（Provisional Translation）

Plan for Global Warming Countermeasures

February 18, 2025

Cabinet Decision

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* For global warming countermeasures for which the year is generally stated in accordance with the Western calendar, the year is indicated as it is indicated in the Western calendar.

Introduction

The Plan for Global Warming Countermeasures (hereinafter referred to as the "Plan") is formulated in accordance with paragraph 1 of Article 8 of the Act on the Promotion of Global Warming Countermeasures (Act No. 117 of 1998) and the Action Policy on Global Warming Countermeasures Based on the Paris Agreement (as determined by the Global Warming Prevention Headquarters on December 22, 2015).

The issue of climate change is an urgent challenge that is unavoidable for each and every one of us and all living creatures on this planet. There has been a dramatic increase in global CO_2 emissions since the 20th Century, with the concentration of CO_2 in the atmosphere increasing every year. In line with this, global average temperatures have already risen 1.1°C compared to pre-industrial levels. 2024 was also the highest temperature year in history since observations began, with global average temperatures about 1.55°C above pre-industrial levels. While this is just a single year, it is the first calendar year to be above 1.5°C.[1] Across the world, including in Japan, extreme heat and weather-related disasters have already occurred frequently. In particular, the rise in Japan's annual average temperature is progressing faster than the global average. It has been pointed out that the number of days with maximum temperatures of 30°C or even 35°C or higher, and days with minimum temperatures of 25°C or higher have increased. In addition, the impacts of climate change are already being observed across various regions and fields, including more frequent occurrence of heavy, and short and intense rain, as well as adverse effects on crop growth and quality due to severe heat. Research has also advanced in the field of event attribution, which statistically analyzes the degree to which global warming has contributed to individual extreme weather events. Some studies have indicated that anthropogenic global warming has led to an increased frequency of heatwaves and greater precipitation associated with typhoons and other weather events. Furthermore, global warming has already had broad-ranging adverse impacts on nature and people, and the likelihood of unforeseeable and irreversible changes is expected to increase as the level of global warming rises. In response to this situation, younger generations, who will play a central role in society around 2050, have expressed a growing sense of anxiety about their own future and that of generations yet to be born, driven by concerns over the recent surge in extreme weather events. In addition, views have been expressed on the importance of human rights perspectives based on climate justice for particularly vulnerable people to the effects of climate change, across boundaries of region, gender, and generation.[2]

Since the entry into force of the Paris Agreement, countries around the world have ratcheted up their efforts toward decarbonization, with movements to improve economic growth and industrial competitiveness through decarbonization efforts rapidly strengthening. We have entered into an era where the competitiveness of companies and

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[1] World Meteorological Organization (https://wmo.int/media/news/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level)

[2] August 28, 2024. Hearing at the third joint meeting of the Subcommittee on Climate Change Countermeasures for Realizing Net Zero by 2050 (Global Environment Committee, Central Environment Council) and the Working Group on the Study of Medium to Long-Term Global Warming Countermeasures (Global Environment Subcommittee, Subcommittee on Innovation and the Environment, Industrial Structure Council)

nations is determined by the success of GX (Green Transformation). In Japan, too, the GX Implementation Council, which has been convened since July 2022, has advanced the discussions on GX to transform our fossil fuel-based industrial and societal structures that have existed since the Industrial Revolution into ones centered on clean energy. Aiming for the simultaneous achievement of energy security, economic growth, and decarbonization, the government established the Basic Policy for the Realization of GX (Cabinet decision on February 10, 2023; hereinafter referred to as the "GX Basic Policy"). To implement this policy, the government formulated the Act on Promotion of a Smooth Transition to a Decarbonized Growth-Oriented Economic Structure (Act No. 32 of 2023; hereinafter referred to as the "GX Promotion Act") and the Act for Partial Revision of the Electricity Business Act and Order Acts for Establishing Electricity Supply Systems for Realizing a Decarbonized Society (Act No. 44 of 2023). With the passing of the two acts, the government formulated its Strategy for Promoting the Transition to a Decarbonized Growth Economic Structure (Cabinet decision on July 28, 2023; hereinafter referred to as the "GX Promotion Strategy"), outlining a policy to advance thorough energy conservation and the shift to decarbonized power sources such as renewable energy and nuclear power (hereinafter simply referred to as "decarbonized power sources"). The government has also formed specific policies aimed at achieving GX, such as promoting GX investment in key areas through area-specific investment strategies, with a combination of upfront investment support through GX Economic Transition Bonds and incentive mechanisms for early GX investment through a pro-growth carbon pricing concept. In response to the increasing uncertainty regarding future outlooks, the government has presented the GX 2040 Vision (Cabinet decision on February 18, 2025), a revised version of the GX Promotion Strategy that comprehensively considers energy, GX industry location, GX industrial structure, and GX market creation from a longer-term perspective. Japan also set up the Asia Zero Emission Community (AZEC) in March 2023 in order to contribute to the realization of GX in Asia.

Companies and financial institutions have endorsed measures such as ESG investment and climate-related financial disclosures, following the Paris Agreement and Japan's declaration of achieving carbon neutrality by 2050 in October 2020. There is a growing awareness that addressing environmental issues, including climate change, is a challenge for corporate management, and that we have entered into an era in which how companies address these challenges will influence their international competitiveness. In Japan, the GX League—a framework in which a group of companies with ambitious emissions reduction targets make investments to reduce emissions while engaging in voluntary emissions trading to achieve their goals—has been in trial operation since fiscal year (FY) 2023. From FY 2024, over 700 participants, covering more than 50% of greenhouse gas (GHG) emissions in Japan, are taking part in this initiative and pursuing the realization of GX. Moves to carefully select business partners across supply chains globally with the aim of decarbonization have also accelerated. In Japan as well, the percentage of small and medium-sized enterprises (SMEs) that have been asked by their business partners to measure emissions or cooperate in achieving carbon neutrality doubled in 2022 compared to 2020[3]. As a result, decarbonized management is advancing

[3] The proportion of SMEs and small-scale operators requested by business partners to measure their greenhouse gas emissions and to cooperate toward carbon neutrality has doubled from 7.7% in 2020 to 15.4% in 2022. (Small and Medium Enterprise Agency, "2023 White Paper on Small and Medium Enterprises in Japan")

across entire supply chains, not only among large corporations but also including mid-level enterprises and SMEs.

Given these circumstances, it is important to transition away from conventional ways of thinking, transform the industrial structure and social economy, through promotion of GX, and advance measures to combat global warming, aiming to simultaneously achieve both emission reductions and economic growth. Furthermore, as a nation, it is necessary to set ambitious targets along with clear pathways toward their realization, thereby ensuring predictability, supporting private-sector commitments and changes in public lifestyles, and creating an enabling environment to put these efforts on track.

As set forth in Article 1 of the Act on the Promotion of Global Warming Countermeasures, the prevention of global warming by way of stabilizing the concentration of GHGs in the atmosphere at a level that will not cause dangerous anthropogenic interference with the climate system is a challenge common to all humanity. With mitigation and adaptation constituting twin prongs of climate change countermeasures, the government will steadily promote climate change countermeasures with a view to achieving net zero[4] by 2050 based on the Act on the Promotion of Global Warming Countermeasures, the Plan, the Climate Change Adaptation Act (Act No. 50 of 2018), and the Climate Change Adaptation Plan (Cabinet decision on October 22, 2021, partially amended May 30, 2023) as formulated based on the same statute, in coordination with GX policies that aim for the simultaneous achievement of energy security, economic growth, and decarbonization.

(Findings of IPCC report)

When discussing the issue of climate change, it is essential to organize the latest scientific findings. In this connection, the Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in order to evaluate scientific, technological, and socioeconomic information related to climate change and enable the obtained knowledge and findings to be widely available to policymakers and the general public. In March 2023, the IPCC announced its Synthesis Report for the Sixth Assessment Report (hereinafter referred to as the "AR6") summarizing the latest scientific insights into climate change.

The AR6 Synthesis Report indicated the following:[5]

- Human activities, principally through GHG emissions, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020.
- Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred. Human-caused climate change is already affecting many weather and climate extremes in every region across the globe.

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[4] Since Japan's declaration of carbon neutrality in October 2020, the terms 'carbon neutral' and 'decarbonization' have been used. However, as stated in the G7 Hiroshima Summit statement, in the international context, in light of the fact that the term 'net zero' is more commonly used in international contexts, the Plan will, in principle, use "net zero," except in proper nouns. The fundamental meaning is understood to be the same in either case.

[5] IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 1-34, doi: 10.59327/IPCC/AR6-9789291691647.00

- Global GHG emissions in 2030 implied by nationally determined contributions (NDCs) announced by October 2021 make it likely that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C.
- Continued GHG emissions will lead to further global warming, with the best estimate of reaching 1.5°C by 2040 in the considered scenarios and modeled pathways.[6]
- Every increment of global warming will intensify multiple and concurrent hazards.
- Limiting human-caused global warming requires net zero CO_2 emissions. Cumulative carbon emissions until the time of reaching net zero CO_2 emissions and the level of GHG emission reductions this decade largely determine whether warming can be limited to 1.5°C or 2°C.
- All global modeled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot,[7] and those that limit warming to 2°C (>67%), involve rapid and deep and, in most cases, immediate GHG emissions reductions in all sectors this decade. Global net zero CO_2 emissions are reached for these pathway categories in the early 2050s and around the early 2070s, respectively.
- Climate change is a threat to human well-being and planetary health. There is a rapidly closing window of opportunity to secure a livable and sustainable future for all. Climate resilient development integrates adaptation and mitigation to advance sustainable development for all, and is enabled by increased international cooperation, including improved access to adequate financial resources, particularly for vulnerable regions, sectors, and groups, and inclusive governance and coordinated policies. The choices and actions implemented in this decade will have impacts now and for thousands of years.

The IPCC continues to accumulate [advance] scientific knowledge to improve our understanding of global warming and the accuracy of Global Climate projections, [understanding and projecting global warming], and it launched its seventh assessment cycle in 2023.

(International movements and Japan's efforts with respect to targets and countermeasures by 2020)

In order to deal with climate change, the United Nations Framework Convention on Climate Change (hereinafter referred to as "UNFCCC") was adopted in May 1992 and entered into force in March 1994. Japan became a signatory to the convention at the United Nations Conference on Environment and Development in June 1992 and

[6] Pathways: The temporal evolution of natural and/or human systems towards a future state. Pathway concepts range from sets of quantitative and qualitative scenarios or narratives of potential futures to solution-oriented decision-making processes to achieve desirable societal goals. Pathway approaches typically focus on biophysical, techno-economic and/or socio-behavioral trajectories and involve various dynamics, goals and actors across different scales. Taken from the IPCC AR6 WG1 Report Glossary.

[7] Temperature overshoot: Exceedance of a specified global warming level, followed by a decline to or below that level during a specified period of time (e.g., before 2100). Sometimes the magnitude and likelihood of the overshoot is also characterized. The overshoot duration can vary from one pathway to the next but in most overshoot pathways in the literature and referred to as overshoot pathways in the AR6, the overshoot occurs over a period of at least one and up to several decades. Taken from a the IPCC AR6 WG1 Report Glossary.

concluded the convention in May 1993. The Kyoto Protocol, which committed advanced countries to legally binding reductions in GHG emissions, was adopted at COP3, which was held in Kyoto in December 1997 as the first step in achieving long-term, continuous reductions in emissions in order to achieve the ultimate goal as provided for in the UNFCCC. Japan concluded the Kyoto Protocol in 2002. In order to comply with the commitment to reduce GHG emissions in the first commitment period (FY 2008 to FY 2012) by 6% compared to the base year (in principle, 1990), Japan formulated the Kyoto Protocol Target Achievement Plan (Cabinet decision on March 28, 2008) based on the Act on Promotion of Global Warming Countermeasures and took comprehensive and systematic global warming countermeasures accordingly. Consequently, the five-year average of total emissions during the first commitment period was 1,278 million t-CO_2 (carbon dioxide (CO_2) equivalent,[8] likewise below) (1.4% increase compared to the base year),[9] an 8.7% decrease compared to the base year when forest and other carbon sinks and Kyoto Mechanism credits are taken into account, meaning Japan achieved the Kyoto Protocol target of 6% reduction compared to the base year.

GHG emission reduction targets for after the first commitment period under the Kyoto Protocol (which began in 2013) up to 2020 were continuously discussed at COP15, which was held in Copenhagen, Denmark, in December 2009, and at COP16, which was held in Cancun, Mexico, between November and December 2010. At COP16, the Cancun Agreement was adopted, recognizing the need to significantly reduce GHG emissions in order to keep the global average temperature increase to less than 2°C from the pre-industrial level, and setting out, among other things, the reduction targets for Annex I countries (developed countries) and the reduction actions by non-Annex I countries (developing countries). The reduction targets and actions of both developed and developing countries came to be positioned within the same framework, and it brought us closer to a fair and effective framework that Japan aspired to have. However, challenges remained as this framework was not legally binding, and there were clear differences in the responses by developed and developing countries.

At COP17, which was held in Durban, South Africa, between November and December 2011, it was determined that a legal framework applicable to all parties beginning in 2020 would be adopted by 2015. The establishment of the Kyoto Protocol's second commitment period was also decided, whilst noting that Japan would not participate in it after 2013.

While Japan's reduction target for FY 2020 had been set to a decrease of 25% compared to FY 1990, it was reviewed in response to changes in the situation Japan has faced, such as the Great East Japan Earthquake in March 2011. In light of the fact that our energy policy and energy mix, including how nuclear power should be utilized, were still under consideration, the target at this moment, which does not include the reduction effect of GHG emissions from nuclear power, was set to a decrease of 3.8% compared to FY 2005 and was registered to the UNFCCC Secretariat in November 2013.

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[8] CO_2 equivalent: The volume of emissions for each greenhouse gas is multiplied by the global warming potential for that gas; the sum thereof is the CO_2 equivalent.

[9] Based on FY2012 greenhouse gas emissions (final figure) (released on April 15, 2014). However, as the five-year total for forest removal exceeded the upper limit set for Japan (238.3 million t-CO_2 over five years), the annual average of the upper limit was included.

(Actions based on the establishment of a post-2020 international framework and the submission of the Intended Nationally Determined Contribution)

Based on the decision at COP17, negotiations have been underway on a new post-2020 legal framework applicable to all parties, with the aim of adopting it at COP21 in 2015. At COP19, which was held in Warsaw, Poland, in November 2013, all parties were invited to present the Intended Nationally Determined Contribution (hereinafter referred to as "INDC", which would become a Nationally Determined Contribution (hereinafter referred to as "NDC") unless the given party decides otherwise) for 2020 and beyond, well in advance of COP21 (by the first quarter of 2015 for parties capable of preparing such proposals).

For Japan's INDC, a draft commitment to set our reduction target for FY 2030 to a decrease of 26.0% compared to FY 2013 (a decrease of 25.4% compared to FY 2005) was determined at a meeting of the Global Warming Prevention Headquarters on July 17, 2015, and was submitted to the UNFCCC Secretariat on the same day.

At COP21, which was held in Paris, France, from November to December 2015, negotiations aimed at adopting a fair and effective post-2020 legal framework in which all countries would participate resulted in the adoption of the Paris Agreement.

The Paris Agreement includes the following points:

- Holding the increase in the global average temperature to well below 2°C above pre-industrial levels as a common global long-term goal, and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- All parties, including major emitting countries, shall submit and update their NDCs every five years toward a global response to climate change.
- Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of NDCs.
- Each party's successive NDC will represent a progression beyond the Party's current NDC.
- Each party shall provide information and undergo review of its implementation in a common and flexible manner.
- The importance of utilizing market mechanisms, including the Joint Crediting Mechanism ("JCM"), the conservation and enhancement, as appropriate, of removals and reservoirs of GHGs, including forests
- Implementation and support for the framework to reduce emissions due to deforestation and forest degradation in developing countries
- Establishing long-term global goals for adaptation and engaging each party's adaptation planning processes and implementation of actions
- Developed country parties shall provide financial resources to assist developing country parties. Other parties are encouraged to provide or continue to provide such support voluntarily.
- The importance of innovation is recognized
- A framework is established for taking stock of the implementation every five years

(Entry into force of the Paris Agreement and negotiations on the implementation guidance, etc.)

The Paris Agreement entered into force on 4 November, the year after its adoption in October 2016, and Japan concluded the Paris Agreement on 8 November of the same year.

At COP24, which was held in Katowice, Poland, in December 2018, an implementation guidance commonly applicable to all parties was adopted, without the bifurcation that might have seen a difference in initiatives to be implemented between developed and developing countries in line with the spirit of the Paris Agreement. This implementation guidance includes, among other matters, mitigation (information on post-2020 reduction targets and calculation method for assessing the achievement of targets), a transparency framework (for reporting of GHG emissions by each party and the progress and the achievement of reduction targets, etc.), and the reporting method of the outlook for and results of financial support.

At COP26, which was held in Glasgow, UK, from October to November 2021, a decision was adopted covering matters that had been ongoing issues since COP24, such as Article 6 of the Paris Agreement (market mechanisms), and completing the implementation guidance for the Paris Agreement. Under the Paris Agreement, 2020 was an important year in that NDCs, for which 2030 is the target year, were required to be communicated or updated. Japan submitted its NDC in March 2020, stating, among other things, that it would pursue further efforts to reduce GHG emissions on a medium and long-term basis rather than to keep its reduction to the level set forth in its INDC.

In October 2020, Japan declared that it would aim to achieve net zero greenhouse gas emission by 2050. In April 2021, Japan declared that it aims to reduce its GHG emissions by 46% in FY 2030 from its FY 2013 levels, setting an ambitious target which is aligned with the long-term goal of net zero by 2050, and that Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50%. Based on these targets, Japan submitted its NDC stating the new FY 2030 reduction targets in October 2021.

(Implementation and negotiations of the Paris Agreement aimed at achieving the 1.5°C goal)

As negotiations over the implementation guidance for the Paris Agreement were concluded and implementation of the Paris Agreement ramped up, raising ambitions to achieve a 1.5°C goal and executing on those became major debate points in climate change negotiations. While progress is being made on some climate change mitigation measures, based on the AR6 Synthesis Report, to limit global warming to 1.5°C with no or limited overshoot (>50%), it would be necessary to reduce global GHG emissions by approximately 43% (34-60%) compared to 2019 by 2030 and by approximately 60% (49-77%) by 2035.[10] Efforts toward achieving the 1.5°C goal are significantly insufficient, and it is necessary to have substantial, rapid, and immediate emission reductions across all sectors worldwide within this decade, and to have global emissions to be peaked out by 2025.

The Leaders' Communiqué of the G7 Hiroshima Summit, held in Hiroshima, Japan, in May 2023, included commitments to holistically addressing energy security, the

[10] All values are median values, with the spread representing the 5th to 95th percentiles.

climate crisis and geopolitical risks to pursue G7 countries' common goal of net zero based on various pathways according to each country's circumstances; prioritizing concrete and timely steps towards the goal of accelerating the phase-out of domestic unabated coal power generation; working towards ending the construction of new unabated coal fired power generation.

COP28, held in Dubai, United Arab Emirates (UAE) from November to December 2023, saw the conclusion of the first global stocktake (GST) evaluating the progress of global climate change actions under the Paris Agreement. In addition to highlighting the need for urgent action to achieve the 1.5°C goal, the need for global emissions to peak out by 2025 was recognized. Specific actions aimed at achieving this were also decided, including formulating emission reduction targets covering all GHGs, sectors and categories, tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030, accelerating efforts towards the phase-down of unabated coal power, transitioning away from fossil fuels in energy systems, accelerating zero- and low emission technologies, and transitioning to sustainable lifestyles and sustainable patterns of consumption and production.

(Trends surrounding Japanese climate change countermeasures and energy policies)

In just over three years since the Plan for Global Warming Countermeasures (the Previous Plan) and the Sixth Strategic Energy Plan were approved by the Cabinet in October 2021, the circumstances facing Japan as relates to energy have changed dramatically.

In addition to heightened demands to ensure energy security in response to Russia's invasion of Ukraine and rising tension in the Middle East, Japan also finds itself facing increased energy demands from the development of DX (digital transformation) and GX domestically.

With regard to decarbonization, while many countries, particularly in Europe and North America, maintain ambitious targets for achieving net zero by 2050, in response to increasing instability in the quantity and price of energy, we have seen a trend towards the adoption of diverse and practical measures. In particular, major countries are increasingly integrating climate change measures with industrial policy, and particularly prominent trends can be observed that of promoting structural changes of energy system as part of climate action in close alignment with industrial policies, with strengthening efforts to enhance domestic industrial competitiveness.

Under such conditions of high uncertainty, we must pursue all possible options, based on a policy of utilizing all available technologies.

It is thus essential to seek decoupling excessive dependence on fossil fuel energy by both making progress on thorough energy conservation and fuel conversion in the manufacturing sector on the demand side, and, on the supply side, making maximum use of power sources that contribute to energy security and have a high decarbonization effect, such as renewable energy and nuclear power.

In particular, Japan finds itself in a situation in which, as demand for energy is expected to rise due to the advance of DX and GX, whether it can secure sufficient decarbonized power sources to keep up will influence Japan's economic growth and industrial competitiveness. Without expanding its decarbonized power sources and thus realizing economic growth and strengthened industrial competitiveness, it will be

difficult to sustain employment levels and achieve wage increases. For this reason, it is highly important for Japan to maximize the use of both renewable energy and nuclear energy, rather than pose a dichotomy between the two.
Additionally, toward 2040, Japan will need to make progress on decarbonization even in hard-to-abate sectors, such as those where electrification is difficult. This means that Japan will need to advance measures to make use of hydrogen and its derivatives (hydrogen, ammonia, e-fuels and e-methane) as well as CCUS [11] among other technologies, on top of the fuel switch to natural gas and other fuels.

An important perspective to keep in mind in executing such measures aimed at decarbonization in energy policy is to minimize the overall social costs associated with decarbonization. In particular, as emission reductions progress, it will become necessary to take measures with relatively high costs for abating GHGs. This makes it essential to prioritize the introduction of economically rational measures. From such reasoning, based on the principle of S + 3E (safety, energy security, economic efficiency, and environment), Japan will seek to suppress the cost increases associated with decarbonization to the greatest extent possible.

[11] Abbreviation for Carbon dioxide Capture, Utilization, and Storage. A technology for separating and capturing carbon dioxide from exhaust gases emitted by thermal power plants, factories etc., and in the atmosphere, and either effectively utilizing it as a resource in the manufacture of minerals, chemicals, and fuels, or storing it in stable underground formations.

Chapter 1: Basic direction of the promotion of global warming countermeasures

Section 1: The direction Japan seeks to take in implementing its global warming countermeasures

Japan will take the initiative in implementing global warming countermeasures under arrangements of international collaboration based on scientific knowledge, while seeking to simultaneously realize both emission reductions and economic growth.

1. Strategic efforts for achieving net zero by 2050

The Paris Agreement aims to reach global peaking of GHG emission as soon as possible and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century in order to achieve the goal to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C.

As indicated in the *1.5°C Special Report*,[12] we must recognize that there are meaningful differences in the impact that might occur between a 1.5°C increase and a 2°C increase in temperature and we must take urgent action to achieve our goals of limiting the increases in the global average temperature to the level of 1.5°C above the pre-industrial levels, based on the AR6 Synthesis Report and the decision related to the global stocktake (GST Decision (Decision1/CMA5)) at COP28 (CMA5).

Japan aims to reduce overall GHG emissions to zero by 2050, in other words, to realize net zero by 2050 in accordance with the notion that industrial structures and economic society can be transformed by proactively implementing global warming countermeasures that no longer act as a constraint on economic growth and that can instead lead to significant growth. This target is established as a basic principle in Article 2, paragraph 2 of the Act on Promotion of Global Warming Countermeasures.

In addition, Japan aims to reduce its GHG emissions by 46 percent in FY 2030 from its FY 2013 levels, setting an ambitious target which is aligned with the long-term goal of achieving net zero by 2050. Furthermore, Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emissions by 50 percent.

In order to grow strongly towards the achievement of our ambitious targets, Japan will promote as many actions as possible in all areas, such as the introduction and utilization of thorough energy conservation and decarbonized power sources, and decarbonization of the public sector and regions, and demand-side measures such as transitioning towards decarbonized lifestyles. Japan will also advance the transition to a circular economy[13] and a nature positive economy in line with the transition to a

[12] The official title is "Global warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty."

[13] The transition to a circular economy contributes not only to address the social issues of climate change, biodiversity loss and environmental pollution, but also to achieve improvements to industrial

decarbonized society as a national strategy, creating new industries and sources of employment, based on the Fifth Fundamental Plan for Establishing a Sound Material-Cycle Society (Cabinet decision on August 2, 2024; hereinafter referred to as the "Fifth Fundamental Circular Economy Plan"), the National Biodiversity Strategy and Action Plan of Japan 2023-2030 (Cabinet decision on March 31, 2023) and the Transition Strategies toward Nature Positive Economy (formulated by the Ministry of the Environment, Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy, Trade and Industry and Ministry of Land, Infrastructure, Transport and Tourism in March 2024). In the food, agriculture, forestry, and fisheries sectors, Japan will further aim to achieve both increased productivity and sustainability through innovations in accordance with the MIDORI Strategy for Sustainable Food Systems (as determined by the Ministry of Agriculture, Forestry and Fisheries on May 12, 2021). Moreover, Japan will steadily implement cross-sectoral decarbonization and other such actions on national land and in our urban and regional spaces in accordance with the Ministry of Land, Infrastructure and Transport Environmental Action Plan (as determined by the Ministry of Land, Infrastructure, Transport and Tourism on December 27, 2021).

Japan will be making steady and unflaggingly pursuing the path towards net zero by 2050. Accordingly, Japan enhances the continuity and predictability of its policies, accelerate actions, investments, and innovations toward decarbonization, and advance global warming countermeasures that contribute to simultaneously realizing both emission reductions and economic growth.

As ambitious targets aligned with the global 1.5°C goal and on a straight pathway towards the achievement of net zero by 2050, Japan aims to reduce its GHG emissions by 60 percent in FY 2035 and by 73 percent in FY 2040, respectively, from its FY 2013 levels.[14] While accelerating the introduction and expansion of already available technologies and facilities to achieve these targets, Japan recognizes the significant uncertainties involved, for example, the technological innovation needed to achieve net zero by 2050, its social implementation, and the supply and prices of necessary resources to achieve that. Taking "backcasting" into account, Japan will not only continue and strengthen the countermeasures to achieve the above-mentioned FY 2030 targets but will also creatively consider, introduce, and implement them without being constrained by the current system or technologies. By performing highly effective review process for countermeasures, the government will seek to both continuously advance their materialization and to flexibly revise them based on factors such as their feasibility and cost-effectiveness.

At present, while net GHG emissions in Japan are on a steady downward trend towards the achievement of net zero by 2050, the factors include not only the reduction of energy consumption and decarbonization of electricity, but also the reduction of production volume in the industry sector. Steadily and unflaggingly pursuing the path towards net zero by 2050 while realizing emission reduction and economic growth

competitiveness, economic security, regional revitalization, and greater well-being for people, by minimizing resource consumption and limiting waste generation. With respect to climate change in particular, it is estimated that approximately 36% of Japan's GHG emissions are emissions from sectors where resource circulation has the potential to contribute to emission reductions.

[14] This is in line with the pathway that keeps warming to 1.5°C (>50%) with limited or no overshoot, as indicated in the AR6 Synthesis Report.

simultaneously is not an easy task, and it is essential to position net zero as one of the main issues in all socioeconomic activities and to promote the transition to a sustainable and resilient socioeconomic system. In order to achieve this goal, Japan will promote policies that contribute to growth with net zero as the axis, in collaboration with the GX policy, which aims to simultaneously achieve stable energy supplies, economic growth, and decarbonization.

2. Contributions to reducing global GHG emissions

Achieving the 1.5°C goal requires not only efforts by individual countries but also collective action on a global scale. Based on this recognition, Japan will demonstrate international leadership in driving global decarbonization, while proactively promoting actions that will lead to emission reductions worldwide, in order to achieve progress with respect to international global warming countermeasures.

During the first global stocktake (GST), evaluating the overall progress made towards achieving the Paris Agreement goals, performed at COP28, which was held from November to December 2023, the importance of strengthening countermeasures was emphasized as it became clear that, even combining all the reduction targets currently put forward by parties, the 1.5°C goal could not be achieved. Although the United States announced its withdrawal from the Paris Agreement in January 2025, Japan will not only steadily advance measures aimed at achieving net zero by 2050, but also continue to actively contribute to the discussions in favor of raising ambitions in global climate change countermeasure aimed at achieving the 1.5°C goal through the implementation of the Paris Agreement, while demonstrating to the world Japan's achievements in GHG emissions and removals, which are steadily trending down on the path to achieving net zero by 2050.

Japan will continue to expand cooperation based on ties of collaboration with partner countries involved in Joint Crediting Mechanism (JCM) and City-to-City Collaboration on the basis of relationships of trust that have been built up to date and platforms such as the Asia Zero Emission Community (AZEC), and promote the business-led international development of technologies and products that offer high levels of environmental performance by leveraging our technological strengths and making further improvements to the environment, such as by promoting the creation of decarbonization markets, developing human resources, and building systems in order to make the greatest possible contribution to emission reductions and removal, particularly in the Asia region and globally.

Section 2: Basic approach to global warming countermeasures

1. Improving the environment, the economy, and society on an integrated basis

The Sixth Basic Environmental Plan (Cabinet decision on May 21, 2024) puts forward the realization of "improvements to the quality of life, level of happiness, well-being and economic welfare of individual citizens now and in the future" through "prevention of hindrances to environmental conservation" and the "creation of a good environment" as the principle aims of environmental policy. The plan put forward a vision of a sustainable society as one where we should aim precisely for the sort of "circulation and

symbiosis based society" where economic society can grow and develop by protecting the environment's carrying capacity and improving the quality of the environment, through the implementation of "Circular and Ecological Economy." The plan thus seeks to enhance integrated improvements to the environment, the economy, and society, with the environment serving as the central foundation.

On this basis, in promoting global warming countermeasures, we will seek to promote countermeasures that will help improve the environment, the economy, and society on an integrated basis by harnessing local resources, technological innovations, and ingenuity and driving DX by utilizing AI, IoT, digital twins and other digital technologies in order to stimulate the Japanese economy, create jobs, solve issues plaguing local communities, and enable the achievement of SDGs.

Specifically, in order to promote GHG emission reductions while achieving economic development, high quality of living for citizens, the revitalization of communities, disaster risk reduction while living in harmony with nature, we will boldly implement the thorough promotion of energy conservation, the introduction and utilization of decarbonized power sources, the further acceleration of technological development and its diffusion in society, a transition to decarbonized lifestyles ("*Decokatsu*" (a national campaign for a new, enriched decarbonized way of lifestyles)[15] and the promotion of environmental education), transition to a nature-positive economy including integrated approaches such as the use of "nature-based solutions" ("NbS[16]") through leveraging the functions of natural ecosystems to absorb and sequester carbon and to a circular economy through 3R ("Reduce" generation of waste and other materials, "Reuse" and "Recycle" of recyclable resources) + "Renewable" (use of biomass and recycled materials, etc.), as well as aggressive business transformation towards decarbonization and support for labor mobility without associated unemployment, including through personnel development measures.

The preamble to the Paris Agreement states that a just transition of the workforce and the creation of decent work and quality jobs are imperatives. For Japan to advance global warming countermeasures, it is important from the perspective of a just transition that we address the new supply and demand of labor created in the transition of industrial structure associated with promoting GX, which must be hand-in-hand with achieving decent work and improving labor productivity. Specifically, relevant agencies and ministries need to work together to make use of measures such as supporting the facilitation of labor mobility, supporting job changes and re-skilling and supporting the acquisition of new skills, among others, while understanding the various issues that may arise during this process, and carefully addressing those issues, including through the use of measures related to the social safety net, to spur a just transition. Furthermore, given the large number of locally rooted enterprises in Japan, and the fact that the impacts of climate change can vary depending on region, industry, and generation, it is essential to consider not only the workforce but also the just transitions of local economies and local companies in an integrated manner.

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[15] The informal name of a national campaign announced in October 2022 to strongly promote changes in public and consumer behavior and transitions in lifestyles aimed at realizing net zero by 2050. The word is a neologism combining the "DE" from "decarbonization," meaning to reduce carbon dioxide (CO_2) and "Eco," meaning environmentally friendly, with "KATASU", meaning activity or daily life.

[16] Nature-based solutions: Initiatives undertaken in an effort to resolve societal challenges by harnessing the functions of healthy natural ecosystems.

It is extremely important that the direction of integrated environmental, economic, and social improvement is shared by all actors, including citizens, the national government, local governments, and businesses, and that climate change measures are implemented together with various other policies and create synergy.

2. Implementation of creative countermeasures

In implementing global warming countermeasures, Japan has steadily achieved tangible results by placing its focus on precisely accumulating outcomes from individual countermeasures and systematically advancing measures. Going forward, in addition to countermeasures that can be realized in the present moment, it will be necessary to consider the introduction of necessary additional measures by backcasting from a straight pathway towards the achievement of net zero by 2050.

To achieve the SDGs, it is important to think in terms of "backcasting," a method in which one reflects on a vision for the society one aspires to and thinks about what should be done now to achieve that, rather than simply accumulating feasible countermeasures based on the current situation.[17]

Thus, in order to make steady and unflaggingly pursuing the path towards net zero by 2050, it is necessary to review and strengthen existing measures flexibly through review processes. At the same time, it is also important to creatively consider, introduce, and implement measures that are not bound by current systems or technologies, including fundamental enhancements and the adoption of future technologies that are currently difficult to materialize.

3. Transforming the awareness of all actors, changing their behaviors, and strengthening their coordination

Climate change issue, which is often referred to as a "climate crisis" that threatens the very foundation of survival for humanity and all living things, is deeply connected to socio-economic activities, regional society, and the lives of citizens in general. As this will also have major impacts on future generations, it is essential for all actors, including citizens (including civil society and regional communities), government (including national government and local governments), and markets (including businesses), to participate and cooperate, taking into account considerations for future generations and ensuring intergenerational equity. These actors need to work together through mutual interaction toward the realization of a sustainable society, in a process referred to as co-evolution.

