Keidanren
Policy & Action

Keidanren Carbon Neutrality Action Plan

– Vision toward Carbon Neutrality by 2050 and Fiscal 2021 Follow-up Results (Performance in Fiscal 2020) –

(Provisional Translation)

March 30, 2022

KEIDANREN
(Japan Business Federation)

Keidanren's efforts toward carbon neutrality (CN)

"Challenge Zero" (Jun 2020)

○**Proactively publicize and support actions to create innovation taken by companies and organizations towards early achievement of CN** which the Paris Agreement sets as the long-term goal.

Challenge Zero

First Policy Speech by then Prime Minister Suga (Oct 2020)

"We hereby declare that by 2050 Japan will **aim to reduce greenhouse gas emissions to net-zero, that is, to realize a carbon-neutral, decarbonized society**."

"Toward Realizing Carbon Neutrality by 2050 ("Society 5.0 with Carbon Neutral") Determination and Actions of the Business Community —" (Dec 2020)

○Given that achieving CN by 2050 requires the fundamental transformation of the socioeconomic system as a whole, **points out the technological and economic challenges and declares the business community's unwavering resolve to solve them.**

Chairman Tokura's Speech at the Keidanren Regular General Meeting "Urgent Policy Proposal toward Achieving Green Growth" (Jun 2021)

Announced that the Keidanren Commitment to a Low Carbon Society would be **reformulated as the Keidanren Carbon Neutral Action Plan**, an initiative for achieving CN by 2050 and realizing GX (Green Transformation). **Relevant industries were invited to formulate action plans** following the announcement.

Formulated the "Keidanren Carbon Neutrality Action Plan" (Nov 2021)

Main points of the Keidanren CN Action Plan

◆ **Formulation of visions and development and introduction of innovative technologies toward carbon neutrality by 2050**

Formulate the visions (basic policy, etc.) toward carbon neutrality by 2050 and advance the development of the innovative technologies required for their achievement with multiple options. ⇒ **pp. 3, 4, 11**

◆ **Emissions reductions from domestic business operations (constantly reviewing the 2030 targets)**

Contribute to achieving Japan's FY2030 target by **constantly reviewing the 2030 targets**, which were set up under the Commitment to a Low Carbon Society, while steadily advancing reduction efforts through the maximized deployment of BAT (best available technologies) and seeking further technology development and deployment. ⇒ **pp. 5-8**

◆ **Strengthening co-operation with other interested groups and promoting contribution at the international level**

Contribute to the transition toward CN and to the achievment of CN by 2050 at the global level through not only reducing CO_2 emissions from one's own business operations, but also taking measures at the use (utilization) phase of products and services and across the entire supply chain, and technology transfer overseas. ⇒ **pp. 9, 10**

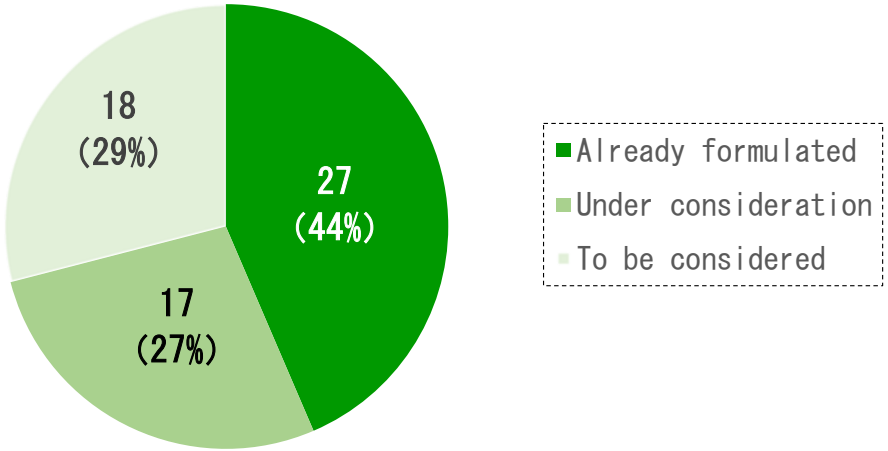
Status of Vision formulation toward CN by 2050

2050CN

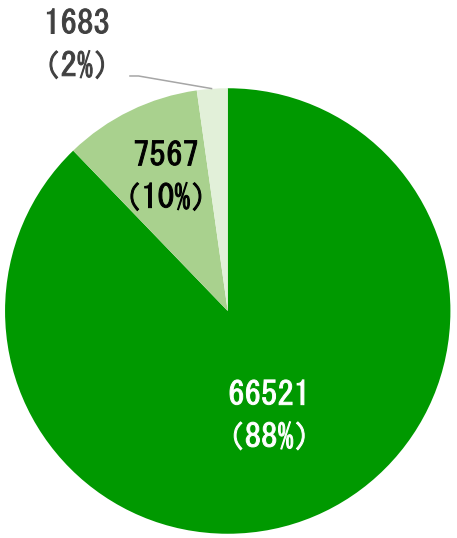
- **All industries reported that they had either already formulated a Vision, were considering one, or intended to consider one.** CO_2 emissions from the 27 industries that have **already formulated** visions collectively **amount to 90 percent of total emissions** from all participating industries.
- This shows their determination to maximize their efforts toward achieving CN by 2050.

Status of Vision formulation among participating industries

In terms of number of industries



In terms of emissions (10,000 t-CO_2)



* CO_2 emissions after electric power distribution are used for the industry, commercial and transport sectors, and CO_2 emissions before electric power distribution are used for the energy conversion sector.

