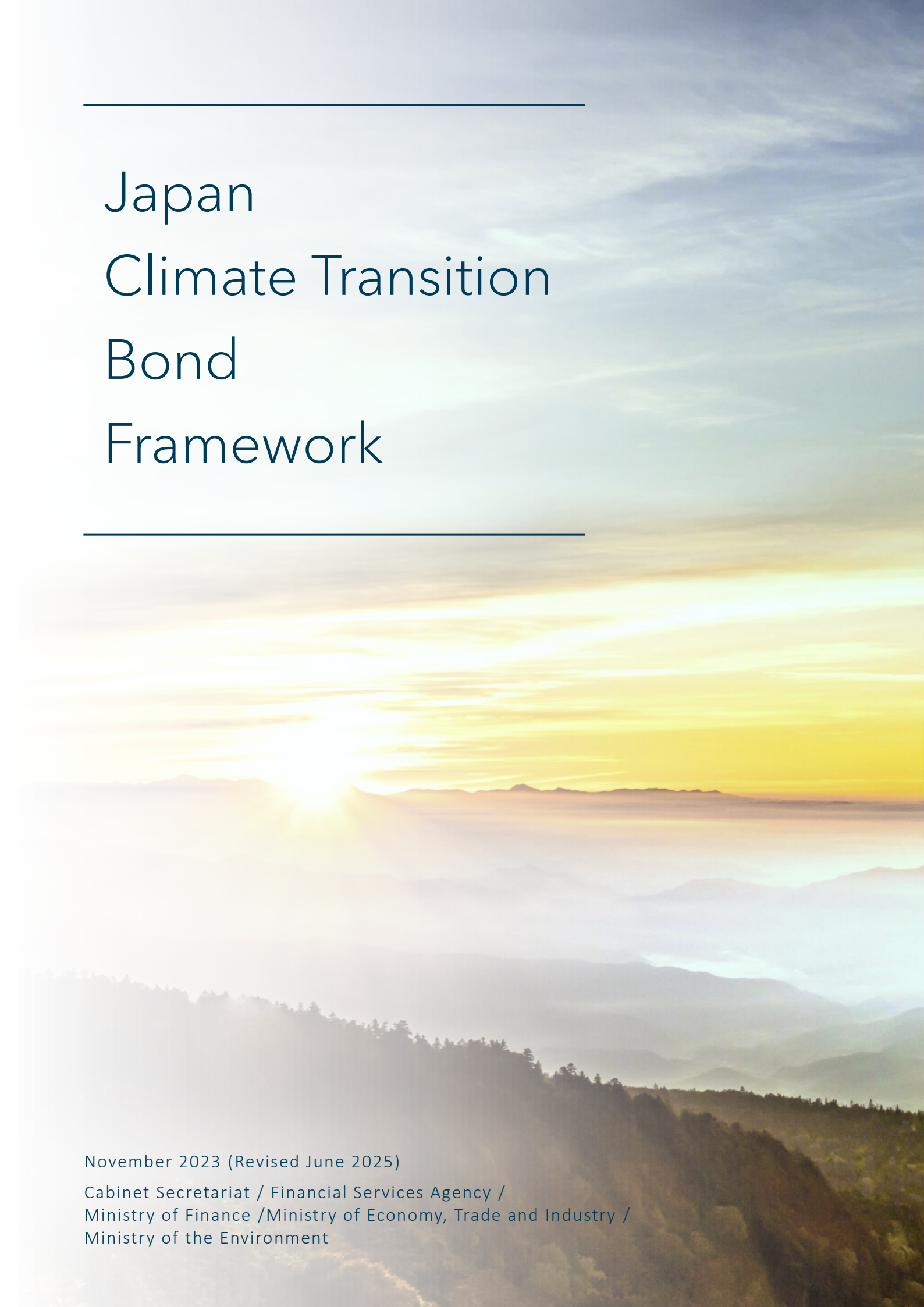

Japan Climate Transition Bond Framework

November 2023 (Revised June 2025)

Cabinet Secretariat / Financial Services Agency /
Ministry of Finance /Ministry of Economy, Trade and Industry /
Ministry of the Environment

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1

Introduction

Actions for climate change issues have already become a common challenge for all humankind amidst the prevalence of extreme global weather conditions and an increase in natural disasters. In the midst of the heightened global movement towards decarbonization, with more countries and regions declaring carbon neutral targets, Japan declared its international pledge to achieve 46% reduction of greenhouse gas (GHG) emissions by fiscal year (FY) 2030, 60% reduction by FY 2035, and 73% by FY 2040 compared to FY 2013, toward achieving net zero by 2050, its national target of GHG emissions reduction. Also, Japan has expressed a strong determination to address climate change at the national level by positioning the goals of the Paris Agreement and the "2050 Carbon Neutrality Declaration" as fundamental principles of relevant legislature. Japan has long been advocating for the resolution of environmental issues, with notable milestones such as the adoption of the Kyoto Protocol in 1997 and hosting the G7 Ministers' Meeting on Climate, Energy and Environment in Sapporo as the chair country during the G7 2023. Japan has been leading the international community in accelerating climate change mitigation efforts, including the formulation of agreements to promote global action. Moving forward, Japan will continue to work towards fulfilling international commitments in alignment with the Paris Agreement, and will create a virtuous cycle of economy and environment: aiming to maintain strong economic growth while working toward the ambitious targets. Japan will promote measures in every possible field such as thorough energy-saving practices, the maximum deployment of renewable energy, and decarbonization in the public sector and local communities.