To this end, knowledge of climate change, which is becoming increasingly serious, information about initiatives being carried out by all actors, the state of the progress with respect to the implementation of global warming countermeasures, and the economic and temporal advantages and the necessary citizen burden from carrying out countermeasures should be proactively provided and shared as visibly as possible, through the promotion of *"Decokatsu"* and environmental education. We will train human resources and develop activities to communicate these ideas and put them into

[17] UN Sustainable Development Solutions Network (SDSN), "Getting Started with the SDGs," December 2015

action so as to induce changes in awareness and behavior across all sectors and levels of the nation.

4. Contributing to the global GHG reductions by strengthening research and development and diffusing leading decarbonization technologies

In order to tackle the global challenge of climate change and realize a decarbonized society, it is necessary to massively transform the systems of the economic society. In some cases, this will be accompanied by disruptive innovation that does not follow the conventional pathway. The realization of a decarbonized society requires that we correct the singular understanding that "innovation means technology innovation only," and promote "innovation for practical applications and diffusion" with a view to promoting the social dissemination of technologies that will lead to reduce, absorb or store GHG emissions in practice, including by way of spreading existing superior technologies along with innovation entailing the creation of cutting-edge technologies. From this perspective, it is necessary to promote innovations that meet the essential needs of people now and in the future, based on the future we should have and want to have. This includes identifying and advancing the development, demonstration, and deployment of technologies necessary for realizing a decarbonized society, determining what technological gaps remain, and accelerating the social implementation of both new and existing technologies.

We will strengthen research and development of innovative technologies in promising fields, while gaining the participation of diverse actors including startups, based on the Basic Plan for Science, Technology, and Innovation (Cabinet decision on March 26, 2021), the "Integrated Innovation Strategy 2024" (Cabinet decision on June 4, 2024), the GX Promotion Strategy, Environment Innovation Strategy (decision made by the Integrated Innovation Strategy Promotion Council on January 21, 2020), the Green Growth Strategy through Achieving Carbon Neutrality in 2050 (formulated jointly by relevant agencies and ministries[18] on June 18, 2021; hereinafter referred to as the "Green Growth Strategy") and area-specific investment strategies.

Japan will also promote the implementation of innovative technologies as part of the process of transforming Japan's economy and society, from both the supply side and the demand side, to a decarbonized model through GX, to improve the industrial competitiveness of the country, and will promote the diffusion of leading decarbonization technologies and the implementation of mitigation activities overseas through international platforms, such as the Asia Zero Emission Community (AZEC) , and the JCM, thus achieving both decarbonization and growth through creating and expanding decarbonization markets domestically and internationally.

[18] "Relevant ministries and agencies" refer to the Cabinet Secretariat; the Ministry of Economy, Trade and Industry; the Cabinet Office; the Financial Services Agency; the Ministry of Internal Affairs and Communications; the Ministry of Foreign Affairs; the Ministry of Education, Culture, Sports, Science and Technology; the Ministry of Agriculture, Forestry and Fisheries; the Ministry of Land, Infrastructure, Transport and Tourism; and the Ministry of the Environment. As part of this strategy, the ministries and agencies listed above specify each part they are charged with. While the Cabinet Office is in charge of a wide range of parts, the Economic and Social Research Institute and the Science and Technology Innovation Promotion Secretariat are in charge of statistics, indicators, and environment innovation strategy-related areas.

5. Implementation of the Paris Agreement

In order to achieve the goals of the Paris Agreement, Japan will steadily implement the five-year cycle of the submission and updating of NDCs under the Paris Agreement, as well as the two-year cycle of reporting and reviewing aimed at improving transparency in the tracking of progress made in implementing and achieving targets. Furthermore, Japan will also continue to actively contribute to discussions at Conferences of the Parties with the aim of carrying out the Paris Agreement. Japan will also steadily respond to reports and reviews with respect to the state of actions taken by each party under the Paris Agreement.

6. Flexible revision and improvement of countermeasures based on review processes

Given the significant uncertainty surrounding future electricity demand and the development and implementation of decarbonization technologies, it is essential to seek to flexibly revise and improve its countermeasures through review processes, and to creatively implement global warming countermeasures in order to make steady and unflaggingly pursuing the path towards net zero by 2050 under the Plan.

Thus, the progress of the measures taken by the government for each of the countermeasures and of the materialization of countermeasures to be put in place going forward will be strictly reviewed every year after the Plan is formulated by assessing the amount of emissions reductions and removes for each GHG and other pertinent categories, measure evaluation indicators, and other relevant indicators (hereinafter referred to as “measure evaluation indicators”). The government will then seek to flexibly revise and improve measures based on feasibility and cost-effectiveness. The government will also refer to analyses of the factors behind increases or decreases in GHG emissions in performing these reviews.

Chapter 2: GHG emission reductions and removals targets

Section 1: GHG emission reduction targets in Japan

Japan aims to reduce its GHG emissions by 46% in FY 2030, from its FY 2013 levels. Furthermore, Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emissions by 50%.

Japan also aims to reduce its GHG emissions by 60% in FY 2035 and by 73% in FY 2040, respectively, from its FY 2013 levels.

The targets for FY 2035 and FY 2040 chart a clear and straight pathway for Japan towards achieving net zero by 2050, through both forecasting from the base year of FY 2013 and backcasting from the long-term goal of net zero by 2050. While meeting these targets will not be easy amidst the various major global uncertainties, for example, the technological transformation required to achieve net zero by 2050, its social implementation, and the supply and prices of necessary resources to achieve that, they have been set as ambitious targets to drive efforts to simultaneously achieve both emission reductions and economic growth. At the same time, the targets will also be used as an axis for measuring overall progress towards achieving net zero by 2050.

Under the Paris Agreement, each country is required to submit its NDC that it intends to achieve. Japan submits these targets to the United Nations as its NDC under the Paris Agreement.[19] Based on the Paris Agreement, Japan must faithfully put in place countermeasures aimed at achieving these targets, and thus, by extension, net zero by 2050, while securing the participation and cooperation of all actors, including government, local governments, companies, and each citizen.

Section 2: State of GHG emissions in Japan

As shown in Figure 1, Japan's GHG emissions[20] have gone down continuously every year since FY 2014. Total GHG emissions in FY 2022[21] were approximately 1.135 billion t-CO_2, while GHG emissions and removals were approximately 1.085 billion t-CO_2. The figures represent decreases of 19.3% and 22.9% respectively, compared to FY 2013 emissions (approximately 1.407 billion t-CO_2).

Factors contributing to the decrease in emissions compared to FY 2013 include a decrease in energy consumption (e.g., progress in energy conservation) and a decrease in electricity-derived CO_2 emissions due to the low-carbonization of electricity (e.g., increased introduction of renewable energy and restart of nuclear power plants).[22]

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[19] Japan will organize the targets associated with greenhouse gas emission reductions and removals as positioned in this chapter, then submit those to the UN as its NDCs under the Paris Agreement separately.

[20] In this Plan, actual figures for GHG emissions are the FY 2022 GHG emissions and removals (published by the Ministry of Environment on April 12, 2024) unless otherwise stated (https://www.env.go.jp/earth/ondanka/ghg-mrv/emissions/).

[21] Figures of HFCs, PFCs, SF_6, and NF_3 are calendar year values.

[22] A decline in production volumes in the industrial sector has been suggested as one cause beyond the progress of energy conservation for the decline in energy consumption. See the following related documents for more information.

Trends of CO_2 emissions by sector (after allocation of power and heat) in Japan are shown in Figure 2, while the breakdown by sector for FY 2022 is shown in Figure 3. In examining the data by sector, emissions from the industry sector, transport sector, commercial and other sectors (including commerce, service, office, etc.), and residential sector are all on a downward trend (24.0% decrease compared to FY 2013 in FY 2022 (industry sector), 14.5% decrease (transport sector), 23.6% decrease (commercial and other sectors), 24.5% decrease (residential sector)).

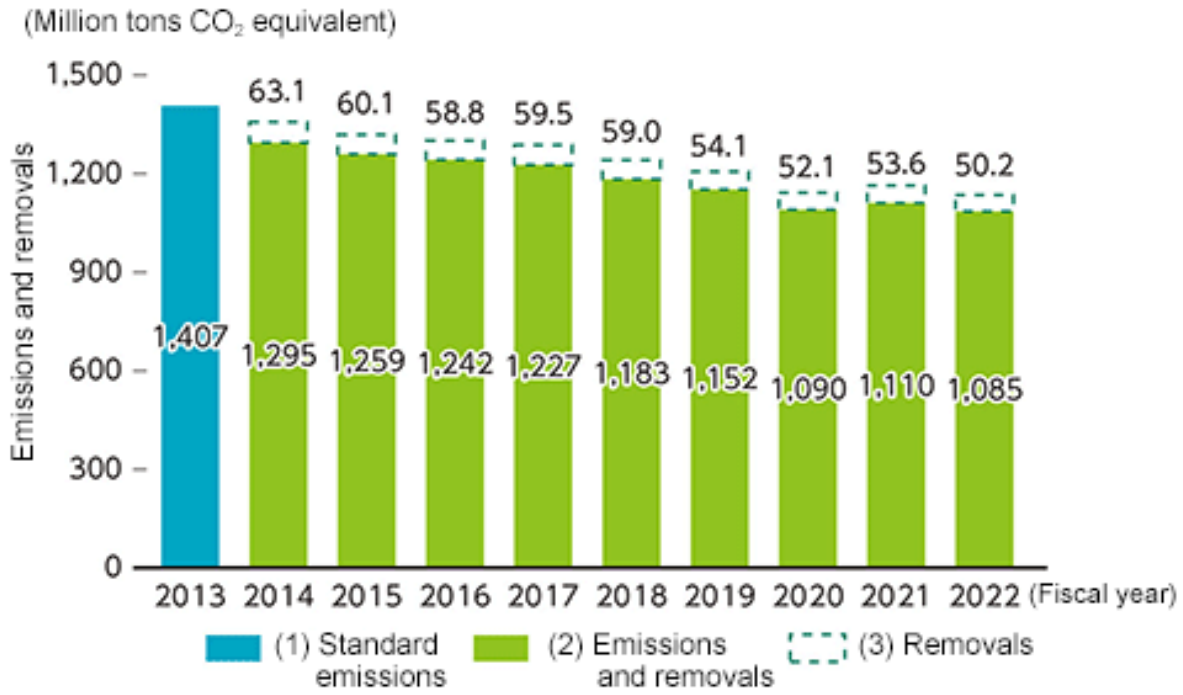

Figure 1: Trends of GHG emissions in Japan

Reference: Based on GHG inventories

- Progress of the Plan for Global Warming Countermeasures in FY2022 (June 20, 2024, Global Warming Prevention Headquarters) (https://www.kantei.go.jp/jp/singi/ondanka/2022/2022_sinchoku.pdf)
- "FY2022 Energy Supply and Demand Report (Final Report)" (published April 2024 by the General Affairs and Strategic Planning Section of the Agency for Natural Resources and Energy) (https://www.enecho.meti.go.jp/statistics/total_energy/pdf/honbun2022fykaku.pdf)

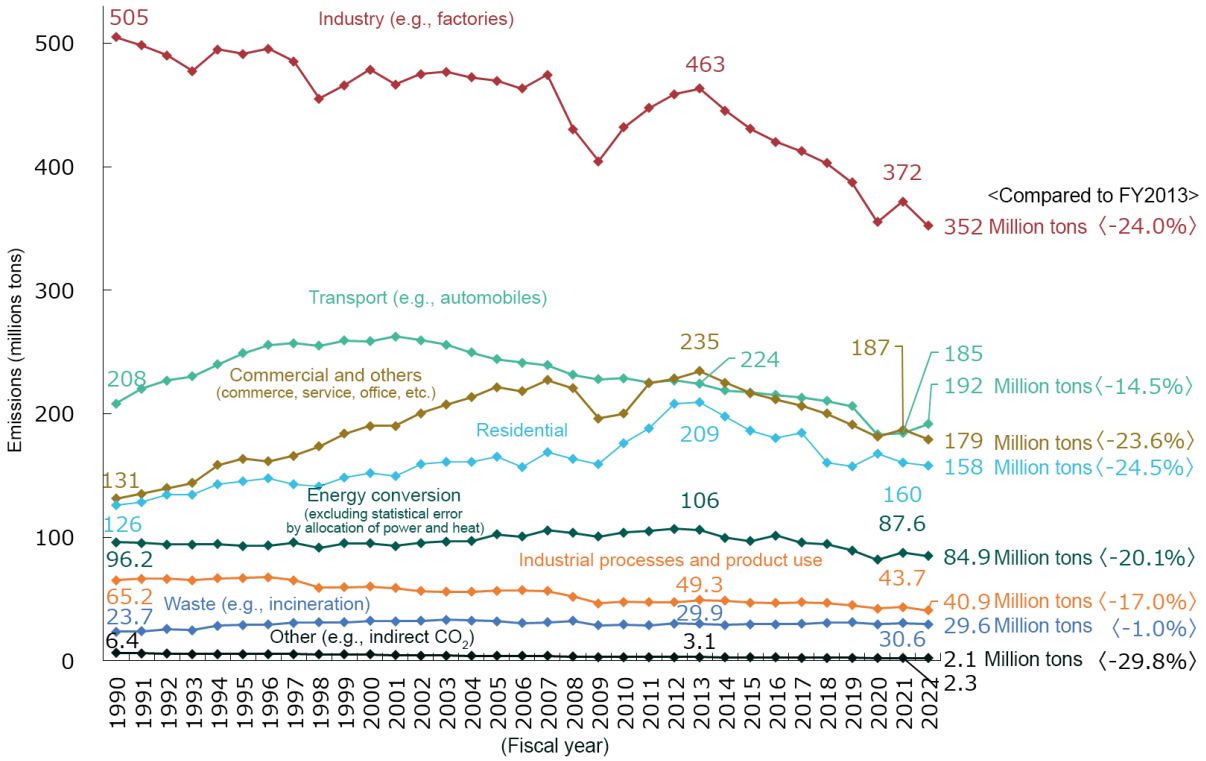

Figure 2: Trends of CO_2 emissions by sector (after allocation of power and heat) in Japan
(Figures in brackets are percentage changes in FY 2022 emissions from FY 2013 emissions for each sector.)

Reference: Based on GHG inventories

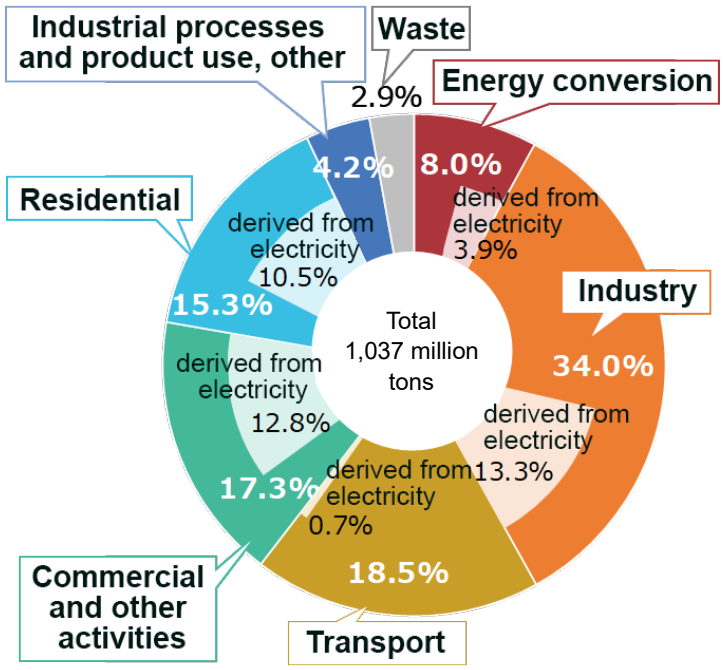

Figure 3: CO_2 emissions by sector in Japan (FY 2022)

Reference: Based on GHG inventories

Section 3: Targets for each GHG and other category

1. Greenhouse gases

Japan hereby targets carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) for reduction and sets emission reduction targets for FY 2030 and FY 2040 by GHG as follows.

(1) Energy-related CO_2

For energy-related CO_2, a decrease of 45% compared to FY 2013 is set as the target for FY 2030 (approximately 677 million t-CO_2), and a decrease of 70-71% compared to FY 2013 is set as the target for FY 2040 (approximately 360-370 million t-CO_2).

(2) Non-energy-related CO_2

For non-energy-related CO_2, a decrease of 15% compared to FY 2013 is set as the target for FY 2030 (approximately 70 million t-CO_2), and a decrease of 29% compared to FY 2013 is set as the target for FY 2040 (approximately 59 million t-CO_2).

(3) Methane

For methane, a decrease of 11% compared to FY 2013 is set as the target for FY 2030 (approximately 29.1 million t-CO_2), and a decrease of 25% compared to FY 2013 is set as the target for FY 2040 (approximately 25 million t-CO_2).

(4) Nitrous oxide

For nitrous oxide, a decrease of 17% compared to FY 2013 is set as the target for FY 2030 (approximately 16.5 million t-CO_2), and a decrease of 31% compared to FY 2013 is set as the target for FY 2040 (approximately 14 million t-CO_2).

(5) Fluorinated gases

For four fluorinated gases, including HFCs, PFCs, SF_6, and NF_3, a decrease of 44% compared to FY 2013 is set as the target for FY 2030 (approximately 20.9 million t-CO_2), and a decrease of 72% compared to FY 2013 is set as the target for FY 2040 (approximately 11 million t-CO_2).

2. GHG removals

For GHG removals, removal of approximately 47.7 million t-CO_2 is set as the target for FY 2030, and removal of approximately 84 million t-CO_2[23] is set as the target for FY 2040.

[23] Removals in FY 2040 are figures expected in the event that the new removals by forest carbon sinks calculation method is applied as stated in Chapter 3, Section 2, 3.(1).

3. Joint Crediting Mechanism (JCM)

Japan establishes and implements the Joint Crediting Mechanism (JCM) in order to quantitatively evaluate Japanese contributions to GHG emission reductions and removals which are achieved through the diffusion of decarbonizing technologies, products, systems, services, and infrastructures as well as through the implementation of measures in global south countries and others; and to use such contributions to achieve Japan's NDC. Through such efforts, Japan aims to secure accumulated international emission reductions and removals through public-private collaborations at the level of approximately 100 million t-CO_2 by FY 2030 and approximately 200 million t-CO_2 by FY 2040.

Section 4: Targets for individual countermeasures

Amidst significant uncertainty over the level of future energy demand and the development and implementation of decarbonized technologies, it is essential for Japan to seek to flexibly revise its countermeasures and to creatively implement global warming countermeasures in order to make steady and unflaggingly pursuing the path towards net zero by 2050 under the Plan.

For this reason, through the review process held yearly by the Global Warming Prevention Headquarters, the government seeks to systematically organize, materialize, and flexibly revise the separately set targets for each GHG and other categories, the estimates for energy-related CO_2 emissions by sector, and the targets related to the implementation of measures necessary for achieving those targets.

Section 5: The period of the Plan

The period of the Plan is from the date of the Cabinet decision on the Plan to the end of FY 2040.

Chapter 3: Policies and measures to achieve targets

Section 1: Basic roles of the national government, local governments, businesses, and citizens

In the promotion of global warming countermeasures, the national government plays the following basic roles, while local governments, businesses, and citizens are asked to play their respective basic roles as described below.

By promoting countermeasures in close cooperation with each other based on an awareness of this division of roles, it is expected that synergistic effects beyond the effects of each actor's effort alone will be achieved.

1. Basic roles of the national government

(1) Comprehensive promotion of global warming countermeasures through the mobilization of various policy instruments

The national government is responsible for forming an overall framework of Japan's global warming countermeasures and comprehensively implementing these global warming countermeasures through the promotion of the Plan. To this end, the government takes into account the following facts: that it is essential to transform society as a whole, from reviewing urban structures and socioeconomic activities to individual lifestyles, in order to reduce the GHG emissions and maintain and intensify the absorption of GHGs (hereinafter referred to as "reducing GHG emissions"); that global warming countermeasures have become an even more pressing challenge than before due to the increase in frequency and intensity of natural disasters and due to deepening energy and food challenges; and that recent changes in public lifestyle and awareness have been triggered by the Great East Japan Earthquake, the nuclear power plant accident, and the spread of COVID-19. In addition, various governmental organizations will also promote countermeasures by working to collaborate fully with one another in line with this overall framework by mobilizing a variety of policy approaches, including voluntary, regulatory, economic, and information-based approaches and environmental impact assessments.

It is important for the government to position decarbonization as one of its key challenges when it formulates and implements policies and projects to ensure that its policies as a whole are consistent with the realization of decarbonization.

Moreover, governmental organizations, even when implementing measures and formulating plans for which the addressing of global warming is not the primary objective, endeavor to contribute to efforts to reduce GHG emissions in line with the basic concept of the Plan.

(2) Taking the lead in implementing actions

The national government takes the lead in implementing advanced measures for reducing GHG emissions in its own affairs and operations, while also focusing on

promoting the dissemination of measures throughout society, even as many local public entities and private sector actors are actively carrying out their own measures.

(3) Encouraging actions to prevent global warming among all sections of the citizens

The national government provides knowledge concerning the issue of climate change to citizens, communicates information to citizens on the opportunities for growth that climate change presents, its impact on the economy, including costs, and specific actions to solve this issue, and promotes changes in awareness and behavior among all sectors of the citizenry.

In order to encourage all sectors of the public to voluntarily engage in global warming countermeasures, the national government conducts awareness-raising projects and the provision of information to all sectors of the citizenry in accordance with the Plan, proactively and efficiently. Targets are set for each awareness-raising project to develop more effective activities for the prevention of global warming through the implementation of the PDCA (plan-do-check-act) cycle. For this purpose, the relevant ministries and agencies will work in concert with one another to promote more effective awareness raising to the citizens in collaboration and co-operation with industry, labor, the education sector, the finance sector, local governments, climate change officers, the Japan Center for Climate Change Actions, private-sector organizations, and other diverse actors engaged in activities to prevent global warming. The national government will also endeavor to accumulate and share scientific knowledge on the issue of climate change in order to contribute to these actions to a greater extent.

In addition, the national government will set appropriate indicators and targets regarding the level of awareness and actions to prevent global warming and implement the PDCA cycle for more effective awareness raising.

(4) Promotion of international cooperation on global warming countermeasures

To achieve the 1.5°C goal, it is exceptionally important that action be pursued by the world as a whole rather than by individual countries. With this in mind, Japan will demonstrate international leadership in driving global decarbonization, while proactively promoting actions that will lead to emission reductions worldwide, in order to achieve progress with respect to international global warming countermeasures.

(5) Observation and monitoring of the state of changes in the concentration of GHGs in the atmosphere

With respect to observation and monitoring of climate change, Japan will strengthen our comprehensive observation and monitoring system for understanding GHGs, climate change, and their impact in accordance with the “GEO Strategic Plan 2016-2025: Implementing GEOSS”, approved at the Ministerial Summit of the Intergovernmental Group on Earth Observations (GEO) (Mexico City, November 2015), the GEO Post-2025 Strategy, adopted by the GEO Plenary (Cape Town, November 2023), Implementation Policy of Earth Observation for 10 years (as formulated by the Earth Observation Promotion Subcommittee, Research Planning and Evaluation

Subcommittee, Council for Science and Technology on January 24, 2025), and the "WMO Global Greenhouse Gas Watch", endorsed its concept at the Nineteenth World Meteorological Congress (Geneva, May-June 2023), which is the highest decision-making body of the World Meteorological Organization (WMO).

2. Basic roles of local governments

(1) Promotion of countermeasures in accordance with natural and social conditions in the local community

Local governments, alone or in partnership with one another, promote comprehensive and systematic policies for reducing GHG emissions in accordance with the natural and social conditions of their respective regions. The aim, for example, is to promote the use of renewable energy as well as thorough energy conservation, accelerate the development of decarbonized cities and regions, establish a circular society, and provide information besides encouraging efforts of business sectors and residents.

Prefectures, designated cities, core cities, and special ordinance cities, in accordance with this Plan, formulate and conduct an action plan (hereinafter referred to as "the local government's action plan for entire municipal jurisdictions") which implements targets and countermeasures for reducing GHG emissions in accordance with the region's natural and social conditions. Other local governments are also encouraged to formulate and conduct their own local government's action plan for the entire municipal jurisdiction. It is recommended that, in the case of small municipalities in particular, the relevant prefecture formulate and conduct in accordance with the local government's action plan for entire municipal jurisdictions, or formulate and conduct the plan in collaboration, partnering with prefectures and central cities: taking into account the shortage of human resources and skilled professionals, as well as the need for efficient adoption and utilization of renewable energy.

Moreover, in order to facilitate renewable energy projects that coexist with regions, takes proper environmental consideration, seeking smooth consensus formation (hereinafter referred to as "regional decarbonization promotion project"), prefectures, where necessary, are to set forth standards for environmental consideration pertaining to the setting of zones for regional decarbonization promotion projects (hereinafter referred to as "promotion areas") under the local government's action plan (hereinafter referred to as "prefectural standards") for entire municipal jurisdictions, while municipalities strive to set forth and implement matters related to regional decarbonization promotion projects.

(2) Measures concerning local governments' own operations

Local governments aim to serve as role models for regional businesses and residents through their own actions. To this end, prefectures and municipalities (including some administrative associations) formulate and implement plans related to measures for reducing GHG emissions (hereinafter referred to as "local government's action plan for operations") in connection with their own operations (all administrative operations established by the Local Autonomy Act (Act No. 67 of 1947) including waste disposal and waste water and sewage operations) in accordance with the Plan.

On the assumption that all local governments bear a responsibility to execute such plans, it is recommended that small municipalities, taking into account the limitations in terms of human resources and skilled professionals as well as adoption and utilization of renewable energy, to formulate and conduct the plan in collaboration, partnering with prefectures and central cities, for example, through cross-regional energy companies or joint procurements.

(3) Matters that are especially expected for governments of prefectures

In promoting the introduction and use of renewable and other energy sources, it is important to build a stable and efficient supply and demand system. Prefectures are thus expected to proactively lead regional decarbonization as cross-regional local governments.

Prefectures endeavor to gather information on good practices, beginning with decarbonization leading areas, and share information with municipalities. They will also endeavor to proactively implement measures to provide technical advice and support for human resource development to municipalities that are experiencing difficulties in formulating and revising action plans of local governments and taking measures based on these plans. Prefectures endeavor to execute such measures by proactively working with and partner with small municipalities in particular: considering the shortage of human resources and skilled professionals, as well as the need for efficient adoption and utilization of renewable energy.

Given that prefectures take the lead industrial policy administration in regional areas, prefectures will also endeavor to proactively implement measures to provide technical advice and support for human resource development to small and medium-sized enterprises (SMEs), which play a leading role in regional economies, and which struggle with decarbonization.

Prefectures will also establish prefectural standards as needed for the establishment of promotion areas in order for municipalities to facilitate regional decarbonization projects, based on ensuring appropriate environmental protection given local environmental and social conditions, on alignment with the targets set in the local government's action plan by the relevant prefecture, and on the local potential for renewable energy. Moreover, according to the Act to Partially Amend the Act on the Promotion of Global Warming Countermeasures (Act No. 56 of 2024; hereinafter referred to as "the Amended Act on the Promotion of Global Warming Countermeasures"), promotion areas, which previously could only be set by municipalities, can now be set jointly by prefectures and municipalities. The act also states that, in such circumstances, the prefecture approves a cross-regional decarbonization enterprise promotion plan covering multiple municipalities; thus, prefectures stimulate the establishment of promotion areas jointly with municipalities and endeavor to provide necessary assistance.

Additionally, prefectures drive the stable supply of decarbonized power sources by operating hydro-electric power plants as local public enterprises to local businesses, residents and local government facilities.

Prefectures endeavor to work broadly with actors such as municipalities, local businesses and civil organizations to drive decarbonization policies for the region as a whole and strive to build a framework that promotes the development of concrete actions.

3. Basic roles of businesses

(1) Implementation of appropriate, effective, and efficient countermeasures in light of business activities

Businesses voluntarily and proactively carry out global warming countermeasures that are appropriate, effective, and efficient in light of their business activities across a wide range of fields while they comply with laws and regulations and exercise their own creativity and ingenuity. They set medium to long-term reduction targets and, to achieve them, not only thoroughly promote energy conservation but also proactively introduce and utilize decarbonized power sources in accordance with RE100[24] and increasing global demand for decarbonized energy. Additionally, they systematically reduce emissions in their own operations and across their entire supply chains. They also promote measures that contribute to reducing GHG emissions by other actors, including the development of CO_2-saving products, the transition to the circular economy through measures such as 3R + Renewable, the transition to decarbonized-management and nature-positive management,[25] the development of products and services with fewer GHG emissions over their entire life-cycles (carbon footprint), the proactive procurement of GX products and services, and waste reduction. It is also important for businesses to pay due heed to a just transition, while seeking dialogue with workers and local communities affected by the carrying out of such measures.

(2) Actions based on being a social presence

Businesses as members of society voluntarily formulate plans and inspect the status of their implementation on their own or in concert with others. In addition, they provide environmental education to their employees; work to reduce GHG emissions in collaboration with labor unions, consumer organizations, and community groups; and implement sink measures to remove GHG emissions through the greening of their premises. Furthermore, they cooperate with national and local governments to implement their policies.

(3) Reduction of environmental impact of providing products and services throughout their lifecycles

Businesses endeavor to identify GHG emissions (carbon footprint) and reductions (reduced emissions of product, avoided emissions of product) throughout the entire value chains and lifecycles of their products and services, and provide information

[24] An international initiative that aims to have 100% of the electricity used by each company supplied by renewable energy sources.

[25] Management that positions the concept of nature conservation as a materiality (key challenge) in each firm's value-creation process, in order to contribute to a nature-positive economy that aims to stop and reverse biodiversity loss to set nature on the path to recovery.

related to GHG reductions through their products and services. They also seek to provide products and services that contribute to reducing these environmental impacts, including through carbon offsets.

4. Basic roles of citizens

(1) The proactive reduction of GHG emissions by citizens themselves

Recognizing that the present state of global warming and GHG emissions is largely determined by the state of societal systems and lifestyles and the behavior of individual citizens, citizens strive to proactively work on their own to change their current behavioral patterns and change how we act. To this end, it is important that each of us work to transform our lifestyles into those that are more comfortable, convenient, and sustainable.

Specifically, in addition to understand their own energy consumption and GHG emissions, as part of "*Decokatsu*," which aims to achieve abundant lifestyles that contribute to decarbonization across all of daily life, including food, clothing, shelter, work, travel and shopping, citizens seek to shift to decarbonized lifestyles by promoting actions such as: energy conservation in housing such as insulation renovation; installing renewable energy such as solar power for own consumption; using decarbonized products and services including LED lighting, energy-efficient appliances, efficient hot water systems, water-saving devices and HEMS (Home Energy Management System); practicing sustainable fashion such as Cool Biz and Warm Biz; consuming local food; fighting food loss and waste by finishing meals; promoting the resource cycle by reducing and separating waste; introducing telework; adopting means of transportation that have reduced environmental impact such as next-generation vehicles, public transport and cycling; and receiving effective information about carbon footprints or nudges that contribute to behavioral change.

(2) Participating in global warming prevention activities

Citizens further deepen their understanding of the issue of climate change and proactively participate and express their opinions in discussions on global warming countermeasures, as well as engage in action for global warming countermeasures in collaboration with various actors, such as by shifting to decarbonized lifestyles (promoting "*Decokatsu*" or environmental education), promoting the transition to the circular economy through measures such as 3R + Renewable and greening campaigns such as forestation and urban greening.

Section 2: Global warming policies and measures

1. Policies and measures related to the reduction and removal of GHG emissions

(1) Policies and measures for reducing GHG emissions

(i) Energy-related CO_2

Countermeasures by Sector (industry, commercial and residential, transport, etc.)

A. Industry sector (e.g., manufacturing)

CO_2 emissions in the industry sector in FY 2022 were 352 million t-CO_2, a decrease of 24.0% compared to FY 2013. Measures such as the promotion of energy efficiency and the industry's voluntary GHG emission reduction plan (hereinafter referred to as "Voluntary Action Plans"[26] for these individual industry plans) have been successful so far, but as this sector accounts for about 30% of Japan's GHG emissions, measures in this sector will continue to be important going forward. For this reason, measures including the Voluntary Action Plans will be steadily implemented, while contributing to the fight against global warming through cooperation among actors, including consumers and customers, promotion of international contributions, and development of innovative technologies.

Heading towards 2040, it will be necessary to promote thorough energy conservation through measures such as upgrading to cutting-edge facilities at factories, expanding systems for supporting energy conservation among regional small and medium-sized enterprises (SMEs), and promoting the use of digital technology, even more so in light of advances in DX and AI. It will also be important, primarily for the manufacturing sector, to boldly advance fuel conversion, electrification and a shift away from fossil fuels combined with supply-side measures such as using decarbonized energy sources and decarbonized energy, including hydrogen and its derivatives, as a transition of heat demand and manufacturing processes themselves will be required. Measures will be materialized and revised at the appropriate point in time in light of future development, verification and implementation of decarbonization technologies.

(a) Promotion of voluntary effort by industry

○ Steady implementation, evaluation, and verification of Voluntary Action Plans

Keidanren and industries have formulated Voluntary Action Plans and have achieved good results so far by advancing the four pillars of <1> Emission reductions from domestic business operations, <2> Strengthening cooperation with other interested groups, <3> Promoting contribution at the international level, and <4> Development of

[26] Keidanren (Japan Business Federation) has taken the lead and been proactive in advancing measures in the economic sphere aimed at reducing greenhouse gases, formulating the "Keidanren Voluntary Action Plan on the Environment" in 1997, which it subsequently revised as the "Keidanren's Commitment to a Low Carbon Society" in 2013 and as the "Keidanren Carbon Neutrality Action Plan" in 2021. These initiatives are collectively referred to as "Voluntary Action Plans."

innovative technologies. Such a voluntary approach has the advantage, in terms of improving transparency, credibility, and likelihood of achieving targets, of allowing each actor to proactively select more appropriate measures based on their originality and ingenuity and of providing incentives to work toward higher targets.

Based on the successes thus far of the Voluntary Action Plans across many industries in steadily reducing GHG emissions while maintaining economic efficiency, the industry will continue to promote voluntary initiatives by businesses, based on points <1> through <7> below as a platform for measures in the industry sector.