Industry-specific Visions toward CN by 2050

2050CN

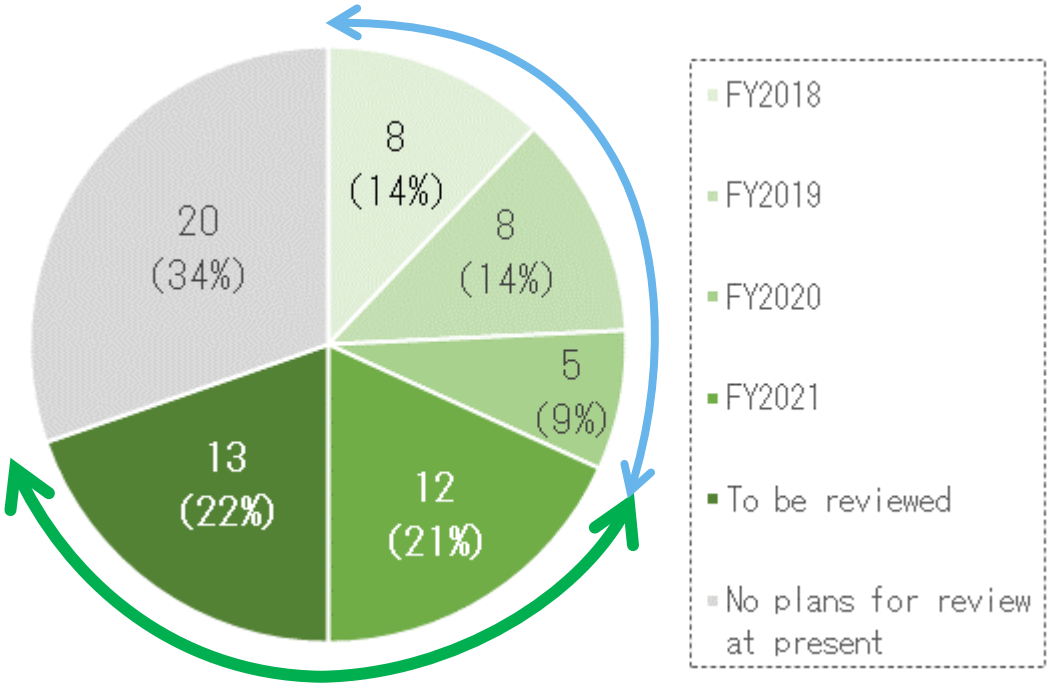
Sector	Industry	Vision (Basic Policy, etc.)
Energy conversion (Efforts to achieve CN in energy)	Electric power	While pursuing an energy mix that achieves "S+3E" at the same time, engage in "low-carbonization and decarbonization of electric power" (renewable energy: **next-generation solar power, supercritical geothermal power**, nuclear power: restarting, **small modular reactors (SMR), nuclear fusion reactors**; thermal power: **hydrogen and fuel ammonia power generation; CCS/CCU/carbon recycling**, etc.) and "promotion of electrification" (development and deployment of **recharging infrastructure for EVs and PHVs, utilization of IoT and AI technologies, wireless power transmission and supply**).
	Petroleum	Seek to achieve net zero CO_2 emissions from business operations and contribute to the achievement of society-wide CN through the decarbonization of the products it supplies. Under this policy, engage in the R&D and the social implementation of innovative decarbonization technologies (**CO_2-free hydrogen, synthetic e-fuel, CCS/CCU**, etc.), building a CO_2-free hydrogen supply chain, and achieving CN at oil refineries.
	Gas	Under the policy to achieve carbon nuetralization of gas, promote **conclusive shift to natural gas** and the sophisticated use of natural gas, decarbonization of gas (**methanation** and **hydrogen use**, etc.) and development of **CCS/CCU**-related technologies.
Industrial (Efforts to establish technologies to fundamentally reduce CO_2)	Iron and steel	Toward achieveing carbon-neutral steel, explore multiple pathways by employing every possible means including the drastic reduction of CO_2 emissions from blast furnace through **COURSE 50** and **ferro coke** technologies plus CCUS, development of super innovative technologies such as **hydrogen-based iron making** and expanded use of scrap.
	Chemical	Allow the potential power of "chemistry" to emerge, thereby promoting and accelerating innovations that will resolve global issues and contribute to sustainable development. Under this policy, engage in the carbon circulation of raw materials (**material use of CO_2, utilization of plastic waste,** etc.) and technological innovations to achieve energy saving (**membrane separation process**, etc.).
	Paper manufacturing	Promote energy efficiency efforts and fuel conversion in production activities (active introduction of the latest energy-efficient facilities and technologies, increase of the utilization ratio of renewable energies, commercialization of innovative technologies (development of **high efficiency pulp production methods**), etc.). Also engage in unique efforts such as reducing CO_2 emissions from product life cycles by developing and utilizing environment-friendly materials derived from wood biomass (**cellulose nanofiber**, etc.) and expand contribution in afforestation as a source of CO_2 absorption.
	Electrical & electronics	Under the policy of contributing to resolve social issues related to climate change and energy constraints through various business fields from the three perspectives of "technology development", "co-creation", and "resilience", engage in innovating advanced energy conservation and carbon-free technology (**smart grids, hydrogen production using water electrolysis, power semiconductors, rapid or wireless charging systems**, etc.) and the social implementation of advanced data utilization solutions (**autonomous driving systems, smart factories, accurate weather observation and simulation technologies**, etc.).
Transportation -related (Efforts to achieve CN in mobility and transport)	Automobile	Deploy electric vehicles (**HV, PHV, EV, FCV**, etc.) and to achieve a hydrogen economy (spreading **FC-based mobility**, etc.).
	Shipping	Work on the shift to **zero-emission vessels using alternative fuels such as carbon-recycled methane, ammonia and hydrogen.**
	Aviation	Introduce new aircraft models, improve flight operations, and introduce and widely use **sustainable aviation fuels (SAF).**
	Railway	Promote the development of **renewable power sources** and accelerate its deployment, deploy **storage battery-powered railing stock**, develop **fuel cell rolling stock**, with a view to achieving net zero CO_2 emissions at every stage across energy production to use.
Commercial (Efforts for full energy efficiency)	Real estate, buildings	Envisioning a society that has reached CN by 2050 with widely deployed "energy-savings and renewable energy-conscious buildings, such as **ZEB** and **ZEH**", "buildings that use low-impact construction material," and "cities that enable community-wide CO_2 reductions by combining **renewable energy facilities, storage batteries and power interchange**," promote ZEB/ZEH and HEMS/BEMS in individual buildings and promote ZET and CEMS in the context of entire communities.

Emission reductions from domestic business operations (Reviewing targets)

2030 target

- Participating industries have continued to review their 2030 targets. In the past 3 annual follow-ups, 21 industries have reviewed their targets. Upon formulating the CN Action Plan, **25 industries have announced revisions or intentions to review their targets** in the short period of time after survey sheets were sent out in June 2021. **Industries are revisiting their targets at a faster pace.**
- This is evidence of the business community's will to contribute to achievement of the Government's 2030 target to reduce emissions by 46%.

Status of review of Phase II (FY 2030) target (number of industries)



※Result for the 58 industries that have disclosed their targets and performance.
(Total does not amount to 58 as some industries reviewed or plan to review their targets multiple times.)
※The denominator for the percentage given in round brackets is 58.

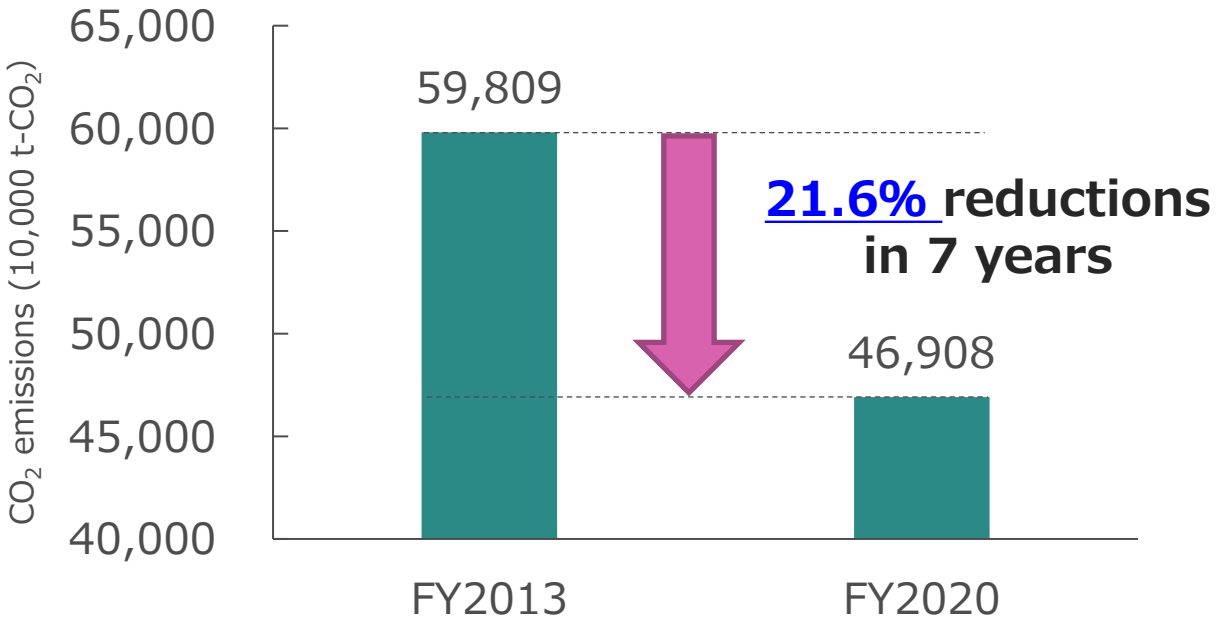
Pillar 1: Emission reductions from domestic business operations ①