However, Russia's aggression against Ukraine in February 2022 drastically changed the world's energy situation. Due to the prominent global inflation within the energy industry, Japan faces an electric power crunch and higher energy prices, that are leading the country towards potentially one of the most serious energy crises since the oil shock of 1973. Needless to say, stable energy supply is the core of the lives of the people and corporate activities. Through this crisis, Japan recognized again its vulnerability of its energy supply system and the challenges on energy security.

For Japan, a country which has experienced a number of energy supply shortages, Green Transformation (GX), which aims to transform the structure of industry and society from being fossil fuel-centric continuing since the Industrial Revolution to become clean energy-centric, would drive the biggest shift in industrial and energy policies since World War II. Western governments have already accelerated their efforts towards decarbonization further since Russia's invasion of Ukraine by supporting investments in sectors such as electric power, industry, transportation, households, etc., that contribute to decarbonization and accelerate efforts on early transition towards a decarbonized society. The European Union (EU), formulated its support plan which aims to achieve circa 140 trillion yen investments from public and private sectors in the next 10 years. Some EU countries also formulated an additional several trillion yen-scaled measures. As the EU and other countries have accelerated decarbonization support and new initiatives on markets and regulations, the world is entering a new era that decarbonization investments towards GX will determine the competitiveness of corporations and countries.

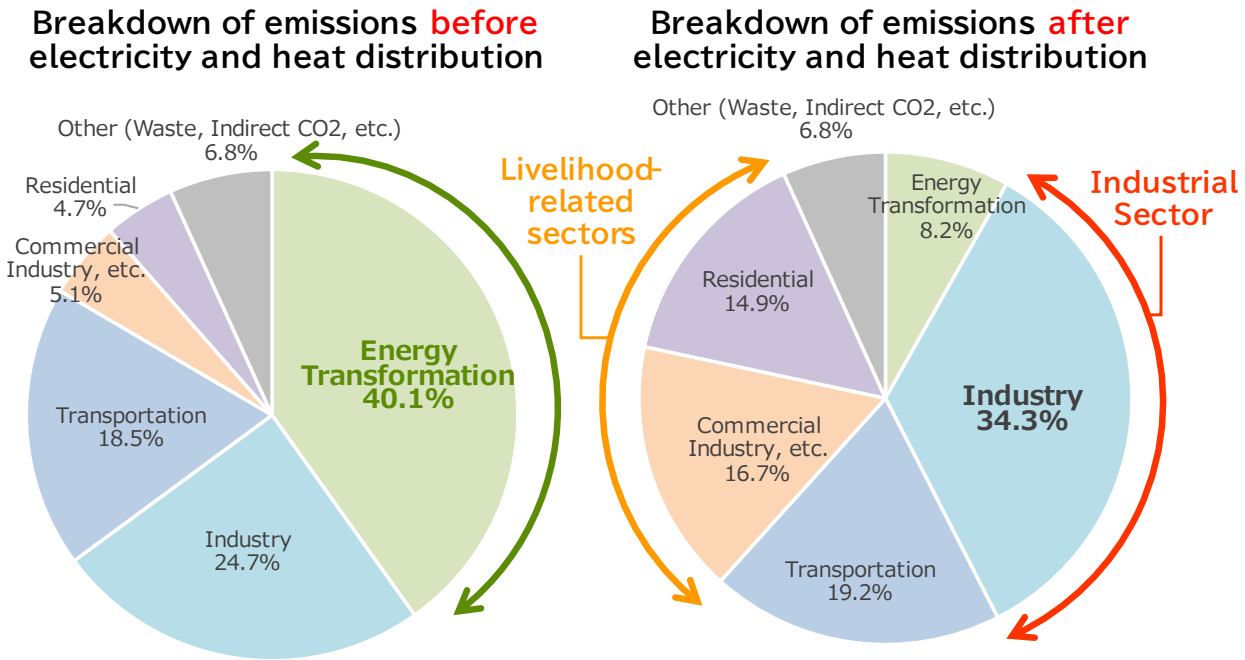
Surrounded by the sea and with scarce resources, Japan has led the research and development on decarbonization technologies, and Japanese firms have technological strengths across many fields. Accelerating GX by utilizing these technological areas as much as possible will lead to a stable energy supply and will become a driving force to help put the Japanese economy back towards a path of growth. Utilizing the cumulated wisdom in the private sector, the nation aims to contribute to achieving carbon neutrality worldwide and also need to achieve economic growth through creating new demand and a market in decarbonization that strengthens the competitiveness of Japanese industry once again.

Through GX realization, Japan aims to achieve its international commitment, i.e., each reduction target and ultimately carbon neutrality by 2050, and a society where all people, including future generations, can live with hope while transforming energy supply-demand structures that lead to stable and affordable energy while revolutionizing our economy and societal structure.

1.1 Features and status of Japan as an issuer

In aiming for a decarbonized society, having an ambitious vision is important, but it is equally important to consider the surrounding circumstances of each country and implement practical measures. Japan has geographical characteristics such as being surrounded by the sea on all sides, lacking international interconnections and pipelines, not being rich in fossil fuel resources, and having limited shallow seas and flat land area other than forests. As a result, reliable energy technologies have been developed, forming the basis for a supply chain. The energy infrastructure (including power transmission lines, gas pipelines, and gasoline stations) is already well-established nationwide and energy efficiency is extremely high, especially in energy-intensive industries. On the other hand, the planned power outages and fuel supply disruptions following the Great East Japan Earthquake in March 2011 and the large-scale power outages caused by the Hokkaido Eastern Iburi earthquake in September 2018 made people well aware of the vulnerability of the existing energy infrastructure and its risks to people's lives and economic activities. Also, Japan's energy self-sufficiency rate was 12.6% in FY 2022, when the country has largely depended on imported oil, coal and Liquefied Natural Gas since the Great East Japan Earthquake in 2011.