The government will evaluate and verify Voluntary Action Plans and initiatives based thereon as appropriate, taking into account the characteristics of each industry, with a view to improving their transparency, credibility, and the likelihood of their targets being met.

<1> Efforts will be continued to increase the coverage within industry, including small and medium businesses, across sectors.

<2> While respecting the voluntary targets, studies will be continued on the consistency with the Japan's FY 2030 targets, the setting of FY 2030 targets with an eye to the ideal state in 2050, and the unified presentation of the CO_2 emission reduction rate compared to FY 2013 as a common indicator. When new Best Available Technologies (hereinafter referred to as "BATs") become available for wide use due to the advancement of technology etc., the numerical targets will be flexibly raised and constantly reviewed.

<3> Under the Voluntary Action Plans, PDCA cycles will continue to be promoted to ensure effectiveness, transparency, and reliability. Changes in the structure of society and industry and progress in technological innovation will be considered while clarifying the preconditions and ensuring transparency so that the 2030 target can be easily compared among industries.

<4> In addition to the emission reduction targets (commitments) set out in <2>, the reduction of CO_2 emissions will be promoted throughout the value chain by supplying decarbonized products and services in cooperation with related industries. Efforts will also be made to raise public awareness and improve the knowledge of global warming prevention.

<5> From the perspective of contributing to global warming countermeasures on a global scale, each industry will actively work on reducing emissions globally through overseas deployment of decarbonized products and services etc., transferring technology and know-how based on international rules to developing countries that are willing to implement measures to prevent global warming, and strengthening private sector based international collaborative activities. At the same time, contributions to reducing emissions through specific initiatives of the business fields of each industry will be presented.

<6> Each industry will actively work on the development and practical application of innovative technologies to achieve net zero by 2050 from a medium and long-term perspective that looks beyond 2030.

<7> In addition, in order to disseminate easy-to-understand information on initiatives based on the Voluntary Action Plans to foreign countries and

consumers, each industry will make international comparisons based on reliable data and actively disseminate such information to the public.

In addition, the industry will contribute to decarbonization in the commercial, residential, and transport sectors by making materials and other products lighter and more functional, developing and providing energy-efficient decarbonized products and services, improving the efficiency of logistics through modal shifts and other means, and promoting the use of next-generation automobiles and public transportation.

As the industry presently sets targets for FY 2030 and advances measures to meet them, it will also, going forward, consider the nature and position of Voluntary Action Plans as part of Japan's global warming countermeasures, in line with the spirit of the GX Promotion Act.

(b) Promotion of decarbonization in corporate management

Since the conclusion of the Paris Agreement and in light of the expansion of ESG finance, an increasing number of Japanese companies have taken climate change countermeasures as a management issue and are engaging in decarbonization management to decarbonize their businesses. For example, the number of Japanese companies that set medium and long-term targets, such as Science Based Targets (SBT)[27] and RE100, is among the highest in the world.

The government will provide technical advice to companies on information disclosure, setting of reduction targets, and planning, etc., in order to further promote decarbonized management, while taking into account financial trends, including ESG finance. In calculating and reducing emissions, the calculation and reduction of emissions throughout the value chain is promoted. The regional support systems for the decarbonization of small and medium businesses will also be strengthened. Furthermore, by promoting the visualization of GHG emissions during the lifecycle of products and services, the environment in which decarbonized management is valued by consumers is developed.

(c) Promotion of the introduction of facilities and equipment with high energy-saving performance

In accordance with the Act on Rationalization of Energy Use and Shift to Non-fossil Energy (Act No. 49 of 1979, hereinafter referred to as the "Energy Conservation Act"), thorough energy management and the introduction of energy-efficient facilities and equipment will be promoted in order to improve the energy consumption intensity.

In addition, based on the periodic reports submitted in accordance with the Energy Conservation Act, the energy conservation status of businesses will be assessed, and businesses that lag behind will be given intensive guidance and advice, while leading businesses will be publicized and praised. In this way, thorough energy conservation will be promoted.

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[27] An initiative that requires companies to set greenhouse gas emission reduction targets consistent with the levels required by the Paris Agreement (which aims to limit global temperature rise to well below 2°C above preindustrial levels, preferably to 1.5°C).

In addition, the benchmarking system, which sets high-energy efficiency and conservation targets for each industry and field and requires achievement of those targets, will be expanded to cover more fields. Also, the target values will be revised to encourage further energy efficiency and conservation efforts by businesses.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (across industries)

In the industrial sector, the introduction of energy-efficient facilities and equipment will be promoted for major energy-consuming equipment used in a wide range of industries, including air conditioning, heat pumps, lighting, hot water supply, industrial furnaces, boilers, and cogeneration equipment.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (iron and steel industry)

As part of the introduction of the latest technologies, the efficiency of power-consuming equipment, waste heat recovery equipment, power generation equipment, and coke ovens will be further improved, and the use of waste plastics and other materials that can be used as a substitute for coal in coke ovens will be expanded.

In addition to the existing technologies, innovative technologies will be developed for significant energy conservation and low carbon emission in the steel-making process, with the aim of putting these technologies into practical use by around 2030.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (chemical industry)

CO_2 emissions will be reduced by promoting the development and introduction of new innovative energy-saving technologies, as well as promoting the recovery of emitted energy and the rationalization of processes according to the characteristics of each process.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (cement and ceramic industry)

Energy consumption in the cement manufacturing process will be reduced by introducing equipment that can use thermal and electrical energy with high efficiency and by promoting the use of waste as a substitute for thermal energy. In addition, through the practical application and introduction of advanced process technology, energy conservation will be achieved in the cement and glass manufacturing processes while ensuring the same quality as conventional products.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (pulp, paper, and paper product industry)

In the recovered paper pulping process, the introduction of pulpers that can more efficiently mix recovered paper and water and dissociate the recovered paper than conventional types will be supported with the aim of reducing operational energy consumption.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (construction work and use of special vehicles)

In the short term, the goal is to reduce carbon dioxide emissions through the promotion of construction machinery and electric construction machinery that has outstanding fuel-conservation performance. In the long term, the certification system for GX construction machinery, which targets construction machinery powered by new sources such as electricity, will be utilized to promote the introduction and dissemination of GX construction machinery in public works projects, with the aim of achieving net zero by 2050. In addition, by promoting i-Construction and other such measures as the spread of construction using information and communication technology (ICT) among small and medium-sized construction companies that carry out construction work for local governments, efficiency and labor saving in construction and maintenance will be further improved to cope with the declining number of skilled workers.

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (greenhouse horticulture, agricultural machinery, and fisheries)

As a measure to reduce GHG emissions from greenhouse horticulture, the development and dissemination of efficient and low-cost energy utilization technologies (heat pumps, woody biomass heat, etc.) in greenhouse horticulture will be promoted. In addition, low CO_2 emissions in agricultural machinery and energy conservation on fishing vessels will be promoted, such as efficiency improvement through the introduction of LED fishing lights and energy-saving outboard engines. Another target is to establish technologies related to the electrification and hydrogenation of agricultural and forestry machinery and fishing vessels by 2040.

(d) Promotion of energy conservation initiatives through inter-industry collaboration

○ Promotion of energy conservation initiatives through inter-industry collaboration

Further energy savings can be achieved through cooperation between multiple factories and businesses, such as energy sharing among multiple factories and businesses, including area-wide supply of electrical and heat energy centered on cogeneration or the sharing of unused heat disposed of at factories without being used through heat conduits. Thus, through the use of the coordinated energy efficiency and conservation planning system based on the Energy Conservation Act and other support measures, energy efficiency and conservation initiatives through such cooperation between multiple operators will be promoted.

(e) Electrification and fuel conversion

○ Electrification and fuel conversion

In conjunction with efforts to decarbonize power sources, electrification in final energy consumption has the potential to reduce fossil fuel consumption in such industrial processes as heating and drying processes, although it is more difficult to apply in some sectors and processes. By increasing the controllability of the process, it is expected to not only reduce energy consumption but also provide added value to the production process, such as high-mix low-volume production and automation. In

addition, the implementation of the demand response (DR) will be promoted to shift demand by operating electricity-intensive production processes in a flexible manner. Initiatives toward electrification will be deepened with a focus on medium to low-temperature heat.

Examples of fuel conversion in sectors where difficulties in electrification arise include boilers with excellent environmental compatibility, industrial furnaces with excellent energy efficiency, natural gas cogeneration that achieves high-energy conservation through combined heat and power supply, fuel cells, and gas air conditioning that mitigates peaks in grid power supply and demand. Measures to make use of hydrogen and its derivatives (hydrogen, ammonia, e-fuels and e-methane) as well as CCUS among other technologies, on top of fuel conversion in favor of natural gas and other fuels, will be promoted.

○ Realization of a hydrogen society (Described below)

(f) Implementation of thorough energy management

○ Implementation of thorough energy management using FEMS

In the industry sector, energy management is already advanced to some extent due to energy management obligations under the Energy Conservation Act. Yet, further energy conservation and CO_2 reduction will be achieved by promoting the introduction of factory energy management systems (FEMS) and other systems that utilize the IoT, making energy consumption visible and encouraging energy-saving initiatives based on objective data.

(g) Promotion of emissions reductions measures for small and medium businesses

To strengthen energy conservation and emission reduction measures in small and medium-sized businesses, measures will be implemented, such as publicity to raise awareness toward energy efficiency and conservation, reduction of energy consumption through energy efficiency diagnoses, implementation of detailed training courses for those in charge of energy management in companies, horizontal development of best practices for energy efficiency and conservation measures, etc. Meanwhile, support will be provided to introduce emissions reduction equipment to small and medium-sized businesses with a focus on reducing emission intensity. At the same time, emissions reduction equipment, introduced in partnership with partner firms with a view to reducing Scope 3[28] emissions, will be supported.

Also, the hidden energy conservation needs of SMEs will be uncovered, further promote energy conservation initiatives by SMEs, while also making use of the frameworks of regional financial institutions and bodies that take a positive attitude towards energy conservation.

[28] Indirect greenhouse gas emissions related to business activities across an organization's supply chains beyond direct emissions (Scope 1) and energy-related indirect emissions (Scope 2).

Additionally, by establishing a community-wide support system partnering with support institutions (including regional bodies, financial institutions, chambers of commerce, and local governments) that have regular contact with medium-sized and small enterprises, Pacesetting support will be promoted based on the needs of diverse businesses across each region, with the achieved outcomes being horizontally developed.

(h) Creation of role models in factories and workplaces

Support will be provided for role models which not only formulate ambitious carbon dioxide reduction plans for factories and workplaces based on their carbon dioxide reduction potentials and implement those plans by installing advanced equipment and promoting electrification and fuel conversion but also seek to further improve operations. Good practice will be publicized and horizontally deployed.

B. Commercial and others

CO_2 emissions from the commercial and other sectors in FY 2022 amounted to 179 million t-CO_2, a decrease of 23.6% compared to FY 2013. The decrease was mainly due to lower emissions from electricity consumption as a result of improved CO_2 emission intensity of electricity and lower energy consumption as a result of improved energy consumption intensity due to energy conservation and other factors.

In order to achieve sector-specific targets, emissions will be reduced through measures to reduce GHG emissions under the Act on the Promotion of Global Warming Countermeasures, measures based on the Energy Conservation Act, and the steady promotion of measures based on the Voluntary Action Plans.

In addition, energy consumption in commercial and other sectors can be reduced by improving the efficiency of equipment used in offices, disseminating energy-efficient equipment, and optimizing its operation. Thus, further improvement of the energy efficiency of equipment will be promoted, and thorough energy management will be ensured.

Buildings, by their nature, become long-term stock once constructed. This makes it important to both quickly drive improvements to their energy-saving performance and also to promote DR and a switch away from fossil fuels. We will also seek to improve the energy-saving performance of buildings and expand the introduction of renewable energy with the aim of securing[29] energy-saving performance at the level to satisfy ZEB standards[30] across the average stock in 2050, and with the aim of ensuring that buildings newly built after FY 2030, leading up to 2050, have energy-saving performance at the level of ZEB standards. We will also promote DR and switching away from fossil fuels.

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[29] ZEB (net zero energy building): A building that has achieved energy conservation of 50% or more and further reduced energy consumption through the introduction of renewable energy sources etc., depending on the amount of reduction: (1) ZEB (100% or more reduction), (2) Nearly ZEB (75% to up to 100% reduction), and (3) ZEB Ready (no introduction of renewable energy). In addition, buildings that have reduced 30% to 40% or more of energy and that introduced technologies that were expected to conserve energy but have not been assessed at present in the energy conservation calculation program based on the Building Energy Efficiency Act and that are 10,000 m^2 or more in size are defined as (4) ZEB Oriented.

[30] Reduction of primary energy consumption, excluding renewable energy, by 30% or 40% (20% for small buildings) from the current energy conservation standard value, depending on the use.

Measures will be materialized and revised at the appropriate point in time in light of future development, verification, and implementation of decarbonization technologies.

(a) Promotion of voluntary efforts by industry (Described above)

○ Steady implementation, evaluation, and verification of Voluntary Action Plans (Described above)

(b) Improvement of the energy efficiency of buildings

○ Improvement of the energy efficiency of buildings

While looking ahead to realize net zero by 2050, we set the goal for all new buildings in 2030, which is to satisfy the ZEB standard level of energy efficiency by maximizing the use of technologies that are technically and economically available at present.

In order to strengthen energy conservation measures for buildings, regulations under the Act on Improving the Energy Consumption Performance of Buildings (Act No. 53 of 2015, hereinafter referred to as the "Building Energy Efficiency Act") will be reinforced as soon as possible. Specifically, based on the Building Energy Efficiency Act, which was amended in 2022, small-scale buildings, that are currently not subject to the obligation to comply with such standards, will be required to comply with energy conservation standards in FY 2025. In addition, the induction standards for buildings will be raised consistently, and the energy conservation standards will be reinforced in stages by FY 2030 at the latest, with the aim of ensuring energy-saving performance at the level to satisfy ZEB standards for new buildings built from 2030 onwards. Energy conservation measures will also be comprehensively promoted, including thorough implementation of labeling based on the energy conservation performance labeling system for buildings at the time of sale or lease of newly built buildings, which came into force in 2024.

The Top Runner Program for equipment and building materials will be strengthened as well to improve the performance of equipment and building materials installed in buildings and to promote their widespread use. In doing so, the energy-saving performance of water heaters and other equipment will be improved with keeping in mind that equipment that uses diverse energy sources is necessary from the perspective of ensuring resilience.

In addition to strengthening regulations, public buildings will be proactively renovated to improve energy-saving performance, and support for demonstrations and further expansion of ZEB will be provided. In advancing such measures, attention will be paid to consistency with local disaster risk reduction and location optimization plans. Furthermore, other energy conservation measures, including support for renovation and reconstruction of existing buildings and energy conservation performance labeling, will be comprehensively promoted.

(c) Promotion of the introduction of facilities and equipment with high energy-saving performance

○ Promotion of high-efficiency energy-saving equipment (commercial and other sectors)

The development of energy conservation technologies is further accelerated while further promoting the spread of high-efficiency energy-saving equipment in order to further improve the efficiency of individual devices and systems.

Diffusion of high-efficient lighting will be promoted, including requiring businesses to comply with the Top Runner Standard, with the aim of increasing high-efficiency lighting, such as LEDs, to 100% of the stock by 2030. In addition, the installation of energy-efficient commercial water heaters, such as heat pump water heaters and latent heat recovery water heaters, will be promoted.

Furthermore, the energy efficiency of refrigeration and air-conditioning equipment will be improved by improving technology for preventing coolant leaks at the time of installation and during use.

Also, information will be disseminated through leading decarbonization technologies (LD-Tech) and other means.

○ Improvement of energy efficiency of equipment through Top Runner Programs (commercial and other sectors)

The Top Runner Program, based on the Energy Conservation Act, was established in FY 1998, and the number of target devices has been gradually expanding, covering 29 energy consumption devices as of FY 2024. In order to further improve the efficiency of individual equipment in the future, studies will be conducted to review the standards for target equipment for which the target year has been reached.

(d) Greening of industry and digital devices

○ Greening of industry and digital devices

Regarding the utilization of power semiconductors and next-generation semiconductors, research and development will be promoted for the commercialization of ultra-efficient next-generation power semiconductors (GaN, SiC, Ga_2O_3, etc.). Also, capital investment support will be provided for the necessary parts of the semiconductor supply chain in order to promote their introduction, thereby accelerating the commercialization and the use and expansion of next-generation power semiconductors with energy savings of 50% or more by 2030. In addition, research, development, and demonstrations will be carried out to improve the energy efficiency of data centers using cutting-edge technology such as photo-electronic integration and to improve the energy efficiency of the entire system by improving the efficiency of software development and processing. We will also aim to further improve energy conservation at data centers and partially switch the electricity used at domestic data centers to decarbonized energy sources by supporting capital investment to expand the manufacturing of energy-saving semiconductors, by acting through systems to set efficiency levels for data centers that operators should meet and surface efforts to that end, and by promoting the use of decarbonized energy sources in data centers.

(e) Implementation of thorough energy management

○ Implementation of thorough energy management through the use of BEMS and energy conservation diagnosis

In order to promote thorough energy conservation and CO_2 emissions reduction for the entire building, a Building Energy Management System (BEMS) that displays energy usage status and supports optimal operation of lighting, air conditioning, and other equipment and facilities will be installed in about half of all buildings by 2030. In addition, more efficient energy management in buildings will be promoted by utilizing energy use data obtained from BEMS.

Eco-tuning, which involves appropriate operational improvements to equipment and systems, and enables reducing GHG emissions while ensuring comfort and productivity in buildings, will be promoted.

Based on the results of the visualization of energy consumption and energy conservation diagnosis, etc., comprehensive services related to energy conservation will be provided. Also, the introduction of energy-saving equipment and facilities using businesses that warrant energy conservation effects (ESCO: Energy Service Company) and downsizing (optimization of equipment and facilities) will be promoted.

(f) Promotion of sector coupling of electricity, heat, and mobility

Considering that solar power systems generate electricity intensively during a certain time period, EVs, heat pump water heaters, fuel cells, cogeneration, etc., that provide demand-side flexibility will be introduced depending on the local characteristics. Also, the use of energy management systems (HEMS and BEMS) and ICT in homes and buildings will be promoted to adjust supply and demand in line with the amount of solar power generated (sector coupling of electricity, heat, and mobility).

In addition, while utilizing local renewable energy, the use of EV car sharing and the installation of EV/battery stations with replaceable batteries will be promoted to improve the demand/supply adjustment function at the local level and decarbonize local transportation.

(g) Promotion of emission reduction measures for small and medium businesses (Described above)

(h) Creation of role models in factories and workplaces (Described above)

(i) Promotion of local production for local consumption and areal use of energy

○ Promotion of local production for local consumption and areal use of energy

Local energy production for local consumption and area use of energy is desirable from the perspective of climate change x disaster risk reduction, which effectively links climate change measures with disaster risk reduction and mitigation measures, since they lead to efficient energy use, regional revitalization, and reduced risk of power outages, etc. in the event of a disaster. In order to utilize a combination of renewable

energy and distributed energy resources (DER[31]), such as battery storage, heat pumps, and cogeneration in regions, the expectation is to use existing grid lines and a self-supporting and distributed energy system using private lines and thermal pipelines. Seizing opportunities for urban development, the formulation of plans and the introduction of equipment and systems for the construction of such a system will be supported, and the facilitation of coordination among local governments and other related actors will be promoted. In addition, to promote true local production for local consumption, which contributes to strengthening regional resilience and revitalizing regional economies, honor will be given to outstanding businesses that coexist with the region and contribute to the construction of regional industrial infrastructure to encourage such activities.

(j) Transition to a decarbonized lifestyle (Described below)

○ Promotion of "*Decokatsu*" (Described below)
○ Promoting Environmental Education and Education for Sustainable Development (ESD) (Described below)

(k) Initiatives of public institutions (Described below)

(l) Other policies and measures

○ Decarbonization of urban areas through improvement of the thermal environment by heat island control

Utilizing digital twins and the knowledge gained from observations, surveys, and research on the urban heat island effect, heat island-related measures will be comprehensively developed, such as the reduction of artificial heat emissions, improvement of ground surface cover, improvement of urban structures, improvement of lifestyles, and adaptation measures to reduce the impact on human health, including heat stroke, thereby promoting urban decarbonization through thermal environment improvements.

Decarbonization of cities will be advanced by decreasing artificial heat emissions, such as air-conditioning equipment systems and vehicles, through the promotion of the use of higher efficiency energy-consuming equipment, low-carbon buildings and facilities, technological development, and the spread of next-generation vehicles, promotion of measures on traffic flows, and promotion of the use of unused energy.

In addition, from the perspective of reducing evapotranspiration and preventing/improving high temperatures on the ground surface by an artificial ground surface cover, the ground surface cover of the entire region will be improved by securing green spaces through the development of urban parks, greening of public spaces and government facilities, greening of building sites through the use of greening area systems, securing quality green spaces through use of the Certification System for

[31] Collective term referring energy resources (electricity-generating equipment, electricity-storing equipment, load equipment) connected behind the consumer's connection point, in addition to electricity-generating and electricity-storing equipment connected directly to the grid.

Securing Quantity and Quality Urban Green Space (TSUNAG) and preservation of privately owned green areas and cropland.

Furthermore, while preserving green spaces in cities, the urban structure will be improved through the formation of water and green networks and the promotion of multiple nature-type river creations from the perspective of securing green spaces and wind paths from the water surface. The government will also work to counter urban heat by creating "cool spots" throughout cities.

In addition, the promotion of "*Decokatsu*", including "Cool Biz" and "Warm Biz" will encourage people to change their lifestyles and achieve appropriate air-conditioning temperatures. Also, local governments and businesses are encouraged to implement heat stroke countermeasures and other adaptive measures according to the characteristics of their regions, city blocks, and businesses.

○ Introduction of energy conservation and renewable energy in water supply and sewage (promotion of energy conservation and renewable energy measures in waterworks)

○ Introduction of energy conservation and renewable energy in water supply and sewage systems (promotion of energy conservation and energy creation measures in sewage operations)

In waterworks, energy conservation will be promoted through the introduction of energy-saving and high-efficiency equipment, the introduction of energy-conservation facilities, such as inverter-controlled pumps, and the wide-area expansion, consolidation, and optimization of the placement of facilities (e.g., water intake from upstream), as well as the introduction of renewable energy power generation facilities, such as small-scale hydroelectric and solar power generation.

In sewage systems, too, the sophistication and efficiency of facility management will be promoted through DX, as well as through the introduction of energy-saving and high-efficiency equipment, in addition to efforts to promote energy conservation through the expansion and consolidation of facilities. Also, energy creation initiatives that effectively utilize sewage biomass, such as power generation from sewage sludge-derived solid fuel and digestion gas, as well as the introduction of renewable energy-producing equipment like solar power generation or systems for utilizing sewage heat, will be promoted.

In addition, as a long-term initiative, the potential for water and sewage facilities to contribute to the adjustment of electricity supply and demand will be pursued.

○ Initiatives in waste treatment

While promoting 3R + Renewable, which contributes to the reduction of GHG emissions, based on the Fifth Fundamental Circular Economy Plan, itself based on the Basic Act on Establishing a Sound Material-Cycle Society (Act No. 110 of 2000; hereinafter referred to as the "Circulation Act"). On top of that, energy recovery, such as waste power generation and production of waste fuels at waste treatment facilities, will be further promoted. GHG emissions generated by vehicles during waste collection and transportation will be reduced through the introduction of energy conservation measures at waste treatment and recycling facilities and EV waste collection vehicles.

(Systematic promotion of measures for inter-ministerial cooperation)

In order to achieve the reduction targets more reliably in the commercial and other sectors, such as the promotion of thorough energy conservation and the introduction of renewable energy in buildings, the cooperation of relevant government agencies will be systematically promoted to more effectively and efficiently implement efforts in all areas.

C. Residential sector

CO_2 emissions in the residential sector were 158 million t-CO_2 in FY 2022, a decrease of 24.5% from FY 2013. The decrease was mainly due to an improvement in the CO_2 emission intensity of electricity and a decrease in energy consumption due to an improvement in the energy intensity realized by energy conservation and other factors.

Since about two-thirds of CO_2 emissions from this sector come from electricity,[32] the reduction of CO_2 intensity (described below) in electricity is important for reducing emissions in the residential sector, in order to achieve sector-specific emission reduction targets. The energy-saving performance of homes will also be improved. In addition, citizens will be encouraged to view climate change with a sense of ownership, constantly review their lifestyles, use renewable energy in their homes, take energy-saving measures, and implement thorough energy management.

Also, energy consumption in the residential sector can be reduced by improving and promoting the efficiency of equipment used in the home and optimizing its operation. For this reason, businesses will be encouraged to further improve the energy efficiency of their equipment. Meanwhile, the provision of accurate and appropriate information to the public on CO_2 emissions associated with the use of equipment will also be promoted.

Homes, by their nature, become long-term stock once constructed. This makes it important to both quickly drive improvements to their energy-saving performance and also to promote DR and a switch away from fossil fuels. We will also seek to improve the energy-saving performance of buildings and expand the introduction of renewable energy, including by introducing homes that have energy-saving performance well above the level of ZEH standards, with the aim of securing [33] energy-saving performance at the level of ZEH standards[34] across the average stock in 2050, and with the aim of ensuring that buildings newly built after FY 2030, leading up to 2050, have energy-saving performance at the level of ZEH standards. We will also promote DR and switching away from fossil fuels. Measures will be materialized and revised at the appropriate point in time in light of future development, verification, and implementation of decarbonization technologies.

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[32] In the FY 2022 GHG emissions, the share of electricity-derived CO_2 emissions in the residential sector's energy-related CO_2 emissions in FY 2022 was 68.6%.

[33] Compliance with enhanced outer shell standards and a 20% reduction in primary energy consumption, excluding renewable energy from the current energy conservation standard values.

[34] ZEH (net zero energy house): A house that has achieved energy conservation of 20% or more and further reduced energy consumption through the introduction of renewable energy sources etc., depending on the amount of reduction: (1) ZEH (100% or more reduction); (2) nearly ZEH (75% to up to 100% reduction); and (3) ZEH oriented (no use of renewable energy).

(a) Transition to a decarbonized lifestyle (Described below)

○ Promotion of "*Decokatsu*" (Described below)
○ Promoting Environmental Education and Education for Sustainable Development (ESD) (Described below)

(b) Improvement of energy efficiency of housing

○ Improvement of energy efficiency of housing

While looking ahead to achieve net zero by 2050, we set the goal for all new houses in 2030, which is to satisfy the energy-saving performance of the level of ZEH standards by maximizing the use of technologies that are technically and economically available at present.

In order to strengthen energy conservation measures for houses, regulations under the Building Energy Efficiency Act will be reinforced as soon as possible. Specifically, based on the Building Energy Efficiency Act, which was amended in 2022, houses that are currently not subject to the obligation to comply with such standards will be required to comply with energy conservation standards in FY 2025. In addition, the induction standards and standards under the Top Runner Program for houses will be raised consistently, and the energy conservation standards will be reinforced in stages by FY 2030 at the latest, with the aim of ensuring energy-saving performance at the level of ZEH standards for new buildings built from 2030 onwards.

The Top Runner Program for equipment and building materials will be strengthened as well to improve the performance of equipment and building materials installed in houses and to promote their widespread use. In doing so, the energy-saving performance of water heaters and other equipment will be improved, keeping in mind that equipment that uses diverse energy sources is necessary from the perspective of ensuring resilience. In addition, the performance labeling system for windows will be examined in order to effectively communicate the thermal insulation performance of windows to consumers and to promote the spread of windows with high thermal insulation performance.

In addition to strengthening regulations, efforts will be made to promote new housing that has energy-saving performance well above the level of ZEH standards, in order to secure energy-saving performance at its level for the average housing stock in 2050. In advancing such measures, attention will be paid to consistency with the regional disaster prevention plan and a location normalization plan. Improving the energy efficiency of existing housing will be supported, including through the introduction of high-efficiency water heaters and replacing windows with thermal insulated models with higher energy efficiency performance. Energy conservation measures will also be comprehensively promoted, including thorough implementation of labeling based on the performance labeling system for buildings at the time of sale or lease of newly built buildings.

(c) Promotion of the introduction of facilities and equipment with high energy-saving performance

○ Diffusion of high-efficiency energy-saving equipment (Residential sector)
○ Diffusion of high-efficiency energy-saving equipment (Residential sector)

(Energy saving septic tanks)

The development of energy conservation technologies is further accelerated while further promoting the spread of high-efficiency energy-saving equipment in order to further improve the efficiency of individual devices and systems.

In order to achieve 100% diffusion of high-efficiency lighting, such as LEDs, in stock by 2030. Support will also be provided for the introduction of small-scale energy-efficient water heaters for rental apartments, where introducing high-efficiency water heaters is impractical for reasons of a lack of installation space, on top of advancing support for the introduction of high-efficiency water heaters in relation to domestic hot water heaters, including heat pump water heaters and hybrid water heaters.

Fuel cells for residential use are a distributed energy source that can achieve a total energy efficiency of up to 90% or more by producing hydrogen from city gas or LPG and chemically reacting the hydrogen with oxygen in the air to generate electricity, as well as effectively utilizing the heat generated during power generation. The use of fuel cells, including pure hydrogen fuel cells, will be further increased.

With regard to septic tanks, the spread of advanced energy-saving household septic tanks and the introduction of medium and large-sized septic tanks with high energy-saving performance will be promoted by guiding energy-saving measures in support for the installation of such septic tanks.

Also, information will be disseminated through LD-Tech and other means.

○ Improvement of energy efficiency of equipment through Top Runner Programs (residential sector)

(d) Implementation of thorough energy management

○ Implementation of thorough energy management through the use of HEMS, smart meters, and smart home devices and the provision of energy-saving information

In order to promote energy conservation and CO_2 emission reductions in the entire house, a Home Energy Management System (HEMS) and smart home devices that display energy usage and promote optimal operation of air conditioning, lighting, and other equipment will be introduced to nearly all housing by 2030. In addition, the introduction of smart meters that can measure electricity consumption at home in more detail than before and promote visualization of electricity consumption through linkage with HEMS and other means will be promoted. In addition, more efficient energy management in housing will be promoted by utilizing energy usage data obtained from HEMS. Also, further energy conservation efforts in households will be encouraged by requesting energy retailers to provide information that would contribute to energy conservation of general consumers based on the Energy Conservation Act.

Based on the results of the visualization of energy consumption through these initiatives, the use of energy-saving equipment and facilities using ESCOs, and other means will be promoted.

(e) Promotion of sector coupling of electricity, heat, and mobility (Described

above)

(f) Other policies and measures

(Systematic promotion of measures for inter-ministerial cooperation)

In order to more reliably achieve reduction targets in the residential sector, such as thorough promotion of energy conservation and the introduction of renewable energy in houses, the cooperation of relevant government agencies will be systematically promoted to more effectively and efficiently implement efforts in all areas.

D. Transport sector

CO_2 emissions in the transport sector were 192 million t-CO_2 in FY 2022, a decrease of 14.5% from FY 2013. The main reasons for the decrease in emissions include the improved fuel efficiency of automobiles and a decrease in the volume of freight transport. To further steady the downward trend in emissions, comprehensive measures will be implemented, including automobile and road traffic streamlining measures, promotion of public transportation, and streamlining of logistics.

A variety of options are being pursued to achieve net zero by 2050 for vehicles, which account for 86% of carbon dioxide emissions in the transport sector, and aim to reach zero CO_2 emissions throughout the vehicle lifecycle by 2050. It is also important to advance measures such as improving energy efficiency in the logistics field and utilizing next-generation fuels in the fields of aviation, ports, and sea transport. Measures will be implemented and revised at the appropriate point in time in light of future development, verification, and implementation of decarbonization technologies.

(a) Promotion of voluntary efforts by industry (Described above)

○ Steady implementation, evaluation, and verification of Voluntary Action Plans (Described above)

(b) Measures concerning vehicles

○ Diffusion of next-generation vehicles, improvement of fuel efficiency, etc.

The use and expansion of energy-efficient next-generation vehicles (EVs, FCVs, PHEVs, hybrid vehicles [HVs], etc.) will be promoted. For those vehicles that are currently in the early stages of introduction and face the issues of high costs, comprehensive measures, including such support measures as subsidy programs and tax incentives, will be taken to expand the use of electrified vehicles and infrastructure. A domestic production platform of 150GWh annually for storage batteries is targeted to be established by 2030 at the latest, with support and other measures advancing domestic establishment and technological development of production platforms for storage batteries, parts and materials, and manufacturing equipment. Additionally, the re-use of vehicle storage batteries and the putting in place of power supply facilities from vehicles will be promoted to contribute to the effective utilization of renewable energy.

Through such efforts, the aim is to achieve 100% of new car sales being electrified vehicles (EV, FCV, PHEV, and HV) by 2035. Also, with regard to commercial vehicles, for small-sized vehicles of eight tons or less, the aim is to make the ratio of electrified vehicles 20-30% of new commercial vehicles sales by 2030, and to make the ratio of electrified vehicles and decarbonized fuel vehicles, including synthetic fuels, etc., combined 100% of new commercial vehicles sales by 2040. Efforts aim to introduce 5,000 large commercial vehicles over eight tons as a trial in the 2020s, and will set an electrified vehicle promotion target for 2040 by 2030, based on the progress of initiatives to develop and promote technology intended to reduce the costs of hydrogen and e-fuels, etc.

The aim is to install 300,000 charging infrastructure sites by 2030 and to build a convenient and sustainable charging infrastructure society, based on policies aimed at promoting the installation of charging infrastructure. The installation of EV charging infrastructure and signage for said infrastructure on arterial roads and expressways will be promoted. In line with this, it is supporting research into dynamic wireless power transfer technology.

As for commercial vehicles, support will be provided for the introduction of commercial vehicles for transportation businesses and shippers that have established plans in line with targets for the possession and use of non-fossil fuel vehicles set by the government, and will consider expanding the targets that the government sets. In addition to supporting the introduction of vehicles and large-scale hydrogen stations to promote the spread of fuel cell vehicles, focused on commercial vehicles, additional support will be provided for priority regions where there will be a concentrated introduction of fuel cell commercial vehicles. Also, technological development aimed at lowering costs associated with hydrogen stations will be advanced.