CN Action Plan Performance

- Total CO_2 emissions from all sectors (industrial, energy conversion, commercial, transportation) decreased by **21.6%** from fiscal 2013 to fiscal 2020. (However, economic activity dropped drastically in fiscal 2020 due to COVID-19.)

<Result of Phase I –Performance in fiscal 2013～2020->

Total emissions from all sectors



※The Final Version reports CO_2 emissions (after electric power distributions) from 60 industries out of the 62 participating industries. The Real Estate Companies Association of Japan and Japan Building Owners and Managers Association have not reported CO_2 emissions thus are not included in the graph..

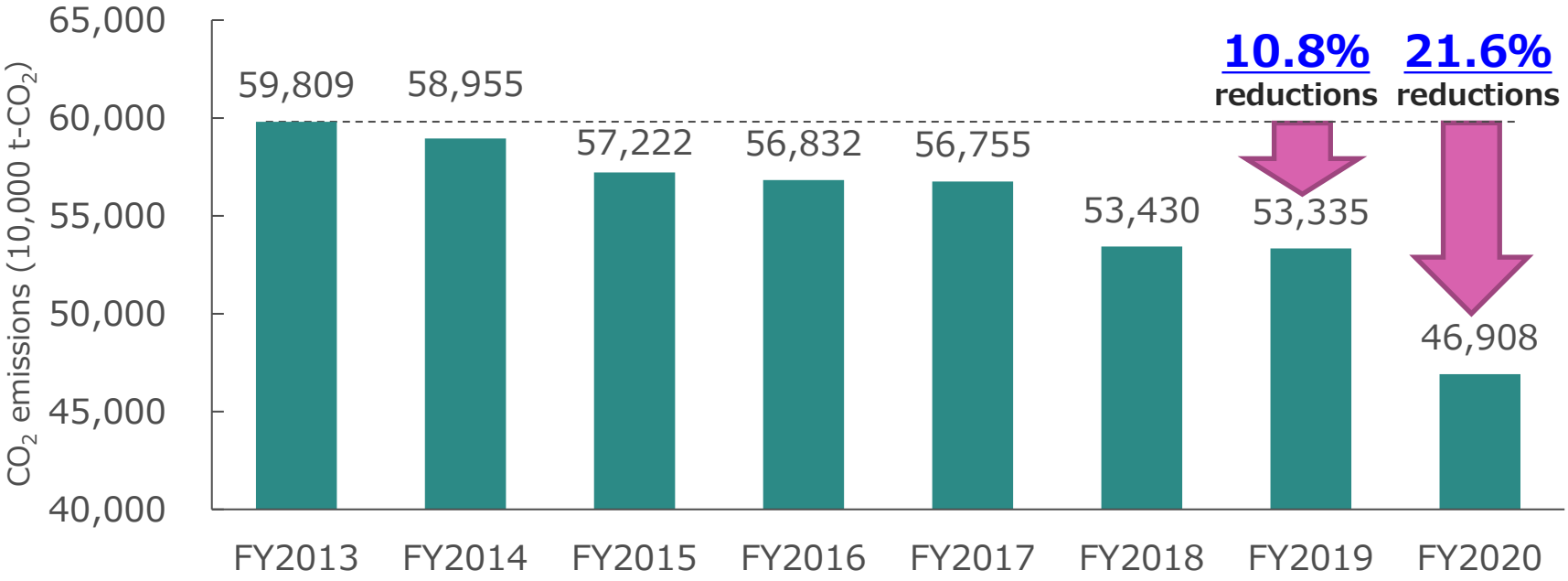
※The scope of calculations differ between FY2003 and FY2020 due to offshoring of businesses, etc.

Pillar 1: Emission reductions from domestic business operations ②

CN Action Plan Performance

- Collective CO_2 emissions from all sectors have continued to decrease since fiscal 2013 and had decreased by **10.8%** as of fiscal 2019.
- Even without the impact of COVID-19, emissions would have been steadily reduced.

<Emission trends in fiscal 2013-2020>
Total emissions from all sectors



※The Final Version reports CO_2 emissions (after electric power distributions) from 60 industries out of the 62 participating industries. The most recent heat values and carbon emission coefficients available at the time of the survey have been used for calculating CO_2 emissions.

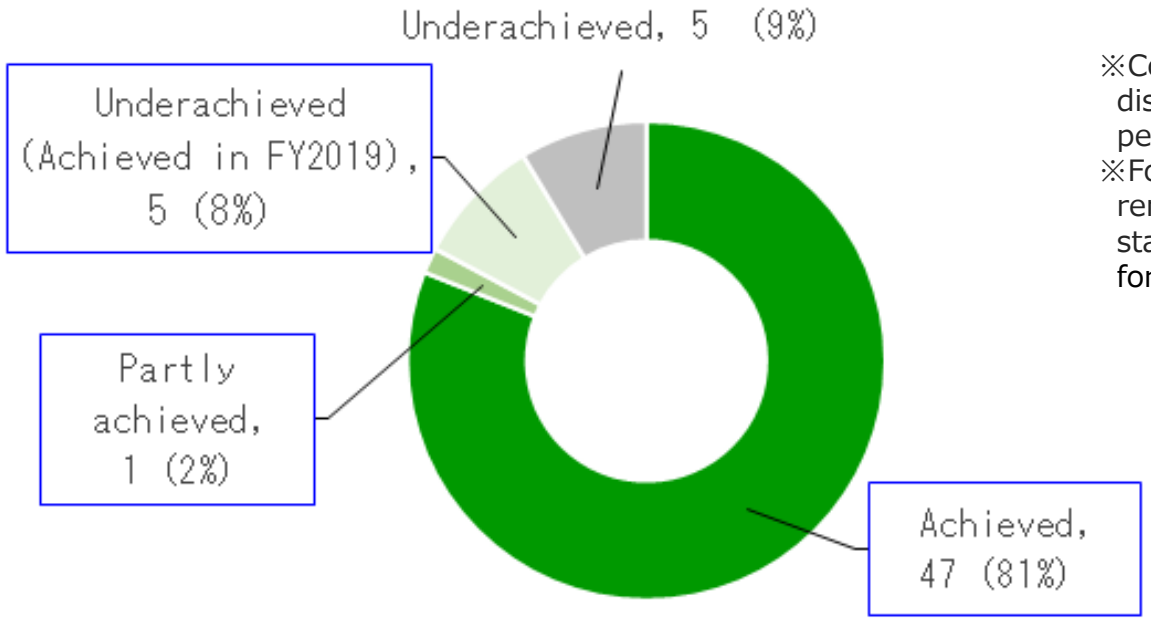
※The scope of calculations differ between fiscal 2013 and fiscal 2019 & 2020 due to offshoring of businesses, etc.

