replacement of old coastal vessels, taking it into consideration that more than 70% of the vessels are old ones with age over 16 years.</p> <p>2. Promotion in development and construction of larger size coastal vessels as well as improvement of propelling efficiency of the vessels in terms of energy consumption.</p>
<p>2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)</p>		<p>Promotion of modal shift, switch the long-distance land transport freight into energy-efficient marine transportation.</p> <p>The transportation industry as a whole should reduce CO<sub>2</sub> by means of modal shift.</p>
<p>3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)</p>		Provision of energy conservation navigation technologies information
<p>4. Development of innovative technologies (in the medium- to long-terms)</p>		<ul style="list-style-type: none"> <li>▪ Energy savings by adopting solar power</li> <li>▪ Bottom air lubrication method to reduce the hull resistance.</li> <li>▪ Waste heat recovery for Stirling engine generator.</li> </ul>

## East Japan Railway Company

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<ul style="list-style-type: none"> <li>○ 8% reduction in energy consumption from railway business activities(MJ: relative to FY2011 level)</li> <li>○ 30% improvement in CO2 emissions per unit of electricity generated at JR East's own power plants(kg-CO2/kWh: relative to FY1991 level)</li> </ul>
	Basis of the target above	
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<ul style="list-style-type: none"> <li>○ Reducing energy consumed for train operations We are putting into service more newgeneration energy efficient railcars, with features such as regenerative brakes, which can convert kinetic energy during deceleration into electric energy, and variable voltage variable frequency (VVVF) inverters, which control motors without wasting electricity.</li> <li>○ JR East's own power plants The plant will reduce CO2 emissions by replacing three units (out of four) with combined-cycle power generation units* with improved efficiency and by switching fuel from oil to natural gas when the plant is renovated.</li> <li>○ Saving energy in office buildings We work hard on reducing energy consumption both in hardware, including the introduction of highly efficient equipment and facilities, and in software, including temperature management of air conditioning and diligently turning off lights.</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		
4. Development of innovative technologies (in the medium- to longterms)		<ul style="list-style-type: none"> <li>○the Environmental Engineering Research Laboratory We determined that a research and development organization should be created, to be responsible for issuing energy strategies and developing technology for, and from the perspective of, the entire group. In April 2009, we established the Environmental Engineering Research Laboratory.</li> </ul>

## All Japan Freight Forwarders Association

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	By fiscal 2020, reduce emissions from delivery and collection vehicles by 14,152 tons-CO <sub>2</sub> (11% reduction on fiscal 2009 levels).
	Basis of the target above	<ul style="list-style-type: none"> <li>• Reduce CO<sub>2</sub> emissions by improving external factors for vehicle efficiency: 4%</li> <li>• Encourage operators to take eco-driving measures: 5%</li> <li>• Have operators promote return-trip deliveries to improve load factors: 2%</li> <li>• In fiscal 2010, we achieved a reduction of CO<sub>2</sub> emissions of around 15% below fiscal 1998 levels. Although we are reaching the limits of CO<sub>2</sub> reduction with such measures as the introduction of low-emission vehicles and the promotion of eco-driving, we will proactively work toward further reduction.</li> </ul>
2. Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>To help promote modal shift among cargo owners, increase the convenience of rail freight through the following measures:</p> <ul style="list-style-type: none"> <li>• Support the introduction of 31ft and other high-standard large containers.</li> <li>• Hold the Rail Container Freight Trial Campaign, where potential new users of rail freight can receive assistance for 80% of the cost of their initial shipments.</li> <li>• Promote measures to reduce freight damage.</li> <li>• Improve responses to limit freight disruptions following natural disasters (including modal shift of 3.6 billion ton-kilometers from trucks to rail freight to reduce CO<sub>2</sub> emissions by 900,000 tons [as per the plan to achieve the Kyoto Protocol targets]).</li> </ul>
3. Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		None.
4. Development of innovative technologies (in the medium- to long-terms)		Develop new containers to enhance freight service and new packing filler materials to improve freight quality.