In relation to vehicle fuel consumption regulations, energy efficiency for passenger vehicles will be further raised based on passenger vehicle fuel consumption standards with FY 2030 as the target year, and systems will be introduced to evaluate energy-saving technologies not normally reflected in fuel consumption testing. Consideration will begin for new fuel consumption standards with their sights set on promoting the spread of electric vehicles, in order to improve fuel consumption in heavy vehicles.

While working toward achieving net zero by 2050, there is a need to continue to work with both regulatory means and incentive measures. Technology-neutral fuel economy regulations will be used to effectively reduce CO_2 emissions by combining all available technologies.

The aim is to begin supplying low-carbon gasoline of up to 10% bioethanol by volume by FY 2030, and to pursue the supply of low-carbon gasoline of up to 20% bioethanol by volume from FY 2040, in order to advance low-carbonization and decarbonization of gasoline for internal combustion engines. It will also develop and expand vehicles able to use this technology. Moreover, the introduction of biodiesel will be promoted. It further aims to commercialize synthetic fuels by the mid-2030s and to make use of such fuels. Also, technological development and social implementation will be promoted for cellulose nanofibers and modified lignin, etc., which are expected to improve fuel efficiency by reducing the weight of automobile parts.

(c) Road traffic flow measures

○ Road traffic flow measures (promotion of road traffic flow measures)
○ Road traffic flow measures (promotion of the maintenance of LED road lighting)
○ Road traffic flow measures (promotion of Intelligent Transport Systems (ITS) (centralized control of traffic lights))
○ Road traffic flow measures (maintenance of traffic safety facilities (improvement and profile (hybrid) of traffic lights))
○ Road traffic flow measures (maintenance of traffic safety facilities (promotion of the use of LED lights in signal lights))
○ Road traffic flow measures (promotion of autonomous driving)

While recognizing the possibility that so-called induced and diverted traffic[35] may occur as a result of road construction, the following measures will be implemented: the strengthening of arterial road networks, including ring roads that will contribute to reducing CO_2 emissions; specific countermeasures on bottlenecks of traffic congestion through scientific analysis of big data using ETC 2.0, for example; study of the introduction of area-wide congestion countermeasures enabled by technologies such as ICT and AI; suitable separation of functions between arterial roads and community roads through traffic safety measures beginning with the described measures and "Zone 30 Plus"; as well as further energy savings and upgrading of road lighting; and installation of LED road lighting. In addition, studies will be conducted to promote the use of renewable energy sources, such as solar power generation, in road spaces, with the aim of nationwide deployment.

Other measures to implement include the following: promotion of intelligent transport systems (ITS), such as centralized control of traffic lights; improvement of traffic lights, such as profiling; improvement of traffic safety facilities etc. that promote sustainable and green traffic, such as the use of LED lights in signal lights; promotion of automated driving; and measures concerning road traffic flow that contribute to reductions in CO_2 emissions.

(d) Transition to a decarbonized lifestyle (Described below)

○ Promotion of "*Decokatsu*" (Described below)
○ Promoting Environmental Education and Education for Sustainable Deve lopment (ESD) (Described below)

(e) Greening of the vehicle transportation business by promoting the use of environmentally friendly vehicles, etc.

[35] Term referring to increases in the number of trips by vehicle, changes in destinations, diversion away from modes such as railways and effects arising from changes in medium to long-term land use. It is important to make judgments about the CO_2 emissions reduction impacts (including decarbonized energy sources and fuel-efficient usage) of measures to rationalize road traffic holistically from the point of view of global warming countermeasures, based on so-called induction and traffic diversion effects arising from increasing the convenience of vehicles, as well as changes to driving characteristics arising from the spread of electric vehicles.

○ Greening of the vehicle transportation business by promoting the use of environmentally friendly vehicles, etc.

To promote eco-driving of commercial vehicles, such as trucks, buses, and cabs, the Eco-Drive Management System (EMS) will be disseminated and promoted among transportation companies, etc. In addition, publicity centered on the Eco-driving Promotion Liaison Committee of the four relevant ministries and agencies will be used to raise awareness of eco-driving.

Also, the spread of the Green Management Certification System, which certifies transportation companies that implement excellent environmental protection activities, such as improved fuel efficiency, will be promoted.

(f) Promotion of the use of public transportation and bicycles

○ Promotion of the use of public transportation and bicycles (promotion of the use of public transportation)

○ Promotion of the use of public transportation and bicycles (promotion of the use of bicycles)

Public transportation, such as railways, has low CO_2 emissions per unit of transportation compared to private vehicles, so the promotion of the use thereof contributes to reducing regional CO_2 emissions. In order to decarbonize the public transportation sector and create an environment that facilitates mobility without relying solely on private cars, the use of public transportation services will be promoted in cooperation with community development while further improving their convenience through the following measures: promotion of the development of Light Rail Transit (LRT),[36] Bus Rapid Transit (BRT),[37] and other low-carbon transportation systems; support for the creation of the Local Public Transportation Plans by local governments; promotion of Mobility as a Service (MaaS[38]) and compact plus networks; reorganization of regional transportation networks; promotion of barrier-free transportation; and strengthening of connections between various transport modes (modal connections) through public-private partnerships, such as through the development of transport nodes, such as station squares and bus terminals ("*basuta*"[39]).

Also, in order to promote the use of bicycles, initiatives will be promoted for the development of safe and comfortable bicycle traffic spaces, the development of bicycle parking facilities, the promotion of shared bicycle use, and the introduction of bicycle commuting.

In addition, the environmental load will be reduced through reductions in automobile traffic and other measures by promoting proactive efforts by businesses, including commuter traffic management such as limiting personal vehicle commuting, and by promoting efforts to encourage behavioral changes in the public, including how they use

[36] A next-generation tram system that is friendly to people and the environment and offers excellent features in terms of ease of boarding, punctuality, speed, transportation capacity, comfort, etc. with improved driving space, vehicle performance, etc.

[37] Bus rapid transit system utilizing dedicated lanes etc.

[38] A service that uses a smartphone app etc. to provide an optimal combination of multiple public transportation and other transportation services to meet the trip-by-trip transportation needs of each local resident or traveler, including search, reservation, and payment all at one time.

[39] A concentrated public transport terminal developed under the initiative of the road administrator.

their cars in daily life. The government will continue to promote the use of public transportation and the use of bicycles in government activities.

The environment that facilitates mobility without relying solely on private cars will also be created in order to realize environmentally sustainable transport (EST).

(g) Countermeasures for railways, ships, and aviation

○ Decarbonization of the railways

In the railways sector, energy-efficient vehicles and advanced energy-saving equipment, such as lightweight vehicles and vehicles equipped with Variable Voltage Variable Frequency control (VVVF) equipment[40], have been introduced. Along with continuing to promote their use, the introduction of renewable energy, such as solar power generation using railway assets, will also be advanced. The introduction of non-fossil fuel diesel fuels and the social implementation of technologies such as hydrogen fuel-cell train cars will be advanced, aiming to decarbonize the entire railway network, including non-electrified sections.

○ Decarbonization of the shipping sector

In the shipping sector, the spread of energy-saving and CO_2-saving ships will be promoted through measures such as the energy-saving rating system for coastal ships. In parallel, technological development, demonstration, and introduction of ships that contribute to the improvement of operational efficiency utilizing innovative energy-saving technologies and digital technologies will be advanced, along with ships utilizing bio-fuels, and zero-emission ships (including hydrogen or ammonia-fueled ships, hydrogen fuel-cell ships, and battery ships), and other ships (including LNG-fueled ships, and methanol-fueled ships). Additionally, the installation and augmentation of domestic production facilities for zero-emission and other ships will be promoted.

○ Decarbonization of the aviation sector

To decarbonize the aviation sector, the following initiatives will be advanced through public-private partnerships: (1) promotion of the introduction of sustainable aviation fuels (SAF); (2) improving operations through further sophisticated air traffic control; (3) introduction of new technologies into aircraft and equipment; (4) promotion of energy conservation in airport facilities and airport vehicles; and (5) turn of airports into renewable energy hubs.

○ Realization of a hydrogen society (Described below)

(h) Promotion of decarbonized logistics systems

○ Improvement of efficiency of truck transportation and promotion of joint transportation and delivery (improvement of efficiency of truck transportation)

[40] A vehicle equipped with a mechanism that efficiently controls motor speed without using electrical resistance.

○ Improvement of efficiency of truck transportation and promotion of joint transportation and delivery (promotion of joint transportation and delivery)

Initiatives, such as joint transportation and delivery, will be promoted through cooperation between shippers requesting deliveries and logistics businesses undertaking deliveries. Global warming countermeasures will also be promoted by improving transport and loading efficiency, while greening the entire logistics system.

Therefore, energy management will continuously be promoted by shippers and carriers in accordance with the Energy Conservation Act. Also, based on the Act on Advancement of Integration and Streamlining of Distribution Business (Act No. 85 of 2005), initiatives will be implemented to streamline transport, such as the establishment of truck sales offices at distribution facilities for storage, cargo handling, and distribution processing, and the introduction of truck reservation reception systems to consolidate and rationalize delivery networks. At the same time, the decarbonization of logistics will be promoted by providing support for operations that provide truck transport with no time spent waiting for loading, promotion of new modal shifts using means such as railways, ships, aircraft, and double-articulated trucks, container round use, and the promotion of consolidated transport and delivery initiatives in depopulated areas and cities. Decarbonized logistics will be further advanced via initiatives to streamline logistics through regulatory measures on shippers and logistics businesses based on the Act on Advancement of Integration and Streamlining of Distribution Business following its amendment by the Act Partially Amending the Act on Advancement of Integration and Streamlining of Distribution Business and the Motor Truck Transportation Business Act (Act No. 23 of 2024), which was promulgated in May of 2024. Additionally, the Green Logistics Partnership Conference[41] will carry out the following activities in cooperation among shippers, logistics businesses, and other related parties: modal shifts, efficient truck transportation, and other initiatives to reduce the environmental impact of the logistics sector, improve logistics productivity, and create a sustainable logistics system. Awards will be given to businesses that have made outstanding achievements in the construction of green logistics to motivate them to take independent initiatives and to promote the use and expansion of green logistics. Responding to the growing needs of shippers, consumers, and others for decarbonization of logistics services, initiatives will be promoted to utilize electric vehicles, such as for the electrification of intra-regional transportation and delivery, and the development and dissemination of fuel cell trucks for long-distance transportation. In addition, to facilitate cooperation among shippers' companies, logistics businesses, and other related parties, the effectiveness of each initiative will be objectively evaluated using a unified method (guidelines) for calculating CO_2 emissions in the logistics sector that can be commonly used by these parties.

In addition, the rapid development of electronic commerce (EC) in recent years has led to an annual increase in the number of parcel deliveries handled, while the redelivery rate has decreased to about 10%, partly due to an increase in time spent at home since

[41] An organization that consists of member companies and organizations that are the shipper companies, logistics businesses, government, and other related fields and is operated with the cooperation of the Ministry of Economy, Trade and Industry; the Ministry of Land, Infrastructure, Transport and Tourism; and related organizations in order to promote voluntary efforts by the industry toward building green logistics.

the spread of the COVID-19 pandemic. To further reduce the number of redeliveries, utilizing courier boxes, diversifying parcel receiving methods, including receiving at stations, public facilities, and convenience stores, promoting and improving porch delivery, and conducting a “cutting down redeliveries PR month will be advanced.” Delivery efficiency will also be improved using tools such as drones and automatic delivery robots. Especially in depopulated areas, demonstration projects will be conducted for the social implementation of drone logistics. The possibility of using a delivery method with less environmental impact will be verified through the dissemination of the Guideline on Parcel Delivery using Drones Ver. 4.0 (March 31, 2023, formulated by the Ministry of Land, Infrastructure, Transport and Tourism) to ensure its implementation in society in the near future.

The efficiency of logistics will be further improved by promoting the introduction of double-articulated trucks and other measures. Efficiency will also be enhanced by strengthening access on expressways, including direct connections to private facilities, supporting operation management using ETC 2.0, and speeding up administrative procedures for passage of oversized and overweight vehicles through promoting the use of a new passage system. The social implementation of autoflow roads, utilizing clean energy enabled by full use of road spaces that will serve as new forms of logistics, will be pursued.

○ Promotion of a modal shift to marine and rail freight transportation (promotion of a modal shift to marine transportation)

○ Promotion of a modal shift to marine and rail freight transportation (promotion of a modal shift to rail freight transportation)

To promote the greening of the entire logistics system, the shift from automobile transportation to transportation by coastal shipping or rail, which emits less CO_2, will be promoted.

As part of this initiative, to increase the competitiveness of coastal shipping that takes on transport, transportation cost reduction and service improvement will be promoted through the development of domestic trade terminals for intermodal transportation, while spreading and promoting energy-efficient coastal vessels. Furthermore, a modal shift to coastal shipping will be promoted through the introduction of trailers that can be detached from truck cabs and the use of the Eco Ship Mark.

Similarly, to increase the competitiveness of rail freight transportation, transportation capacity will be increased, and transportation quality will be improved by devising new timetable settings and enhancing transportation equipment, such as block trains and temperature-controlled freight trains. In addition, modal shifts will be promoted by improving the convenience of freight rail services through introducing new technologies that contribute to better efficiency, labor savings, and safety improvement at freight stations, enhancing BCP including the expansion of container platforms to ensure alternative transportation in the event of disasters and promoting the Eco Rail Mark, etc.

The introduction of automated equipment and systems that utilize AI, IoT, and other digital technologies through collaboration among related businesses will also be promoted to improve transportation efficiency and energy conservation throughout the supply chain.

In addition, further efficiency improvements will be promoted in truck transportation. In doing so, the conversion from private trucks to commercial trucks and the use of larger vehicles and trailers, such as large CNG trucks, will be promoted. Loading efficiency will also be improved by eliminating congestion and securing return cargo.

○ Promotion of decarbonization of logistics facilities

The spread of zero-energy models for warehouses will be promoted by supporting projects that simultaneously introduce renewable energy equipment, such as solar power generation facilities, and equipment that contributes to unmanned or labor-saving operations, including unmanned forklifts and carriers, in facilities such as logistics centers, which are the core of logistics operations. The decarbonization of logistics facilities will also be promoted by converting to energy-efficient natural refrigerant equipment in refrigerated and frozen warehouses.

○ Efforts at ports and harbors (reduction of the distance of land transportation of cargo through optimal selection of ports and harbors)

○ Efforts at ports and harbors (comprehensive decarbonization of ports and harbors)

In ports, we will develop competitive ports in response to the needs of shippers and others who are working on decarbonization of the entire supply chain. Additionally, as industries that emit large amounts of GHGs are concentrated in ports and coastal areas, we will encourage these industries to promote energy conversion and contribute to structural transformation and increase their competitiveness. Therefore, we will promote Carbon Neutral Port (CNP) initiative that aims to enhance decarbonization of terminal operation and develop environments for receiving hydrogen, ammonia, etc. thus contributing to achieving Japan's target of net zero by 2050. Specific initiatives include the following: implementing measures based on the port decarbonization promotion plans at each port; promoting the adoption of low or zero-carbon cargo handling equipment etc. ; developing environments for receiving hydrogen, ammonia, etc.; establishing and promoting CNP certification that objectively evaluates the status of decarbonization efforts at container terminals; developing next-generation fuel bunkering bases; alleviation of traffic congestion in front of container gates through construction of digital logistics systems; promoting the introduction of facilities for supplying power to ships from land; promoting the introduction of renewable energy such as off-shore wind and solar power; creating port green areas that contribute to carbon dioxide absorption; improving the functionality of coastal ferry and RORO ship terminals to promote modal shifts; reducing carbon dioxide emissions from port construction; and making use of blue carbon (carbon coming from carbon dioxide sequestrated through ocean ecosystems) through the conservation, restoration and creation of blue infrastructure (seagrass meadows, macroalgal beds, tidal flats and bio-symbiotic port structures). Consideration will also be advanced to further facilitate the use of carbon credits derived from blue carbon by firms.

In addition, promoting the development of international marine containers terminals, etc., that can handle marine transportation to the nearest port, thus reducing the travel distance for truck transportation.

○ Realization of a hydrogen society (Described below)

(i) Promotion of sector coupling of electricity, heat, and mobility (Described above)

(j) Other policies and measures

(Systematic promotion of measures for inter-ministerial cooperation)

○ Reform of regulations contributing to global warming countermeasures

To achieve the reduction targets more reliably in the transport sector, including the decarbonization of each transport mode and the promotion of modal shifts, the relevant ministries and agencies will systematically promote cooperation and implement initiatives in all areas in a more effective and efficient manner. In addition, initiatives that take advantage of reforms to regulations that contribute to global warming countermeasures will be promoted.

E. Energy-conversion sector

CO_2 emissions in the energy conversion sector in FY2022 were 84.9 million t-CO_2 (excluding statistical errors in electricity and heat distribution). This is 20.1% lower than in FY 2013 (after electricity and heat allocation). On the other hand, CO_2 emissions from power generation before electricity and heat allocation account for about 40% of Japan's energy-related CO_2 emissions.

Under the Seventh Strategic Energy Plan (Cabinet decision on February 18, 2025), advancing the maximum possible efforts aimed at economic efficiency and compatibility with the environment is the basic principle of energy policy, with a stable supply of energy as the first priority, on the major assumption of safety.

It is thus essential for countries to reduce excessive dependency on fossil fuel energy by both making progress on thorough energy conservation and manufacturing sector fuel conversion on the demand side, and, on the supply side, contributing to guaranteeing energy security through renewable and nuclear energy, and maximizing the use of energy sources with high decarbonization impacts, in order to realize a conversion to a resilient energy supply and demand structure that can withstand energy crises.

(a) Promotion of voluntary efforts by industry (Described above)

○ Steady implementation, evaluation, and verification of Voluntary Action Plans (Described above)

(b) Expansion of decarbonized power sources

○ Reduction of CO_2 emission intensity in power sectors

From the standpoint of achieving both a stable energy supply and decarbonization in the power source mix, renewable energy will be utilized as the primary power source to

the fullest extent, with efforts aimed at achieving a balanced composition to avoid excessive dependency on specific power or fuel sources.

With domestic demand for power expected to increase as DX and GX develop, Japan also needs to address such future increases in power demand by expanding the decarbonized power sources. Furthermore, amidst volatility risks in the price of fossil fuels due to the invasion of Ukraine and conflict in the Middle East, Japan needs to consider all possible options to expand decarbonized power sources, including the maximum possible introduction of renewable energy, the use of nuclear power, on the major assumption of ensuring safety, and decarbonization of thermal power, rather than posing a dichotomy between renewable energy and nuclear power, based on the fact that current decarbonized power sources make up only some 30% of power sources.

Effectiveness and transparency across the entire electricity industry are ensured based on efforts such as policy measures rooted in electricity industry voluntary frameworks, as well as the Energy Conservation Act and the Act on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Raw Materials by Energy Suppliers (Act No. 72 of 2009) which encourage those frameworks. It also evaluates the progress of those efforts to check whether they are consistently becoming more effective. Related measures are examined based on the degree of achievement of emission factor targets, with the stable supply of energy as the major premise.

[Renewable energy]

○ Maximum introduction of renewable energy

Under the major premise of S+3E (Safety, Energy security, Economic efficiency, and Environment), the use of renewable energy as a main source of power will be thoroughly promoted. The maximum introduction of renewable energy will be promoted to the greatest extent possible while seeking coexistence with local communities and limiting the burden on the public by partnering with relevant ministries and agencies and local governments to improve measures. In making renewable energy a major power source, we will seek to minimize the costs to society as a whole coming from efforts to integrate renewable energy into the electricity market associated with the grid development and securing balancing capacity, while also working to make renewable energy a reliable power source for the long term. In expanding the introduction of renewable energy, the strategic acceleration of innovation and the construction of supply chains will be advanced and thus improve the technical self-sufficiency of Japan through the use and expansion of domestic renewable energy, while also putting in place measures to deal with used solar panels.

<Co-existence with local communities>

The rapid growth of the introduction of renewable energy, triggered by the introduction of the FIT system led to growth in various businesses entering the market. This resulted in increased concerns from local communities about the effects on the environment and future waste, including from safety, disaster risk reduction, scenery and biodiversity perspectives. The emissions associated with solar panels are expected to rise significantly from the late 2030s, requiring a strategic approach. It is important for governments to promote understanding in local communities and to ensure proper

business orders so that local communities and the society can accept renewable energy as a power source that generates electricity stably over the long term.

<Curbing the national burden>

Japan's renewable energy generation costs are steadily coming down but remain high compared to international levels. Charges for renewable energy in FY 2024 are also expected to reach 2.7 trillion yen. In order to limit the burden on the public, the cost of renewable energy will be reduced to a competitive level and bring about conditions under which the autonomous introduction of renewable energy proceeds.

Specifically, the utilization of a bidding system in the FIT and FIP systems will be promoted, in addition to efforts to promote renewable energy power generation businesses, the business models of which do not rely on the FIT and FIP systems. To promote the prompt conduct of business following FIT and FIP certification, systems for FIT and FIP certifications to lapse, among other measures, will be steadily operated.

<Integration into the electricity market>

In making renewable electricity a main power source, we will advance efforts to secure balancing capacity to further integrate into the electricity market of renewable energy, which has fluctuating output, by, for example, making use of pumped hydro power or batteries. The installation of inter-regional interconnections will be promoted to connect regions with significant scope to introduce renewable energy and areas of high demand. From the perspective of the maximum use of renewable energy, efforts will be made to reduce the volume of output control.

In thus integrating renewable energy into the electricity market, minimizing integration costs for society as a whole will be essential. From this perspective, further leverage of the FIP system will encourage renewable energy producers to act in accordance with the supply and demand circumstances of their own electricity markets (e.g., by shifting supply using batteries) and promote local production for local consumption of renewable energy resources in regions.

<Accelerating innovation/building supply chains>

In seeking to further expand the introduction of renewable energy going forward, it will be necessary to pioneer new sites for renewable energy, such as the roofs and walls of buildings, and deep-sea zones. This means that accelerating the technological innovation that supports this will be important. To that end, while industries related to the production of solar panels appear presently to be highly reliant on foreign markets, concurrently with the expansion of the introduction of renewable energy, it will be important to build resilient domestic supply chains, to seek to improve industrial competitiveness and to develop skilled people, based also on the ripple effect this would also have to regional economies.

<Other challenges>

Naturally derived heat from renewable energy is a vital energy resource with high regionality, and so it is important to promote it based on economic and regional characteristics. We will seek to support the introduction of naturally derived renewable energy heat supply facilities, including solar heat, geothermal, snow and ice heat, hot

spring heat, seawater heat, river heat, and sewage heat. It will also aim to expand the introduction of renewable energy heat by supporting initiatives that enable the area-wide sharing of heat by aggregating multiple consumers.

Research and development of revolutionary technologies beginning with sea-based energy, such as wave and tidal power, will be promoted to contribute to lowering costs, increasing efficiency, and pioneering diverse applications.

(Solar power generation)

In further expanding the introduction of solar panels, it is important to pursue the effective utilization of the roofs and exterior walls of buildings where solar panels can be installed for self-consumption use or according to a demand proximity model, on the presumption of coexistence with the local community, while reducing the burden on the citizens.

Work is being undertaken on three aspects of Perovskite solar cells, which have the characteristic of being lightweight and flexible, namely establishing mass-production technology, preparing production structures, and generating demand, with a target for introducing roughly 20GW in 2040.

(Wind power generation)

Finding sites for installing wind power generation while co-existing with the local community is a challenge in introducing wind power, and lead times to being able to introduce such projects are long due to coordination with locals and other factors, meaning there is a need to address these points also. It is furthermore important to install transmission networks connecting sites appropriate for wind power generation to locations where there is demand.

In offshore wind, the government aims to form 10GW worth of projects by 2030 and 30-45GW worth of projects by 2040, including floating-type projects through a public offer system based on the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities (Act No. 89 of 2018). To that end, continued involvement from an early stage by the government and related entities will be ensured, and the government will expand the sea areas subject to the scheme (centralized model) for quicker and efficient conduct of foundation and other surveys and ensure connections to the grid when appropriate. At the same time, a system for conducting offshore environmental surveys will be considered during the designation of promotion areas. Necessary institutional arrangements will be developed to enable the placement of offshore wind power generation facilities in Japan’s expansive exclusive economic zone.

(Geothermal power generation)

In relation to geothermal power generation, we will overcome the challenges such as the high development risks and costs, the long lead time, the limitations on suitable locations for development and connections to the grid due to the uneven distribution of promising sites for geothermal resources, and addressing the various regulations involved in coordinating with locals and with development. Specifically, the government will set up Geothermal Frontier Projects in multiple areas that it has selected and perform geothermal resource surveys (including discharge tests) through the Japan

Organization for Metals and Energy Security (JOGMEC). Understanding among stakeholders, with consideration for the natural environment and hot spring operators, will be fostered. Inflation in excavation costs and high excavation risks will be addressed, and while collaboration with relevant ministries and agencies will offer one-stop review for handling various licensing procedures under, among others, the Hot Springs Act (Act No. 125 of 1948), the Natural Parks Act (Act No. 161 of 1957) and the Forest and Forestry Basic Act (Act No. 249 of 1951) depending on the conditions of the location, in order to execute the "Geothermal Development Acceleration Package". [42] Additionally, research and development and demonstration of next-generation geothermal technology, such as closed loops that can generate power even in locations without hydrothermal water, will be advanced, thus contributing to commercialization, with the aim of putting the technology into practical use at an early stage in the 2030s

(Hydropower generation)

In relation to hydropower generation, challenges such as high development risks stemming from development costs and regulatory compliance, decreases in capacity due to the severe build-up of silt, damage from heavy rain disasters, which are growing more intense, and deterioration of facilities over time need to be overcome. Achieving self-sufficiency for such projects while seeking co-existence with local communities and cost reductions. Initiatives will also be advanced to promote investment in power generation, detailed investigation and project formation for candidate development sites under the initiative of local governments, and hybrid dam initiatives that combine improvements to flood control functions and promotion of hydropower generation.

(Biomass power generation)

In the introduction of biomass power generation, fuel costs such as collection and transportation make up the bulk of power generation costs. Additionally, we have recently seen the balance between fuel supply and demand become tight. Amidst this, efforts will be made to maintain stable business operations, as well as to reduce costs and secure stable fuel supply through collaboration with local agriculture and forestry.

- ○ Introduction of energy conservation and renewable energy in water supply and sewage (promotion of energy conservation and renewable energy measures in waterworks) (Described above)
- ○ Initiatives in waste treatment (Described above)

(Nuclear power generation)

Serious reflection over the Tokyo Electric Power Company Fukushima Daiichi Nuclear Power Station Accident must remain unforgotten as the starting point of nuclear power policy. Use of nuclear power must be fundamentally premised on ensuring safety, and we must fully take to heart the lesson to never again fall into the trap of believing in "safety myths." We must also take seriously those who express concerns over the safety of nuclear power and its progress on the backend.

[42] Announced at the 43rd Advisory Committee for Natural Resources and Energy and Fuel Subcommittee (November 13, 2024).

With this in mind, nuclear power has an overwhelming energy output relative to its fuel inputs. It is a semi-domestic energy source that can sustain power generation for many years with domestically held fuel alone, offering exceptional stability of supply and technological independence. It also compares favorably to other fuel sources in terms of cost level and variance. It is also a decarbonized energy source that is unaffected by the climate and can stably generate a set amount of energy.

The characteristics of nuclear power align with the anticipated growth in electricity demand driven by the advancement of DX and GX, and the new energy needs coming from the GX of manufacturing in particular, as well as from data centers, which operate at the rated level, and from semiconductor plants. Given this, we will work to gain the trust of the public and make sustainable use of nuclear power on the scale needed, premised on ensuring safety.

Amidst this context, the government will take the lead in fulfilling its responsibilities in order to further the constant pursuit of safety, coexistence with local communities and communication with all layers of society, to help accelerate backed processes, to make the greatest possible use of existing reactors, to prepare the environment to facilitate the development, installation and sustainable use of next-generation innovative reactors, to maintain and improve supply chains and personnel, and to contribute to solving shared international problems.

(Decarbonization of thermal power generation)

In relation to thermal power generation, the use of LNG thermal power as a means of transition fuel will be promoted. Additionally, steps will be taken to decarbonize thermal power generation using technologies such as hydrogen, ammonia, and CCUS, while paying attention to time factors and emissions based on technological development and costs and ensuring foreseeability for businesses. The phasing out of inefficient coal-fired power generation will be further promoted. It is also important to advance measures for the decarbonization of inefficient thermal power generation by joint thermal power generators and private power generators. In advancing such measures, attention must be given to potential future impacts on regional economies and employment stemming from the maintenance, decarbonization, suspension or abolition of supply chains necessary for building, operating, and maintaining thermal power generation. It is important to advance the transition towards decarbonization while in constant communication with stakeholders based on the situation in each region, for example, having power generators broadly present the direction of transition to relevant parties. Considering the situation in outlying island regions, where there are limitations on power sources and the scale of power grids, is crucial.

(c) Construction of a next-generation electricity network

The development of next-generation electricity network is essential for advancing the decarbonization of the electricity system while ensuring a stable supply of power. This requires optimizing the utilization use of the existing power grids, develop inter-regional interconnection lines based on the Master Plan of Nation-wide Power Transmission Networks formulated by the OCCTO, and steadily reinforce local backbone grids. In

addition, as the maximum deployment of renewable energy is progressing, it is crucial to promote the construction of a next-generation electricity network that ensures flexibility to accommodate the variability of renewable energy sources. To address this, it is essential to secure sufficient balancing capacity and advance sophistication of grid and supply-demand operations, thereby enabling the construction of a next-generation electricity network that ensures flexibility to accommodate the variability of renewable energy.

Additionally, with regard to providing flexibility in the power system, batteries are important as a highly responsive, adjustable power source that can store electricity generated through renewable and other energy, then supply electricity, for example, during evening demand peaks, while demand response (DR) is an important approach on the demand side for securing the balance between supply and demand. With the spread of distributed energy resources (DER) such as batteries and cogeneration systems, it is necessary to develop DR that makes use of these resources and to seek their further spread. In making use of DER, local microgrids that contribute to efficient use of energy through local production and consumption, and to improve disaster resilience, will also be important.

○ Promotion of local production for local consumption and areal use of energy (Described above)

(d) Realization of a hydrogen society

○ Realization of a hydrogen society

Hydrogen is a foundational material for ammonia, e-methane, and e-fuels, and is expected to be utilized across a wide range of sectors, including steel, chemicals, mobility, industrial heat, power generation, as a key energy source for achieving carbon neutrality by 2050.

Japan has been a global leader in multiple hydrogen technologies, including hydrogen production, transportation, and combustion. In order to "excel in technology and also succeed in business", Japan will continue to enhance its competitiveness through world-leading technological development supported by initiatives such as the Green Innovation Fund Projects, while also encouraging proactive capital investment by companies in anticipation of global market expansion.

For social implementation, we will strongly support the establishment of large-scale supply chains for low-carbon hydrogen and its derivatives under the Act on Promotion of Supply and Utilization of Low-Carbon Hydrogen and its Derivatives for Smooth Transition to a Decarbonized, Growth-Oriented Economic Structure (Act No. 37 of 2024; hereinafter referred to as the “Hydrogen Society Promotion Act”). Taking into account global and corporate trends, Japan will continue to implement integrated regulatory and support policies to promote the large-scale supply and utilization of low-carbon hydrogen and its derivatives both domestically and internationally, aiming to reduce costs and expand usage in tandem. In addition, we will also promote the utilization of hydrogen and its derivatives based on local assets, contributing to regional revitalization.

CCUS is a technology that can achieve decarbonization in hard-to-abate areas such as steel, chemicals, cement, and oil refining, during the process of electrification or conversion to non-fossil fuels such as hydrogen and its derivatives by storing in the ground or making effective use of CO_2 generated in hard-to-abate areas or in power generation. As this means that CCUS will be essential for simultaneously achieving a stable energy supply, economic growth, and decarbonization, these efforts will be promoted.

(e) Decarbonization of oil refining

○ Promotion of the introduction of facilities and equipment with high energy-saving performance (petroleum product manufacturing sector)

Towards cleaner oil refining processes, further advancements in energy conservation measures are being pursued, while initiatives such as the utilization of CO_2-free hydrogen are being promoted to achieve the decarbonization of oil refineries.

(ii) Non-energy-related CO_2

Non-energy-related CO_2 emissions in Japan in FY 2022 were 72.6 million t-CO_2, a decrease of 11.7% compared to FY 2013. The following initiatives have been implemented so far: expansion of the use of blended cement, which emits less CO_2 in the production process; reduction of the generation of waste and other materials; promotion of the reuse and recycling of recyclable resources and products; effective use of wood-related resources, which can be reproduced as a raw material and energy source and has a low environmental impact; and promotion of the use of biomass plastics. In the future, these measures will be promoted or strengthened as outlined below, utilizing a certification system established by the Act Concerning Sophistication of Recycling Business, etc. to Promote Resource Circulation (Act No. 41 of 2024; hereinafter referred to as the "Resource Circulation Act"), to reduce emissions of non-energy-related CO_2.

○ Expansion of the use of blended cement

The production ratio and use of blended cement, which is made by mixing blast furnace slag and other materials in clinker, an intermediate product of cement, will be expanded.

In addition, the use of blended cement will be increased by promoting the use of blended cement in public works projects undertaken by the government through the proactive use of blended cement in accordance with the Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Act No. 100 of 2000, hereinafter referred to as the "Act on Green Purchasing").

○ Reduction of waste incineration

The 3R + Renewable activities will be promoted to achieve the targets set forth in the Fifth Fundamental Circular Economy Plan under the Circulation Act and the waste reduction targets based on the Act on Waste Management and Public Cleansing (Act No. 137 of 1970, hereinafter referred to as the Waste Management Act). The incineration of petroleum-based waste, such as waste plastic and waste oil (solvent, lubricant), will be

reduced. Specifically, specific actions to reduce CO_2 emissions from waste incineration include the enforcement of thorough separate collection at municipalities and the introduction of charges for waste, the implementation of measures in accordance with the Act on the Promotion of Resource Circulation for Plastics (Act No. 60 of 2021), and individual recycling acts. Efforts are being made to address plastic waste product measures based on the future progress of negotiations over the Global Plastics Treaty. Additionally, the material cycle of waste oils (solvents and lubricating oils) is being promoted to reduce waste generation.