Pillar 1: Status of target achievement

CN Action Plan Performance

- **47 industries achieved** their fiscal 2020 targets. Among them **14 industries had renewed their targets to more ambitious targets, which they successfully achieved.**
- Among 10 industries that underachieved their targets, 5 had achieved their targets in fiscal 2019.
- Contributes to Japan's emission reductions as a key initiative of the business community.

Status of Phase I (FY2020) target achievement



※Covers the 58 industries that discloses their targets and performance, etc.
※For industries that have renewed their targets, the status of achievement is given for their new targets.

Pillar 2: Strengthening co-operation with other interested groups

CN Action Plan Performance

- Many industries **contribute to achieving avoided emissions along the value chain (procurement, provision of products and services, use, disposal, etc.).**
- Active communication through **the quantification of reductions** and Keidanren's concept book in order to raise public recognition of products and services that contribute to society-wide emission reductions.

<Examples of emissions reduction efforts along the value chain>

Procurement of products that emit less before manufacturing

Biomass polyethylene containers (Federation of Pharmaceutical Manufacturers' Associations of Japan)

Provision of products and services that emit less during use

High-function steel (Japan Iron and Steel Federation)
Residential thermal insulation material (Japan Chemical Industry Association)
Digital solutions utilizing IoT and AI (Liaison Group of Japanese Electrical and Electronics Industries for Global Warming)
Next-generation vehicles (Japan Automobile Manufacturers Association)
High mileage tires (Japan Rubber Manufacturers Association)
Insulating glass (Flat Glass Manufacturers Association of Japan)
Latent heat recovery type high-efficiency oil hot water boiler (Petroleum Association of Japan)

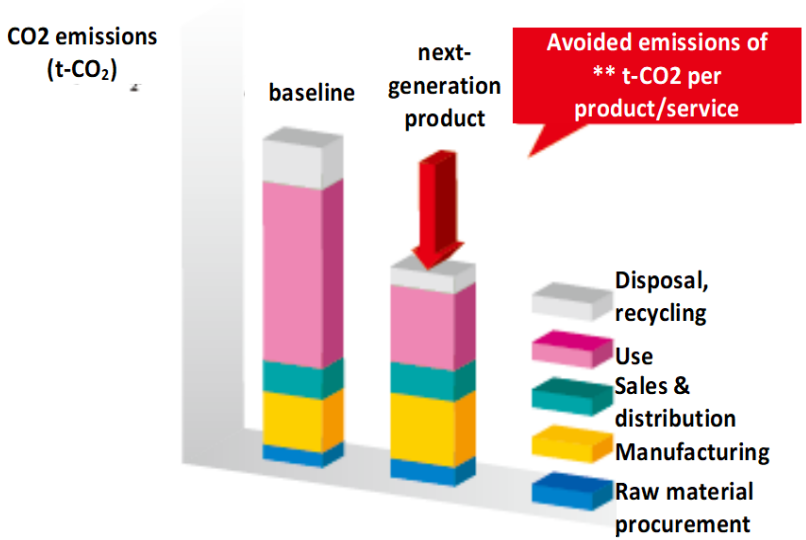
Provision of lightweight products that emit less during transport

Material for aircrafts (Japan Chemical Industry Association)
Lightweight paper and cardboard (Japan Paper Association)

Disposal of products (3R)

Effective utilization of waste and byproducts (Japan Cement Association)

<Approach to avoided CO_2 emissions>



Pillar 3: Promoting contribution at the international level

CN Action Plan Performance

- Many industries **contribute to reducing global GHG emissions** through overseas transfer of advanced products and services and overseas deployment of products and services.
- **Industries are promoting the quantification of emissions** avoided through international contribution, as done in measures taken under Pillar 2.

<Examples of avoided emissions overseas>

Overseas transfer of technologies and knowhow	Provision of low-carbon products and services
CDQ (coke dry quenching), TRT (top-pressure recovery turbine) power generation, GTCC*1 exclusively fired using by-product gas (Japan Iron and Steel Federation) Ion-exchange membrane for the production of caustic soda (Japan Chemical Industry Association) Aluminum recycling (Japan Aluminium Association) CO_2–EOR*2 by GHG emitted from coal-fired thermal power plants (Japan Petroleum Development Association) Renewable power generation (Electric Power Council for a Low Carbon Society, The Japan Gas Association, etc.) Renewable energy IPP*3 business (Japan Foreign Trade Council)	High efficient thermal power generation and renewable power generation technologies, high efficiency IT products, solutions (Liaison Group of Japanese Electrical and Electronics Industries for Global Warming Prevention) Next-generation vehicles (Japan Automobile Manufacturers Association) Energy-saving ships (Shipbuilders' Association of Japan & Cooperative Association of Japan Shipbuilders) Permanent magnet synchronous motors (PMSM) for railway vehicles (Japan Association of Rolling Stock Industries) Water-saving toilets (Japan Sanitary Equipment Industry Association)

*1 Gas Turbine Combined Cycle
*2 Enhanced Oil Recovery
*3 Independent Power Producer

Pillar 4: Development of innovative technologies toward CN by 2050

CN Action Plan Performance

- **The creation of completely new innovations is key** to achieving significant CO_2 reductions in the medium- to long-term toward CN by 2050, as drastic reductions cannot be achieved along the lines of conventional measures.
- Medium- to long-term R&D that the private sector finds difficulty in committing to alone will be continued **through collaboration with the Government**.

<Example of roadmaps for developing and deploying innovative technologies>

Industry/company	Innovative technologies※	2020	2025	2030	2050
The Japan Iron and Steel Federation	COURSE50	R&D		Full-scale plant	Deployment
Japan Chemical Industry Association	Plastic feedstock production processes using CO_2, etc.		R&D, commercialization		Business phase
Japan Paper Association	Cellulose nanofiber (CNF)		Market creation		Market expansion
Japan Cement Association	Innovative cement production process	Preliminary considerations	Confirm manufacturing conditions, economic rationality, etc.		
Electric Power Council for a Low Carbon Society	Thermal power generation technologies that reduce environmental burden (ammonia co-firing, hydrogen co-firing)		Demonstration	Start operations; increase co-firing ratio	Single fuel firing (ammonia)
Petroleum Association of Japan	Large-scale hydrogen supply chain establishment	R&D		Demonstration	Commercialization
The Japan Gas Association	Methanation	R&D, demonstration		Commercialization	Increased commercialization
Telecommunications Carriers Association	Optical/electrical converged super-low energy consumption high-speed signal processing technologies		Develop specfications		
East Japan Railway Company	Development of fuel cell rolling stock	Development	Demonstration	Introduction	Increased deployment