## The Scheduled Airlines Association of Japan

		Contents of the Plan
1. Reduction target in domestic business operations for the year 2020	Reduction target	<p>○The goal: Basic unit of CO2 emissions 0.00095t-CO2/RTK (Comparison with BAU in 2020 as 0.00116t-CO2/RTK)</p> <p>*1 Basic unit is adopting CO2 emissions per RTK (Revenue Ton Kilometer). RTK is multiplied by the distance flown in weight (passenger and freight and mail) with paid ones of the aircraft.</p> <p>*2 It is including both domestic and international flights</p> <p>*3 The forecast future demand is based on the publications Aviation Ministry of Land, Infrastructure, Transport and Tourism (aviation subcommittee Council of Transport Policy in May2006 ).</p> <p>*4 We will review the goals as necessary in the future, in case there is a significant effect on such things, and unpredictable for the aviation.</p>
	Basis of the target above	<p>○We will continue to introduce ecology flight as much as we can. &lt;Example of ecology flight measures currently being implemented&gt;</p> <p>○Reducing the weight of various equipments and in-flight items on board to improve fuel efficiency.</p> <p>○Shortening of the distance flown and the adjustment of engine output.</p>
2.Strengthened cooperation with other interested groups (life cycle effect as of 2020)		<p>○ Coordination with air traffic control authorities about CDO (Continuous Descent Operations) . CDO is a flight descent procedure that has been optimized so that the aircraft can be flown with engines at idle thrust from a high altitude - potentially from cruise - until initial approach fix. Aircraft executing a CDO realize far more efficient fuel burn during the descent and arrivals phase of flight, as compared to a traditional arrival path.</p> <p>○Contribution to the minimization of CO2 emissions associated with the movement of passenger and freight operations through the provision of the least impact on the environment in cooperation with air traffic control operating with new generations of aircraft.</p> <p>○Provide Carbon offset program to passenger.</p>
3.Contributions on the international level (effect through transferring advanced Japanese technologies and expertise abroad as of 2020)		<p>○The global promotion of efficient operating system in cooperation with each national air traffic control authorities through the IATA (International Air Transport Association).</p>
4.Development of innovative technologies (in the medium- to long-terms)		<p>○ Promoting the development and dissemination of innovative technologies with unprecedented bio-fuel SPK(Synthesized Paraffinic Kerosenes).</p> <p>○Promotion of the development of fuel cells for aircraft that replaces the APU (auxiliary power unit).</p>

# **IV. Evaluation Committee Report on Keidanren's Commitment to a Low Carbon Society**

Evaluation Committee Report on  
Keidanren's Commitment to a Low Carbon Society

1. Introduction

As a new plan that extends on the efforts under the Voluntary Action Plan now in effect, Keidanren announced in December 2009 that it would formulate and implement Keidanren's Commitment to a Low carbon Society (“the Commitment” hereafter). With this announcement, it declared that under this new plan, Japanese industry would endeavor to develop and commercialize the world's most advanced low carbon technologies and assume global leadership in creating a low carbon society that achieves economic growth in harmony with the natural environment.

To implement the Commitment, focus has been placed on the following core policies.

(i) Participating industries and companies (collectively “participating industries” hereafter) will publicly pledge to maintain and improve their world-leading low carbon technologies and levels of energy efficiency.

(ii) In the interest of promoting the creation of a low carbon society on a global scale, participating industries will announce and pursue a set of voluntary initiatives.

(iii) To ensure that participating industries make steady progress with these efforts, Keidanren will pursue the PDCA cycle in collaboration with the Japanese government.

In the interest of improving the transparency and credibility of the Commitment, an Evaluation Committee for the Commitment to a Low carbon Society (“Evaluation Committee” hereafter) was set up in July 2012. Through two meetings of its own and participation in two gatherings of the Voluntary Action Plan Working Group, the Evaluation Committee held hearings with representatives for 16 different industrial sectors. Representing 12 sectors of the industrial and energy-conversion fields were the Japan Gas Association, the Japan Iron and Steel Federation, the Japan Chemical Industry Association, the Japan Paper Association, the Japan Cement Association, four electrical and electronics-related organizations, the Japan Federation of Construction Contractors, the Japan Automobile Manufacturers Association and the Japan Auto-Body Industries Association, the Japan Mining Industry Association, the Lime Manufacture Association, the Japan Rubber Manufacturers Association, and the Japan Soft Drink Association. Representing three sectors of the commercial field

were the Real Estate Companies Association of Japan, the Japan Building Owners and Managers Association, and the NTT Group. The transportation sector was represented by the Scheduled Airlines Association of Japan. The hearings comprised inquiries into the status of low carbon-oriented undertakings in the energy industry; technology-related innovations in the energy-intensive materials industry and assembly and fabrication trades; and emissions-control structures for the entire life cycle of products and services in all sectors as well as related undertakings in the commercial, residential, and transportation sectors.

## 2. Evaluation of Efforts under the Commitment

Applying the perspectives of transparency and credibility, the Evaluation Committee sought to determine whether participating industries had fulfilled their obligations to accountability regarding the viability of targets incorporated into the Commitment as well as other aspects of the Commitment as a whole, including steps to strengthen cooperation with other interested groups, international contributions, and the development of innovative technologies.

### (1) The Commitment as Perceived by Sectors

#### (i) The Commitment for nine energy-intensive sectors

##### a. Materials and manufacturing

Despite an uncertain future outlook for raw steel output, the Japan Iron and Steel Federation has declared a target for reduced CO<sub>2</sub> emissions of 5 million tons by the year 2020 compared to “business as usual” (BAU) levels through implementation of the latest technologies. Energy-conserving technologies developed in Japan for steel industry applications have come into increasingly widespread use abroad. In terms of their quantitative contributions to CO<sub>2</sub> reductions, the Eco-Product technologies (through the supply of high-performance steel) and Eco-Solution technologies (through transfers of energy-conserving technologies to developing countries) are estimated to have already reduced CO<sub>2</sub> emissions by approximately 34 million tons and 70 million tons, respectively. In the years ahead, it is hoped that advances in these technologies will lead to further CO<sub>2</sub> reductions in Japan as well as reductions on a global scale.