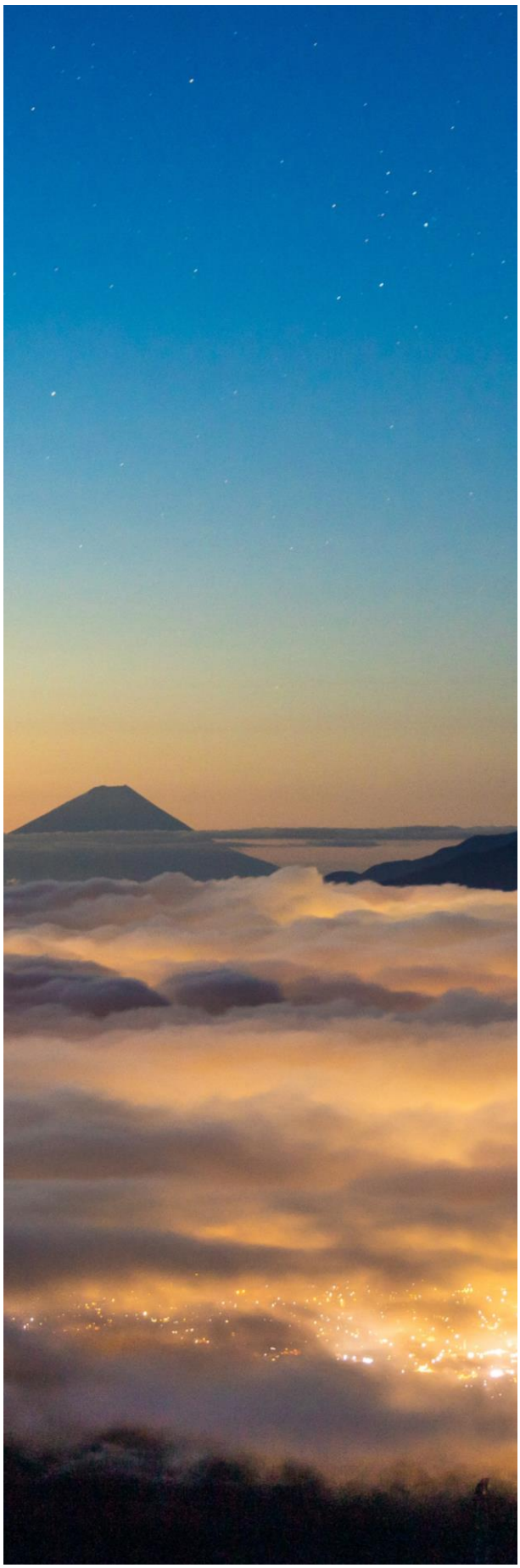
In order to achieve GX, it is necessary to address sectors with high emissions. Efforts in emission reduction are essential not only in the energy transformation sectors such as power generation, but also industrial sectors like steel and chemicals that contribute significantly to post-distribution emissions, as well as sectors closely related to people's daily lives such as households, transportation, commercial and educational facilities. Also, among the technologies that contribute to reducing emissions in each sector effectively and efficiently, priority is given to the technologies particularly effective for enhancing industrial competitiveness and economic growth.



Source: Japan National Institute for Environmental Studies (based on emissions in FY 2023)

In these circumstances, renewable energy introduction has been largely increasing by the Feed-in Tariff system (FIT system)[1] started in July 2012. Solar power generation in particular has increased to 9.2% in FY 2022 from 0.4% in FY 2011. Renewable energy has increased to 21.7% from 10.4%. According to an international agency's analysis, Japan is placed 6th in the world for the amount of renewable energy introduced, and ranked 3rd for solar power. Solar power has grown fourfold in the past 8 years, placed among the top tier in terms of growth pace in the world. Japan's solar power per area of land is the largest scale among major countries. However, as mentioned earlier, considering the geographical constraints, characteristics of renewable energy, and necessity of stable procurement to reduce damage in case of disaster, further efforts are essential. In addition to existing initiatives, Japan will promote decarbonization of electricity through maximizing the adoption of renewable energy, developing interconnector lines to facilitate inter-regional power transmission and utilizing nuclear power and carbon-neutral thermal power. Furthermore, Japan also plans to introduce energy-saving technologies that have been the focus of efforts for many years and reduce GHG emissions from heat demand in manufacturing and process-related emissions where there are currently no viable alternatives for decarbonization.

The Government of Japan believes the creation of these new technologies will also make a significant contribution to emission reduction in Asia where over half of the world's emissions originate.



1 The system in which the government guarantees that electric power companies will purchase electricity generated from renewable energy at a fixed price for a certain period.

1.2 Japan's efforts on sustainable finance

The Government of Japan has been proactively building an enabling environment on sustainable finance towards the promotion of efforts to address climate change issues through finance. Specifically, based on the recommendations of the High Level Meeting on ESG Finance compiled in 2018, Japan has established the "The High-Level Panel on ESG Finance" as a platform for collaboration and discussions among top leaders in the financial and investment sectors, the academia and related government agencies. The panel is held annually to facilitate discussions aimed at promoting ESG finance in the country. Japan also formulated the Green Bond Guidelines in line with international principles in March 2017 for the promotion of domestic green finance. Furthermore, Japan revised the guidelines and formulated the Green Loan and Sustainability Linked Loan Guidelines in March 2020.