※Includes transition technologies

Reference

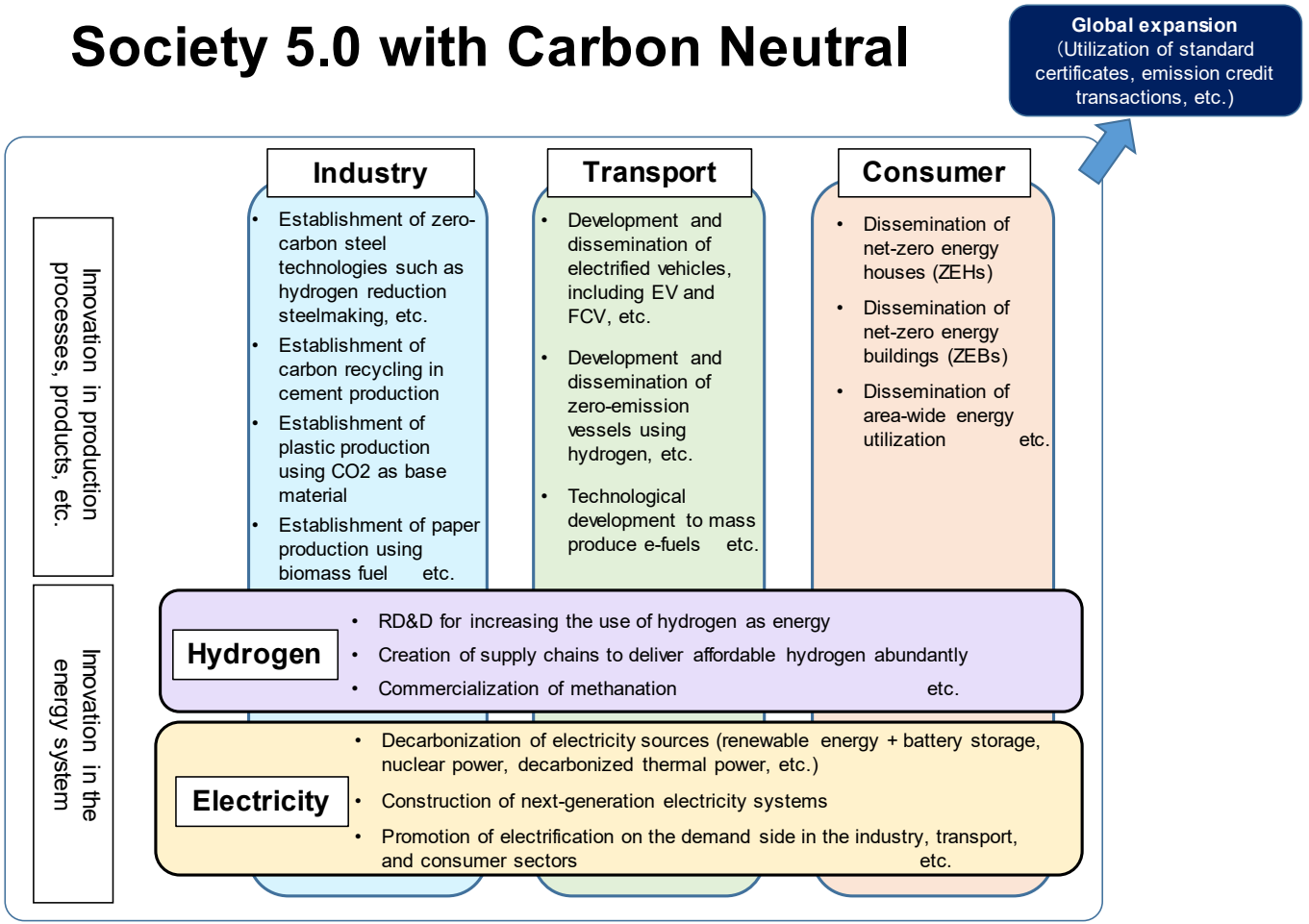
Keidanren's efforts to combat climate change

- Keidanren took the first pioneering steps on climate change ahead of governmental policy decisions.

1991 April	**Presentation on Keidanren Global Environment Charter**
1992 June	Adoption of the Framework Convention on Climate Change
1997 June	**Presentation on the Keidanren Voluntary Action Plan on the Environment**
1997 December	Adoption of Kyoto Protocol (COP3)
2013 January	**Announcement of the first phase of the plan for Keidanren's Commitment to a Low Carbon Society (FY 2020 targets)**
2013 March	Current Policy of Global Warming Countermeasures (Decision of Global Warming Prevention Headquarters)
2015 April	**Announcement of the second phase of the plan for Keidanren's Commitment to a Low Carbon Society (FY 2030 targets)**
2015 July	Submission of Japan's Intended Nationally Determined Contribution (INDC) to the UN
2015 December	Adoption of the Paris Agreement (COP21)
2016 November	Entry into force of the Paris Agreement
2018 November	**Announcement of Keidanren's Concept Book "Contributing to Avoided Emissions through the Global Value Chain"**
2019 January	**Announcement of Keidanren's "Actions by the Business Community on Long-term Global Warming Countermeasures up to 2050"**
2019 June	Japan's Long-term Strategy under the Paris Agreement (Cabinet decision)
2020 June	**Starting "Challenge Zero"**
2020 October	Declaration of challenge of achieving carbon neutrality by 2050
2021 June	**Announcement of Keidanren Carbon Neutrality Action Plan**