The Japan Chemical Industry Association has set a CO<sub>2</sub> reduction target, relative to activity level, of 1.5 million tons compared to BAU CO<sub>2</sub> emissions as of the year 2020. This target seeks reductions through the adoption of energy-saving technologies by key processes at facilities for ethylene production and steam generation, with equivalent reductions achieved through incremental improvements on a smaller scale by other manufacturing processes. This industry deserves

commendation for setting ethylene production-related energy-savings targets that surpass even the IEA-established levels that are among the highest in the world. The chemical industry supplies other industries with raw materials. As such, from a society-wide perspective, it is important that the products of this industry be assessed for the CO<sub>2</sub> emissions they generate at the utilization stage. Going forward, it will be necessary for interested groups to strengthen their cooperation and on that basis develop guidelines for the calculation of CO<sub>2</sub> emissions from petrochemical products using the perspectives of life-cycle assessment (LCA). Additionally, ensuring the transparency and reliability of these calculations also will be valuable. Furthermore, it will be necessary to set the stage for such guidelines to be adopted abroad as international standards and facilitate the widespread acceptance of environmentally sound Japanese products.

According to the Japan Paper Association, the paper and pulp industry in fiscal 2010 reduced its consumed volume of fossil fuel per unit energy by more than 25 percent compared to fiscal 1990 thanks largely to energy-saving and fuel-conversion measures as well as the consolidation of production facilities under the current Voluntary Action Plan. Under the Commitment, the industry has announced a CO<sub>2</sub> emissions reduction target of 1.39 million tons for fiscal 2020 compared to the projected BAU level, to be achieved chiefly through the utilization of spent materials and waste products for fuel-conversion purposes but also through the installation of high-efficiency paper pulping machinery and high-temperature, high-pressure black liquor recovery boilers. Compared to actual output in fiscal 2009, paper production is expected to grow 4.6 percent by fiscal 2020 in the BAU scenario. Accordingly, there will be significant increases over fiscal 2009 in fossil fuel consumption and CO<sub>2</sub> emissions in both quantitative and unit-output terms. In terms of future countermeasures, we hope to see the paper and pulp industry take action to increase the supply of biomass fuels and pursue expanded forestation programs in Japan as well as abroad.

The Japan Cement Association is of the view that the cement industry does not have much room left for improvement in the years ahead because it has already made substantial improvement in per unit energy consumed through the installation of high-efficiency suspension preheater kilns and new suspension preheater kilns at cement production plants. Under the Commitment, for fiscal 2020 it has drawn up target reductions in energy consumption of 69,000 kL compared to fiscal 2005 and 281,000 kL compared to fiscal 1990 based on the widespread adoption of energy-saving facilities and equipment and the expanded utilization of waste

materials. In the years ahead, the industry can be expected to become more actively involved in applying strategies based on an LCA perspective, including transitioning from the supply of asphalt to cement for road construction projects, to form stronger cooperation among interested groups, and to achieve far-reaching reductions in CO<sub>2</sub> emissions. In the cement industry, Japan has proactively contributed to the creation of a recycling-oriented society by enthusiastically harnessing waste materials as alternative energy sources and curbing the consumption of fossil fuels. In coming years, it is hoped that the industry will contribute to reduced CO<sub>2</sub> emissions on a global scale through its transfers of energy-saving technology to other countries.

The four organizations representing the electrical equipment and electronics sectors have set an average annual per unit energy consumption improvement target of 1 percent for fiscal 2020 in the Commitment. This target is based on the goals for achievement stipulated in the national Act on the Rational Use of Energy, and is to be met through gains in manufacturing-process energy efficiency combined with emission curbs. This industry is of the view that continuing efforts to cut CO<sub>2</sub> emissions through conventional means including the installation of high-efficiency machinery are approaching their limits, and takes the position that despite the tough economic climate it faces from international competition, it can achieve its CO<sub>2</sub> reduction target through steady, cumulative gains in production yield and product quality and progress in the conversion to alternative fuels. From an LCA perspective, the products and services of this industry possess immense potential for reductions of CO<sub>2</sub>. Under the Commitment, specific measures have been laid out for contributions to curbs on CO<sub>2</sub> emissions through enhancements in the performance of power generation technologies, household electrical appliances, and information and communications technology (ICT) equipment. Although various challenges remain, including the task of establishing methods to quantify expected CO<sub>2</sub> reductions available for specific products and services, it is hoped that these efforts will lead to the establishment of methodologies that are acceptable to international society at large as well as to an expansion in exports of environmentally friendly Japanese products and services.