In addition, following developments such as the International Capital Market Association (ICMA)'s revision of its Green Bond Principles, the Loan Market Association's revision of its Sustainability Linked Loan Principles, international trends in discussion to address the so-called "greenwashing" and various domestic development of measures, Japan set the "Committee on Green Finance" and formulated the "Green Bond and Sustainability Linked Bond Guidelines 2024" and the "Green Loan and Sustainability Linked Loan Guidelines 2024" in November 2024 with the aim to develop our sustainable finance market further soundly and appropriately. The latest Guidelines reorganize the Japanese translation part of the international principles and the domestic guidance part, and provide additional guidance based on the current market situation.

In addition, to further promote green investment in areas such as renewable energy, it is also important to promote the transition toward decarbonization such as low carbon initiatives in hard-to-abate sectors (the industrial and energy conversion sectors where there are no alternative measures for decarbonization technologically and economically feasible at present) from the viewpoint of steady reduction of GHG emissions around the world to achieve the Paris Agreement's goal.

For this reason, there is a need to actively provide financing for energy efficiency and other initiatives for the decarbonization of hard-to-abate sectors and for initiatives that contribute to its decarbonization transition, such as long-term research and development.

Singapore, Australia, Canada and other countries are proceeding with initiatives that take into account the characteristics specific to their respective regions. Giving due consideration to the developments of these countries, with the aim to share a globally uniform approach, ICMA published the "Climate Transition Finance Handbook" in December 2020 (revised in 2023).

In Japan, in line with the handbook, the Financial Services Agency (FSA), the Ministry of Economy, Trade and Industry (METI) and the Ministry of the Environment (MOE) announced the "Basic Guidelines on Climate Transition Finance[2]" in May 2021, and revised in March 2025. The guidelines and sector specific roadmaps, which are described later, led to the market growth of transition finance in the private sector (JPY 2.4 trillion as of April 2025[3]). Building this enabling environment has contributed to securing the credibility on the 'transition finance' label and started to establish this as funding measure towards climate transition especially in hard-to-abate sectors.

Furthermore, at the G7 Hiroshima Summit in May 2023, where Japan held the Presidency, the leaders "highlight[ed] that transition finance […] has a significant role in advancing the decarbonization of the economy as a whole", representing the importance of transition finance increasing globally. In particular, regarding the facilitation of the ASEAN region, which like Japan, have a high dependence on fossil fuels, deepening collaboration with the region through the Asia Zero

2 Basic Guidelines on Climate Transition Finance

3 Based on data the Ministry of Economy, Trade and Industry has gathered from publicly available information as of April 2025.

Emission Community (AZEC) is needed. In terms of finance, Asia Transition Finance Study Group (ATF SG) led by private financial institutions, under the "Asia Energy Transition Initiative" (AETI), will serve as a focal point in the development of decarbonization roadmaps, creating lists of transition technologies to improve the investment environment. Furthermore, establishing a cooperative framework based on the memorandum of cooperation signed by the Ministry of Economy, Trade and Industry (METI) with the Asian Development Bank (ADB[4]) and the Economic Research Institute for ASEAN and East Asia (ERIA[5]) and development of human resources in the energy transition sector will accelerate financing for transition technologies and projects and establishing transition finance within Asia.

4 ADB is an international development financial institution that covers the Asia-Pacific region.

5 ERIA is an international research institute that conducts research and provides policy recommendations to support economic integration among 16 East Asian countries (Japan, China, South Korea, India, Australia, New Zealand, and ASEAN).

1.3 Formulation of Japan Climate Transition Bond Framework

1.3.1 Concept of GX

According to the International Energy Agency (IEA)[6], roughly half of CO_2 emissions cannot be reduced by existing technologies. The IEA highlights the importance of innovation support through sovereign (i.e., national governments and government agencies) bonds from the viewpoint of utilizing national credit, as there is a risk private firms cannot resolve entirely on their own.

In these circumstances, Japan is in a leading position on new technologies and business development to solve challenges such as the limitation of available renewable energy, and the demand for heat or raw materials within the industrial sector. Funding these technologies and businesses will lead to innovation and significantly contribute to decarbonization in areas where existing technologies are not sufficient.

In addition, keeping in mind of geopolitical risks such as the Ukraine crisis, middle-to-long term steady decarbonization while securing energy supply and security is necessary. Furthermore, considering Japan's high manufacturing industry ratio and low job mobility, just transition[7] is an important challenge where it is essential to promote a comprehensive policy package such as design of carbon pricing (CP) with predictability, and consideration at GX Implementation Council[8] which includes experts from labor and economic community.

1.3.2 Concept of GX Economy Transition Bond

Firstly, Japan's GX Economy Transition Bond will support those who make proactive challenges toward decarbonization (support for first movers) with future CP scheme as its redemption resource. Future CP introduction has been legally designated by "Act for Promoting a Smooth Transition to a Decarbonized Pro-Growth Industrial Structure" (GX Promotion Act). Therefore, entities who emit CO_2 are incentivized to change their activity to avoid the future CP burden by making early decarbonization investments.

Secondly, as one of its purposes, the GX Economy Transition Bond includes projects which aim to transition towards decarbonization. By including these projects in its use of proceeds, it aims to encourage transition investments from private firms and promote transition finance from private financial institutions.

Thirdly, by issuing the GX Economy Transition Bond as individual securities (Japan Climate Transition Bond, hereinafter referred to as "CT bonds"), Japan will establish the structure to implement measures towards steady decarbonization through conversation with investors and markets and periodical reporting, etc.