Furthermore, based on the Roadmap for Bioplastics Introduction (formulated by the Ministry of the Environment; the Ministry of Economy, Trade and Industry; the Ministry of Agriculture, Forestry and Fisheries; and the Ministry of Education, Culture, Sports, Science and Technology in January 2021), the use of plastics made from biomass will be promoted on the assumption that it will become more sustainable. By doing this, CO_2 emissions from the incineration of waste plastics (CO_2 from petroleum-based carbon in waste plastics) will be reduced as they replace petroleum-based plastics.

○ Promotion of "*Decokatsu*" (Described below)
○ Promoting Environmental Education and Education for Sustainable Development (ESD) (Described below)

(iii) Methane

Methane emissions in Japan in FY 2022 were 29.9 million t-CO_2, a decrease of 8.6% compared to FY 2013. Relevant countermeasures implemented so far included promoting the 3Rs of waste, upgrading combustion at waste incineration facilities by promoting the introduction of full continuous feed incinerators, improving management of farm fields, and improving livestock manure management methods. These countermeasures will continue to reduce methane emissions.

○ Measures to reduce greenhouse gas emissions related to agricultural soil (reduction of methane emissions in paddy fields)

Emission of methane generated from rice cultivation will be reduced by promoting " prolonging mid-season drainage " as a part of water management during the cultivation period, while paying due heed to potential reduced harvests and to preserving biodiversity, and by promoting the development and use of other technologies expected to reduce methane emissions.

○ Measures to reduce greenhouse gas emissions related to livestock (reduction of methane emissions)

Measures to reduce methane emissions resulting from enteric fermentation and manure management of livestock are being promoted. These include the use of feed supplements that limit methane production and changes in manure management methods.

○ Reduction of final waste disposal

The 3R + Renewable activities will be promoted to achieve the targets set forth in the Fifth Fundamental Circular Economy Plan under the Circulation Act and the waste reduction targets set forth in the Waste Management Act. Specific measures to reduce methane emissions from landfilling waste include reevaluation of the disposal method by municipalities, thorough waste sorting, and strengthening the disposal system, which will directly reduce the landfilling of organic waste, such as food waste.

○ Adoption of semi-aerobic landfill structures in final waste disposal sites

A semi-aerobic landfill structure will be adopted when installing a final waste disposal site. This will reduce methane emissions from the biological decomposition of organic waste, such as landfilled food waste, compared to an anaerobic landfill structure.

(iv) Nitrous oxide

Nitrous oxide emissions in Japan in FY 2022 were 17.3 million t-CO_2, a decrease of 13.3% compared to FY 2013. Measures have been implemented so far to reduce emissions in industrial processes and to upgrade combustion in waste and sewage sludge incineration facilities, for example, by promoting the introduction of fully continuous feed incinerators. These countermeasures will continue to reduce emissions of nitrous oxide.

○ Measures to reduce greenhouse gas emissions related to agricultural soil (reduction of nitrous oxide associated with fertilization)

Excessive fertilizer usage will be limited, and nitrous oxide emissions coming from the nitrogen in fertilizer ingredients in croplands will be reduced by promoting efficient fertilization using low-fertilizer technologies such as localized fertilizer distribution devices and by promoting optimized fertilization through soil analysis and fertilization design using sensing technology.

○ Measures to reduce greenhouse gas emissions related to livestock (reduction of nitrous oxide)

Reducing methane emissions coming from manure will involve promoting the addition of feed and feed supplements that contribute to limiting nitrous oxide production, as well as promoting changes in manure management methods.

○ Advancement of incineration at sewage sludge incineration facilities

Emissions of nitrous oxide from the incineration of sewage sludge will be reduced by upgrading combustion at sewage sludge incineration facilities and promoting incinerators and sewage sludge solid fuel conversion facilities that emit less nitrous oxide.

(Reduction of waste incineration, etc.)

The 3R + Renewable activities will be promoted to achieve the targets set forth in the Fifth Fundamental Circular Economy Plan under the Circulation Act and the waste reduction targets set forth in the Waste Management Act. These initiatives aim to reduce

the volume of waste incinerated at waste incineration facilities. Also, emissions of nitrous oxide from waste incineration will be reduced by increasing the upgraded combustion at general waste incineration plants through the conversion to full continuous feed incinerators through wide-area waste disposal and by increasing the proportion of waste treated by continuous operation at general waste incineration plants.

(v) Fluorinated Gases: (HFCs, PFCs, SF_6, NF_3)

The emission of fluorinated gases in Japan in FY 2022 was 38.51 million t-CO_2, which is estimated to be an increase of 33.3% compared to FY 2013.[43] Of these, emissions of HFCs have been on an increasing trend due to the ongoing conversion from CFCs and HCFCs to HFCs, mainly for the use of refrigerants in refrigeration and air-conditioning equipment. For this reason, though emissions had been trending upwards, they are estimated to have fallen by 2.3% in FY 2022 compared to FY 2021. About 90% of HFC emissions come from the refrigerants used in refrigeration and air-conditioning equipment. Leakage of HFCs during equipment use and uncollected HFCs at disposal contribute significantly to the emissions.

In response to the global increase in the use and emission of HFCs, an amendment (hereinafter referred to as the "Kigali Amendment") was adopted in 2016 to add HFCs to the list of substances covered by the Montreal Protocol on Substances that Deplete the Ozone Layer. To fulfill the obligation to reduce the production and consumption of HFCs based on the Kigali Amendment, Japan amended the Act on the Protection of the Ozone Layer Through the Control of Specified Substances, etc. and Other Measures (Act No. 53 of 1988) in 2018, regulating the production and import of HFCs and implementing other measures. By steadily fulfilling the obligations of the Kigali Amendment, the production and consumption of HFCs will be gradually reduced by 85% compared to the reference volume[44] by 2036. The development of low-GWP[45] refrigerants and natural refrigeration devices is being promoted to further reduce the emissions of HFCs.

Japan has also implemented countermeasures throughout the entire lifecycle of fluorocarbons, from the manufacture of fluorocarbons and products to the use and disposal of products and the destruction and recycling of fluorocarbons, under the Act on Rational Use and Proper Management of Fluorocarbons (Act No. 64 of 2001, hereinafter referred to as the "Fluorocarbons Emissions Control Act"). In 2019, amendments were made to add a mechanism for the reliable recovery of fluorocarbons at the time of equipment disposal. As 2025 marks five years since the Amended Act on Rational Use and Proper Management of Fluorocarbons went into effect, the

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[43] Estimated values based on the revised calculation method for fluorinated gases approved at the FY2024 Committee for the Greenhouse Gas Emissions Estimation Methods held on January 24, 2025. As part of the volume of emissions and removals of greenhouse gases, in FY 2022, the emission of fluorinated gases was 51.7 million t-CO_2, which is an increase of 39.0% compared to FY 2013 and a decrease of 1.6% compared to FY 2021.

[44] A total of 15% of the average value of the production volume and consumption volume of HFCs and of the reference value for HCFCs (the production volume and consumption volume of HCFCs in 1989) from 2011 to 2013.

[45] Global Warming Potential (GWP): The ratio of the effect of each greenhouse gas on global warming to that of carbon dioxide.

government will consider the state of enforcement of the revised act and make necessary revisions.

In addition, waste household air conditioners are subject to the Act on Recycling of Specified Household Equipment (Act No. 97 of 1998, hereinafter referred to as the "Home Appliance Recycling Act"), and the recovery of fluorocarbons from them is being promoted. However, the recovery rate[46] of waste household air conditioners is lower than that of other target products. Effective countermeasures are being implemented based on a proper understanding of the facts regarding illegal collection businesses and yard operators, and to improve awareness raising among industrial waste disposers and consumers.

Studies will be continued on the introduction of economic methods to reduce the emissions of fluorocarbons, considering that while there are possible effects, there are also issues to be addressed.

Voluntary efforts by industry to reduce emissions from non-refrigerant applications will continue to be promoted.

○ Fluorinated gas (HFCs, PFCs, SF_6, NF_3) countermeasures

(Reduction of production and import volumes of HFCs, conversion of refrigerants)

To reduce the environmental burden caused by fluorocarbons, gas manufacturers, etc. (manufacturers and importers of fluorocarbons, etc.) are encouraged to implement such measures as the substitution of fluorocarbons with non-fluorocarbon alternatives, including lowering the GWP of fluorocarbons that they handle and reducing their production volume, etc.

In response to the Kigali Amendment, gas manufacturers, etc., are requested to systematically reduce the amount of fluorocarbons they manufacture based on the outlook for the use of fluorocarbons established by the government in accordance with the Fluorocarbon Emissions Control Act.

Regarding refrigeration and air-conditioning equipment and other products using fluorocarbons, the following measures will be implemented to promote the accelerated and steady shift to non-fluorocarbons and low GWP products, taking into consideration that the equipment to be introduced will continue to be used for a certain period of time and taking into account future technological advances and market trends in Japan and overseas.

i. Non-fluorocarbons and low GWP products are promoted as soon as possible through active use of systems, such as adding new products and revising targets in the designated product system, which requires manufacturers and importers to achieve the standard values in a certain target year for each appropriate product category based on the Fluorocarbon Emissions Control Act, while fully

[46] Recovery rate of waste household air conditioners: The recovery rate of items subject to the Home Appliance Recycling Act is calculated as the number of units shipped in the denominator and the number of units properly collected and recycled (the number of units recycled by manufacturers etc., the number of units recycled by waste disposal licensed companies etc., and the number of units disposed as general waste by local public bodies) in the numerator.

considering the actual situation of each product, etc.

ii. To raise awareness of the greenhouse effect of fluorocarbons and to educate users and consumers about the introduction of non-fluorocarbons and low GWP products, the labeling of products that use fluorocarbons will be improved in a way that is easy for them to understand.

iii. In addition to institutional measures, policies will be implemented to develop low-GWP refrigerants, promote the spread of energy-saving natural refrigerant equipment, train personnel to install and maintain equipment compatible with new refrigerant alternatives, ensure the quality of the equipment installation and maintenance personnel, and spread awareness among the public.

(Reduction of fluorinated gases at the time of product manufacture)

Countermeasures implemented against fluorinated gases in the industry's voluntary action plans will be evaluated and verified. Also, measures will be implemented to support businesses' efforts to reduce emissions, such as subsidies for the introduction of equipment that contributes to emission reductions.

(Reduction of volume of HFC leaks at time of product use)

Based on the Fluorocarbon Emission Control Act, leakage of fluorocarbons will be prevented when commercial refrigeration and air-conditioning equipment, particularly obsolete equipment, is used in cooperation with prefectural governments through compliance with the criteria for management that stipulate equipment inspections etc., operation of the system for reporting and publishing the leakage amount of fluorocarbons calculation, and promotion of compliance with appropriate filling. The Standards of Judgment for Managers of Class I Specified Products (2014, Public Notice No. 13 from the Ministry of Economy, Trade and Industry and the Ministry of the Environment) were revised in 2022, making it possible to switch to the use of simple inspections using IoT constant monitoring systems. The adoption of IoT constant monitoring systems is progressing, while also considering whether it would be possible to also apply the technology to regular inspections.

In addition, to prevent leakage during the use of refrigeration and air-conditioning equipment, it is important not only for product manufacturers and equipment users but also for equipment installation and maintenance contractors to take action. Thus, efforts are underway to improve the technical level of the management of the installation and maintenance of equipment for the prevention and early detection of refrigerant leaks. Also, initiatives will be promoted to secure and train personnel with expertise in the practical management of refrigeration and air-conditioning equipment.

(Reduction of volume of HFC releases at time of product disposal)

The recovery and proper processing of fluorocarbons from refrigeration and air-conditioning equipment will be promoted through the reliable enforcement of the Fluorocarbons Emission Control Act and the Act on Recycling of End-of-Life Automobiles (Act No. 87 of 2002).

In particular, commercial refrigeration and air-conditioning equipment (excluding car air conditioners) accounts for approximately 70% of HFC emissions from refrigeration and air-conditioning equipment. In accordance with the Fluorocarbons Emission

Control Act, a system that enables equipment disposers, dismantlers, waste/recycling companies, fluorocarbons filling and recovery companies to check each other will be thoroughly implemented, and the volume of releases of gases at the time of disposal will continue to be improved in cooperation with prefectures.

In addition, regarding fluorocarbons contained in the disposal of household air conditioners, the recovery rate of the disposal of household air conditioners will be improved, thereby promoting the recovery and proper processing of fluorocarbons by steadily enforcing the Act on Recycling of Specified Kinds of Home Appliances and raising awareness.

(2) Policies and measures to remove greenhouse gases

The emissions and removals through forest and other sink measures in FY 2022 resulted in a net removal of 50.2 million t-CO_2. This is equivalent to 3.6% of the total GHG emissions (1,407 million t-CO_2) in FY 2013.

(i) Policies and measures for forest carbon sinks

Forests play important roles not only in land conservation and water resources conservation, but also as a natural mechanism for removing and storing carbon dioxide. Forests absorb carbon dioxide from the atmosphere through photosynthesis and store it in the form of trunks and branches, making a significant contribution to preventing global warming. Sustainably managed forest, that involves harvesting and replanting trees, are considered carbon neutral, as emissions and removals of GHGs in such forests balance out over the long term.

Wood produced in forests has a variety of applications depending on its diameter and quality. The use of wood － ranging from construction, which creates new carbon reservoirs in cities[47], to woody biomass unsuitable for construction and off-cuts produced during wood-processing, as substitutes for fossil fuels and fossil fuel-derived materials, also contributes to reducing CO_2 emissions.[48]

Wood products also have the advantage of requiring relatively little energy during manufacturing compared to other materials. Therefore the use of wood in construction contributes to reducing CO_2 emissions throughout the building lifecycle.[49]

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[47] In a case study evaluating the carbon-storage effects of the wood used in 11-story building (construction commenced in 2022) based on the Guidelines on the Display of Carbon Storage Volumes Related to Wood Used in Buildings (Notification No. 85 (2021, Wood Industry Division, Forest Policy Department) by the Director-General of the Forestry Agency, dated October 1, 2021) the volume of carbon stored through the use of 1,990m^3 of wood used was calculated as being 1,652t-CO_2.

[48] Supposing that all of approximately 23 million m^3 (2022) of fuel wood was used as a substitute for fuel oil A in power generation, heating and combined heat and power, this would be equivalent in effect to a roughly 4.5 million t-CO_2 reduction in emissions.

[49] In a case study estimating the CO_2 emissions when building an 11-story RC/wooden building (construction commenced in 2021), it was estimated that 1,380t-CO_2 was saved compared to if the building had been all RC. Additionally, the CO_2 emissions when manufacturing wood for a standalone home (136m^2) come to “5,140kg-C” for “wooden construction,” “14,743kg-C” for “S construction) (steel frame) and “21,815kg-C” for “RC construction” (reinforced concrete), according to “Evaluation of Wood Frame Home Building From the Perspective of Carbon Stock and CO_2 Release) (Okazaki and Okuma, 1998).

For this reason, based on the Basic Plan for Forest and Forestry (Cabinet decision on June 15, 2021), Japan aims to comprehensively pursue the forest and forestry sector's contribution toward achieving net-zero by 2050. This will be achieved through securing medium- to long-term removals by forest carbon sinks by promoting appropriate management and conservation of forests, and encouraging the use of wood; and advancing the transition from other materials to wood.

To this end, comprehensive action, including cross-sectoral policies, will be taken on various measures based on the Plan, while securing cooperation from stakeholders such as local governments, forest owners, private businesses, and the public.

○ Policies and measures for forest carbon sinks

(Appropriate management of forests)

Appropriate forest management practices depending on natural conditions, such as reforestation and forest thinning, countermeasures against forest damage caused by deer and other wildlife, and the promotion of appropriate road networks combining forest roads and forestry operation road, will be promoted to foster diverse and healthy forests.

To this end, reforestation will be reliably promoted by streamlining and reducing the costs of afforestation work, and by expanding the production of seeds and saplings from Elite Trees. This approach will promote the development of vigorous growing young forests and promote support the transition to low-pollen forests. Furthermore, forest management led by public entities will be promoted through the use of frameworks such as the Act on Special Measures concerning Advancement of Implementation of Forest Thinning, etc. (Act No. 32 of 2008), the forest management system, and the forest environment transfer tax.

(Promotion of appropriate management and conservation of protection forest, natural parks and other areas)

The planned designation of Protected Forests and the operation of the Protection Forests System will be appropriately implemented, along with the proper enforcement of regulations under the Forestland Development Permission System, national parks, and Nature Conservation Areas. In addition, management and conservation will be promoted through the Protected Forest system for national forests, as well as through pest-control measures and forest fire prevention. Furthermore, forest conservation projects will be systematically implemented in areas vulnerable to mountainous disasters and in degraded forests.

(Promotion of the use of wood)

Based on the Act for Promotion of Use of Wood in Buildings to Contribute to the Realization of a Decarbonized Society (Act No. 36 of 2010, hereinafter referred to as "Wood Use Promotion Act") the use of Japanese wood will be encouraged in areas where its utilization remains low such as horizontal members in wooden-houses, along with the adoption of wood in non-residential and mid-to-high-rise building in cities and other areas. In addition, the development and spread of technologies of sawn lumber, CLT (Cross Laminated Timber) and fire resistant wooden materials will be promoted.

Furthermore, steps will be taken to deepen the understanding of the emissions reduction and carbon storage effects of building construction using wood over the entire lifecycle.

The expansion of demand for woody biomass will be pursued not only for energy purposes but also by through the utilization of new woody materials that can substitute for fossil fuel-derived plastics, beginning with glycol modified lignin.

(ii) Policies and measures to increase carbon removals in agricultural soils

○ Policies and measures to increase carbon removals in agricultural soil

It has been confirmed that carbon storage in cropland and grassland soils in Japan can be increased through the continuous application of organic matter, such as compost and green manure to the soil as part of soil preparation and the application of biochar. Thus, promoting these contributes to carbon sequestration in cropland and grassland soils.

(iii)Promotion of urban greening

○ Promotion of urban greening

Urban greening is the most familiar sink measure for people in their daily lives. Its promotion is not only effective as an actual sink measure but also has a great effect on spreading awareness of the concept of global warming countermeasures.

Therefore, in accordance with the Green Basic Policy (the Basic Policy for Urban Green Conservation and Greening Promotion (Public notice no. 1367 of the Ministry of Land, Infrastructure and Transport, 2024)), the Green Regional Plans formulated by prefectures, the Green Basic Plans formulated by municipalities, and other comprehensive plans for the conservation and creation of greenery by the national and local governments, the following initiatives will be actively promoted: the development of urban parks; greening of roads, rivers (including erosion control structures), ports and harbors, sewage treatment facilities, public rental housing, and government facilities; the creation of new green spaces on the rooftops of buildings; the securing of quality green spaces by private businesses and others; and the designation of Special Green Conservation Areas.

As part of this initiative, the meaning and benefits of urban greening will be widely publicized to all sectors of the public. At the same time, support will be actively provided to create new green areas, such as in urban areas using a variety of different means and entities, such as urban greening, through the participation of a variety of entities, including citizens, businesses, and NPOs, and the use of a citizen greening certification system and multi-story urban park system.

In addition, the development of a system for reporting and verifying the removals by urban greening, etc. will continue to be systematically promoted.

(iv) Initiatives related to blue carbon and other removals

○ Initiatives related to blue carbon and other removals

Japan, surrounded on all sides by sea, benefits from rich ecosystem services that support its lifestyles and economic activities. Based on this foundation, efforts related to blue carbon, which has multidimensional value in terms of being nature positive,

conserving marine environments, and being part of climate change adaptation, are being actively promoted. Blue carbon refers to CO_2-derived carbon that is sequestrated by coastal and marine ecosystems. Specific sources of such carbon removals include seagrass meadows, macroalgal beds, salt marshes, and tidal flats. As, with some exceptions, methods for calculating the volume of GHGs sequestrated by blue carbon ecosystems are yet to be established, steps will be taken to lead the establishment of such calculation methods, to have these reflected in the country's inventory of emissions and removals of GHGs, and to establish international rules around this. In addition, the conservation, regeneration and creation of effective seagrass meadows, macroalgal beds and tidal flats are being advanced through "*Satoumi*" creation projects such as "*Reiwa Satoumi creation*" model enterprises that aim to create positive feedback loops of conserving, restoring, creating and making use of regional resources for seagrass/macroalgal beds and tidal flats in coastal regions, and through the Project to expand blue infrastructure in ports that contributes to biodiversity. Further, in order to advance consideration of the possibility of measures to remove GHGs using off-shore blue carbon, which shows great promise as a resource for carbon removal, to sequestrate those gases deep underwater by growing and producing macroalgae, and to calculate and evaluate such projects in terms of their volume of carbon sequestration, while seeking to use off-shore blue carbon as a bio-resource, promotion structures will be established, and investigations will be advanced in partnership with relevant ministries and agencies as well as through public-private partnership. These efforts will focus on the nature of sea zone utilization, considering the state of usage by the fishing industry, the development of technologies such as large-scale macroalgal beds and deep-sea subsidence, and the assessment of the impacts of such efforts on the marine environment through monitoring. The creation of new industries based on marine resources to use such resources as bio-resources will be promoted through the development of new materials, such as functional foods and biomass plastics made from aquatic plants.

The capacity of healthy ecosystems will be increased to remove carbon dioxide by promoting the conservation and restoration of forests, grasslands, peatland, and other wetlands, soils, coastal areas, and other ecosystems that fix a lot of carbon. Appropriate bird and animal management will be promoted, including damage control and population management to reduce damage caused by birds and animals that have a significant impact on forests and other ecosystems, and to help ensure removals by healthy ecosystems. Furthermore, to increase the adaptive capacity of ecosystems to climate change, stresses other than climate change (e.g., development, environmental pollution, overuse, impact of non-native species, etc.) will be reduced in conjunction with the formation of ecosystem networks, which are pathways for organisms to move and disperse.

In addition, green infrastructure that utilizes the diverse functions of the natural environment and ecosystem-based approaches, such as forests (EbA[50] and Eco-DRR[51]), can be used for adaptation to climate change, such as disaster prevention and mitigation. Various benefits can also be expected, including mitigation of climate change through carbon storage; effective use of aboveground resources in Satochi-Satoyama; creation

[50] Ecosystem-based Adaptation
[51] Ecosystem-based Disaster Risk Reduction

of diverse social, economic, and cultural reciprocity in local communities; and contribution to biodiversity conservation and sustainable use. These efforts, more comprehensively referred to as nature-based solutions (NbS), will be promoted in conjunction with the establishment of protected areas and other areas conducive to biodiversity conservation, as needed.

DAC methodologies have been formulated to facilitate the creation of credits to prepare the environment for creating a market for DACCS (Direct Air Capture and Carbon Storage). It is possible that the same technology will be effective as a decarbonized power source or even when applied to the wealth of CCS-ready sites overseas. We will thus look into preparing international systems for the inter-state transfer of removal value so that the technology can contribute to Japan's emissions reductions. As DAC consumes massive amounts of energy in the process of capturing CO_2, transformational research and development will be advanced to enhance energy saving and lower costs in technology. Advancing the use of Japan's exceptional technology at home and abroad will not only contribute to decarbonization in Japan and across the world, but it will also contribute to improving Japan's industrial competitiveness.

As, with some exceptions, methods for calculating the volume of GHGs absorbed and fixed by CO_2-absorbing concrete are yet to be established, Japan establishes such estimation methods and works to have these reflected in the country's inventory of emissions and removals of GHGs. The goal is to enable this technology to achieve the same cost as existing concretes in 2030 through technological development, examining incorporating CO_2-absorbing concrete to the J-Credit Scheme, and expansion of sales routes using public procurement based on the "Plan Establishing Measures to be Taken by the Government to Reduce Greenhouse Gases Related to its Administration and Operations" based on the Act on Promotion of Global Warming Countermeasures (Cabinet decision on February 18, 2025; hereinafter referred to as the "Government Action Plan"). The expansion of public procurement by the national and local governments will be pursued through notifications to construction operators and local governments through the New Technology Information System (NETIS), a database maintained by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) to encourage the use of new technologies in public works, and through the introduction of the technology at the 2025 Japan International Expo. Testing of the productivity, safety, and cost effectiveness of the technology is being advanced with a view to also mandating its procurement in future public works.

2. Cross-cutting measures

(1) Cross-cutting measures for achieving the goals

(a) Activation of the J-credit Scheme

○ Activation of the J-credit Scheme

The J-credit Scheme, recognized as a reliable and high-quality credit system, is a necessary tool for achieving net zero by 2050. Further expansion of demand is expected through the extension of the system to transactions on the Tokyo Stock Exchange Carbon Credit Market, in addition to mutual transactions. While ensuring the continuity

of the system even after FY 2030, in order to continue to actively promote emission reduction measures such as introducing energy-saving equipment, utilizing renewable energy by various domestic actors and water management in rice paddies, as well as sink measures through appropriate forest management and through negative-emissions technology using engineering processes. We will also further accelerate the J-credit Scheme that certifies credits that can be used for carbon offsets of emissions, including the achievement of targets under voluntary plans, and for increasing the added value of goods and services.

Specifically, in order to promote the generation and use of carbon removal/ sequestration credits, which is increasingly important to achieving net zero by 2050, we will focus on encouraging forest owners and management bodies to make use of the system, expanding the generation and utilization of J-Credits derived from forest management activities, and advancing consideration for incorporating CO_2-absorbing concrete and other technologies to the J-Credit scheme.

Additionally, in order to promote the crediting of the environmental value generated by the introduction of energy-saving/renewable energy equipment for individuals and small and medium-sized businesses, we will further promote the utilization of subsidized national projects, as well as the integration of GHG reduction activities such as adopting energy-saving equipment by different small and medium-sized businesses and individual into large projects led by manufacturers of energy-saving equipment, leasing companies, and trading companies. Furthermore, through consideration of generating credits using new technologies such as hydrogen, ammonia, and CCUS, we will increase supply while ensuring quality.

Combined with such supply-side expansion, the government will also expand demand through the use of offsets in business, the national government, and local governments. Specifically, besides considering using it in the offset scheme of the international aviation industry (CORSIA), we will expand the demand by cooperating with local governments aiming to achieve zero-carbon cities and a Circular and Ecological Economy.

At the same time, while promoting the revision of certification targets within a range that ensures the reliability of the system, including revision and development of methodologies, in consideration of technological development and the business environment, we will continue to consider improving the system's environment by promoting digitalization to ensure convenience through, for example, the use of the MRV Support System, linking to similar systems such as Non-Fossil Fuel Energy Certificates, and increasing activities to publicize the system.

(b) Contributions to reducing global greenhouse gas emissions (Described below)

○ Contributions to reducing global greenhouse gas emissions (Described below)

(C) Transition to a decarbonized lifestyle (Described below)

○ Promotion of "*Decokatsu*" (Described below)

○ Promoting Environmental Education and Education for Sustainable Development (ESD) (Described below)

(d) Creation of urban/regional structures and socioeconomic systems contributing to decarbonization

○ Creation of urban/regional structures and socioeconomic systems contributing to decarbonization

Since urban/regional structures and transportation systems will continue to affect CO_2 emissions over the medium and long-term through variations in traffic volume and business floor area, it is necessary to continue to promote urban and regional development that contributes to decarbonization through Compact Plus Network measures, the creation of people-centered downtowns, and improvements to the efficiency of the energy systems of cities.

In order to do this, we will promote policies and projects based on the Integrated Urban and Regional Transport Strategy and create spaces that are Comfortable and Walkable by combining comfort improvement zones with the improved Pedestrian Convenience Road System (Hokomichi) and Compact Plus Network measures based on the Location Optimization Plan and low-carbon city development plan. With regard to the decarbonization of each area in the city, we will also strongly promote the comprehensive efforts, including the promotion of areal energy use, the development of urban parks and conservation and creation of green spaces that serve as GHG removers, the utilization of digital technologies such as 3D city modeling (PLATEAU), and support for environmental-friendly and high- quality urban development projects by the private sector, as well as the utilization of private funds and the social implementation of smart cities. We will also promote the introduction of renewable energy in urban parks.

As for local government action plans and regional climate change adaptation plans, we will proceed with such efforts in coordination with city planning, the Location Optimization Plan, the low-carbon city development plan, agricultural promotion area development plans, and other policies. Additionally, we will utilize systems[52] for enabling the deployment of facilities that contribute to the local production/local consumption of renewable energy, utilizing land with an unknown owner. We will also promote the use of public transportation in coordination with land use policies and consider optimizing the floor area of stores and commercial premises. Along with this, we will promote energy-saving and CO_2 reduction in houses and buildings. As for existing infrastructure, such as public facilities including water and sewage treatment facilities, waste processing facilities, transportation infrastructure, and energy infrastructure, we will enhance their energy-saving efficiency while turning them into regional energy centers, and at the same time, expanding and consolidating them, extending their lifespan, and improving their disaster prevention functions. Additionally, we will promote the social implementation of green infrastructure that makes the best use of the diverse features of the natural environment through public-private partnerships and cross-cutting collaboration.

[52] Community welfare promotion project as defined in Article 2, Paragraph 3 of the Act on Special Measures for Facilitating the Use of Land with an Unknown Owner (Act No. 49 of 2018).

Regional development that continuously forms a positive feedback loop across the three domains of economy, society, and environment will be promoted through measures under “SDGs Future Cities”. Insights and know-how gained from these measures will be deployed nationally. To continuously advance such measures, integrated approaches that make the maximum use of regional resources and produce synergies across the three domains of economy, society, and the environment will be pursued.

○ Promotion of decarbonization efforts in national parks

In national parks and hot spring areas, with full respect for the natural environment conservation, we will create a virtuous cycle of nature conservation and utilization by enhancing the attractiveness and resilience of the region through promoting the creation of sustainable tourist sites that aim to decarbonize the demand side, such as the introduction of self-consumption renewable energy and energy-saving equipment to be used in accommodation and visitor facilities, the generation of heat and power using hot springs, and the decarbonization of mobility.

○ Promotion of local production for local consumption and areal use of energy (Described above)
○ Decarbonization of urban areas through improvement of the thermal environment by heat island control (Described above)

(e) Reduction of lifecycle carbon in houses and buildings

○ Reduction of lifecycle carbon in houses and buildings

An environment will be created in which the GX value of construction materials and equipment used in buildings is valued by the market, while also establishing a system for promoting the calculation and valuation of the CO_2 emitted throughout the lifecycle of a building not only at time of use but all the way up from its construction to its dismantling (lifecycle carbon), based on close cooperation with relevant ministries and agencies, in order to facilitate the decarbonization of buildings.

Measures will also be advanced to prevent the release into the atmosphere of alternative chlorofluorocarbons (HFCs) used mainly as refrigerants in commercial air-conditioners due to refrigerant leaks during device operation and refrigerant recovery leaks when devices become old and are disposed of.

(2) Other related cross-cutting policies

(a) Initiatives based on guidelines for controlling GHG emissions

○ Initiatives based on guidelines for controlling GHG emissions

As for Guidelines for Emission Reductions based on the Act on Promotion of Global Warming Countermeasures, the menu including countermeasures for emissions from upstream and downstream of businesses will be revised, taking into account technological trends such as BAT and market trends such as GX products, and we will formulate and publish policies in areas where no such policies have yet been formulated as soon as possible. With the goal of contributing to the decarbonization of individual

lifestyles, the range of options for measures that businesses are expected to implement will be further expanded when procuring, manufacturing, importing, selling, or providing and disposing of raw materials of products and services consumed in people's daily lives. Voluntary and proactive efforts by businesses to engage in environmentally friendly business activities will also be promoted through offering various forms of assistance and information to implement the measures addressed in the guidelines.

(b) GHG emissions accounting, reporting, and disclosure program

○ GHG emissions accounting, reporting, and disclosure program

From the standpoint of establishing the foundation of voluntary emission reduction efforts by having the emitters calculate their emissions and promoting and creating opportunities of voluntary efforts by the citizens and businesses through visualization of emission data as outlined in the Act on Promotion of Global Warming Countermeasures, businesses that emit more than a certain amount of GHGs are obliged to calculate their own emissions and report them every fiscal year to the national government, and the reported information is compiled and published by the national government. Information will be provided in user-friendly formats to enhance its usability, utilizing the Energy Efficiency and Global Warming Countermeasures Online Reporting System (EEGS). Additionally, the operation of the emissions data platform will be reviewed, taking into account the needs of businesses, investors, and financial institutions, while also looking into policies and ways to improve functionality in order to improve the value of using the EEGS.

To further encourage decarbonization efforts by businesses, the handling of measures such as removals by forest carbon sinks through forest management, carbon storage through wood products or CCUS will be considered. Moreover, to improve the usability of the reported information, active reporting of information on emissions, reducing efforts, including the entire value chain, will be encouraged along with emission data. Measures to evaluate businesses that have provided such information will be considered, incorporating opinions from businesses to further promote the reduction of GHG emissions by businesses. With moves progressing to form international rules aimed at reducing emissions across the entire value chain, active contributions will be made to the creation of such rules so that the various initiatives to reduce emissions by Japanese businesses are properly evaluated.

(c) Promotion of environmental considerations in business activities

○ Promotion of environmental considerations in business activities

In order to reduce GHG emissions, we will appropriately incorporate the standpoint of environmental consideration into economic activities and promote investment and technological development in business activities.

More specifically, we will promote a cycle whereby businesses that are taking action on environment can reap benefits, by implementing following efforts: (1) the value of environmental consideration in products, services, and financial markets is widely appreciated and the public demands environmental consideration from businesses; (2) suppliers carry out environmentally friendly business activities and inform consumers

of them in easy-to-understand manner; and (3) the accurate delivery of such information to consumers allows consumers to reward environmentally friendly businesses, as well as their products and services, by evaluating and choosing them.

To this end, we will encourage businesses to voluntarily and proactively engage in environmentally friendly business activities based on guidelines such as those for reducing emissions.

Furthermore, based on the Act on the Promotion of Business Activities with Environmental Consideration by Specified Corporations, etc., and by Facilitating Access to Environmental Information and Other Measures (Act No. 77 of 2004), we will establish the conditions where environmentally friendly business activities and environmentally friendly products are highly rated among society and the market by promoting the use of environmental information by businesses and the citizens through disclosing environmental data of businesses. To enhance the reliability and comparability of disclosed information throughout the value chain, measures will be advanced. In particular, decarbonization across entire value chains and the preparation of calculation methods for Scope 3 emissions will be promoted. We will also, however, consider how to conduct clear and appropriate disclosure without overburdening companies, given that there are also growing efforts to expand non-climate change disclosures around matters such as biodiversity and the circular economy.