The Japan Automobile Manufacturers Association and Japan Auto-Body Industries Association declared industry-wide CO<sub>2</sub> reduction targets under Keidanren's Voluntary Action Plan on the Environment. For the period from fiscal 2008 through 2012, manufacturers in these sectors aimed for an average target reduction of 25 percent compared to the fiscal 1990 emission level, and the likelihood that they will generally meet this target appears high. Under the Commitment, they have declared

a target reduction of 28 percent compared to 1990 in fiscal 2020. This target is based on an assumed increase in CO<sub>2</sub> emissions over the decade to fiscal 2020, attributable to a 10 percent expansion in the number of vehicles produced with next-generation vehicles making up an 18 percent share. Compared to BAU-based CO<sub>2</sub> emissions, a reduction of 1.65 million tons has been targeted, and will be achieved through roughly equivalent contributions from efforts in energy conservation and improvements in per unit electricity consumption. However, the improvements derived from the latter will depend on the composition of electric power sources utilized by the power industry. In this context, significant uncertainty surrounds the reductions possible under the current lack of a timeline for the resumption of operations at nuclear power stations. Energy conservation-based measures to reduce CO<sub>2</sub> emissions would include facility improvements by the suppliers and consumers of energy for manufacturing processes, improvements in operations management, conversion to alternative energy sources, the steady development of innovative technologies for these purposes, and efforts to conserve energy use by offices and research facilities. This industry can make major contributions to the reduction of CO<sub>2</sub> emissions through efforts that influence automobile life cycles, including improvements in vehicle fuel economy and the development and commercialization of next-generation models. Preliminary estimates of CO<sub>2</sub> reduction potential in fiscal 2020 put it at 6 to 10 million tons domestically (reduction potential from fiscal 2010) and approximately 17 million tons abroad (assuming next-generation vehicles will account for an 18 percent share of all vehicles on the global market in fiscal 2020, in line with the ratio expected in Japan). In the years ahead, it is hoped that Japanese automakers will augment energy-saving measures in their manufacturing processes with active efforts to promote the market penetration of models boasting improved fuel efficiency as well as next-generation models in Japan and abroad.

#### b. Energy

The hearings held with members of the energy industry included interviews with Japan Gas Association representatives. Evaluations of the Federation of Electric Power Companies of Japan and the Petroleum Association of Japan— whose industries are two major sources of CO<sub>2</sub> emissions—were also undertaken based on the Commitment<sup>9</sup> that was covered in a November 2010 report.

---

<sup>9</sup> See the Keidanren document submitted at the November 19, 2010 Hearings on Three Key Initiatives for Action against Global Warming. ([http://www.npu.go.jp/policy/policy07/pdf/20101203\\_02/siryous3.pdf](http://www.npu.go.jp/policy/policy07/pdf/20101203_02/siryous3.pdf)) (in Japanese)

The Japan Gas Association has already improved its city gas production efficiency to a level of 99.5 percent. Given that additional gains on a per-unit output basis are approaching their limits and the fact that study is under way on the possibility of expanding cogeneration and other new business operations, it is estimated that this industry will achieve CO<sub>2</sub> reductions of 9.5 to 10.0 g-CO<sub>2</sub>/m<sup>3</sup> by fiscal 2020 (details under examination), for an improvement on the reductions it achieved in fiscal 2011. However, with the current trend toward reduced reliance on nuclear power, it is projected that demand for natural gas will climb in the future. This underscores the possibility that gas cogeneration, LNG combined cycle power generation, and other forms of expansion in the power generating sector will have the effect of boosting unit output by the gas industry at large. In the years ahead, disclosures of CO<sub>2</sub> emission data not only for the city gas supply system but for the industry as a whole will be called for. It is estimated that as in the case of the petroleum industry, the potential for CO<sub>2</sub> reductions by industrial sectors that utilize gas also will be significant. Specific examples would include a shift to cars powered by natural gas, conversions to natural gas as a source of heat for industrial applications, cogeneration, and fuel cells for household applications. The majority would involve substituting alternatives to petroleum products. In the future, joint studies with related industrial sectors on optimal systems for introduction will be needed.

In hearings with the Federation of Electric Power Companies of Japan, it was determined that in view of revisions to national energy and nuclear power policies following the March 2011 disaster at the Fukushima Daiichi Nuclear Power Station, the year 2020 CO<sub>2</sub> reduction target level (approximately 20 percent lower unit CO<sub>2</sub> emissions than the level recorded in fiscal 2009) would need to be reexamined. Unit emissions from the generation of electric power have a major impact on the emissions total. This factor calls for continued efforts toward improvement including the resumption of nuclear power plant operations.

The Petroleum Association of Japan has declared an energy conservation target of 530,000 kL/year in crude oil equivalents by the year 2020 (corresponding to 1.4 million tons of CO<sub>2</sub>/year). This reflects the fact that oil refineries in Japan already are among the most energy-efficient in the world and have little margin left for further energy-saving gains. Strategies reported to offer the potential for further cuts in CO<sub>2</sub> emissions would include the utilization of biofuels in the transportation sector, the market penetration of vehicles powered by clean diesel fuels, the widened utilization of high-efficiency oil-fired boilers and petroleum-based fuel cells, and other undertakings backed by strengthened collaboration among interested groups.