Based on the above, Japan formulated the Climate Transition Bond Framework (the Framework) to raise the necessary funds for promoting GX in Japan. Japan will implement 20 trillion yen scale of bold upfront investment, including the CT bonds issued based on this framework, to increase policy predictability and achieve GX with public-private cooperation.

In addition, Japan expects the Framework will be one of the milestones of transition finance and a catalyst for further transition finance promotion and funding by private sectors.

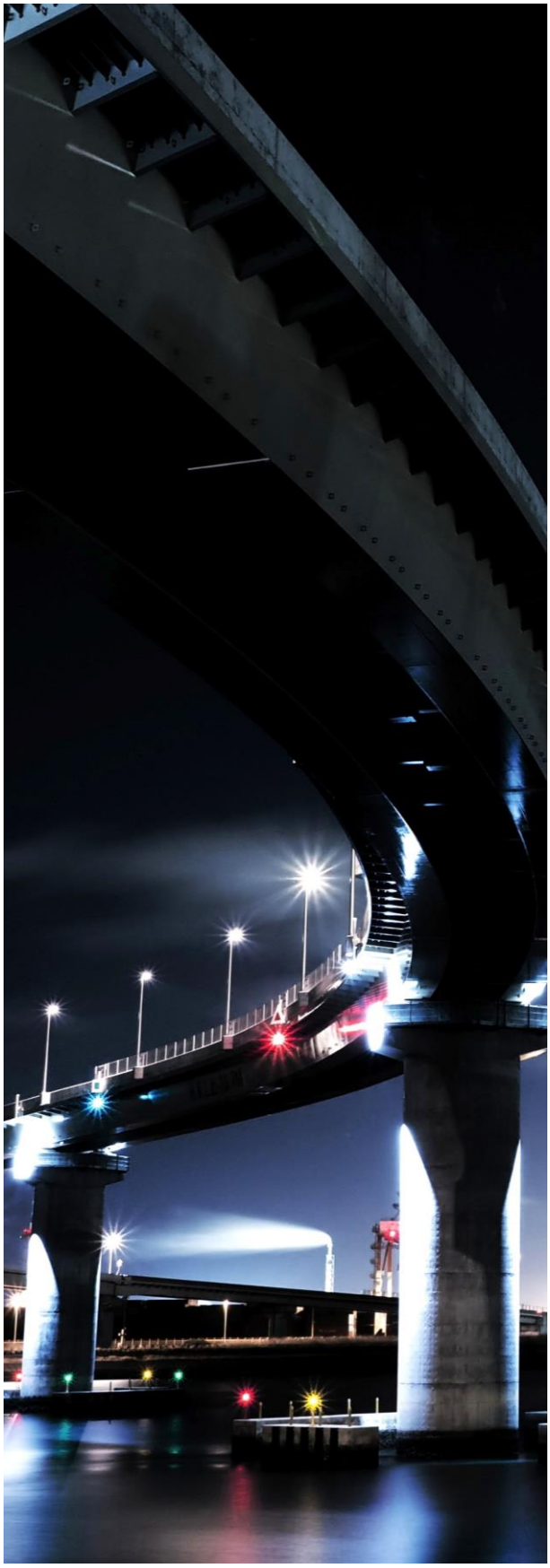
6 The International Energy Agency (IEA) was established in 1974 as an autonomous agency within the framework of the Organization for Economic Co-operation and Development (OECD).

7 Support for industries, workers, and regions that will face a relatively large burden as a result of implementing climate change measures.

8 The council held in the Cabinet Secretariat to achieve GX, which is an overall transformation of the economic and social system. The Prime Minister serves as the chairperson of the council.

The Framework is aligned with the principles and guidelines below.

- Green Bond and Sustainability Linked Bond Guidelines 2024 (MOE)
- Green Bond Principles 2021 (ICMA)
- Climate Transition Finance Handbook 2023 (ICMA)[9]
- Basic Guidelines on Climate Transition Finance 2025 (FSA, METI, and MOE)



9 Page 3 of the Climate Transition Finance Handbook issued by the International Capital Market Association (ICMA) defines bonds with specified use of proceeds as being aligned with Green Bond Principles.

2

Disclosure based on the four key elements of Climate Transition Finance Handbook

2.1 Issuer's climate transition strategy and governance

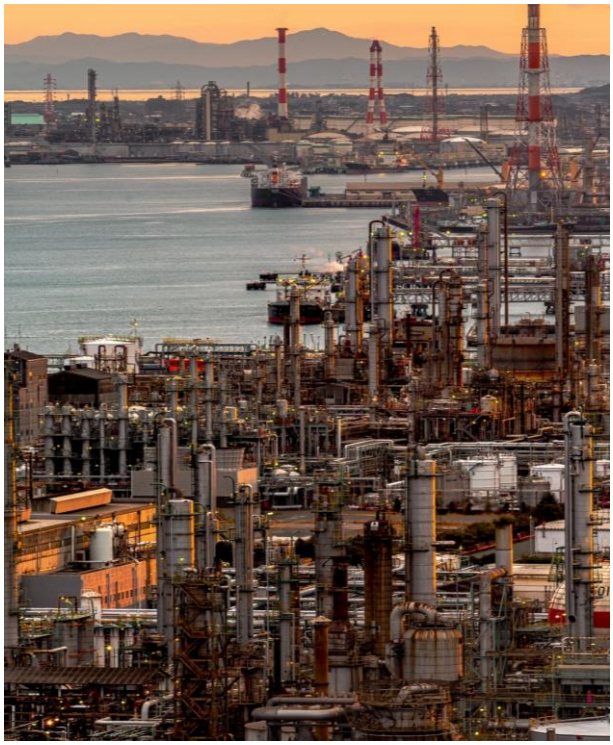
Climate transition strategy of Japan

2.1.1 Japan's strategies for realizing Carbon Neutrality by 2050

In October 2020, the Government of Japan declared its commitment to achieve net zero by 2050 in line with the Paris Agreement (to hold the increase in the global temperature to well below 2°C and pursuing efforts to limit the temperature increase to 1.5°C). The Act on Promotion of Global Warming Countermeasures was amended to establish a legislative framework in the following year.