Moreover, we will enhance the effectiveness of environmental management by promoting the deployment of environmental management systems by incorporating a PDCA cycle, such as ISO 14001 and Eco-Action 21, for small and medium-sized businesses. At the same time, we will promote further environmental consideration in business activities by fostering the appropriate training of employees.

To advance the decarbonized management of medium and small to medium-sized firms in particular, regional financial institutions, chambers of commerce, and economic organizations, as well as local governments that have regular points of contact with such firms, will partner across entire regions to build systems for supporting such efforts. Additionally, decarbonization will be encouraged through structured stages, including information gathering on measures to achieve net zero (learning), ascertaining company emissions (measuring), and reducing emissions (reducing). An environment will be established to enable medium and small to medium-sized firms without mandatory reporting obligations to calculate and publish their emissions with ease, using EEGS and other systems. This initiative will advance the formulation of emissions reduction targets and plans, as well as investment in decarbonized facilities, in partnership with the firms they do business with. In doing so, advancing decarbonized management will be emphasized as a means to address various business challenges faced by small to medium-sized enterprises, including reducing management risks and creating opportunities for growth. By highlighting these benefits, these initiatives will be encouraged.

In addition, environmental due diligence, which is a form of risk management for environmental issues, is important on top of traditional human rights due diligence, as part of a firm's measures related to business and human rights. Public education and awareness raising of environmental due diligence initiatives for firms will be promoted to support the achievement of responsible value chains.

(d) Pro-growth carbon pricing

○ Pro-growth carbon pricing

Carbon pricing, a policy method that puts a price on CO_2 emitted from business activities and consumption activities, can be implemented through a variety of mechanisms. These involve not only carbon tax and cap-and-trade emission trading systems, but also credit trading such as the J-credit Scheme and JCM including voluntary market, and internal carbon pricing, through which companies voluntarily put a price on their CO_2 emissions for their investment decisions. Additionally, measures such as Carbon Border Adjustment Mechanisms exist as a policy tool to adjust the price of imported goods from countries with inadequate climate policies. Such a scheme is set to come into force from 2026 in the EU, while some countries and regions, such as the UK and Australia, are considering such schemes.

In terms of economic methods that harness market mechanisms such as carbon pricing, the GX Promotion Act, enacted in May 2023, and the GX Promotion Strategy formulated under this act, set forth the realization and implementation of "pro-growth carbon pricing," including an emissions trading system and fossil fuel surcharge. The emissions trading system, currently being trialed within the voluntary framework of the GX League, is scheduled for full implementation in FY 2026. The system will target firms with emissions over a certain amount and call on setting reduction targets and effective emission reductions based on government policies, taking into account industry characteristics and transitional measures. For its part, the government is continuing to work to legislate the system and prepare relevant ordinances ahead of the system's full introduction. The phased introduction of an "emission allowance auction" system for high-emission power producers, starting in FY 2033, will remain under consideration. A fossil fuel surcharge will be introduced as a consistent carbon pricing mechanism for addressing carbon emissions, starting in FY 2028 for importers of fossil fuels, etc., with a low initial burden, and will be gradually increased.

○ Activation of the J-credit Scheme (Described above)

(Carbon border adjustment mechanisms (CBAM))

While paying close attention to the policy and implementation developments in other countries, we will take the following actions in parallel with the realization and implementation of "pro-growth carbon pricing."

<1> Assuming that carbon border adjustment mechanisms need to be designed inconsistency with WTO rules, we will appeal that the mechanisms would be systems that contribute to global emission reductions without discriminating domestic and international actors, while we pay close attention to the state of discussions and implementation in other countries. In particular, regarding the burden and risks for businesses, we will appropriately reflect the opinion of the industry in our approach.

<2> Regarding the measurement of carbon emissions per product unit, we will encourage countries and regions which would introduce a CBAM to adopt internationally reliable measurement and evaluation methods that are well-balanced in terms of accuracy and feasibility.

<3> From the perspective of non-discrimination between domestic and international parties, we will advocate that the carbon price levied by Japan should be accurately taken into account in the design of carbon border adjustment mechanisms.
<4> Regarding the appropriateness of introducing a CBAM and the effective design of the system, we will cooperate with countries which share with us the same position in terms of preventing carbon leakage and ensuring a level playing field.
<5> We will regularly review the risk of carbon leakage in Japan and will discuss future measures based on the details of such reviews.

(e) Greening of the tax system and effective use of tax for global warming mitigation

○ Greening of the tax system and effective use of tax for global warming mitigation

Greening the environment-related tax system is an important policy for achieving net zero by 2050. We will investigate and analyze comprehensively and systematically the environmental effects of environment-related tax systems, including the situation in other countries, thus forming countermeasures for global warming.

By using the revenue from the tax for climate change mitigation enforced since October 2012 regarding the special tax rate provisions for the petroleum and coal tax, we will steadily implement a wide range of policies to reduce energy-related CO_2 emissions, such as energy-saving, deploying renewable energy, and making fossil fuels cleaner and more efficient. With the close cooperation between relevant ministries, we will promote wise spending by focusing on cost-effective policies, given the characteristics of each business.

(f) Promotion of sustainable finance

○ Promotion of sustainable finance

In order to realize the society envisioned in the Paris Agreement, it is necessary to further encourage private investment for companies engaging in climate change countermeasures and innovation; therefore, the role of finance is becoming more important. Across the world, sustainable finance, in particular ESG finance, which incorporates environmental, social, and governance factors into investment and loan decisions from the standpoint of reducing investment risk and improving returns over the medium and long term, is widespread. Furthermore, taking climate change risk into account in investment decisions is becoming the standard in the international financial markets. In Japan, the scale of ESG investment has also expanded significantly in recent years.

At the same time, there is also growing demand for climate-related financial disclosures, with growing moves centered mainly in Europe to mandate sustainability disclosures, including regulations on the labeling of financial products and disclosure by institutions of GHG emissions from their financial activities (financed emissions). Given such developments, among other factors, it is becoming more important for

financial institutions to advance climate change measures across their entire portfolios, including consideration of approaches to reduce emissions.

Japan will promote sustainable finance, such as ESG finance, in consideration of international trends, in order to attract domestic and international environment-related investment for businesses that contribute to global warming countermeasures to realize a decarbonized society.

More specifically, in collaboration with related ministries and agencies, we will integrally promote renewable energies and other energies (green), the shift to decarbonization (transition), including steady low-carbon efforts such as energy-saving, and the finance to innovative technologies (innovation) for decarbonization. In relation to green finance, such as green bonds, it will be promoted by developing the market for them by, for example, encouraging building capacity for their issuances and elaborating green bond and other guidelines. In terms of transitional finance, which provides financing to initiatives for transition towards decarbonization, investment in companies engaged in shifting to decarbonization (transition) and in innovation will be promoted based on the Basic Guidelines on Climate Transition Finance (established on May 7, 2021 by the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment), and through guidance such as sector specific technology roadmaps spanning eight areas for high-emissions industries that cannot decarbonize in a single step and Addressing the Challenges of Financed Emissions (established on October 2, 2023 by the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment). Leadership in the global debate over transition finance aimed at achieving net zero worldwide will be demonstrated by advancing cooperation between countries, such as Asia, by issuing Climate Transition Bonds based on the Japan Climate Transition Bond Framework (formulated by the Cabinet Secretariat, the Financial Services Agency, the Ministry of Finance, the Ministry of Economy, Trade and Industry and the Ministry of the Environment on November 7, 2023), the world's first government-led transition bond, in order to realize public-private GX investment of over 150 trillion yen in the decade from FY 2023. In order to promote innovation, in September 2020, companies that have challenged themselves to boldly pursue innovation toward the realization of a carbon-free society have been hailed as Zero Emission Challenge Companies, and their efforts have been highlighted both in Japan and abroad.

Additionally, active information disclosures by companies and constructive dialogue based on such disclosures create the foundation of encouraging financing for efforts to improve corporate value through decarbonization. In Japan, a private-sector-led TCFD Consortium was established in 2019, facilitating discussions involving both financial institutions and companies to develop climate-related disclosure initiatives in line with the Task Force on Climate-related Financial Disclosures Declaration (TCFD). In November 2021, the International Sustainability Standards Board (ISSB) was established. In June 2023, the ISSB finalized its sustainability disclosure standards, and, in Japan, the Sustainability Standards Board of Japan (SSBJ) published an exposure draft in March 2024. Based on this, actively participating in international discussions around the formulation of disclosure frameworks related to sustainability, including those at ISSB, is being pursued. Consideration is also being given to the application of domestic standards that are functionally aligned with ISSB standards, as well as to

approaches to ensuring the assurance of sustainability-related financial information, targeting all or part of the firms listed on the Tokyo Stock Exchange Prime Market.

Moreover, discussions around the TCFD have continued beyond the conclusion of its activities. With utilizing private initiatives such as the TCFD Consortium, disclosure and dialogue are being promoted through the domestic guidelines on green finance, and development, revision, and deployment of scenario analysis guides, as well as support for the formulation of transition plans and scenario analysis by companies and financial institutions.

From the standpoint of promoting the decarbonization of regions and small to medium-sized enterprises, the role of regional financing activities is important. In order to link the decarbonization of a region to a creation of a virtuous circle for economy and environment in the area, besides offering a clear nationwide vision, we will promote ESG regional financial efforts that emphasize the impact on the environment, economy, and society by advancing the creation of models for solving regional issues and the establishing businesses using regional resources by forward-looking regional financial institutions in cooperation with local governments.

Furthermore, we will promote actions to steer private investment towards efforts to reduce GHG emissions by supporting investment in decarbonization projects where private funds are insufficient, by promoting investment in cutting-edge equipment through leasing methods, and by guaranteeing debt through the provision of financing and other support via the Japan Green Investment Corp. for Carbon Neutrality (JICN) or through the Organization for the Promotion of Decarbonized Growth Economic Structure Transition (the GX Acceleration Agency).

Moreover, we will increase the momentum on ESG finance by hosting the ESG Finance High-Level Panel and the GX Finance Summit, a gathering of top executives from the financial and investment fields, and promote discussions to create a positive impact on the environment and society through finance.

(g) Creation of a GX market

○ Creation of a GX market

Sustained expectation of future demand is essential for sustained investment for future growth. It is, however, unlikely that Japan can expect demand to expand in terms of material resources driven by a population bonus, as was seen during the period of high growth. While demand born of aspirations to solve social problems will be essential for growth investment going forward, such demand would come with cost increases in the manufacturing sector, such as those coming from the conversion to decarbonized processes. As value matching those costs is yet to materialize, it is unlikely that a supply and demand cycle will emerge from market mechanisms alone.

With uncertainty high around the scale, timing, and costs associated with the introduction of new, decarbonized forms of energy or with the conversion to decarbonized energy, particularly when it comes to initiatives aimed at realizing net zero by 2050, generating stable demand is difficult.

For these reasons, government initiatives focused on demand will be essential for generating new industries in the GX domain.

(Surfacing the value of GX (carbon footprints, reduced emissions, and avoided emissions))

To sustainably conduct GX policy over the short to medium term, particularly during the development phase of carbon pricing, it is essential to generate demand by highlighting the value of the environment. As demand is something that arises from individual products and services, to surface the environmental value of said products and services will mean attention being brought to various indicators beyond just the carbon footprints of said products and services, such as their emission reductions (i.e., reduced emissions and avoided emissions, etc.).

Recent years have seen policies focused on carbon emissions at the level of individual products, beginning with the European Carbon Border Adjustment Mechanism (CBAM) and Europe's battery regulations, with these having effects on the competitiveness of global products. Amidst such currents, Japan, for its part, will also consider incorporating indicators focused on carbon footprints and emission reductions into its industrial policies, and thus improving its industrial competitiveness through public-private decarbonization investment.

To that end, the use of indicators (reduced emissions of product and avoided emissions of product, etc.) focused on carbon footprints and emission reductions will be considered, with potential applications in the project selection processes in investment promotion policies. At the same time, active participation and collaboration in the international rule formation process will be pursued, along with efforts to promote the spread of such rules, beginning with the Action Plan for the Next Decade in the Asia Zero Emission Community (AZEC), and including the GHG Protocol, the ISO and guidelines formed through industry-specific international initiatives, so that Japan's products and services contributing to decarbonization will be recognized in the global society.

(Promotion of public procurement)

It is important, as part of the generation of initial demand for not only private firms but also the public sector, to take the initiative in procuring cutting-edge environmental products and services, beginning with GX products such as green steel and green chemicals. Expansion of evaluation indicators, beginning with indicators focused on carbon footprints and emission reductions (reduced emissions of product and avoided emissions of product, etc.) will be pursued. Proactive procurement of GX and other products will be advanced through measures such as the utilization of the two-stage decision-making criteria under the Act on Green Purchasing.

Policies for the proactive utilization of green construction materials, such as low-carbon concrete and green steel in public works, will be considered. In addition to practicing procurement based on the Act on Green Purchasing, GX measures will be advanced by leveraging the regional agency. For example, priority in the application of government support for GX promotion will be given to local governments that have joined the "GX Leadership Declaration" and are advancing autonomous measures.

(Promoting private enterprise procurement)

In order to give greater credit to firms that intend to take the initiative in procuring GX products and services, for which a supply and demand cycle is hard to generate

through market mechanisms alone, such as green steel and green chemicals, and in order to increase procurement incentives for such firms, the "GX Leadership Declaration" established under GX League will be leveraged to promote autonomous initiatives by firms, including prioritizing government support for promoting GX to firms that have joined the declaration.

For Japan as a whole to reduce its emissions, it will also be important for not only firms that are large emitters to reduce their emissions, but also for firms that are small emitters to reduce not only their own emissions, but also to reduce emissions across their entire supply chains. To that end, the GX League sets Scope 3 (particularly for upstream emissions) emissions reduction targets on top of Scope 1 and Scope 2 targets for firms where, for example, emissions are high across the firm's entire supply chain relative to the emissions of the firm itself. To achieve these targets, firms consider systems for promoting emissions reductions across their entire supply chains, such as actively procuring GX products and services or encouraging small and medium-sized enterprises (SMEs) in their supply chain to support emission reduction efforts, and work to foster momentum to generate markets where GX products and services are proactively selected.

Support focused on demand in relation to the advancement of startups in GX deep tech fields that can ultimately support new industries can also be effective for expanding the procurement of GX products and services. Partnerships between startups and large firms can take various forms, such as joint research, operational alliances, and investment. Among such partnerships, there are also cases where, ultimately, the partnership fails to lead to expansions in the sales pathways of the startup's products or services, it fails to lead to new innovation, it fails to secure sufficient opportunities for growth, or it fails to generate new business for the large firm. Going forward, there is a need for policies that will lead to large firms and startups partnering up, which leads to the creation of new businesses or growth opportunities for the startup.

To this end, measures will be taken to foster procurement of products and services from startups in GX deep tech fields by large firms, which leads to the improvement in scale, and support for startups that work with large firms, with the aim of creating products and services that solve management challenges facing large firms. Such measures will lead to the commercialization of the technologies of startups in GX deep tech fields.

○ Reduction of lifecycle carbon in houses and buildings (Described above)
○ Proactive actions by the national government (Described below)
○ Promotion of "*Decokatsu*" (Described below)
○ Rule innovation (systematic measures) (Described below)
(Generating demand for cutting-edge products and services, making use of the Act on the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities frameworks) (Described below)

(h) Transition to a circular economy

○ Transition to a circular economy

The circular economy is an economic model that seeks to maximize value by using resources for a long time through the reuse, repair and maintenance of products, by

advancing 3R efforts to recycle circulative resources, by promoting the use of renewable resources, and by recovering, maintaining and adding to the value of resources and products through conversion to a service model, while making effective use of resource stocks, and while limiting the volume of resources input or consumed. By reducing resource consumption and limiting the creation of waste, transitioning to a circular economy is an important measure for addressing social issues, such as climate change, loss of biodiversity, and environmental pollution. It also contributes to improvements in industrial competitiveness, economic security, regional revitalization, and well-being. In terms of climate change in particular, it is estimated that advancing resource cycle measures could contribute to reducing emissions from sectors, such as manufacturing, transportation of cargo, industrial processes, use of products and waste products, which account for some 36% of Japan's GHG emissions.

To expand the supply and use of resource circulation and recycled resources by improving cooperation between the manufacturing and retail sectors on the one hand and the waste disposal and recycling sectors on the other, measures based on the Resource Circulation Act will be implemented to promote resource circulation, such as ensuring decarbonization and quality and volume in recycled materials. Also, enhancements to resource recovery will be pursued through the promotion of mechanization and the introduction of AI, while, at the same time, advancing the development of domestic and international resource circulation network nodes, and selection and development resource circulation base ports, furthering the expansion of the supply of recycled materials. Additionally, the construction of diverse regional resource cycle systems will be advanced by utilizing regional renewable resources within their regions.

New circular industries will be developed, centered on waste processing facilities that make use of CO_2 as a resource. To that end, it will promote the technological development of "carbon neutral waste treatment facilities" that separate and recover CO_2 in the waste treatment facility itself and will establish such facilities by FY 2030. In doing so, priority will be placed on supporting local government initiatives that create sites for aggregating industries that make use of CO_2 and other recovered resources from waste treatment facilities, in addition to high-efficiency waste power generation, in order to advance the rapid implementation of "waste treatment processing x CCU."

These and further measures will be advanced, and we will take on the transition to a circular economy as a national strategy based on the Fifth Fundamental Circular Economy Plan.

3. Basic policies

(1) Establishing a domestic system for calculating and disclosing greenhouse gas emissions and removals based on the UN Framework Convention on Climate Change

○ Establishing a domestic system for calculating and disclosing greenhouse gas emissions and removals based on the UN Framework Convention on Climate Change

To date, calculations of GHG emissions and removals have been performed based on the UN Framework Convention on Climate Change (UNFCCC), and the GHG

inventories have been prepared and submitted to the United Nations. While keeping an eye on reporting under the Paris Agreement's Transparency Framework and observing how it is implemented across the entire world (Global Stocktake), relevant ministries and agencies led by the Ministry of Environment will cooperate and work on establishing national system to calculate and publish emissions and removals, implementing quality control and quality assurance, and complying with reviews by expert review teams dispatched under the UNFCCC.

Additionally, in order to more accurately understand actual GHG emissions and removals and better assess the methods for reviewing the implementation status of countermeasures, in cooperation with relevant ministries and agencies, further refinements will be made in the calculation of GHG emissions and removals by preparing statistics of activities and by advancing research on the calculation of energy consumption intensity and GHG emission factors, and on methods for measuring GHG emissions, as well as on methods for measuring and accounting CCU and other cutting-edge technology-related emissions and removals.

We will also work on reviews by technical experts and facilitative, multilateral consideration of progress, and submit the National Communication and Biennial Transparency Reports that are regularly requested based on the UNFCCC, the Paris Agreement, and related decisions.

On the other hand, when measuring, monitoring, and reporting removals (or emissions) by removals, GHG emissions and removals are calculated and accounted for based on the IPCC guidelines and the supplementary methods guidance arising from the Kyoto Protocol. In order to improve the accuracy of the data, we will continuously compile information on the activities and land use changes required for MRV (Measurement, Reporting and Verification), as well as promote research on the GHG removal and emission mechanisms in forests.

○ Improvement of the calculation methods for removals by forest carbon sinks

Regarding removals by forest carbon sinks, since fiscal year 1999, Japan has been conducting the National Forest Inventory survey, which involves periodic five-year ground-based measurements of all standing trees at approximately 15,000 sample plots nationwide. In addition, since the 2009 survey, implementation of -quality assurance and quality control (QA/QC) for the measurement results has improved the statistical reliability of the survey data, making it possible to calculate removals by forest carbon sinks through direct comparison of forest growing stock data between different time points.

Therefore, in order to improve the method for calculating forest carbon removals, and with a view to applying it to the greenhouse gas inventory from FY2025 onward, consideration is being given to shifting from the current method—which indirectly estimates changes in forest growing stock using growth models primarily developed for timber production—to a new approach that directly estimates changes in forest growing stock by comparing survey results from different time points of the National Forest Inventory survey.

(2) Technological development and social implementation of global warming

countermeasures

○ Technological development and social implementation of global warming countermeasures

The development and demonstration of technologies for coping with global warming is an effort to reduce GHG emissions significantly in the future by scaling up GHG emission reduction, by promoting the reduction of the cost, and by deploying them to society at large. We will thoroughly pursue energy conservation and promote electrification and decarbonization of power (rapid diffusion of technologies for maximizing the introduction of renewable energy, use of nuclear power with the highest priority on safety, and the development of next-generation reactor technology) as outlined in the Science, Technology, and Innovation Basic Plan and the GX Promotion Strategy with the participation of various actors including startups. We will also strongly promote cutting-edge innovations, such as next-generation solar cells, next-generation semiconductors, innovative catalysts, tidal power, CCUS/carbon recycling, including artificial photosynthesis and methanation, and hydrogen and its derivatives. In doing so, the status of the development, testing, and implementation of the technology needed to realize a decarbonized society will be monitored through a review process conducted every financial year under the Executive Committee of the Global Warming Prevention Headquarters. The results of this will be published together with the results of progress inspections, thus helping to identify where technology is lacking and advance its development, and promoting the social implementation of existing technologies. We will also seek to generate large-scale demand for decarbonized products and services, promote behavioral and lifestyle changes, accelerate regional decarbonization, and foster public understanding through the promotion of programs such as "*Decokatsu*," in order to encourage the introduction of technology and its social implementation. At the same time, we will also look into frameworks, such as any necessary systems or standards.

Utilizing the Green Innovation Fund established in FY 2020, we have been providing support in areas where long-term ongoing support is needed for social implementation and where the policy impact is particularly large, out of the focus areas where execution plans have been formulated under the Green Growth Strategy, or in the key areas where the path forward has been indicated based on the GX Basic Policy. We have been providing continuous support to companies and other organizations which are committed to taking on the challenge of ambitious targets shared by the public and private sectors, from R&D to demonstration and social implementation. In doing so, to "excel in technology, and also succeed in business," we will promote such efforts toward the social implementation of developed technologies by comprehensively implementing policies such as regulatory reform, standardization, international coordination, and support for implementation. Having formed 20 projects to date and awarded over 2 trillion yen to support recipients, we have been driving world-leading technological development across fields including hydrogen-reduction ironmaking, which significantly reduces CO_2 emissions, Perovskite solar cells, which are a next-generation solar cell originating from Japan, liquefied hydrogen carriers that transport hydrogen in

massive volumes, ammonia mono-fuel combustion, which contributes significantly to decarbonization in Asia and elsewhere, and next-generation all-solid-state batteries.

Furthermore, to materialize investment promotion policies aimed at realizing GX, we will put in place investment promotion policies, based on industry specific investment strategies, that make use of GX Transition Bonds for those technologies that, while effectively and efficiently realizing emissions reductions, do so in ways that particularly improve industrial competitiveness and have strong economic growth effects. In doing so, the government will also establish, in an integrated manner, regulatory and systemic measures connected to frameworks for changing behavior on the corporate investment and demand side.

Additionally, we will conduct research and development aimed at advancing energy management systems, which include heat and hydrogen derived from renewable energy, and establishing circular economic systems for plastics, as part of the 3rd term Strategic Innovation Promotion Program (SIP) challenges ("Smart Energy Management Systems" and "Development of Circular Economy System") from FY 2023.

Furthermore, in order to achieve the 2050 goals of Moonshot Research and Development Program ("Realization of sustainable resource circulation to recover the global environment" and "Creation of the industry that enables sustainable global food supply by exploiting unused biological resources"), the necessary R&D will be promoted, the international situation and technological trends will be sorted out, the portfolio will be reviewed flexibly, including challenging R&D, and initiatives for commercialization and social implementation will be accelerated.

Additionally, we will steadily carry out basic research at universities and other institutions so as to constantly generate the seeds of innovative decarbonization technologies based on new ideas. We will also award those who have innovative ideas that contribute to the development of a decarbonized society and whose achievements are expected to be implemented in society. By doing so, we will promote efforts to accelerate the creation of innovations and their social implementation.

In order to accelerate the national and local governments' decarbonization actions, we will bring together the universities and similar institutes that have comprehensive knowledge and diverse networks and promote interdisciplinary research in order to translate academic research results into concrete policies and social implementation of technologies by national and local governments. In addition, we will establish a system for strengthening cooperation between universities, industry, academia, and government, and further strengthen the function of universities as regional knowledge centers.

(3) Promoting climate change research and strengthening observation/ monitoring systems

○ Promoting climate change research and strengthening observation/monitoring systems

In order to promote global warming countermeasures from a long-term and global perspective, it is essential to continuously collect the latest scientific knowledge domestically and internationally, and research, observation, and monitoring of climate change are extremely important measures to form the basis. With regard to research related to global warming, based on efforts which have been made, we will promote

international cooperation based on preceding efforts, into topics such as: uncovering the mechanisms of climate change and the material cycle of GHGs through continuous development of climate models, and generating more climate prediction data centered on the Japan region; improving the accuracy of our predictions and our understanding of climate change and the accuracy of our predictions using event attribution methodologies that quantitatively evaluate the contribution of climate change to extreme weather events, and advancing the development of technologies needed for those ends; evaluating the impact of global warming on the environment, society and the economy; as well as reducing GHG emissions and integrating this with adaptation policies.

With respect to observation and monitoring of climate change, we will strengthen the comprehensive observation and monitoring system for understanding the spatiotemporal variations of GHGs, climate change and their impact in accordance with the "GEO Strategic Plan 2016-2025: Implementing GEOSS", the "GEO Post-2025 Strategy", the "Implementation Policy of Earth Observations for 10 years" and the "WMO Global Greenhouse Gas Watch".

In particular, we will work to strengthen comprehensive atmospheric observations using aircraft, ships, and in-situ observations in Asia and Oceania, to establish an ecosystem monitoring system at terrestrial carbon circulation observation bases in Asia, to maintain the network for observing water temperatures, pH and CO_2, etc. in the ocean environment, and to monitor the global warming impact in areas vulnerable to climate change such as cryosphere and coastal areas, while also advancing the long-term stable operation of the Data Integration and Analysis System (DIAS), a platform for promoting the storage and use of global environment big data such as global observation data and climate prediction data, advancing the maintenance of a user-friendly environment for that system, and advancing research and development that contributes to climate change countermeasures using DIAS. In particular, global warming affects the Arctic region the most, such as rapid sea-ice retreat, and it has become a global issue that affects non-Arctic countries, including Japan. Therefore, we will enhance scientific knowledge in the Arctic Circle, where there has been no observational data, by deploying an Arctic research vessel, the Mirai II, to serve as an international research platform in the Arctic Circle. Also, oceans are the important areas for accurately understanding the effects of climate change, with them being reported to take up approximately 90% of the excess heat in the climate system due to global warming and approximately a quarter of human-induced carbon dioxide emissions. We will thus continue oceanographic observation on water temperatures, salinity and CO_2 concentrations and so on from the surface to the bottom in the ocean utilizing ocean-meteorological research vessels. Additionally, the geostationary meteorological satellites Himawari 8 and Himawari 9, which has become operational since July 2015, observe and monitor the global environment by acquiring the sea surface temperature, the distribution of sea ice, dust in the atmosphere, and so on.

Furthermore, Japan has leading technologies for observing GHGs from space using the greenhouse gas observation satellites Ibuki (GOSAT), launched in January 2009, the world's first dedicated greenhouse gas observation satellite, and Ibuki No. 2 (GOSAT-2), launched in October 2018. Thanks to GOSAT's observational data, we are now able to estimate CO_2 and methane emissions for each country that emits these gases above a certain threshold. The observational outcome with such strength will contribute to

refining climate change forecasts and will provide a highly transparent infrastructure for monitoring efforts to reduce GHGs in Japan and the world. Moreover, in recent years, research to estimate emissions in large cities and initiatives to make use of observational data from companies have been conducted.

Development is progressing toward the launch of the third Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW) to promote initiatives by various countries and to measure the emission reductions. Furthermore, with an eye on the future, studies on the concept of an international GHG observation mission will continue. GOSAT-GW will continue and develop the mission of GOSAT-2, and will enable the assessment of the CO_2 emissions in metropolitan areas or large-scale emission sources, further enhance technology for estimating emissions on a per-country basis, which the GOSAT series has advanced thus far, and thus help further secure transparency in GHG inventory reporting. Japan is also steadily preparing for Himawari 10, Japan's next geostationary meteorological satellite, which implements the latest observational technologies, to begin operations in FY 2029, in order to advance climate change countermeasures such as observation and monitoring of the global environment and disaster risk reduction.

By supporting international joint research network activities related to global warming, Japan will share information, knowledge, and experience in the Asia-Pacific region and contribute to the promotion of regional decarbonization.

Section 3: Efforts by public institutions

○ Proactive actions by the national government

The government, in conformity with the National Government Action Plan and the action plans of each ministry and agency based on said plan, through liaison conferences of relevant ministries and agencies related to the decarbonization of the public sector, will proactively take the lead in maximizing the introduction of renewable energies, constructing and managing buildings, purchasing and using goods and services, and participating in other administrative work and projects.

In particular, the following will be promoted.

(Maximum introduction of renewable energy, construction and management of buildings)

- Maximum introduction of solar power generation in government-owned buildings and lands, and leading introduction of Perovskite solar cells
- Implementation of ZEB in new buildings
- Improvement of heat insulation, implementation of planned energy-saving renovation, promotion of wood use in government buildings, energy-saving assessment, and utilization of BEMS, and consideration of lifecycle carbon
- In-depth consideration of how to decarbonize equipment that uses fuel

(Purchase/use of goods and services)

- Introduction of electric vehicles
- Introduction of LED lights
- Promotion of the procurement of electricity from decarbonized energy sources
- Proactive adoption of equipment with high energy-saving performance
- Proactive adoption of GX products
- Utilization of wood and use of recycled products such as recycled paper
- Promotion of the use of public transportation, such as railways, in work-related mobility, such as transportation to work or on business trips
- Limiting the emission of fluorinated gases
- Purchase and use of products and services that contribute to reducing the environmental burden, including the aspect of their lifecycle.

(Other administrative work and projects)

- Implementation of 3R + Renewable for waste
- Ensuring work-life balance by reducing overtime and introducing telework

The National Government Action Plan aims to reduce the total direct and indirect emissions from the government's administrative work and projects by 50% by FY 2030, by 65% by FY 2035, and by 79% by FY 2040 compared to FY 2013, through the steady implementation of the measures included in the plan.

The progress of the National Government Action Plan will be evaluated and verified by the Central Environment Council every year and then reported to the Executive Committee of the Global Warming Prevention Headquarters, and the inspection results

will be published. From the standpoint of ensuring transparency and promoting proactive actions, evaluation and verification by the Central Environment Council will be carried out with the participation of each ministry and agency. In addition, when inspection results are published, the progress of each effort will be evaluated by comparing various indicators stipulated in the National Government Action Plan, such as the total GHG emissions, with the target and past results, and by comparing schedules and progress at organization units in a cross-cutting way. The results will be disclosed together.

In addition, regarding the above-mentioned administrative work and projects, the national government will enforce contracts that take into account GHG emissions reduction (hereinafter referred to as "green contracts"), focusing on the eight areas of electric power, automobiles, ships, building design, building maintenance management, building repair (ESCO and other energy conserving repairs) and industrial waste, in accordance with the Act on Promotion of Contracts of the State and Other Entities, Which Show Consideration for Reduction of Emissions of Greenhouse Gases, etc. (Act No. 56 of 2007, hereinafter referred to as the "Green Contract Act") as well as on the basic policy stipulated in the act. The government will more reliably achieve the goals set forth in the National Government Action Plan and strive to further reduce emissions.

In addition, in order to promote a shift in demand towards environmental goods, such as products contributing to GHG emissions reduction, including carbon offsets, the national government will take the initiative in procuring environmental goods in accordance with the Act on Promoting Green Procurement. In particular, the national government will indicate policies to take the initiative in procuring and thus contributing to generating early-stage demand as a government for effective environmentally-friendly products, technologies and services that are expected to spread in future, or the use of which has not expanded, due to the fact that only a limited number of firms can bid for them, or because of high manufacturing costs.

For national government buildings, we will continue to promote the use of Life Cycle Energy Management (LCEM) methods for air-conditioning equipment, as well as the thorough implementation of appropriate management and visualization of energy consumption. This includes maintaining government facilities to reduce the environmental burden and to preserve the surrounding environment. Moreover, we will endeavor to use wood, including CLT and timber elements with fire resistance properties in public buildings in accordance with the Wood Use Promotion Act.

○ Proactive actions by local governments and promotion by the national government

Local governments, alone or collaboratively, will formulate and implement local government's action plan for operations, in line with the Plan and referring to the manuals for formulating and implementing the local government's action plan formulated by the national government in relation to local government administration and operations (i.e., all administrative duties set out in the Local Government Act, including waste treatment operations and water supply operations). In doing so, local governments shall carry out leading measures in line with measures carried out by the national government based on the Government Action Plan. By taking such initiatives,

local governments aim to become models for local businesses and residents within their regions.

Additionally, the department in charge shall participate and take responsibility to promote the effective and continuous reduction of GHG emissions from all operations in principle, by building and operating a PDCA cycle.

Furthermore, with regard to the equipment used for business, local governments shall strive to select equipment that contributes to reducing GHG emissions, taking into account advances in technology based on the guidelines for emission reductions. In particular, prefectures and designated cities are encouraged to actively consider introducing BAT. Moreover, equipment used for business should be used in a way that reduces GHG emissions to the extent possible.

Furthermore, premised on the fact that all local governments have a responsibility to implement such measures, local governments in small-scale municipalities shall strive to proactively carry such measures out in collaboration or partnership with prefectures or allied central cities by, for example, making use of cross-regional energy companies or joint procurements, given their difficulties stemming from shortages of personnel and specialists, and with a view to efficiently introducing and using renewable energy and such.

In order to promote the formulation of plans by local governments and their execution, the national government will compile manuals for formulating and implementing the local government's action plan. In addition, in cooperation with prefectural governments, the government will collect and share positive case studies, beginning with leading regions for decarbonization, provide training for local government staff, dispatch specialist personnel, prepare information platforms such as systems to support the formulation and management of action plans for local governments, and, at the same time, provide support for the setting up and introduction of facilities and equipment related to renewable energy and energy conservation. Moreover, the government will compile the local government action plans announced by the local government and publish them in a list form.