The years ahead will call for efforts to reduce CO<sub>2</sub> emissions from an LCA perspective through strengthened cooperative arrangements with related institutions that utilize petroleum products.

(ii) Commitments for other sectors

The Scheduled Airlines Association of Japan notes that its industry is acting in line with a program for achievement of targets under the Kyoto Protocol, specifically over the five years from 2008 through 2012 to curb unit energy consumed (fuel consumption per paid ton per km) by an average 15 percent compared to 1995. Having already achieved an improvement of 17 percent in fiscal 2010, the industry decided to redouble its efforts under the Commitment to a Low carbon Society and states that it will reduce unit energy consumed in fiscal 2020 by 21 percent compared to fiscal 2005. To meet this goal, Association members have been working to build fleets of new aircraft equipped with composite materials for weight reduction and engines rated for better fuel efficiency. Additionally, they plan to improve fuel efficiency through routine engine flushes and to transition to lighter payloads. It is recommended that they put into operation eco-flights that can maximize the reduction of CO<sub>2</sub> emissions while improving the conveniences for consumers of their services. Hopes also are that the future development and commercialization of bio-jet fuels will provide a favorable tailwind for sustainable undertakings.

The NTT Group has announced a target (compared to fiscal 2008) comprising plans to reduce Group CO<sub>2</sub> emissions by at least 15 percent (600,000 t-CO<sub>2</sub>) compared to the BAU level in fiscal 2020, in line with three Group concepts: “Green of ICT” toward 2020 (reduction of the environmental load from NTT’s own business operations); “Green by ICT” (contributions to the reduction of environmental load on a society-wide scale through the penetration and expansion of ICT services); and “Green with Team NTT” (reduction of environmental load through employee eco-practices). Amid expectations of an increase in CO<sub>2</sub> emissions stemming from enhancements to infrastructure for next-generation networks and high-speed wireless services, the NTT Group plans to move closer to its reduction target with steps to conserve energy use at telecommunications facilities and data centers and employee-led energy-saving practices including workplace lights-out policies. Also from the standpoint of achieving tangible CO<sub>2</sub> reduction benefits through the utilization of ICT, in the years ahead it is hoped that this industry will assume the initiative in the drive to establish international standards for environmental

assessment methods.

The Japan Soft Drink Association states that its industry has been confronted by a growth trend in energy consumption (in 2010, up 2.56-fold compared to 1990) that stems from a shift in consumer preferences over the past 20 years (e.g., marked by strong growth in demand for bottled mineral water and green tea products) but has been able to control relative growth in CO<sub>2</sub> emissions (in 2010, up 2.07-fold compared to 1990) by converting to fuels with a smaller emission factor. Given that this industry has already made substantial headway with the fuel conversion process and has expanded the number of sterilization stages on its production lines as an outgrowth of increases in its product categories and a heightened reliance on high-frequency, small-lot production, the Association foresees that additional curbs on energy consumption will be difficult. Nonetheless, we still would like to see the industry form tie-ups with convenience store chains and vending machine operators and implement public relations campaigns aimed at influencing consumer purchasing behavior.

According to the Japan Mining Industry Association, the mining industry in Japan faces a tough international climate marked by oligopolistic trends among leading mining companies, rapid growth in Chinese demand for resources, and the rise of resource nationalism. These trends have prompted mining companies in Japan to secure mining rights through management efficiency and joint smelting operations, participate in the development and operation of new mines, and actively pursue recycling programs for the effective use of domestic resources. Due to the pronounced decline in the quality of copper ores in recent years, the volume of energy utilized for copper smelting operations has been on an uptrend. Nonetheless, the industry has announced its commitment to reduce CO<sub>2</sub> emissions per unit output in fiscal 2020 by 25 percent compared to fiscal 1990 through maximal implementation of cutting-edge technologies including those for waste-heat recovery and electric motors equipped with power inverters. However, there is concern that participants in the mining industry may accelerate their withdrawal from the domestic sector (moving operations offshore) should business conditions deteriorate any further.

The Japan Lime Manufacture Association has announced a fiscal 2020 CO<sub>2</sub> emission target of 3.006 million t-CO<sub>2</sub>, which constitutes a 150,000-ton reduction from the BAU scenario. This target takes into account historical trends in lime use by the steel industry—the largest consumer of lime—as well as projections of future lime

production, and is to be met through measures including the conversion of facilities to new kilns with improved energy efficiency (e.g., shaft kilns) and the expanded utilization of recycled fuels. In view of the ability of the lime industry to fully satisfy its mineral resource needs with domestic sources, expectations are that it will contribute to CO<sub>2</sub> reductions over the entire product life cycle by working toward tie-ups with interested groups in a broad spectrum of industrial sectors.