Moreover, in April 2021, Japan stated its intention to reduce its GHG emissions by 46% in FY 2030 (compared to FY 2013 levels) and continue strenuous efforts in its challenge to meet its aspirational goal of cutting emissions by 50%. In October 2021, based on the new GHG emission reduction goal, the "Plan for Global Warming Countermeasures"[10] was amended. This plan covers all greenhouse gases including those other than CO_2 and outlines countermeasures and policies that support the new targets for FY 2030. Additionally, the "Long-term Strategy under the Paris Agreement" was also amended to show basic concepts and the vision for carbon neutrality by 2050. Japan's NDC (Nationally Determined Contributions)[11] was decided and submitted to UNFCCC. In order to show the roadmap for achieving new GHG emission reduction goal, the Sixth Strategic Energy Plan[12] was approved by the cabinet in October 2021. Furthermore, by proposing GX, the industrial and social structure will be transformed from a fossil fuel-centered one that has existed since the Industrial Revolution towards a clean energy-centered structure. Since 2022, the GX Implementation Council, chaired by the Prime Minister, has been held to facilitate discussions with experts, and the "Basic Policy for the Realization of GX" was established in February 2023. In the 211th Ordinary Session of the Diet, the "GX Promotion Act" and the "GX Decarbonized Power Act"[13] were established and the "Pro-Growth Carbon Pricing Concept" was materialized. In July 2023, to implement decarbonization policies, "The Strategy for Promoting Structural Transition toward a Decarbonized and Growing Economic Structure (GX Promotion Strategy)" was approved by the cabinet based on GX Promotion Act.

Furthermore, in February 2025, the "Global Warming Countermeasures Plan" was revised, and the "7th Strategic Energy Plan" and "GX2040 Vision" were formulated and approved by the Cabinet, outlining the policies for after 2030 (details to follow).



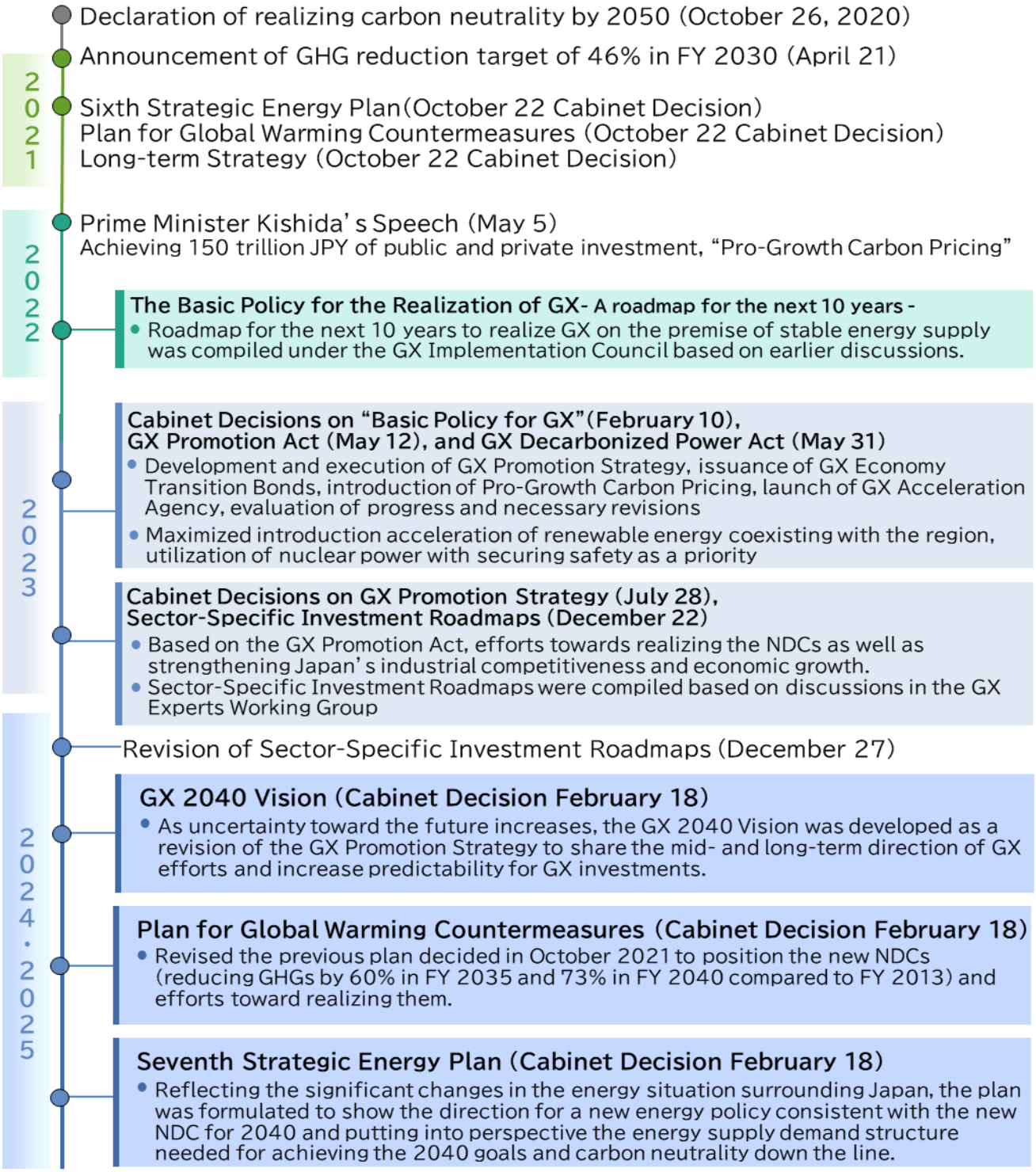
10 The government's comprehensive plan based on the Act on Promotion of Global Warming Countermeasures was decided by the Cabinet on May 13, 2016, and was revised for the first time in five years in October 2021. It outlines the measures and policies that support the FY 2030 targets and provides a roadmap towards achieving the new goal.