In addition, local governments endeavor to promote green contracts by making policies for the promotion of such contracts, focusing on the eight areas of electric power, automobiles, ships, building design, building maintenance management, building repair (ESCO and other energy conserving repairs), and industrial waste outlined in the Green Contract Act.

Furthermore, efforts for green purchases are expected to involve creating policies to promote the procurement of environmental goods in accordance with the Act on Promoting Green Procurement and procuring goods based on such policies. Moreover, the use of wood in public buildings is encouraged in accordance with the Wood Use Promotion Act.

(Promotion of initiative of public institutions other than national and local governments)

It is important that not only the national and local governments but also public organizations such as independent administrative agencies take the initiative. Therefore, the national and local governments provide information on effective global warming countermeasures in accordance with their characteristics to independent administrative

agencies and other public institutions. This facilitates the independent administrative agencies and other public institutions to take the lead in formulating plans and taking proactive actions related to reducing GHG emissions from their office work and projects, in accordance with the National Government Action Plan and the local government's action plan. The national government monitors the status of these initiatives as regularly as possible.

Moreover, independent administrative agencies, special public corporations, national university corporations, and similar bodies are expected to make green contracts, conduct green purchasing and strive to reduce GHG emissions.

Section 4: Basic matters regarding measures to be implemented by local governments

○ Promotion of efforts based on the local government's action plans for entire municipal jurisdictions

Local governments promote policies to reduce GHG emissions according to the natural and social conditions of their regions. In particular, while ensuring the collaboration and cooperation with local businesses and residents in conjunction with the promotion of comprehensive management of public facilities and community development, local governments aim to maximize the introduction and use of renewable energies and untapped energies (hereinafter referred to as "renewable energies and other energies") and also aim to promote thorough energy savings. Additionally, they strive to create cities and regions that contribute to decarbonization while tackling various regional problems and promoting the formation of a sound material-cycle society. In promoting such policies, local governments promote autonomous and distributed sustainable community development using local resources in coordination with different regions based on the concept of a Circular and Ecological Economy as set forth once again in the sixth Basic Environmental Plan.

Regional decarbonization measures that are responsive to regional characteristics and leverage regional resources can contribute to addressing various regional challenges, such as revitalization of regional industry, stimulating agriculture, forestry, and fisheries, and improving disaster risk reduction. To quickly develop decarbonization in regions, Measures will be advanced in forms that contribute to regional revitalization in cooperation with regions and in ways that benefit them.

It is also recommended that for particularly small villages, towns and cities, the relevant prefecture executes its measures based on the local government's action plan for entire municipal jurisdictions, or that those small municipalities formulate and execute plans in collaboration and partnership with prefectures and central cities, based on the difficulties stemming from a lack of personnel and specialists and with a view to efficiently introducing and utilizing renewable and other sources of energy.

In formulating the local government's action plan for the entire municipal jurisdiction, this Plan is to be complied with, and while referring to the manual for formulating and implementing the local government's action plan compiled by the national government, the following points are to be noted.

1. Target setting and specific countermeasures

Local governments, having overall reduction targets for GHGs to begin with, set quantitative targets such as quantitative targets for the introduction of renewable energy, which is a regional resource, quantitative targets for regional employment numbers and regional economic impacts, as well as qualitative targets that help address regional issues based on the Act on Promotion of Global Warming Countermeasures. At the same time, they position specific countermeasures and policies put in place within the local government's action plan for the entire municipal jurisdiction on the part of the local government to achieve these targets. If setting targets for renewable energy and countermeasures to achieve said targets, targets will be set in line with the natural and

social conditions of the region, while making the utmost use of the region's renewable energy potential, premised on cooperation with the region. At the same time, measures will be implemented to achieve those goals cooperatively and to the benefit of the region in a form that contributes to regional revitalization.

2. Division of roles among and cooperation with diverse actors in regions

It is important for the government to advance initiatives that are part of local government action plans while complementing initiatives with diverse actors, including locally-rooted prefectures, municipalities, financial institutions, core businesses, and regional energy corporations playing a central role, making use of the strengths of each and building up structures for effective, regionally led cooperation on measures. To that end, it is recommended that the government establish such structures from the planning stage and position the roles and initiatives expected of the various actors in the region such as businesses, financial institutions and residents within the local government's action plan for entire municipal jurisdictions, in addition to the local government's own role and the specific countermeasures and policies they put in place.

3. Expanding the introduction of renewable energy sources that are locally symbiotic and beneficial to the local community

Considering various problems related to renewable energy, such as deterioration of the landscape, adverse effects on wildlife, destruction of ecosystems, generation of noise, impact on hot spring resources, landslides, and impact on radars, it is necessary to consider how to best preserve the environment based on the region's natural and social conditions, the originally envisioned land use, national security, and other public interests. Based on the Global Warming Countermeasures Promotion Act and utilizing Local Government's Action Plan Councils to form local consensus, local governments promote the introduction of renewable energy that contributes to regions, defining within the local governments action plan promotion areas and regional decarbonization promotion projects; initiatives that contribute to regional environmental conservation, developing local economy and society.

Additionally, when a municipality sets up a promotion area, from the standpoint of maximizing the potential of renewable energies based on coexistence with the local community and in consideration of the implementation goals set by each local government related to policies on the promotion of renewable energy use, it is important to consider a wide area where the introduction of renewable energy can be promoted, and proactively define as a promotion area. For example, in the case of solar power generation, this includes public idle land, final waste processing sites, deteriorated agricultural land where farming is not possible, reservoirs, and other virtually unused land; for onshore wind power generation, based on wind conditions above a certain level; for geothermal power generation, consider the area's geothermal potential. Risks such as landslides should also be noted on the presumption of compliance with relevant laws and regulations, to avoid areas at high risk of landslides.

Considerations will also be made when setting prefectural standards from the perspective of maximizing the use of the renewable energy potential in each prefecture,

on the presumption of coexistence with the local community, by ensuring appropriate consideration for conserving the environment in response to local environmental and social conditions, ensuring alignment with targets put forward in local government action plans established by the prefecture in question, while also assessing the local potential for renewable energy. If farming and forestry land is to be included in the promotion area, it will be done in accordance with the basic policy of the Act on Promoting the Generation of Electricity from Renewable Energy Sources Harmonized with Sound Development of Agriculture, Forestry and Fisheries (Law No. 81 of 2013) and the standards specified in the Ordinance of the Ministry of Agriculture, Forestry and Fisheries of Article 5, Paragraph 5, of the same law.

Utilizing the Promotion Area System for Renewable Energy Utilization in Buildings under the Building Energy Efficiency Act is recommended when municipalities seek to expand the use of renewable energy in the construction domain based on regional conditions.

In addition to the above, there have been concerns raised over cases where agricultural solar power generation has not allowed the agricultural land beneath it to operate appropriately. Thus, from the perspective of coexisting and benefiting agriculture and local communities in accord with regional characteristics, it is expected that such efforts will be promoted in partnership with local governments and public research organizations.

Additionally, regional energy companies and similar entities utilizing local renewable energy sources can promote decarbonization in a way that is both sustainable and beneficial to the community. Under private-sector innovation, area-wide decarbonization can be implemented as a business that supports regional coexistence and shared benefits. Therefore, it is essential to promote the formation of entities that facilitate autonomous and widespread decarbonization efforts tailored to the specific characteristics of each region.

For the national government to promote prefectures and municipalities efforts, the national government will compile manuals for formulating and implementing the local government's action plan. In addition, in cooperation with prefectures,, the government will develop information infrastructure to, for example, aggregate and share positive case studies into measures and to train local government officials, to dispatch experts, offer regional-level GHG emission inventories and statistical tools, provide systems to support the formulation and management of local government action plans, provide systems to serve information on renewable energy, and to provide tools for analysis of the local economic cycle, while also supporting the development of facilities and the introduction of equipment related to renewable energy and energy conservation.

4. Promotion of urban/regional development that contributes to decarbonization as a response to various regional issues

In promoting global warming countermeasures in a region, it is necessary to concentrate on urban structures as the basic policy, and to comprehensively and systematically work on urban and regional development that contributes to decarbonization in order to prevent the freezing of the socioeconomic structure (lock-in) into a rigid pattern of high GHG emissions. Furthermore, in order to smoothly

promote such efforts and allow results to take root, it is effective and important to consider how to respond to various regional challenges, such as regional revitalization and biodiversity conservation, while at the same time using regional resources, including renewable energy. Since the use of renewable energy in a region will reduce the risk of power outages in the event of a disaster due to regional distributed power sources, renewable energy is desirable from the dual perspective of effectively promoting climate change countermeasures and preventing or mitigating disasters.

For this reason, regarding measures related to the reduction of GHG emissions, such as in city planning, location optimization plans, low carbon town planning, agricultural promotion area development plans, forest plans, comprehensive plans, comprehensive management plans for public facilities, regional public transportation plans, and so on, consideration will be given to reducing GHG emissions in cooperation with the local government's action plan while striving to harmonize results with the achievement of the objectives of the measures. Examples of strongly expected initiatives that are to be implemented mainly by local governments range from area-wide efforts such as the introduction of regional energy management systems (CEMS), the introduction of locally-managed microgrids, and regional heating in business-centered districts and industrial parks, Compact Plus Network measures, promotion of the use of public transportation, such as railways, creation of comfortable and walkable spaces, construction of smart communities, and the social implementation of green infrastructure to broad-based initiatives for reducing emissions through the utilization of Eco-DRR and avoiding the installation of artificial structures.

Additionally, in order to promote the understanding and cooperation of businesses and residents regarding such efforts, it is important to promote the development of human resources and networks that participate in community development and encourage various actors to play a leading role in decarbonization. For this reason, community-based policies such as supporting the activities of private organizations and intermediary support structures are expected to be promoted, which include teaching and raising awareness for environmental education and area management.

5. Coordination and cooperation of local governments

As local governments make use of the Regional Energy and Global Warming Mitigation Councils while cooperating with the national government, regional centers for climate change actions, and Regional Councils on Global Warming Countermeasures, information and know-how related to global warming countermeasures between prefectures and municipalities will be actively shared, and it is strongly expected that efforts by various actors will be promoted.

Additionally, the promotion of joint examinations and the implementation of measures and projects contributing to global warming countermeasures by means of wide-area cooperation and collaboration with other local governments are expected to further enhance and diversify initiatives, as well as make them more efficient. Examples of various forms of cooperation that are conceivable include the sharing of knowledge on measures and policies considered to be effective by public governments with similar natural and social conditions and the implementation of joint projects; coordination and linking of measures and policies in metropolitan areas formed by a central city of

considerable scale surrounded by neighboring cities, towns, and villages; implementation of joint energy projects between mountainous area rich in renewable energy resources and urban areas with significant energy demand; and more. Since having multiple local governments, including prefectural governments, work together to jointly formulate and implement measures for emission reductions in offices and businesses may help reduce GHG emissions more effectively, these governments attempt to jointly formulate and execute the local government's action plan in accordance with conditions on the ground locally. It is recommended that, in the case of small municipalities in particular, plans are formulated and executed with prefectures executing measures based on the local government action plans for entire municipal jurisdictions of said prefectures and municipalities coordinating and partnering with prefectures and allied central cities, given their difficulties stemming from shortages of personnel and specialists, and with a view to efficiently introducing and using things like renewable energy.

Moreover, the promotion of urban development aiming at decarbonization overseas and at sharing information on advanced initiatives and technologies through international city-to-city cooperation based on sister city relationships and other cooperation agreements with overseas local governments is expected to contribute to the reduction of GHG emissions worldwide.

6. Progress management for the local government's action plan (establishing PDCA structures)

In advancing policies for reducing local GHG emissions, local governments should carry out annual follow-up and review of the achievement status of their emissions reduction targets and of the progress of individual countermeasures and policies. Local governments should build internal, cross-departmental structures as well as cooperation with outside stakeholders such as external experts for carrying out such reviews.

In particular, constantly and comprehensively identifying the emission status of energy-related CO_2 emissions (type and amount of energy used, operating status of equipment using the energy, etc.), as well as actively pursuing opportunities to adopt and utilize renewable energies to save energy, will be desirable. Based on the results of such efforts, necessary operational improvements and the adoption of cost-effective facilities should be considered. In prefectures, designated cities, core cities and special cities/areas, and cities with particularly high GHG emission levels, a GHG emissions reporting program and a global warming planning document system should be established to encourage businesses to reduce GHG emissions.

When doing so, a PDCA system for initiatives to control GHG emissions targeting all projects should be established and operated. However, in evaluating the progress of plans, it is important to noted that, in the event that it proves difficult to reflect the effects of decarbonization efforts per city and thus to make use of the data need to, for example, see GHG emissions on a per municipality basis, in managing the progress of reductions, municipalities may manage progress with focus on indicators such as the volume of renewable energy introduced per city, while referring to prefectural GHG emissions levels and the progress of overall prefectural plans.

Section 5: Efforts expected of businesses with particularly high emissions

Businesses with considerably high total GHG emissions are expected to formulate plans that include quantitative targets for emission reduction measures to promote effective individual or collective countermeasures across different GHGs, sources, and reduction measures.

Although the details of the plans are left to the autonomy of the businesses, it is expected that they note the following points to ensure the best possible results.

- In particular, businesses should strive to reduce emissions by improving energy and carbon intensity and analyzing their performance. Businesses should also source low-carbon intensity electricity.
- Businesses should strive to set targets based on an international comparison of emission intensities, taking into account the characteristics of each industrial sector and assuming that the best available technology (BAT) will be implemented when new equipment is installed or upgraded, and then explain to the public that this is the maximum feasible target level.
- To the extent possible, businesses should include in their plans, measures that contribute to the reduction of GHG emissions by other entities, such as measures to reduce GHG emissions that are implemented jointly with other entities in the value chain, the development of products and services with low GHG emissions (carbon footprint) across their entire lifecycles, and the reduction of waste. Also, a quantitative assessment of the contribution to emission reductions in other sectors, such as commercial and other, residential, and transport, should be carried out.
- Businesses that have drawn up plans should strive to publish the plans and the progress of the measures implemented in accordance with the plans.
- Businesses should strive to improve the transparency and credibility of their plans through objective evaluations by relevant government councils and third-party organizations, and based on such evaluations, they should strive to work to improve the feasibility of plan implementation.

Section 6: Transition to a decarbonized lifestyle

○ Promotion of "*Decokatsu*"

Households account for about 20% of Japan's production-based GHG emissions, which are mainly due to energy consumption at home, such as heating and cooling, hot water supply, and the use of household appliances, while other reports say that households account for about 60%[53] of Japan's consumption-based GHG emissions (carbon footprint). Thus, to realize a decarbonized society, every citizen needs to take action to combat global warming.

To that end, the promotion of "*Decokatsu*," will present an overall vision of future lifestyles that spans all areas of daily life including clothing, food, housing, work, travel and shopping and that contributes to fostering momentum for understanding of global warming countermeasures among the public and to activation of consumer behavior. At the same time, initiatives will inspire the creation of vibrant lifestyles contributing to decarbonization by making use of behavioral economics insights such as nudge theory. Through this, the transformation towards a social economic system and the conversion to lifestyles suitable for a decarbonized society, beginning with the expansion and creation of markets for decarbonized products and services, including GX products. In particular, focus will be placed on advancing housing energy conservation through insulation renovation, the promotion of high-efficiency water heaters, and the social implementation of next-generation automobiles, and make it a target to contribute to ensuring 140 million t-CO_2 emissions reductions overall by FY 2040.

Specifically, the government will encourage the following measures in partnership with businesses, local governments and other bodies, in unison with relevant government agencies. In doing so, it will promote the economic and time advantages coming from advancing energy conservation and the realization of new, vibrant lifestyles, as well as the necessary costs.

- Decarbonization of housing, including insulation renovations (including apartment buildings)
- Introducing renewable energy, including solar power generation for personal use
- Use of decarbonized products and services, including LED lighting, energy-saving appliances, high-efficiency water heaters, water-saving appliances, and HEMS
- Implementation of sustainable fashion, such as Cool Biz/Warm Biz[54]
- Food loss and waste[55] countermeasures through local consumption and reducing leftovers
- Reducing trash (including used paper diapers[56]) and promoting the resource cycle through separation

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[53] "Embodied Energy and Emission Intensity Data for Japan Using Input-Output Tables" (provided by the National Institute for Environmental Studies) by Keisuke Nansai; Carbon Footprint of Japanese Health Care Services From 2011 to 2015 by Keisuke Nansai, Jacob Fry, Arunima Malik, Wataru Takayanagi, and Naoki Kondo; and estimates by the Institute for Global Environmental Strategies (IGES) from the Ministry of Internal Affairs and Communications: "2015 Input-Output Table."

[54] The government aims to reduce the amount of clothing thrown away by households by 25% from 2020 levels by FY 2030.

[55] The government aims to more than halve food loss and waste volumes compared to FY 2000 by FY 2030.

[56] A total of 150 local governments aim to practice or consider the renewable use of used paper diapers by FY 2030.

・ Introduction of teleworking
・ Selection of less environmentally impactful means of transit, such as next-generation automobiles, public transportation, and bicycles
・ Information dissemination making use of nudge theory and incentives

Through the "*Decokatsu*" Support Team (Public-Private Partnership Council for New National Movement), the formation of public-private projects for social implementation will be promoted. At the same time, we will make proactive use of diverse approaches and tools such as the internet and social media to distribute information about initiatives, products and services that combine decarbonization and the creation of rich lifestyles. Changes in public behavior and lifestyle will be encouraged by fostering cooperation with the Japan Center for Climate Change Actions (JCCCA), the Regional Center for Climate Change Action, the climate change officers, the Regional Councils on Global Warming Countermeasures, and other organizations and businesses to promote global warming countermeasures.

Mechanisms and countermeasures will be further revealed to indicate policies and pathways needed to create new value contributing to decarbonization and to realize vibrant lifestyles, and structurally address challenges and bottlenecks from the public's perspective, as part of the 10-Year Roadmap of Lifestyles (formulated February 2024), itself formulated based on the Grand Design and Action Plan for a New Form of Capitalism 2023 Revised Version (Cabinet decision on June 16, 2023), while also encouraging effective public-private initiatives.

Additionally, home eco-diagnosis will be encouraged to suggest countermeasures for CO_2 emission reduction tailored to individual lifestyles by visualizing the energy consumption status in each household and the CO_2 emission reductions through individual decarbonization measures.

By 2030, the lifecycle of CO_2 emissions of products and services by companies is expected to be visualized in an objective form, based, for example, on calorie labeling for food (by indicating the carbon footprints and such), and this information will be incorporated into product packaging, IC tags, electronic receipts, and more so as to foster communication between producers, sellers, and consumers and to assist with inventory and sales management in combination with location information and purchase history. A greater degree of surfacing of emissions will be achieved through the development of expert personnel related to the calculation and display of carbon footprints, aspiring to create a society where consumers can actively choose products and services that contribute to decarbonization.

Additionally, we will provide citizens with reliable information from Japan and overseas on the critical situation of climate change, its impact on society and global warming countermeasures, based on the latest scientific findings presented by the IPCC Assessment Report and the Assessment Report on Climate Change Impacts in Japan, in a form that is easy to understand and adapted to different generations and lifestyles, in order to change the awareness of climate change and spread awareness of the crisis. We will also contribute to the creation of opportunities for the government to take on the views of younger generations to lift up the voices of the youth of the future, improve how policy reflects and how parties across the public are aware of issues, beginning with the nature of social economy based on decarbonization, and to a positive cycle of encouraging initiatives.

○ Promoting Environmental Education and Education for Sustainable Development (ESD)

To solve the problem of climate change, it is extremely important that each citizen takes action in his or her daily lives. Transforming lifestyles involves advancing environmental education that spurs transformation in society and organizations and changes in a joined-up way for all adults and children across homes, schools, workplaces, regions and all other places. To promote this, it is not enough to simply impart knowledge, but it is important to advance education that seeks to help learners understand the current situation of global warming and its relationship to human activities, and to take action themselves to address the problem, starting with those in their immediate environment.

With regard to Education for Sustainable Development (ESD), proposed by Japan, the international framework ESD for 2030, which indicates that ESD contributes to the achievement of all the goals of the SDGs through fostering the creators of a sustainable society, was adopted at the UN General Assembly in December 2019. Domestically, the Second ESD Implementation Plan was formulated in May 2021 and is being advanced to promote ESD across the whole country, based on the principles of ESD for 2030.

In the National Curriculum Standards for kindergartens, elementary, junior high, and high schools, fostering competencies needed to be "the builders of a sustainable society" is being advanced. At the same time, under the Fourth Basic Plan for the Promotion of Education (June 16, 2023), "fostering creators of a sustainable society" is put forward as a comprehensive basic policy for educational policy overall, and advancing ESD is mentioned. Furthermore, we are advancing the promotion of exchange using the UNESCO associated schools [57] network and promotes the establishment of environmentally friendly educational facilities (Eco-schools). At the same time, we are driving environmental education efforts by partnering with relevant agencies to provide teachers with opportunities of training and teaching materials.

Additionally, in the Basic Policy for the Promotion of Environmental Conservation Activities, Motivating Participation in Environmental Conservation, Environmental Education, and Collaborative Efforts (Cabinet Decision on May 14, 2024) based on the Act on the Promotion of Environmental Conservation Activities through Environmental Education (Act No. 130 of July 2003; hereinafter referred to as the "Environmental Education Act"), which was fully amended by Cabinet decision in May 2024, it is stated that it is important to promote all possible opportunities for experiential learning, dialogue and cooperation with diverse actors, and learning through the use of ICT, with a view to promoting behavior aimed at comprehensively improving the environment, the economy and society and at transforming those things in specific ways, based on the ESD approach.

Based on this, We will not only seek to offer greater sites for high-quality environmental education and promoting it across a wider range of sites through a Certification of Place for Nature-Based Experiences System and a Services of Human Resource Certification System, based on the Environmental Education Promotion Act,

[57] Schools that practice peace and international cooperation to realize the ideals of UNESCO, and which are approved by UNESCO. In Japan, UNESCO schools have been positioned as sites for promoting ESD.

it will also promote autonomous efforts by all possible actors through awards systems, the provision of opportunities for training and through the active dissemination of positive case studies on websites. Intermediary support functions, such as ESD activity support centers, will be enhanced and utilized to advance such efforts through sustainable means, while partnering with social education facilities, private bodies, and businesses. Additionally, environmental partnerships will be leveraged to further form regional joint action and support bodies to promote activities in local communities and support parties performing environmental conservation activities.

Section 7: Accelerating regional decarbonization to contribute to regional revitalization (Regional Decarbonization Roadmap)

Regional decarbonization could be an opportunity to solve local issues and lead to attractive and high-quality regions as a growth strategy, making the most of regional strengths in an age of decarbonization, combined with economic competition.

While regional decarbonization policies are being deployed, particularly centered on priority measures and policies toward 2030, based on the Regional Decarbonization Roadmap (decided by the Council for National and Local Decarbonization on June 9, 2021), which sets out a process and specific measures, it is necessary to accelerate regional decarbonization efforts led by local governments that are closely tied to local communities and lifestyles, in order to meet the ambitious target of a 46% reduction in emissions by FY 2030, on the path to achieving net zero by 2050.

However, various challenges have become apparent in promoting regional decarbonization. On top of shortages of financial resources and personnel with expert knowledge in local governments, in particular the shortage of personnel and expertise to lead local decarbonization in small municipalities is severe. This is likewise the case for the small and medium-sized enterprises (SMEs) and those engaged in the primary industries who form the bedrock of regional economies. There is thus a need to further advance regional decarbonization efforts while seeking to address these challenges.

In light of issues such as local troubles arising from the introduction of renewable energy and the increasing demand for output control, to introduce renewable energy to the greatest degree possible, it is increasingly necessary to have local production for local consumption of renewable energy through self-consumption and in-region consumption, with a view to introducing renewable energy that coexists with and benefits the local community and that lessens the burden on the grid. Local government-led regional decarbonization is thus becoming increasingly important.

Furthermore, as new technologies are developed and implemented that overcome issues, such as Perovskite solar cells that can be installed in locations where conventional solar panels are difficult to deploy, it is necessary to take into account the application of such emerging technologies in advancing regional decarbonization. In addition, there is a growing nationwide need to expand the establishment of data centers and other facilities with high energy demand. It will be important to incorporate such new sources of demand within regions and connect them to the local economic circulation, in order to maximize the use of renewable energy in local regions and to promote regional revitalization.

In light of the current challenges that have emerged during the implementation of the Regional Decarbonization Roadmap, as well as new decarbonization technologies that should be considered moving forward, it is necessary to accelerate regional decarbonization efforts led by local governments that are closely tied to local communities and lifestyles.

Producing, storing, and smartly using renewable energy in line with regional potential can contribute to transforming regions into more resilient in the face of surging energy prices and supply-demand constraints. At the same time, it could also contribute to solving various local challenges, such as revitalization of industry through the use of untapped resources, improving resilience, improving local economic balance, and

securing and maintaining public transportation through greater revenue. In light of the global trends toward decarbonization, achieving regional decarbonization as early as possible can also enhance the attractiveness of regions for business location and investment, thereby contributing to maintaining and improving local industrial competitiveness, making regional decarbonization an exceptionally important element in regional revitalization.

For this reason, Japan will continue to position decarbonization as one of the key priorities across all policy areas related to regional decarbonization efforts and will make every effort to implement the necessary measures, while also actively promoting additional measures. Going forward, in order to strengthen policy responses and firmly establish the foundation for the nationwide rollout of regional decarbonization, the government will designate the five years from FY 2026 to FY 2030 as a new intensive implementation period and will work to carry out the necessary measures, in close cooperation with the Ministry of the Environment and other relevant ministries and agencies, based on the direction of policy indicated in the summary of the "Study Group on the Future Direction of Regional Decarbonization Policies" (December 2024).

1. Promotion of regional decarbonization, including nationwide implementation of Decarbonization Leading Areas and priority countermeasures that serve as the foundation for decarbonization (scaling up locally driven initiatives across the country)

○ Promotion of regional decarbonization, including nationwide implementation of Decarbonization Leading Areas and priority countermeasures that serve as the foundation for decarbonization (scaling up locally driven initiatives across the country)

The government will select at least 100 regions as Decarbonization Leading Areas by FY 2025 and, by FY 2030, realize leading decarbonization measures that contribute to regional revitalization. At the same time, the government will promote the Priority Measures Acceleration Projects, which are implemented by local governments over multiple fiscal years in a comprehensive manner within their respective areas, by introducing technologies that should be promoted nationwide, such as rooftop solar power generation for self-consumption, renewable energy that promotes regional coexistence and benefits the community, ZEH/ZEB, EVs, storage batteries, EMS (Energy Management Systems), and private power lines. Through such measures, model cases will be created that simultaneously address regional challenges and decarbonization, and will expand the establishment of foundations (establishment of frameworks and foundations for promoting regional decarbonization through collaboration between regional financial institutions, regional core companies, regional energy companies, universities and other educational and research institutions, chambers of commerce and other local governments) for promoting decarbonization at the local level.

In line with this, information will be proactively disseminated regarding the classification of the advanced and model characteristics of Decarbonization Leading Areas, as well as information on best practices and case studies of overcoming challenges. Additionally, the aim is to accelerate and expand regional decarbonization

across the country by proactively distributing information about more practical and specific know-how, such as insights into business viability and efficiency gained from Decarbonization Leading Areas and the Priority Measures Acceleration Program, and KPI improvements of best practices that contribute to regional revitalization.

Additionally, in promoting regional decarbonization, the government will advance efforts that generate regional benefits, such as management improvement for small and medium-sized businesses, as well as those engaged in agriculture, forestry, and fisheries who play key roles in the regional economies, through the use of J-Credit and a combination of solar power generation and agricultural production. The government will seek to coordinate with policy programs across different domains and various regional development measures advanced by relevant ministries and agencies, such as the Fifth Basic Plan for Establishing a Sound Material-Cycle Society, which is promoted as a national strategy to transition to a circular economy; the Strategy for Sustainable Food Systems (Strategy MIDORI), which aims to achieve both improved productivity and sustainability of the food, agriculture, forestry and fisheries industries through innovation; the MLIT National Environmental Action Plan, which strategically promotes cross-sectoral decarbonization and other measures to realize a green society at national, urban and regional levels, and to thus solve multiple problems simultaneously, including not only decarbonization but also the realization of a circular economy, establishment of a sustainable food system, disaster prevention and risk reduction, and improved national land resilience.
(E.g., measures based on the Act Concerning Sophistication of Recycling Business, etc. to Promote Resource Circulation, expanding the range of and aggregating waste processing facilities, expanding certification based on the Strategy MIDORI, fully implementing cross compliance, improving the effectiveness of location optimization plans and decarbonization of infrastructure spaces such as airports, ports, dams and roadways.)

2. Implementation and creation of demand for new technologies in regional areas

○ Promotion of regional decarbonization, including nationwide implementation of Decarbonization Leading Areas and priority countermeasures that serve as the foundation for decarbonization (scaling up locally driven initiatives across the country) (Described above)

Toward the realization of a decarbonized society, new products and technologies for decarbonization have been developed and demonstrated. It is necessary to gradually implement these innovations for decarbonization at the regional level. Going forward, in order to encourage early acceptance of such new products and technologies for decarbonization among regional companies and citizens and to create demand, regional decarbonization efforts that serve as platforms for implementing innovative products and technologies for decarbonization will play an important role in driving demand.

Consequently, GX Economic Transition Bonds will be utilized to support the fostering of domestic and regional industries and the generation of demand in the GX domain through, for example, support for the introduction of regional microgrids and heating pipelines with high local production and consumption rates, and the introduction

of enhanced regional energy management systems (e.g., using Virtual Power Plants (VPP)), and through support for, the introduction of GX products such as electrification of commercial vehicles, installation of insulated windows, and deployment of high-efficiency water heaters. Additionally, in order to generate initial demand for decarbonized technologies and products that are being newly applied, such as Perovskite solar cells, the government will consider financial support schemes for social diffusion in regions and build a new pilot project (pilot project for regional GX innovation) for the comprehensive introduction of such new technologies in regional areas.

3. Basic policies to support the acceleration and nationwide implementation of regional decarbonization

(1) Establishment of a local administrative framework and mechanisms for active support by the national government

○ Establishment of a local administrative framework and mechanisms for active support by the national government

In order to accelerate regional decarbonization and promote regional revitalization, it is essential to establish regionally led, effective cooperative policy structures. This should be built through collaboration among a wide range of key actors rooted in the local regions, including prefectures, municipalities, financial institutions, core companies, local energy companies, universities, and other educational and research institutions. These actors should complement one another's efforts and make use of their respective strengths, such as infrastructure and expertise, under the concept of "cooperation among industry, government, academia, finance, labor, and civil society". Using such cooperation structures, a large movement for decarbonization will be created, involving the citizens and regional businesses, thus aspiring to transition to a decarbonized regional economy as a comprehensive initiative rather than as isolated initiatives.

The national government will actively support such regional efforts in terms of human resources, information, technology, and finance.

(Human Resources)

As securing administrative framework with limited personnel and specialized expertise continues to be a challenge for many local governments, the government will seek to enhance and promote the use of the pool of necessary expert personnel in the support schemes for dispatching expert personnel to local governments (Decarbonized Town Planning Advisor System, Regional Revitalization Personnel Support System (Green Expert Personnel) etc.). In doing so, the government will investigate making further use of local experts, such as experts from regional energy companies or public enterprises. When matching dispatched personnel with local governments, detailed and tailored coordination will be carried out with the involvement of prefectures and Regional Environmental Offices.

The government will also promote the setting up of an administrative framework that oversees decarbonization policy in local governments across agencies, while also

supporting the installation of personnel to advise on such an administrative framework from a place of expertise.

Furthermore, we will conduct training and networking with businesses aimed at developing core personnel responsible for realizing regional decarbonization within local governments, which will be enhanced and implemented in a more practical manner, in partnership with relevant agencies, experts, and businesses.

Additionally, the government will encourage the acquisition of regional financial and other institutions of qualifications based on the Decarbonization Advisor Qualification System, which certifies private sector qualifications of the fulfillment of criteria, so that personnel with appropriate knowledge for promoting decarbonization can effectively fulfill their roles both within and outside companies.

(Information and Technology)

In order to accelerate regional decarbonization, the government will seek to enhance the content of information and technical support tools at the regional level, such as GHG emission inventory and estimation tools, systems for providing information about renewable energy and tools for analyzing regional economic circulation. We will also actively disseminate information on its effectiveness and usefulness. The government will also continue to improve and expand data, such as GHG emissions and electricity consumption by municipalities, in order to enable local governments to develop effective policies. In response to data gaps, such as information on self-consumed renewable energy, we will also consider proactively providing regional-level data on GHG reductions achieved through government-funded subsidy programs directed to local businesses and citizens.

Furthermore, we will seek to enhance the information on regional natural and social environments recorded in the Environmental Assessment Database (EADAS) in order to promote the introduction of wind power generation. Making proactive use of this information, we will work with relevant agencies and ministries to support the development of wind power projects that coexist with local communities.

(Financial Resources)

To provide intensive and targeted support to local governments with ambitious decarbonization projects, the government will carry out ongoing and comprehensive support over multiple years through regional decarbonization promotion grants. We will also provide support to address emerging challenges and new technologies by utilizing the support tools compiled in “Major Support Tools and Frameworks from Relevant Government Agencies for Regional Decarbonization Initiatives”, local fiscal measures contributing to regional decarbonization, as well as through the use of financial instruments that help attract private investment.

Through the Japan Green Investment Corp. for Carbon Neutrality (JICN), the government will proactively providing funding for businesses carrying out business activities that contribute regional decarbonization, and offering advice on business activities eligible for the supports, and also provide support for projects that contribute to regional revitalization in partnership with local governments and other related local actors, based on support criteria that focus on coexistence with local communities.

From the perspective of promoting sustainable finance, including ESG finance, the national government will provide support for the formation of regional ESG finance projects and the development of administrative framework, developing regional financial institution personnel, and matching of demand and supply for carbon credits derived from primary industries and energy conservation credits from small and medium-sized enterprises (SMEs), to contribute to simultaneously achieve a regional decarbonization transition and economic revitalization through cooperation between a wide range of actors, including local governments, regional enterprises and regional financial institutions.