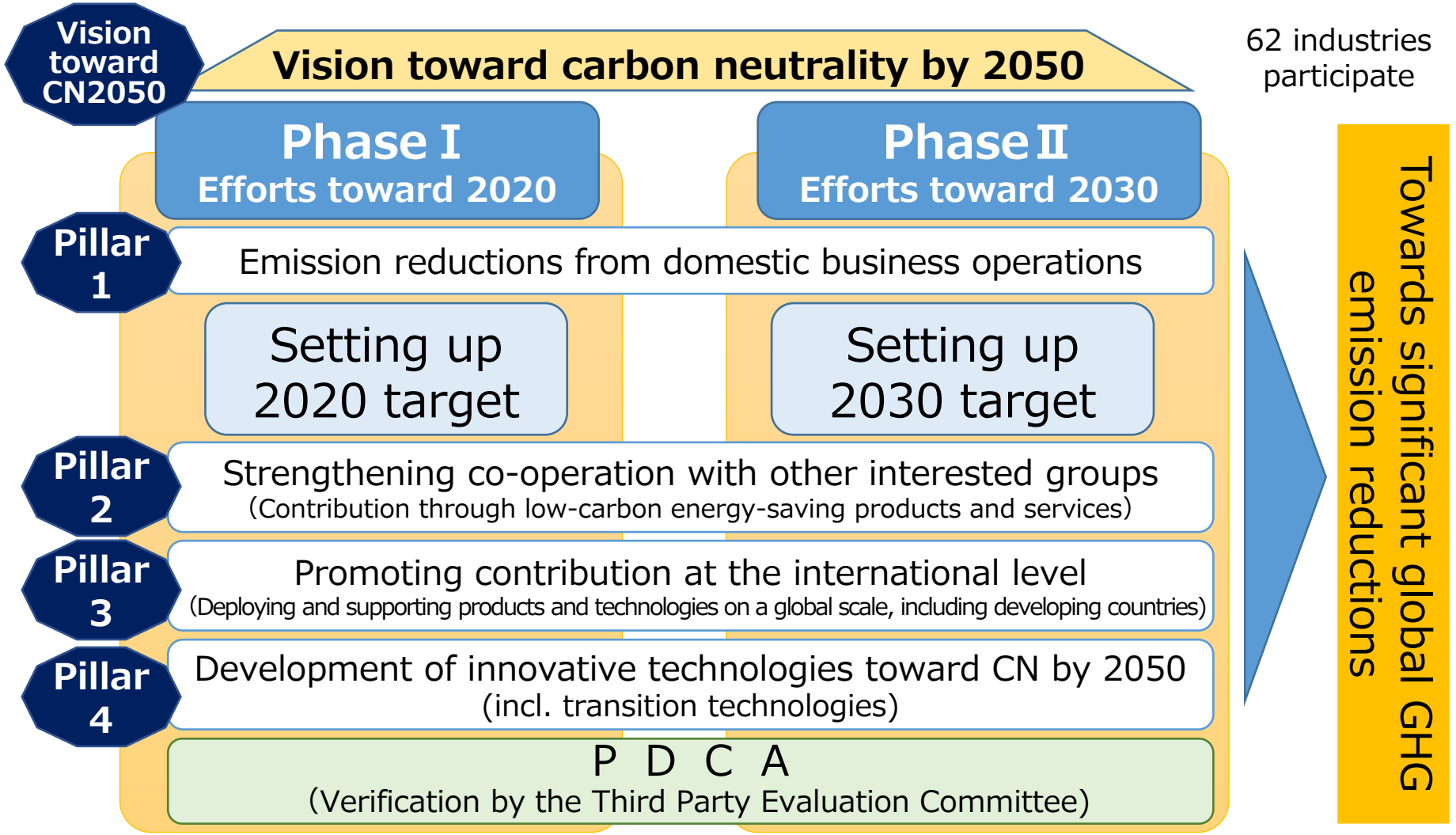
Society 5.0 with Carbon Neutral

- "Toward Realizing Carbon Neutrality by 2050 ("Society 5.0 with Carbon Neutral") Determination and Actions of the Business Community —" (Dec 15, 2020), states that **achieving CN by 2050 requires the fundamental transformation of the socioeconomic system as a whole and the achievement of "Society 5.0 with Carbon Neutral".**



Outline of Keidanren Carbon Neutrality Action Plan

■ Contributing to long-term global warming countermeasures on a global scale through efforts based on the formulation of **a Vision and four pillars**.

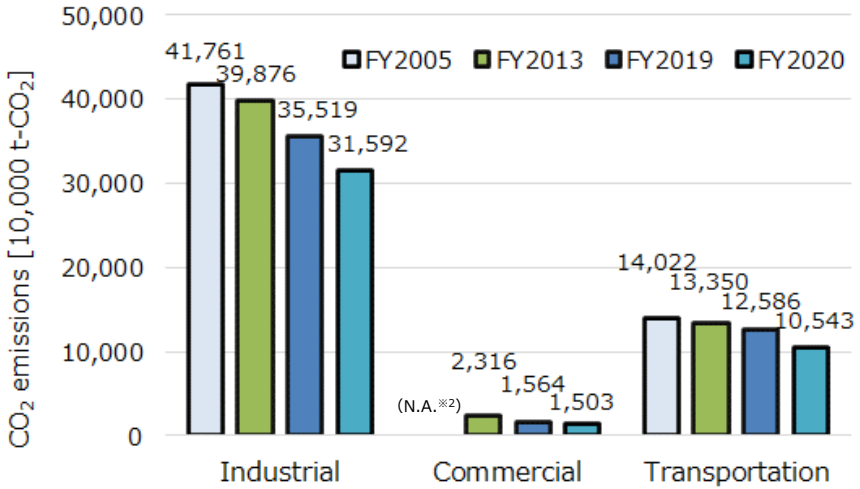


＊The current report summarizes the results of Phase I.

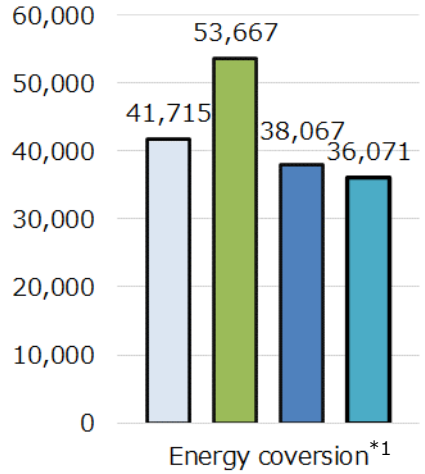
Pillar 1: Emission reductions from domestic business operations - Performance in CO_2 emissions -

- In fiscal 2020, CO_2 emissions were reduced in **all sectors** (industrial, energy conversion, commercial, transportation) **relative to the previous year and fiscal 2013 (*).**

(*) baseline year for Japan's 2030 target



<CO_2 emissions after power distribution>



<CO_2 emissions before power distribution>

Sector	Target industries/ participating ind.	FY2020 emissions	Relative to FY2005	Relative to FY2013	Relative to previous FY (FY2019)
Industrial	31/31 industries	315.92 Mt-CO_2	-24.3%	-20.8%	-11.1%
Commercial	14/16 industries	15.03 Mt-CO_2	–*2	-35.1%	-3.9%
Transportation	12/12 industries	105.43 Mt-CO_2	-24.8%	-21.0%	-16.2%
Energy conversion*1	3/3 industries	360.71 Mt-CO_2	-13.5%	-32.8%	-5.2%

*1 Emissions before power distribution are provided for the energy conversion sector; and emissions after power distribution, for other sectors.
*2 Emissions in the commercial sector in fiscal 2005 are not provided due to the status of data collection.

Pillar 1: Emission reductions from domestic business operations
- Factor analysis of change in emissions: relative to FY2019 -

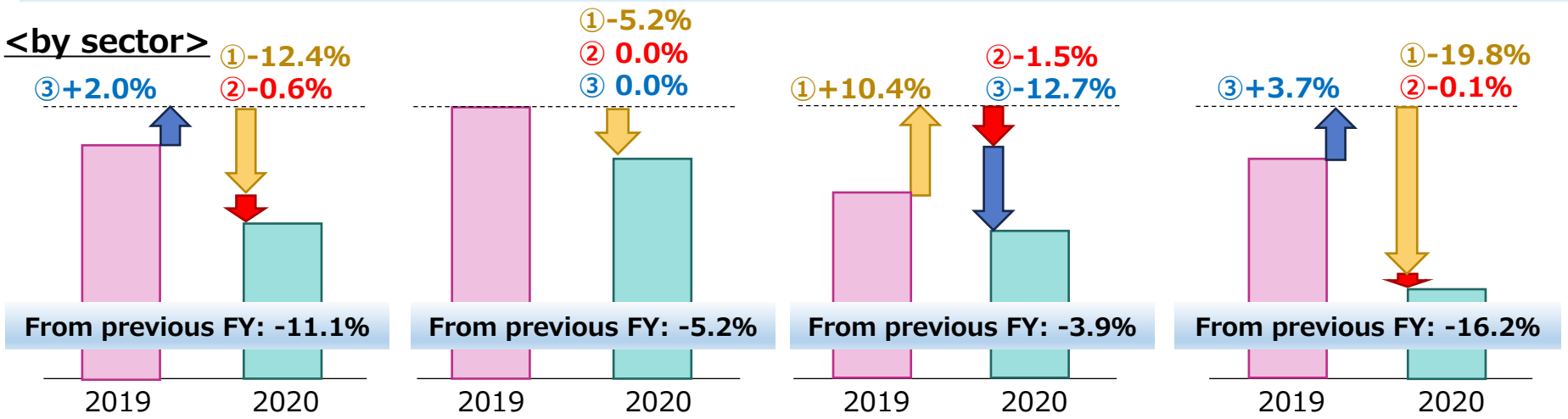
Breakdown of factors of change in CO_2 emissions