11 Abbreviation of Nationally Determined Contribution. Under the Paris Agreement (adopted in December 2015, effective from November 2016), all countries are obligated to submit and update their greenhouse gas emission reduction targets every five years as their "nationally determined contributions".

12 The plan stipulated in the Energy Policy Basic Act enacted in 2022. The Sixth Strategic Energy Plan was decided by the Cabinet in October 2021.

13 The law named "Act for Partial Revision of the Electricity Business Act and Other Acts for Establishing Electricity Supply Systems for Realizing a Decarbonized Society".

Strategies towards achieving carbon neutrality (CN) in 2050

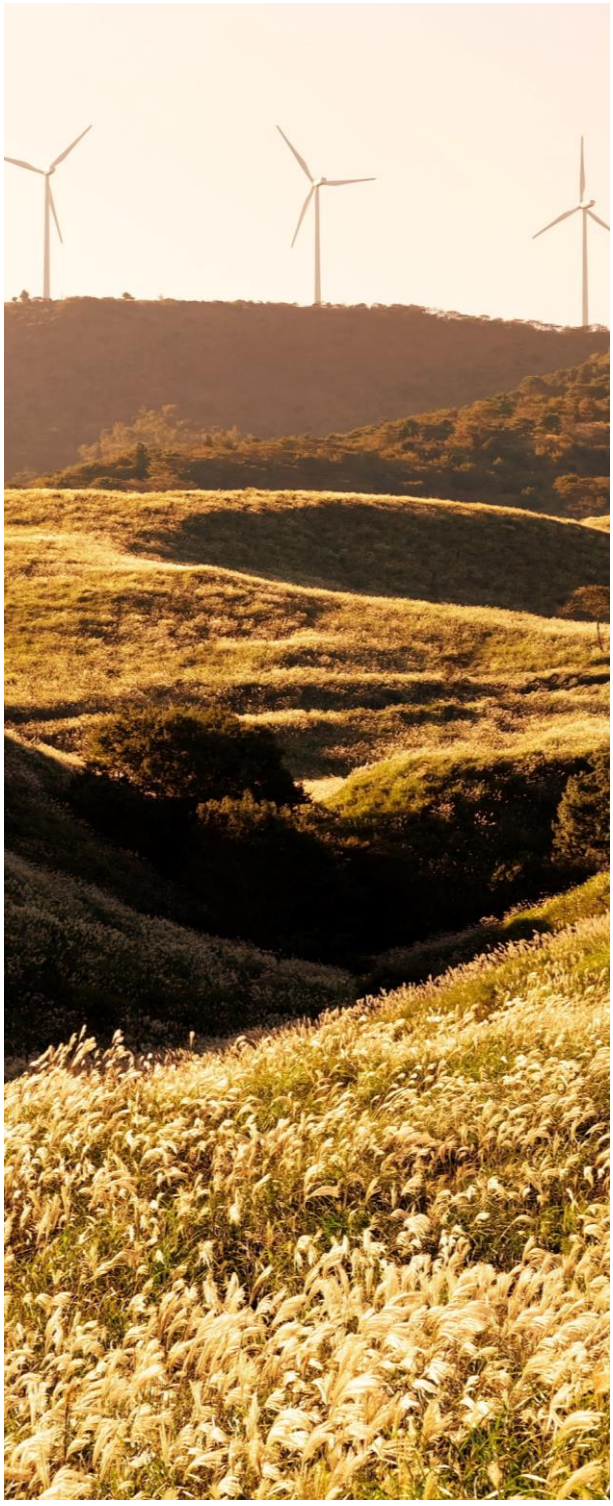


2.1.2 Plan for Global Warming Countermeasures

In February 2025, the "Plan for Global Warming Countermeasures"14 was approved by the Cabinet as a revision of the previous plan decided in 2021. On the same day, Japan's new NDC (Nationally Determined Contribution) was submitted to the United Nations Framework Convention on Climate Change (UNFCCC), as ambitious targets that are consistent with the global 1.5°C goal and on a linear path toward achieving net-zero by 2050. Specifically, the targets are to reduce greenhouse gas emissions by 60% and 73% from FY 2013 levels by FY 2035 and FY 2040, respectively.

The revised Plan for Global Warming Countermeasures positions these new reduction targets along with measures and policies aimed at achieving them, demonstrating a steadfast commitment to a linear path toward net-zero by 2050. Through this, the plan aims to enhance the continuity and predictability of policies, accelerate efforts, investments, and innovations toward decarbonization, and promote global warming countermeasures that contribute to the simultaneous realization of emission reductions and economic growth.

Additionally, related materials published alongside the plan summarize the targets for greenhouse gases by type for FY 2030 and FY 2040, as well as guidelines for sector-specific emissions of energy-originated CO2, along with a list of measures and policies for each target year.