In active support of the national government, Local Branch Offices of the national government (Regional Agricultural Administration Offices, National Forest Regional Office, Regional Bureaus of Economy, Trade and Industry, Regional Development Bureau, District Transport Bureau, Regional Environmental Office, etc.), which are close to the regional implementation system, will work in horizontal cooperation to carefully identify the strengths, challenges and needs of each region and provide support in a flexible manner. They will share information on the support tools and examples of support achievements of their respective branches and departments, and work together to disseminate information and encourage local governments and other stakeholders.

For complex actions involving multiple actors and sectors, the support tools of each branch will be combined. Moreover, in promoting regional decarbonization, a contract system will be ensured in each branch, where local government can consult with their counterparts, and consultations and project progress will be shared and handled in cooperation between branches.

(2) Initiatives to transition to a decarbonized lifestyle in regional areas

○ Initiatives to transition to a decarbonized lifestyle in regional areas

It has been reported that approximately 60% of Japan's GHG emissions, when measured on a consumption basis (carbon footprint), come from households. We can thus switch from mass production, mass consumption, and mass waste lifestyles to lifestyles based on optimal production, optimal purchasing, and circular use. By choosing decarbonized products and services, a greater number of people can enrich their lives while driving the nationwide decarbonization from the demand side.

Thus, in order to promote behavior change among local citizens and businesses towards decarbonization, the national government will work with local governments to promote initiatives that clearly visualize the details of such efforts and their co-benefits, such as the economic and time-saving advantages, and will advance measures to promote specific behavioral changes.

(Promotion of "*Decokatsu*" in cooperation with regional decarbonization efforts)

As it is important to advance regional decarbonization with the understanding of the citizens and businesses, local governments need to proactively promote public PR and awareness raising for citizens about regional decarbonization efforts. The national government will work with local decarbonization initiatives led by local governments

to rigorously drive "*Decokatsu*" which promotes enriched lifestyles that contribute to decarbonization.

(Promotion of environmental education in cooperation with regional decarbonization efforts)

To promote behavior change among a broad range of actors in promoting regional decarbonization, it is important to also coordinate environmental education, consumer education, and school education. To that end, the national government will advance measures for consumers through cooperation with relevant local government agencies (e.g., environmental agencies or consumer affairs agencies). By promoting school facilities that take into account the environment (eco schools), we can also make use of school facilities as resources for environmental education.

To promote understanding and behavioral change among citizens and businesses in regional areas, the government will also host forums with diverse participants in regional blocks at the level of each regional environmental agency. Additionally, we will take the opportunities presented by events such as the 2025 Japan International Expo to communicate the benefits of regional decarbonization efforts for communities and citizens, both domestically and internationally.

(3) Rule innovation (institutional measures, etc.)

○ Rule innovation (institutional measures, etc.)

In promoting the development of renewable energy and the renovation of homes, buildings, and infrastructures, which take time to introduce and involve various actors, institutional reforms and other measures will ensure effectiveness in addition to support measures.

(Institutional measures to accelerate regional decarbonization that coexist with and benefit local communities)

The regional decarbonization promotion project system that practices positive zoning for renewable energy siting based on the Act on Promotion of Global Warming Countermeasures has been brought in since FY 2022. However, there are still few examples of promotion areas being established or promotion businesses being approved as originally anticipated under the scheme. The government is thus considering further measures to advance regional decarbonization that also contribute to regional revitalization, such as establishing promotion areas and incentivization measures related to the use of the regional decarbonization promotion project system based on the Act on Promotion of Global Warming Countermeasures. Also, the framework to promote local production for local consumption and expanding adoption of renewable energy that contributes to regional revitalization in a way that coexists with and benefits the local community, which is led by regional energy companies will be explored.

(Promoting wind power generation by optimizing the environmental impact assessment suited to wind power characteristics)

For offshore wind power generation projects, the government will conduct surveys from the perspective of conserving the marine environment, etc. and designate

promotion zones. At the same time, the government will consider establishing a system that partially exempts projects equivalent to this from the environmental impact assessment procedures, thereby promoting the smooth project implementation, while ensuring appropriate environmental considerations. The government will also monitor projects during construction and operation under the division of roles between government and project proponent in order to address uncertainties in predicting environmental impacts. At the same time, the government will seek to consider further environmental conservation measures and to enhance its scientific knowledge and thus enabling more appropriate environmental considerations for subsequent projects. For onshore wind power projects as well, the government will also take necessary measures to ensure effective and efficient implementation of environmental impact assessments based on project characteristics.

(Promotion of geothermal development that is symbiosis with local communities)

To alleviate concerns among local stakeholders such as hot spring operators, the government will identify and collect scientific data in order to establish a system for data aggregation by serial hot spring monitoring, proper management and evaluation, and public disclosure. By thus promoting measures that synergize with conservation of the natural environment and that coexist with the local community, the government will accelerate the development of projects through smooth regional coordination.

The “Geothermal Development Acceleration Plan” (announced by the Ministry of Environment on 27 April 2021), which includes these efforts, aims to shorten the lead time for geothermal development from more than 10 years to a minimum of 8 years by 2 years, and to double the number of geothermal power generation facilities (including those located outside of natural park areas) nationwide by 2030 from approximately 60 facilities (as of March 2021).

Additionally, the government will seek to reduce development risks and costs for businesses by conducting its own geothermal resource surveys (including steam discharge tests) of geothermal resources, based on the Geothermal Development Acceleration Package. At the same time, relevant agencies such as the Ministry of Economy, Trade and Industry and the Ministry of Environment will also provide accompanying support to foster understanding in local communities, thereby promoting geothermal development with due consideration for the natural environment and hot spring operators.

(Institutional measures to strengthen countermeasures in the residential buildings and other building sectors)

Based on the Building Energy Efficiency Act, revised in 2022, the government will improve countermeasures such as reinforcement of regulatory measures, such as the mandating of compliance with energy-efficiency standards, including for residential buildings. The government will also set targets related to the installation of solar power systems as part of the standards under the Top Runner Program for detached houses.

Additionally, regarding the introduction of renewable energy systems such as solar power to residential and other buildings, the government will partner with relevant ministries and agencies to share knowledge about measures to promote the installation

of solar power system in buildings, including initiatives such as ordinances by some local governments that mandate the installation of solar panels on new residential buildings.

(Institutional measures to promote the recycling of solar panels)

Regarding solar panels, a significant increase in waste is expected from the late 2030s onwards. In order to ensure appropriate reuse, recycle, and disposal of them, the government proceeds with the examination of establishing a new system to ensure proper handover and collection of solar panels, including the use of a mandatory recycling system.

(Creating demand for cutting-edge products and services through the framework of the Act on Promoting Green Procurement)

A key agenda is expanding demand for products that are expected to further reduce the burden on the environment, driven by the development and diffusion of new technology, arising from the progress of GX. We have been promoting a higher level of environmental performance by establishing a two-tiered set of criteria for the application of the standards under the Act on Promoting Green Procurement. In the first place, we will appropriately position such cutting-edge products and services under the higher environmental performance standards (standard value 1). By indicating a policy to advance procurement of such products and services insofar as there is no impediment or restriction on supply in conducting procurement, we will promote expansion of demand in the domain of public procurement as well.

Section 8: Promoting greenhouse gas emission reductions overseas, ensuring international partnership and promoting international cooperation

To achieve the 1.5°C target, it is exceptionally important to advance efforts not only within individual countries but also globally. With this regarding mind, Japan will demonstrate international leadership in driving global decarbonization, while proactively promoting actions that will lead to emission reductions worldwide, in order to achieve progress with respect to international global warming countermeasures. In doing so, Japan will further advance the establishment of an environment that facilitates the creation of decarbonization markets, human resource development, and institutional development in each country, by building on the trust it has developed and utilizing platforms such as the Asia Zero Emissions Community (AZEC), thus promoting business-led international expansion of technologies and products with high environmental performance and contributing to international emission reductions and removals, particularly in the Asia region.

1. Implementation of the Paris Agreement

○ Implementation of the Paris Agreement

To achieve the goals set out in the Paris Agreement, all countries, including the major emitting countries, are requested to set ambitious targets, take action to reduce emissions, and ensure transparency in tracking their progress.

Therefore, Japan will consistently submit updated Nationally Determined Contributions (NDCs) to the UNFCCC Secretariat every five years and report and review progress towards the NDC targets every two years, with the aim of improving transparency, in accordance with the provisions of the Paris Agreement. In this context, Japan will provide the latest scientific data and knowledge from the Greenhouse gases Observing SATellite (GOSAT) series, the Advanced Land Observing Satellite-2 (ALOS-2, “Daichi-2”) and the advanced radar satellite “Daichi-4” (ALOS-4) to assist each country in implementing and achieving its target. Japan will also continue to actively contribute to discussions at Conferences of the Parties with the aim of carrying out the Paris Agreement. Japan will also continue to cooperate to facilitate the appropriate execution of the Paris Agreement by countries in the Global South, contribute to the international reviews and the Climate Technology Centre and Network (CTCN) with commitment and cooperation.

2. Japan’s contribution to the overseas emission reduction

(1) Actions to reduce global greenhouse gas emissions

○ Contributions to reducing global greenhouse gas emissions

As contributions toward achieving the Paris Agreement's goal of net zero are also expected in the development of policies and institutions and the promotion of decarbonization technology, Japan will demonstrate international leadership to drive global decarbonization on the basis of international cooperation.

From this perspective, Japan will further leverage its strengths and support partner countries in developing policies toward decarbonization, including proposing a full

range of options that can contribute to reducing CO_2 emissions and the long-term strategy for achieving the goals set out in the Paris Agreement, based on a deep understanding of partner countries' needs. In addition, it will work to further establish an enabling environment that facilitates decarbonization markets, human resources development and institutional development in each country, seek to deploy high environmental performance technologies and products through public-private partnerships, and make the greatest possible contribution to global emissions reductions, with platforms such as the Asia Zero Emissions Community (AZEC) as a foundation. In doing so, Japan will treat the massive social transformations facing the world as a massive growth market and opportunity, more strategically and vigorously promote international deployment of environmental infrastructure, including the use of JCM, and contribute to sustainable growth for both Japan and the whole world.

Through initiatives such as the Cleaner Energy Future Initiative for ASEAN (CEFIA), established within the ASEAN+3 Energy Ministerial Meeting process in 2019, Japan will promote the deployment of low-carbon technologies in the energy sector and the establishment of related institutions, and promote transition financing through public-private collaboration. In addition, the government will create opportunities for business matching and support access to financing for individual projects, also with public-private partnerships, through the Japan Platform for Redesign: Sustainable Infrastructure (JPRSI).

Japan will seek to promote and expand synergistic projects that aspire to not only mitigate climate change but also to simultaneously improve or solve other environmental and social challenges, such as improving climate change resilience, waste management, air pollution, and fluorinated gases. Keidanren has forwarded "Promoting contribution at the international level" as one of the pillars of the Keidanren Carbon Neutrality Action Plan and has been promoting contributing to GHG emission reductions throughout the entire global value chain from upstream to downstream as an active and proactive measure in all industries and firms. The industry sector will continue to actively contribute to global emissions reductions through the global deployment of decarbonization products and services of its industry subsector, promoting GHG emission reductions across global value chains[58], and by indicating emissions reduction contributions through measures in line with the business field of each industry.

In relation to the contributions to reducing global GHG emissions, which Japan brought about by proactively fulfilling its role through public-private partnerships, Japan is also promoting international understanding of the idea of "avoided emissions of product," which was first mentioned in the 2023 Sapporo G7 Climate, Energy and Environment Ministers' Communiqué.

[58] Contributing to Avoided Emissions through the Global Value Chain (Japan Business Federation, March 5, 2024 (Sixth Edition)) offers as examples of CO_2 avoided emissions globally in 2030: 2.53 million tons from 100% biomass-based polyester, 131.2 million tons from desalination plant by means of the RO membrane process, 8.1 million tons from aircraft that use carbon fiber reinforced plastics, 384,000 tons from corrugated sheet (compared to 2013).

(Asia Zero Emissions Community (AZEC))

Japan is carrying out AZEC initiatives under the AZEC principles of "simultaneously achieving decarbonization, economic growth and energy security" and "realizing net zero through various pathways." Specifically, in line with the Action Plan for Next Decade adopted at the 2nd AZEC Leaders Meeting in October 2024, partner countries will advance policy harmonization including the development of rules using the Asia Zero Emission Center in the Economic Research Institute for ASEAN and East Asia (ERIA) , in addition to individual projects. Based on the Action Plan for Next Decade, Japan also plans to: (1) promote "AZEC Solutions" such as the development of rules to promote activities that contribute to decarbonization, (2) launch initiatives for decarbonization in the sectors with high emissions such as electricity, transport and industry, and (3) further develop and implement individual projects. Through such efforts, Japan will seek to contribute to decarbonization in Asia and around the world and to solving social challenges, while also following up on those efforts.

(Promotion of the Joint Crediting Mechanism (JCM))

Reducing and removing GHG emissions through the deployment of leading decarbonization technologies with a deep understanding of the needs of partner countries can contribute to the transition to a decarbonized society and a virtuous circle for the economy and environment, not only for partner countries but also for Japan.

For this reason, Japan will establish and implement the JCM in order to quantitatively evaluate its contributions to GHG emission reductions and removals and utilize them toward the achievement of its NDC, which are achieved through the diffusion of, among others, leading decarbonizing technologies, products, systems, services, and infrastructures as well as through the implementation of measures.

To promote mitigation measures through the use of JCM, firstly, Japan will work to expand the scope, scale, and routes for project development sourcing. Japan will seek to extend into emissions reductions in various areas and fields such as non-energy sectors, including agriculture and peatland management, CCS, and, furthermore, efforts beyond reductions, such as GHG removals, on top of energy conservation, renewable energy, and waste management, in which many projects have been launched since the JCM's inception. At the same time, Japan will work to identify and develop projects with particularly high emissions reduction potential as a priority. To that end, in addition to project support through government funding, Japan will expand and accelerate JCM projects financed mainly by private funding, by working with a broad range of public and private sector institutions,[59] which will be accompanied by the proactive technical support and support for MRVs by the government. Japan will also strategically expand JCM partner countries, taking into account factors such as emissions reduction potential.

Secondly, the government will work to improve the capabilities of government officials and businesses who are responsible. Specifically, we will work to promote understanding and to support improvements to administrative capacity in partner

[59] For example: The New Energy and Industrial Technology Development Organization (NEDO), Japan International Cooperation Agency (JICA), Japan Bank for International Cooperation (JBIC), Nippon Export and Investment Insurance (NEXI), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD) World Bank (WB), United Nations Industrial Development Organization (UNIDO), and the Japan International Research Center for Agriculture, Forestry and Fisheries (JIRCAS).

countries through Paris Agreement Article 6 Implementation Partnership (A6IP), to foster awareness of the intent of Article 6 of the Paris Agreement (market mechanisms) and its guidance (environmental integrity) by private Japanese firms, and to share its knowledge and experience on carbon markets through international platform such as AZEC and the G7.

Thirdly, we will work to improve operational efficiency and develop the necessary institutional framework and infrastructure. Specifically, we will set up the designated implementation agency based on the revised Act on Promotion of Global Warming Countermeasures and improve the efficiency and effectiveness of operations related to crediting procedures under the joint committee through the improvement of project management, revision of various guidelines and rules with partner countries. Through such efforts, we will seek to improve JCM implementation structures and advance the further reduction and removal of GHG emissions across the world. In parallel, with the anticipated increase in credit issuance and the number of account holders, we will work to develop a well-secured, robust, and user-friendly registry system.

Furthermore, as part of a cooperative approach in line with Article 6 of the Paris Agreement (market mechanisms), some partner countries have set their implementation period as being up to 2030. We are considering and coordinating how to continue and improve international mitigation cooperative approaches from 2031 onwards, so we aspires to offer a future outlook as soon as possible, in order to secure predictability for relevant businesses and other stakeholders.

(2) Development of policies and institutions in partner countries

○ Developing policies and institutions in partner countries

Promoting emission reductions through the introduction of high environmental performance technologies and products in partner countries requires the formulation of policies and mechanisms for their implementation, frameworks for their proper assessment, and improved transparency, while sharing a high level of ambition with partner countries. To that end, Japan will provide policy recommendations and share our experiences with partner countries. Additionally, Japan will offer support for the development of long-term strategy and NDC revision through the Asia-Pacific Integrated Model (AIM), support for the improvement of the accuracy of GHG inventories through the Workshop on Greenhouse Gas Inventories in Asia (WGIA) and the Partnership to Strengthen Transparency for Co-Innovation (PaSTI), support for the establishment of institutions related to GHG emissions accounting and reporting and climate disclosure, support for the preparation of Biennial Transparency Reports, and support for cooperation related to training necessary personnel. Japan will thus contribute to raising the level of ambition of partner countries and strengthening their measures for decarbonization.

(3) Leadership in international rulemaking

○ Leadership in international rulemaking

Japan will take the lead in international rulemaking, such as the formulation of international standards, to promote the diffusion of decarbonization technologies and products around the world.

For example, in order to accelerate energy conservation on a global scale, Japan will develop data to promote the "visualization" of the energy consumption efficiency of industries in each country and region and promote international standardization of evaluation methods such as the energy consumption evaluation of steel, the energy-saving performance of green building materials, and the general measurement of GHG emissions.

With regard to the JCM, which Japan has taken the lead in establishing, Japan will ensure environmental integrity and avoid double-counting consistent with international rules, including the Paris Agreement. Based on our experiences gained through building and executing the JCM, Japan will take part in international discussions on Article 6 of the Paris Agreement (market mechanisms) and lead the establishment of appropriate international rules for the use of the market mechanisms and improvements of the rules through its implementation.

In addition, as a major shipping and shipbuilding country, Japan will contribute to the achievement of globally agreed GHG reduction targets for the international shipping sector at the International Maritime Organization (IMO) and the decarbonization of international shipping by promoting technology development in Japan and leading the formulation of an international framework at the IMO. Moreover, Japan will contribute to the reduction of emissions from international aviation by leading discussions on reducing CO_2 emissions at the International Civil Aviation Organization (ICAO).

(4) Promoting cooperation among cities

○ Promoting cooperation among cities

In addition to the collaboration and co-creation among various actors, including public agencies, private companies, research institutes, and NGOs, international collaboration among urban stakeholders, including local governments that play an important role in promoting regional decarbonization in particular the implementation of efforts directly connected to local communities, represents an effective approach to building a global decarbonized society. Japan will support city-to-city cooperation between Japan and other countries by further expanding opportunities for international dialogue and communication among urban stakeholders through initiatives such as City-to-City Collaboration for Zero Carbon Society Program (C3P), JICA Clean City Initiative (JCCI), and Clean City Partnership Program (C2P2), which coordinate these related efforts. Japan will also work to share information among domestic stakeholders, to offer networking and mutual learning, so that more cities can participate in city-to-city cooperation. Through these initiatives, Japan will expand leading actions of regional decarbonization globally, as model cases of cooperation between the national and regional levels, and expand the "Decarbonizing domino effect" across the world.

(5) Overseas development of energy infrastructure that contributes to reducing carbon emissions

○ Overseas development of energy infrastructure that contributes to reducing carbon emissions

In order to truly balance the two major global challenges of improving global energy access and achieving a decarbonized society, it is essential to realize the innovations

needed to decarbonize fossil fuels, such as CCUS and carbon recycling, in addition to decarbonized power sources and hydrogen and its derivatives. Japan will contribute to the world by taking a leading role in the development and dissemination of technologies for this purpose and the sharing of knowledge through international cooperation.

At the same time, Japan will present all options that contribute to reducing CO_2 emissions in response to the needs of partner countries and actively work to disseminate the results of the innovations with a view to achieving a decarbonized society.

With this in mind, Japan will promote the export of energy infrastructure abroad in order to contribute to the global reduction of CO_2 emissions in a manner consistent with the long-term objectives of the Paris Agreement. In particular, given the growing demand for decarbonized power sources across the world, Japan will seek to introduce decarbonized power sources that tailored to the circumstances of each partner countries, and further develop and implement projects that promote the introduction and distribution of hydrogen utilizing the introduced decarbonized power sources. This will contribute to enhancing the potential of each country for introducing decarbonized power sources.

In line with the G7 Leaders' Communiqué agreed at the G7 Summit in Cornwall in June 2021, Japan ended new direct government support for unabated international thermal coal power generation by the end of 2021, including through Official Development Assistance, export finance, investment, and financial and trade promotion support.

(6) International development of lifecycle management for fluorocarbons

○ International development of lifecycle management for fluorocarbons

There are a few countries that have taken countermeasures to address the entire lifecycle of fluorocarbons in the world, and Japan's knowledge of measures against fluorocarbons is useful to developing countries and others. Japan will continue to support financial and technical cooperation through its contribution to the Multilateral Fund for the Implementation of the Montreal Protocol, raise international awareness of the importance of fluorocarbons management primarily through the Initiative on Fluorocarbons Life Cycle Management (IFL), share specific knowledge with administrators and others in developing countries, and conduct activities aimed at establishing a mechanism to prevent the release of fluorocarbons into the atmosphere in each country through continuous training.

By implementing model projects for the recovery and destruction of fluorocarbons in developing countries where such systems have not yet been developed for the lifecycle management of fluorocarbons, Japan will contribute to the establishment of such systems in those countries.

(7) International deployment of climate actions in agriculture, forestry, and fisheries

○ International deployment of climate actions in agriculture, forestry, and fisheries

GHG emissions from agriculture, forestry, and other land-use sectors account for approximately a quarter of total anthropogenic emissions worldwide and have a high potential for emission reduction, especially in developing countries. Therefore, through cooperation with international organizations and the utilization of JCM etc., Japan will promote our outstanding decarbonization technologies in agriculture, forestry, and fisheries overseas, including technologies for carbon sequestration in agricultural soils, combating deforestation and forest degradation, and promoting afforestation/reforestation activities, thereby contributing to the reduction of GHG emissions globally.

(8) Effective use of public funds and increased mobilization of private funds

○ Effective use of public funds and increased mobilization of private funds

In terms of finance, Japan will work to expand finance for climate change-related support (climate finance), not limited to Official Development Assistance (ODA), Other Official Flow (OOF), and others. In order to contribute to drastic global emission reductions, at the G7 Summit in Cornwall in June 2021, it was announced that Japan would provide climate finance, both public and private, totaling JPY 6.5 trillion over the next 5 years, from 2021 to 2025. In line with this, at COP26 in 2021, on top of the above commitment on finance, Japan announced that it would add up to 10 billion U.S. dollars of support and intends to double financial support for adaptation, totaling approximately 14.8 billion U.S. dollars. Through such commitments on finance, Japan will continue to sincerely deliver its obligation to provide climate finance as required under the Paris Agreement.

In the overseas deployment of infrastructure under the “Policy Program for Promotion of Overseas Infrastructure Systems”, Japan, as a government, will further encourage infrastructure-related initiatives by Japanese companies, promote public-private collaboration, and work together to take on challenges and contribute to growth in Japan and the partner countries, and contribute to global decarbonization.

In carrying out JICA’s ODA projects, Japan aspires to align all new projects with the goals of the Paris Agreement. Additionally, by realizing GHG emissions reductions by 2030 of 4 million tons per year, Japan will contribute to building a sustainable and resilient international society without easing its efforts even after 2030. In parallel, Japan will continue to assess the amount of GHG emissions and reductions in accordance with the JICA Guidelines for Environmental and Social Considerations.

In addition, Japan will actively participate in the effective and efficient management of the Green Climate Fund (GCF) and the Global Environment Facility (GEF), improve access to financial resources in partner countries and promote understanding of the financial mechanism and project cycle, while building networks with implementing agencies so that Japanese and partner country companies can participate in GCF and GEF projects.

Furthermore, in addition to the Japan Bank for International Cooperation (JBIC) and JICA, Japan will further strengthen collaboration with international developmental finance institutions such as the World Bank, the Asian Development Bank and the European Bank for Reconstruction and Development, and will expand the scale of

international support and promote the mobilization of both domestic and international funds for the developing of decarbonization projects in partner countries.

And Japan will encourage private sector investment by using these public finances effectively as leverages and by using risk mitigation finance and green bonds, such as samurai bonds.

(9) Reducing emissions from deforestation and forest degradation

○ Reducing emissions from deforestation and forest degradation

As measures to address GHG emissions from deforestation and forest degradation caused by agricultural land expansion, fuel extraction and illegal logging have become urgent issues, Japan will actively promote REDD+[60] and afforestation/reforestation through initiatives such as JCM in forestry sector and through public-private partnerships, utilizing its knowledge and technologies, and thereby contribute to reducing emissions and enhancing removals in the forest sector. Japan will support sustainable forest management in developing countries and contribute to reducing deforestation through services such as the JICA-JAXA Forest Early Warning System in the Tropics (JJ-FAST), which monitors the status of deforestation and forest transformation in the vast rainforests of the Amazon in Brazil using Japan's satellite technology (e.g., "DAICHI-2").

In addition, Japan will promote international cooperation on the distribution and use of legally harvested wood products in accordance with the Act on Promoting the Distribution and Use of Legally Harvested Wood and Wood Products (Act No. 48 of 2016), and supporting efforts to promote sustainable forest management and wood use through the International Tropical Timber Organization (ITTO).

3. Policies coordinated with other countries and international organizations

○ Policies coordinated with other countries and international organizations

Japan has been proactively engaged in coordination with countries across the world and international institutions, with a view to contributing to global emissions reduction to the greatest extent possible.

Japan has also announced a new pledge of up to 165 billion yen in 2023 to the GCF, to which Japan has contributed over the years, bringing the total amount of Japan's committed contributions to a maximum of 4.2 billion dollars. Japan is continuing to seek to make effective use of such financial contributions.

With regard to bilateral environmental cooperation, Japan will further promote it based on our accumulated experience, knowledge, lessons learned, and countermeasure technologies, including the signing of memoranda of understanding on environmental cooperation and the dispatch of experts.

Japan will proactively engage in environmental cooperation through regional policy frameworks such as the Tripartite Environment Ministers Meeting among Japan, Korea, and China (TEMM), Japan-ASEAN, ASEAN+3 Environment Ministers Meeting, East

[60] REDD+: Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

Asia Summit Environment Ministers Meeting (EAS EMM), and the Small Island Developing States (SIDS) Decarbonization Forum.

In addition, international networking across regional and other boundaries and multi-stakeholder collaboration involving international organizations are essential to reducing GHG emissions globally. As part of this effort, Japan will organize the Innovation for Cool Earth Forum (ICEF), which will bring together industry, national governments, and academia from around the world to accelerate innovation to help solve the problems caused by climate change.

Regarding short-lived climate pollutants (SLCPs) such as methane and fluorinated gases, the Climate and Air Cleanup Coalition for the Reduction of Short-Lived Climate Pollutants (CCAC) was launched in February 2012 at the initiative of the United States and others to reduce SCLPs. As a member country, Japan will actively contribute to measures to reduce SLCPs. Furthermore, as for methane, the Global Methane Pledge (GMP) was announced at COP26 in 2021 as the initiative of the U.S. and the EU. This initiative aims to globally reduce methane emissions by 30% compared to 2020 levels by 2030. Japan has taken part in this initiative since its inception with a view sharing with other countries its successful efforts to reduce methane emissions domestically as best practices.

Based on the G7 Transport Ministers' Meeting Agreement, in the maritime sector and ports, Japan will seek cooperation of both domestic and international stakeholders in these sectors, through the realization of Green Shipping Corridor, which are ocean routes where low and zero-emissions fuels and technologies have been introduced throughout the entire lifecycle, thereby accelerating decarbonization of these sectors. Additionally, in order to contribute to the decarbonization of not only Japanese ports but also ports across the world, Japan will promote the international deployment of measures such as Carbon Neutral Ports (CNP), which seek to enhance port functions that consider decarbonization and to establish an environment for accepting fuels such as hydrogen and ammonia. Specifically, Japan will promote the development of CNP in other countries through “Action Plan for Next Decade” under the collaboration framework of Asia Zero Emission Community (AZEC), as well as a project to formulate “guidelines for the development of Carbon Neutral Ports (CNP)” for ASEAN countries under the Japan-ASEAN transport cooperation.

In addition, Japan will further promote collaboration with international organizations, including: raising international awareness through multilateral discussions such as G7/G20 summits; actively promoting domestic implementation of agreed issues; considering measures to combat global warming at the Organisation for Economic Cooperation and Development (OECD); contributing to the deployment of renewable energy and promoting the use of hydrogen through the International Renewable Energy Agency (IRENA); contributing to the reduction of emissions from international transport through ICAO and IMO; addressing climate actions and biodiversity conservation in an integrated manner, based on the Kunming-Montreal Global Biodiversity Framework, adopted at the 15th Conference of the Parties to the Convention of Biological Diversity.

Chapter 4: For the promotion of sustained actions to global warming

Section 1: Progress management of the Plan for Global Warming Countermeasures

Based on the concept that proactive climate change measures will bring about transformation of an industrial structure and socio-economy, leading to the next higher growth, as a country, Japan will increase the policy continuity and predictability and accelerate decarbonization efforts, investment and innovation, by showing that it is steadily and unflaggingly pursuing the path towards net zero by 2050.

At present, while net greenhouse gas emissions in Japan are on a steady downward trend towards the achievement of net zero by 2050, the factors include not only the reduction of energy consumption and decarbonization of electricity, but also the reduction of production volume in the industry sector. Steadily and unflaggingly pursuing the path towards net zero by 2050 while realizing emission reduction and economic growth simultaneously is not an easy task, and it is essential to position net zero as one of the main issues in all socioeconomic activities and to promote the transition to a sustainable and resilient socioeconomic system. In order to achieve this goal, Japan will promote policies that contribute to growth with net zero as the axis, in collaboration with the GX (Green Transformation) policy, which aims to simultaneously achieve stable energy supplies, economic growth, and decarbonization.

From these perspectives, the government will conduct the progress management of the Plan as follows.

1. Basic approach to progress management

The Global Warming Prevention Headquarters will conduct strict annual reviews of the achievement status of targets by GHG and other classifications, relevant indicators, the progress of individual countermeasures and policies, and of the status of the materialization of countermeasures to be implemented going forward, while also taking into account periodic evaluations and reviews by the relevant councils, etc. In particular, for measures to achieve the FY 2040 target, we will focus on advancing the materialization of them and seeking flexible revision. When conducting reviews, the government will also take into account analyses of the factors behind any increases or decreases in GHG emissions volumes.

In addition, Japan will also seek to improve its review process by, for example, flexibly updating evidence used in evaluations, based on the performance of past evaluation and revision processes.

As it is necessary to have an up-to-date picture of the situation for accurate review, the relevant ministries and agencies will work to expedite the calculation of actual figures and other required information for reviewing indicators to evaluate the progress in implementing countermeasures.

Furthermore, the results of progress reviews for each countermeasure will be released via the Internet and others so that citizens can access the details of countermeasures and progress appropriately.

Specific methods for managing progress are as follows.

2. Methodology of progress management

(1) Methodology of progress management related to FY2030 targets

The latest figures for all countermeasure evaluation indicators, as well as the forecast of each measure evaluation indicator after the fiscal year of the progress review to FY 2030 (forecasts in each fiscal year as long as data is available), will be presented at the Global Warming Prevention Headquarters or the Executives Meeting of the Headquarters once every year. In line with this, the implementation status of policies that support the outlook of the measure evaluation indicators, along with countermeasures that are going to be implemented in the next fiscal year or after, including a draft budget, a tax reform plan, bills, etc., will be clearly presented as well. When reviewing progress, the government will closely examine the relationship between the evaluation indicators of individual countermeasures and the emission reductions that are the effect of the measure in question, as well as the cost-effectiveness of the countermeasure, as necessary.

Based on the above, by administering evaluations on each section of measures and policies and identifying sections whose progress is delayed, the government flexibly considers revision and improvement of the identified sections, and creatively implement global warming countermeasures.

(2) Methodology of progress management related to FY 2040 targets

Relevant ministries and agencies will strive to materialize countermeasures as soon as possible based on the status of the development, demonstration, and diffusion of future decarbonization technologies, and show how countermeasures have been materialized at the Global Warming Prevention Headquarters or the Executives Meeting of the Headquarters. Additionally, in materializing countermeasures, they will consider the feasibility of emissions reduction and cost-effectiveness, and, to the extent possible, present outlooks for countermeasure evaluation indicators for individual countermeasures toward the FY 2040 target, as well as the status of consideration and implementation of measures that support the outlooks. In reviewing the progress of materialized measures, the government will, as stated in section (1), closely examine the relation between the evaluation indicators of individual countermeasures and the emission reductions that are the effect of the measure in question, as well as the cost-effectiveness of the countermeasure as necessary.

Based on the above, by administering evaluations on each section of measures and policies and identifying sections that have not been materialized, the government flexibly accelerates the considerations of specific measures and replaces items as necessary, and creatively implements global warming countermeasures.

(3) Considerations based on the outcomes of inspections of progress status

In addition to these annual reviews of progress, the targets and policies specified in the Plan in consideration of GHG emissions and removals and other circumstances shall be examined at least every three years, taking account of the results of reviewing reports submitted by the Japanese Government to the Secretariat of UNFCCC, including the GHG Inventory for every fiscal year, Biennial Transparency Report and National Communication. Then the Plan will be revised as needed based on the results of the examination, and the revision will be decided by the Cabinet. In doing so, opinions of experts and others will be listened to appropriately and in a timely manner in relevant councils, and cooperation with relevant organizations shall be sought.

For the revision, the provisions, including the five-year cycle of submitting and updating NDCs as outlined in the Paris Agreement and the COP21 decisions, will be followed.

Section 2: Development of a promotion system

It is important to develop a systematic promotion system so that each entity can promote countermeasures continuously for building a sustainable decarbonized society.

In the government, led by the Global Warming Prevention Headquarters headed by the Prime Minister with all Cabinet Ministers as its members, and the Executive Meeting of the Global Warming Prevention Headquarters, which is a meeting of the director-general of the ministries, the relevant ministries and agencies will work in close cooperation with each other. In doing so, opinions of experts and others will be listened to appropriately and in a timely manner in relevant councils, and cooperation with relevant organizations will be sought.

Additionally, in the regions, the Regional Energy and Global Warming Mitigation Councils set in each regional block will be utilized in cooperation with local governments and the Regional Councils on Global Warming Countermeasures, etc., in order to back up regional efforts for global warming prevention with collaboration among the relevant ministries and agencies.