① **Change in economic activity**
Increase in the commercial sector, decrease in the industrial, energy conversion, and transportation sectors

② **Change in CO_2 emission factors (decarbonization of energy)**
Same level or decrease in all sectors

③ **Change in energy consumption per unit economic activity (energy saving efforts)**
Increase in the industrial and transportation sectors, decrease in the commercial sector

<by sector>



<Main factors>
①: Less production due to COVID-19
②: Fuel conversion, energy recovery
③: Aggravated emission intensities due to drastic drop in production

<Main factors>
①: Decreased energy demand due to COVID-19

<Main factors>
①: Increased telecommunication volumes with more time spent at home amid COVID-19
②: Enjoying the benefits of decarbonizing energy, as an energy-intensive sector
③: Improved efficiency of facilities, equipment and operations

<Main factors>
①: Limited human and material flow due to COVID-19
③: Small rate of decrease in fuel consumption compared to decrease in economic activity amid COVID-19

Status of deployment of renewable energy, energy recovery and utilization

- With a view to achieving CN, more industries are **deploying and developing renewable energy (solar power, hydropower, wind power, biomass and geothermal, etc.).**
- Seek CO_2 emission reductions by **recovering and utilizing waste heat and byproduct gases** generated during manufacturing or fuel use, thus reducing fuel consumption.

Deployment of renewable energy

Development and deployment of hydro, geothermal, solar, wind and biomass power generation (Electric Power Council for a Low Carbon Society)

Biomass power generation (Japan Paper Association, Japan Cement Association)

Use of hydropower generation at business establishment (Japan Aluminium Association)

Solar power generation (Liaison Group of Japanese Electrical and Electronics Industries for Global Warming, Japan Franchise Association, Japan Foreign Trade Council, Real Estate Companies Association of Japan)

PPA (Power Purchase Agreement)* (Japan Federation of Printing Industries, Japan Chain Stores Association)

Renewable power generation (Japan Chemical Industry Association, Japan Cement Association, Japan Auto Parts Industries Association, Federation of Pharmaceutical Manufacturers' Associations of Japan, Japan Society of Industrial Machinery Manufacturers, Brewers Association of Japan, Telecommunications Carriers Association, Telecom Services Association)

Energy recovery and utilization

Power generation using byproduct gases and waste heat recovered energy; steam use (Japan Iron and Steel Federation)

Use of waste as alternatives for heat (Japan Cement Association)

Waste heat power generation (Japan Cement Association, Japan Mining Industry Association, Japan Rubber Manufacturers Association, Flat Glass Manufacturers Association of Japan, Limestone Association of Japan)

Utilization of waste heat from boilers as a heat source for HVAC at plants (Japan Rubber Manufacturers Association, etc.)

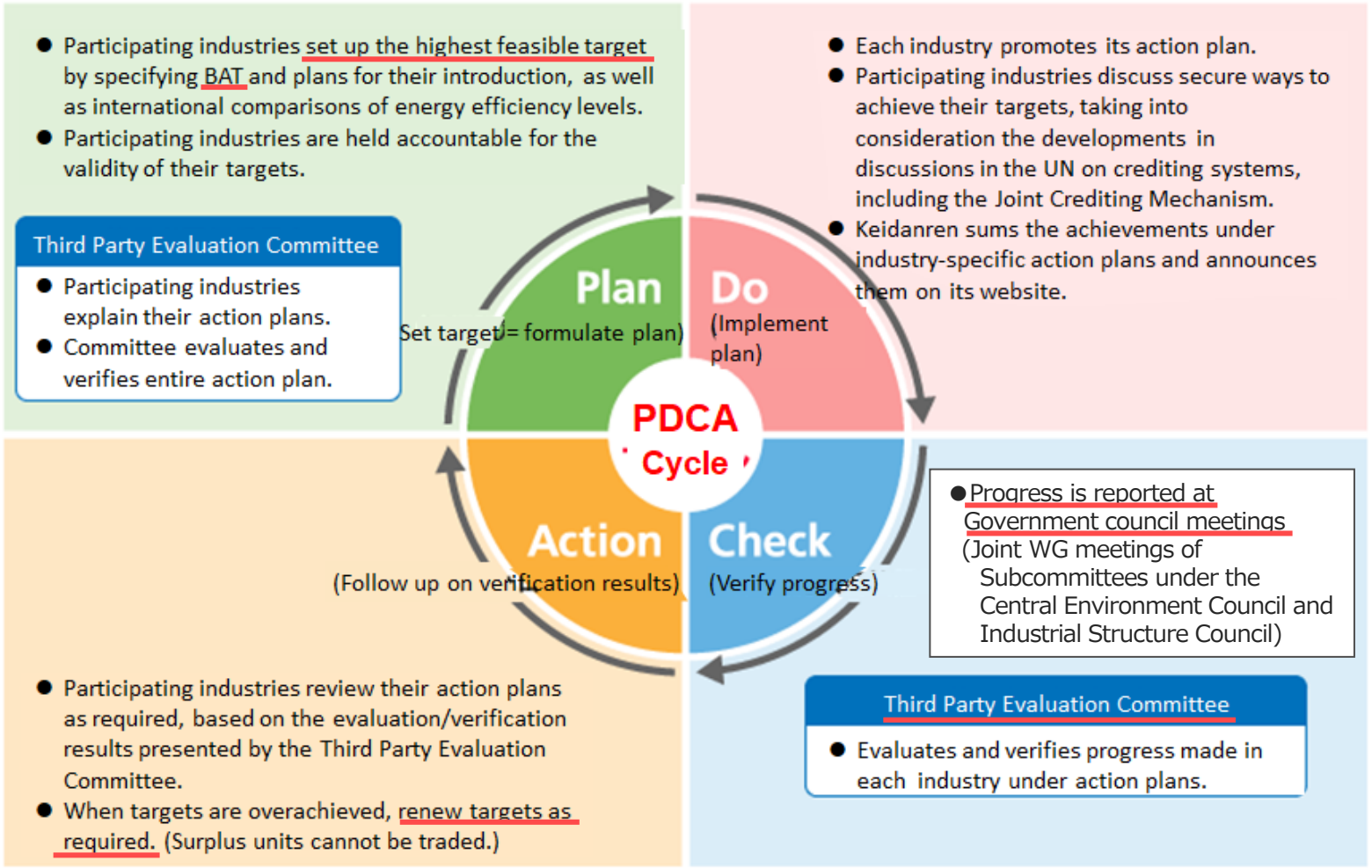
Utilization of waste heat from neighboring power plants (The Japan Gas Association)

Other waste heat recovery and use (Japan Chemical Industry Association, Japan Mining Industry Association, Japan Lime Association, Japan Aluminium Association, Japanese Electric Wire & Cable Makers' Association, Brewers Association of Japan, Petroleum Association of Japan)

* An agreement where solar power systems, etc. are installed on the rooftop of a business operator's building free of charge and the power generated is bought by consumers, such as the business operator.