The Japan Rubber Manufacturers Association has declared a CO<sub>2</sub> emission target per unit output for fiscal 2020 that is 15 percent below the fiscal 2005 level. The plan is to achieve this reduction chiefly through the installation of high-efficiency cogeneration facilities and conversion to alternative fuels. In the interest of promoting fuel-efficient tire products from an LCA perspective, in January 2010 the tire industry in Japan launched a tire labeling system based on a framework that rates tire performance in terms of two factors: “rolling resistance” and “wet grip.” It is worth noting that tire manufacturers in Europe, North America, and South Korea have been exploring the idea of adopting this framework. It is hoped that the tire industry will strengthen its cross-industrial alliances particularly with the cement and automotive industries in the years ahead.

Taking the goals of the current Voluntary Action Plan to heart (targeting a 13 percent reduction in CO<sub>2</sub> emissions per unit construction value by fiscal 2012), the Japan Federation of Construction Contractors has stated in the Commitment to a Low carbon Society that by fiscal 2020 it aims to cut CO<sub>2</sub> emissions per unit construction value by 20 percent. The Federation deserves high marks for the earnest efforts it has made to bring about additional CO<sub>2</sub> reductions in this industry. Those efforts comprise the implementation of energy-conserving lights-out and no-idling policies, the establishment of common implementation-rate targets for construction sites in areas where improvements are attainable, the management of progress toward those targets, and exhaustive policies for the fuel-efficient operation of dump-trucks and trucks. It is believed that the success with which the construction industry promotes energy-saving designs in its projects through collaboration with the Real Estate Companies Association of Japan and other groups will be of key importance in curbing CO<sub>2</sub> emissions within the commercial and residential sectors in coming years.

The Japan Building Owners and Managers Association has not been a participant in the current Voluntary Action Plan. However, it was one of the earliest organizations to announce plans to participate in the Commitment to a Low carbon Society. As a consortium of blue-chip office-building managers, the Association has already been

engaged in tireless efforts to improve emission levels per unit energy consumed in line with the set of Building Energy Management Guidelines it formulated in June 2008. In the Commitment to a Low carbon Society, the Association declared its participation in CO<sub>2</sub> countermeasures in the commercial sector by defining targeted implementation rates for 93 CO<sub>2</sub> reduction measures that are covered by the aforementioned guidelines. (For example, the target for the transition to LED lighting [currently at 14 percent] calls for a 95-percent implementation rate by the year 2020.) Its success in teaming up with national and local governments to pursue similar measures for small and medium-scale buildings will be a future challenge.

The Real Estate Companies Association of Japan is currently working to reduce energy consumption at buildings under its members' management (over the five-year span from fiscal 2008 through 2012, for an average reduction of 5 percent compared to fiscal 1990) while also exploring ways to incorporate higher levels of environmental performance into new office buildings and condominium complexes for sale that will be built in the period leading up to 2020. Both of these are initiatives under the Action Plan for Low carbon Urban Development. However, building contractors and managers are limited in their ability to bring about improvements because tenant-related activities typically account for approximately 70 percent of all energy consumption within a given structure. This reality will call for efforts to establish closer cooperative arrangements with tenants in the years ahead.

## (2) The Commitment from a Comprehensive Perspective

This section reports on ways the 16 interviewed sectors have been striving to implement elements of the Commitment. We applied a comprehensive perspective that examined sector performance in terms of the four principal components of the Commitment: reduction targets, cooperation with other interested groups, international contributions, and innovations in technology.

### (i) Establishment of CO<sub>2</sub> reduction targets for the period to 2020

Of the 16 sectors that were interviewed during the hearings, nine had established reduction targets based on unit energy consumed or CO<sub>2</sub> per unit of output. As noted before in the context of the Voluntary Action Plan to date, the utilization of such units as indicators or yardsticks is of critical importance to the task of measuring the levels of performance or effort made by industrial sectors. However, identifying quantitative reductions in CO<sub>2</sub> demands that we have data on total CO<sub>2</sub> emissions. In the interest of improved transparency as well, each sector needs to provide data on

total CO<sub>2</sub> emissions and perform a causal analysis of quantitative reductions attributable to activity levels, structural changes, and unit output.

(ii) Strengthened cooperation with other interested groups

Many sectors are finding it increasingly difficult to achieve further, significant quantitative reductions in their CO<sub>2</sub> emissions through improvements in unit output or unit energy consumed or through structural changes to their lines of products and services. Their margin for future reductions will come primarily from energy-saving practices in office buildings and the transport stages for raw materials and finished products. Additionally, they should be able to develop energy-saving household appliances, fuel-efficient automobiles, heavily insulated homes, and other low carbon products and services that allow significant reductions in CO<sub>2</sub> emissions during the utilization or consumption stages. Reducing CO<sub>2</sub> emissions from products and services from the perspective of life cycle will demand stronger cross-industrial alliances. For example, developing tires with reduced rolling resistance and transitioning from asphalt- to concrete-paved roads will involve technology-related development work on the same level of importance as the development of lightweight automobiles. Establishing tie-ups that enable separate interested groups to cooperate with one another in initiatives can be expected to generate synergistic effects on a broader, comprehensive scale. A majority of the sectors interviewed during the hearings associated with this report were engaged in a range of undertakings aimed at cutting CO<sub>2</sub> emissions from the perspective of product life cycle. We look forward to seeing the public and private sectors work more closely together to help strengthen levels of cooperation among interested groups in the years ahead. In the process, methodologies that facilitate analyses of CO<sub>2</sub> emissions from a product life cycle perspective will need to be developed.

(iii) International contributions

Although Japanese industry confronts limits to its ability to reduce CO<sub>2</sub> emissions within Japan, it faces mounting expectations that it will contribute more to countermeasures against climate change on a global scale by leveraging the advanced low carbon technologies now at its command. Japanese industry can make international contributions by promoting the foreign acceptance and penetration of environmentally friendly Japanese products and technologies and implementing forestation programs and other undertakings aimed at developing natural environmental resources overseas as carbon dioxide sinks. Many industrial sectors are already exploring or engaged in efforts to leverage their low carbon technologies on an international scale. Identifying ways to expand their markets with technologies

and products suited to the needs of specific countries is the challenge that lies ahead. Forestation programs thus far have been implemented by only a few sectors including members in the Japan Paper Association. In coming years, additional sectors will need to do more in the area of forest protection through cooperation with REDD+ and other government-led infrastructure development programs.

(iv) Development of innovative technologies

The sectors interviewed during hearings by this Committee generally do not expect to reap any meaningful CO<sub>2</sub> reduction benefits from innovative technologies in the period leading up to year 2020. As reasons for that outlook, they cited limits to the benefits available from investments in energy-saving and low carbon technologies and slow sales revenue growth due to the effects of the strong yen, among other factors. In terms of fostering Japan's competitiveness in overseas markets, developing innovative technologies is vitally important to the nation in its position as a technology powerhouse. To sustain Japan's competitive edge in the international marketplace, in the years ahead it is advisable that Japanese industry pursue advanced environmental technology development programs from a long-range perspective.

### 3. Conclusions

During the hearings, representatives from participating industries described in quantitative as well as qualitative terms the maximum effort their own sectors are prepared to make and explained their views on targets for accomplishment and the suitability of those targets. They are to be credited for generally fulfilling a certain measure of accountability on this subject.

Members of the Evaluation Committee were strongly interested in the potential for CO<sub>2</sub> reductions through global activities and strategies based on life cycle. They gained a firsthand understanding of the real strength of Japan's supporting industries from the detailed and specific explanations they heard on distinctive product undertakings tailored to the circumstances of different industries and business sectors. Actively promoting the penetration of these products and leveraging their benefits for effective CO<sub>2</sub> reductions will be needed in the future.

As another challenge for the future, we look forward to seeing participating industries make further efforts to form stronger cross-industrial alliances and improve their information-sharing activities within Japan and at the international level. Public-private collaboration, moreover, will be indispensable to the tasks of establishing computational methods for LCA-based undertakings, further harnessing

the potential for CO<sub>2</sub> reductions overseas, and cultivating a climate conducive to the development of innovative technologies. The Evaluation Committee looks forward to sustained improvements in the PDCA cycle.

Under the Voluntary Action Plan, participating industries declared their own voluntary targets for the reduction of CO<sub>2</sub> emissions while Keidanren also declared a set of uniform targets and pursued voluntary programs for the achievement of these targets by industry as a whole. Thanks to the steady and earnest efforts that participating industries have made thus far, the reduction targets for the first phase of commitments appear to have been largely met. Through the activities they pursued during this phase, participating industries acquired the ability to objectively identify the factors and challenges that deserve the attention of GHG countermeasures.

The Commitment depends on how well society is able to benefit from the accomplishments participating industries have made in reducing CO<sub>2</sub> emissions to date and the expertise they have amassed in the process. Within Japan, this will be manifested in municipal action plans as well as activities on a national level; overseas, it will translate into efforts to promote the penetration of low carbon products and systems of technology with priority on emerging nations. To provide support to this bottom-up approach by participating industries, Keidanren needs to take steps to build necessary frameworks and expand public relations activities as required for educational purposes and to encourage wider acceptance and understanding of the Commitment and its goals.

Members of the Evaluation Committee for  
Keidanren's Commitment to a Low carbon Society

Committee Chair

Dr. Yoji Uchimaya (Professor, Graduate School of Systems and Information Engineering, University of Tsukuba)

Members (*in alphabetical order by last name*)

Dr. Tadashi Aoyagi (Former Senior Research Director, Mitsubishi Research Institute, Inc.)