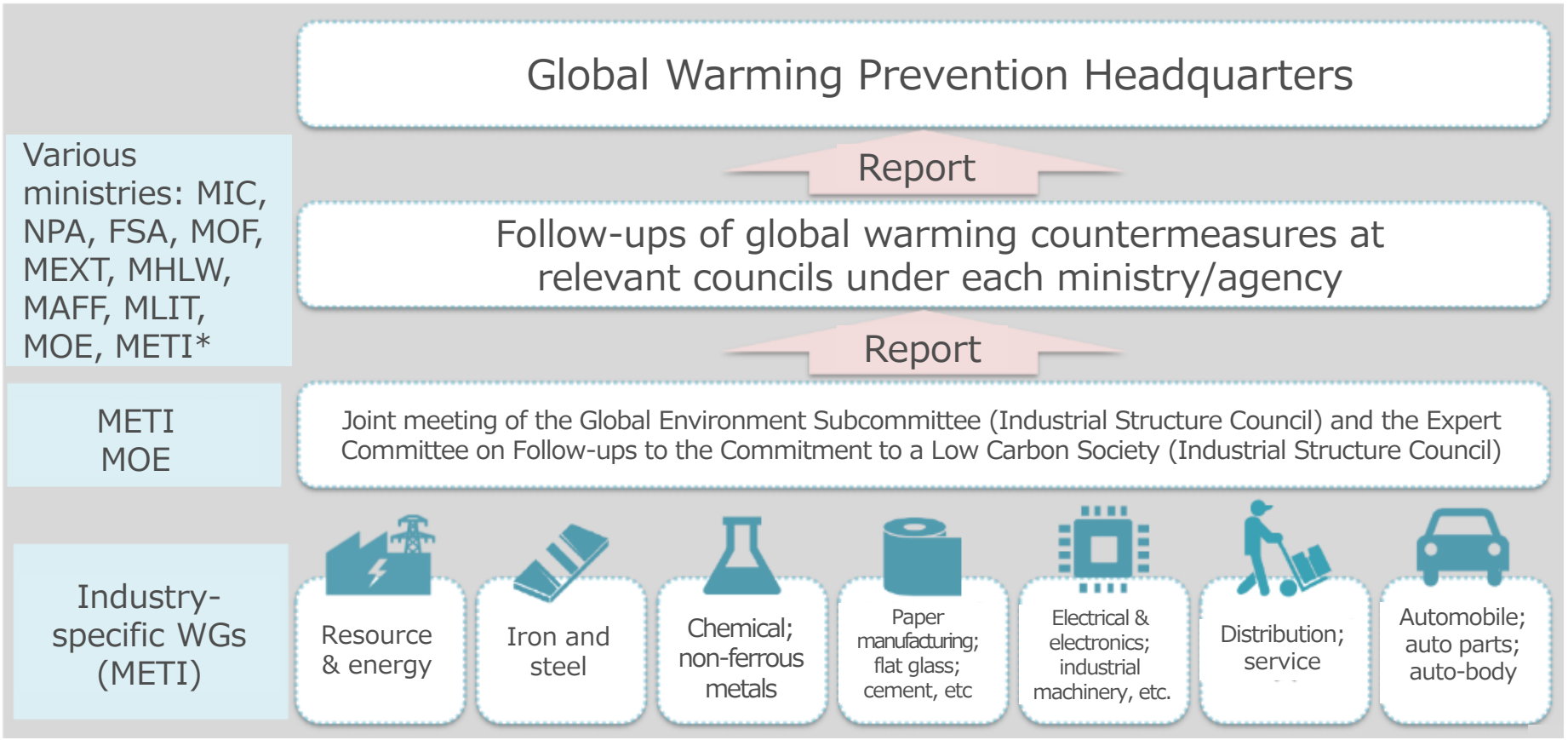
Evaluation and verification of the Keidanren CN Action Plan

- **Individual industries formulate targets** based on **the maximized deployment of BAT (best available technologies)** and prospects of economic activity.
- The progress made under the Action Plan is **checked by the Third Party Evaluation Committee and Government councils** and **target levels are continuously reviewed.**



Annual follow-ups by the Government

- Annual follow-ups are conducted for industries under the supervision of the Ministry of Economy, Trade, and Industry (METI) by 7 industry-specific WGs under Councils comprising expert committee members from universities and research institutions. Results are reported to a higher level, the joint meeting of METI and the Ministry of the Environment (MOE)'s councils.
- Government-wide annual follow-ups are conducted on global warming countermeasures, including the business community's Commitment to a Low Carbon Society, and results are compiled by the Global Warming Prevention Headquarters led by the Prime Minister.



Source: METI material

*MIC: Ministry of Internal Affairs and Communications; NPA: National Policy Agency; FSA: Financial Services Agency; MOF: Ministry of Finance; MEXT: Ministry of Education, Culture, Sports, Science and Technology; MLIT: Ministry of Land, Infrastructure, Transport and Tourism; MAFF: Ministry of Agriculture, Forestry and Fisheries; MHLW: Ministry of Health, Labour and Welfare of Japan; MOE: Ministry of the Environment

Positioning in Japan's Climate Change Countermeasures

■ Keidanren's proactive efforts have been positioned as **a pillar of Japan's climate change countermeasures**.

"Current policy regarding global warming prevention" (March 15, 2013; Global Warming Prevention Headquarters)

Regarding measures to be taken in each sector against carbon dioxide emissions, of energy origin, evaluations and verifications of voluntary approaches taken by business operators under the Commitment to a Low Carbon Society will be conducted along with institutional measures including the formulation, announcement and implementation of emissions control guidelines and various support measures.

Japan's NDC (interim target) (decision by the Global Warming Prevention Headquarters and registration with the U.N. on July 17, 2015; re-submission on March 30, 2020)

<Reduction target>

・Japan seeks to firmly achieve its target of reducing emissions by 26% relative to fiscal 2013 levels (-25.4% relative to fiscal 2005 levels) in fiscal 2030.

・The NDC reduction target will be revisited before the next deadline (every five years) under the Paris Agreement, in line with the revision of Japan's energy mix, by taking a bottom-up approach of building up GHG-related measures and aiming to set up a highly motivated figure that reflects further ambition reduction efforts.

(Explicitly refers to the Commitment to a Low Carbon Society as measures which form the basis for the bottom-up calculation of the GHG emission reduction target.)

"Plan for Global Warming Countermeasures" (Cabinet decision of Oct 22, 2021)

The business community, led by Keidanren, has engaged in emission reduction by formulating the Voluntary Action Plan and has achieved highly successful results. Given the steady GHG reductions achieved while maintaining economic efficiency in many industries under the Commitment to a Low Carbon Society, in order to secure emission reductions toward achieving the reduction target set up under this Plan, measures taken by the business community will continued to be centered upon voluntary approaches.