Ms. Kiyoe Asada (President, Women's Energy Network)

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

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

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

Ms. Yuko Sakita (Journalist and Environment Counselor)

Mr. Isao Sugaya (Assistant General Secretary)

Mr. Michio Ushioda (Editorial Writer, The Mainichi Newspapers)

Dr. Kanji Yoshioka (Professor Emeritus, Keio University)



## **V. Keidanren's Commitment to a Low Carbon Society**

## **Keidanren's Commitment to a Low Carbon Society**

15 December 2009

Nippon Keidanren

### **1. Basic Concept**

After establishing its Global Environmental Charter in 1991, Nippon Keidanren went on to lead in the implementation of responsible initiatives aimed at finding solutions to the problems of climate change. In particular, even prior to adoption of the Kyoto Protocol, Keidanren formulated a Voluntary Action Plan on the Environment in 1997, and on that basis, sought to achieve reductions in domestic emissions of CO<sub>2</sub> principally within the industrial and energy-conversion sectors. Undertakings in these areas by the business community have been enormously successful in fostering the development of a wide array of low carbon technologies driven by Japanese ingenuity.

Nonetheless, the level of global greenhouse gases (GHGs) in the atmosphere has continued to expand unabated at a rapid pace. Along with limits on the utilisation of natural resources and energy, climate change stands before us as an immediate challenge threatening the sustainable development of the world economy itself. The Japanese business community is determined to further refine and build on the world-leading technologies it has developed and amassed to date, and actively contribute to the mitigation and solution of these problems.

Climate change constitutes a long-range, global-scale problem. To address it, we hereby declare, as a shared vision, our resolve as members of the Japanese business community to harness our technological prowess and assume an instrumental role in the drive to halve global GHG emissions by the year 2050.

To this end, in the coming decade to 2020, domestically, we will fully implement the best available technologies (BAT), and on that basis, strive for maximum reductions in CO<sub>2</sub> emissions from the business and household sectors. Furthermore, overseas, we will actively furnish assistance for motivated initiatives aimed at stemming climate change. And in the process, we will strategically develop innovative technologies that promise breakthroughs in the quest to halve CO<sub>2</sub> emissions by 2050.

In keeping with these perspectives, Keidanren will move forward with efforts to formulate its “Commitment to a Low Carbon Society” as a re-envisioning of its current Voluntary Action Plan.

We hereby declare that Japanese industry, acting in line with this Commitment, will move ahead with its drive to develop and implement commercially viable low carbon technologies that are among the most advanced in the world and assume global leadership in the effort to create a low carbon society that achieves economic growth in harmony with the environment.

## **2. Overview of the Commitment**

### **2.1 Core Policies**

(1) Participating industries and companies (collectively, “participating industries”) pledge to provide society with world-leading low carbon technologies while maintaining and/or improving their own levels of energy efficiency.

(2) Participating industries will publicly announce and pursue a set of voluntary initiatives in line with section 2.2 below in the interest of fostering the development of a low carbon society of global scale.

(3) Keidanren will pursue the PDCA cycle in partnership with government to ensure that the initiatives by participating industries are steadily and reliably implemented.

### **2.2 Structure**

(1) Establishment of reduction targets for domestic business operations up to the year 2020

a. Set numerical CO<sub>2</sub> reduction targets for the year 2020 based on international comparisons of energy efficiency for each industrial sector in areas ranging from production and service provision to business operations and logistics, and on the assumption that BAT will be implemented whenever new facilities are built or existing facilities are updated. Targets will be expressed in CO<sub>2</sub> emissions intensity or as CO<sub>2</sub> emissions.

b. In setting numerical targets, utilise international comparisons of energy efficiency and disclose BAT details and implementation plans to demonstrate to the international community that the targets represent the deepest reduction levels attainable.

c. Additionally, explore ways of guaranteeing that targets will be achieved.

(2) Strengthened cooperation with other interested groups

a. In the interest of paving the way to the creation of a low carbon society, participating industries will strengthen their cooperative ties with consumers, customers, employees, local communities, and other interested groups.

Specifically, take steps to reduce CO<sub>2</sub> emissions through product life cycles, including the development and commercialisation of products and services that harness world-leading energy-saving technologies.

b. To complement these efforts, pursue independent initiatives in employee education, information disclosure to consumers (e.g., highlighting levels of CO<sub>2</sub> emitted when products are used), forestation, and assistance to NPOs, and contribute to efforts to reduce CO<sub>2</sub> emissions across a broad spectrum of sectors, from business to transport to households.

(3) Contributions on the international level

a. Actively participate in the Asia-Pacific Partnership on Clean Development and Climate (APP) and other international frameworks for development assistance and actively transfer advanced Japanese technology and expertise to motivated developing countries in compliance with international rules.

b. Demonstrate stronger leadership and pursue collaborative ventures aimed at reinforcing private-led cooperative international undertakings in electric power, steel, chemicals, cement, and other industrial sectors committed to the creation of a low carbon society on a global scale.

(4) Development of innovative technologies

Japan needs to build a development strategy for the technologies that will facilitate the achievement of the long-term goal of halving global GHG emissions by the year

2050. To this end, each industrial sector should collaborate with universities and other centres of research, clearly identify the technical challenges as well as the GHG reduction potential of those innovations that should be developed and transformed into commercially viable technologies, and prepare and pursue a medium- to long-range road map for the development and dissemination of new technologies.

# Keidanren's Commitment to a Low Carbon Society