[14] Plan for Global Warming Countermeasures (February 18th 2025 Cabinet Decision)

2.1.3 Seventh Strategic Energy Plan

The Seventh Strategic Energy Plan, adopted by Cabinet Decision in February 2025, outlines the future direction of energy policy based on the principle of S+3E, while taking into account the

2040 and beyond, with a view to achieving carbon neutrality[15].

Japan has set the above-mentioned reduction target as an ambitious goal aligned with the global 1.5°C target, and on a linear path toward achieving carbon neutrality by 2050. All policies and research in the energy sector will be linked to achieving these goals.

On the other hand, there are many uncertainties looking toward 2040, such as development progress for innovation regarding energy-related technologies, policy directions of other countries, and advancement of DX and GX. In discussing energy policy for 2040, it is necessary to pursue all options under the policy of utilizing all available technologies to achieve carbon neutrality by 2050.

Given Japan's unique circumstances, such as a lack of readily accessible natural resources, mountainous land and being surrounded by deep oceans, from the perspective of achieving both stable energy supply and decarbonization, we will maximize the use of renewable energy as our major power source and we will aim for a balanced power generation mix that does not excessively depend on specific power sources or fuel sources. On the supply side, it is essential to make maximum use of renewable energy, nuclear energy, and other power sources that contribute to energy security and have a high decarbonized effect, while promoting thorough energy efficiency improvement, and energy switching in the manufacturing sector on the demand side, in order to break away from excessive dependence on fossil fuels. Regarding renewable energy in particular, the plan sets forth a policy to promote its maximum introduction while ensuring coexistence with the local communities and curbing the burden on the public. For nuclear power, the plan emphasizes safety as a fundamental prerequisite and outlines a policy for the maximum utilization of existing plants, in addition to developing and installing next-generation advanced reactors.

In order to progress investment into the power sector for the decarbonization transition, it is necessary to establish a financial and business environment that secures stable funding for necessary investments, enhances the predictability of returns from investment in decarbonized power, and actively encourages new investments by utilities through improved conditions for proactive business engagement. This is based on balancing the stable supply of energy and economic efficiency, even in the process of research and development aimed at realizing innovation without excluding any options towards decarbonization aiming for carbon neutrality by 2050. Energy policy toward 2040 will be based on these points, and development and revision of necessary measures based on progress and environmental changes will be conducted.

With the expected increase in electricity demand due to the progress of DX and GX, Japan's industries and economy depend on whether or not we can provide enough decarbonized electricity that matches the demand at competitive prices and energy policy and industrial policy are inseparably interconnected. By implementing this plan and the GX2040 Vision (2.1.4) in an integrated manner, we will accelerate our efforts to simultaneously achieve a stable energy supply, economic growth, and decarbonization.

[15] In the Seventh Strategic Energy Plan, the term "carbon neutrality" is used, since many cabinet decision documents have also used the term after the carbon neutral declaration. As such, this section will also use "carbon neutrality". In the international context, the term "net zero" is commonly used, but the term "carbon neutrality " is used with the recognition that the basic meaning of both terms are the same.

2.1.4 GX2040 Vision

Under the recognition that future energy strategies will influence national strength, discussions have progressed in an integrated manner with the Strategic Energy Plan and the Global Warming Countermeasures Plan, leading to the revision of the "GX Promotion Strategy" (approved by the Cabinet in July 2023) and the formulation of the "GX2040 Vision" (approved by the Cabinet in February 2025). This Vision aims to provide a longer-term direction to enhance the predictability of investments toward GX, amid increasing uncertainties regarding future prospects, such as the speed of introducing innovative technologies necessary for carbon neutrality and cost reduction forecasts and the impact of increased electricity demand due to electrification and the progress of digital transformation (DX).

The Vision includes the details on carbon pricing, such as the comprehensive design of an emissions trading system, and the market design of a "circular economy" that contributes to national security such as by securing rare resources.

In this Vision, it is positioned that: 1) new GX businesses utilizing innovative technologies are emerging one after another, and 2) Japan’s strength of having the entire supply chain from materials to products is advanced based on decarbonized energy and DX, are the aim as a GX industrial structure, and to realize this "GX industrial location" policies will be put in place. The background to this is that, with the advancement of GX, products and services utilizing clean energy such as decarbonized power have added value, such as perovskite solar cells with an expected new market, and semiconductor supply chains and datacenters. There is an increasing demand from end-users of products for manufacturing and other processes to utilize clean energy.

Given this context, as there is regional disparity potential for clean energy such as decarbonized power, the Vision aims for future regional revitalization and economic growth under the concept of "accumulating demand in line with energy supply." As a direction for this response, it is proposed to consider incentive measures to encourage companies to utilize decarbonized power, thereby concretizing demand for decarbonized electricity. This aims to serve as an incentive for local governments that wish to attract investments by developing decarbonized power sources.

Additionally, it is necessary to promote GX among medium-sized and small enterprises to advance GX across society while fostering the growth of these enterprises. This includes building a push-type support system in the region that provides assistance for calculating and visualizing energy consumption and emissions, support for the introduction of energy-saving equipment, and support for the development of innovative products and services that contribute to GX, along with collaboration among financial institutions and support organizations.

Furthermore, the vision specifies efforts to contribute to global decarbonization and rule formation from an Asian perspective, such as expanding the adoption of transition finance in Asia.

In addition to support utilizing the GX Economy Transition Bonds based on sector-specific investment strategies, policies will be developed in line with the directions indicated in the GX2040 Vision, striving for the simultaneous realization of stable energy supply, economic growth, and decarbonization.

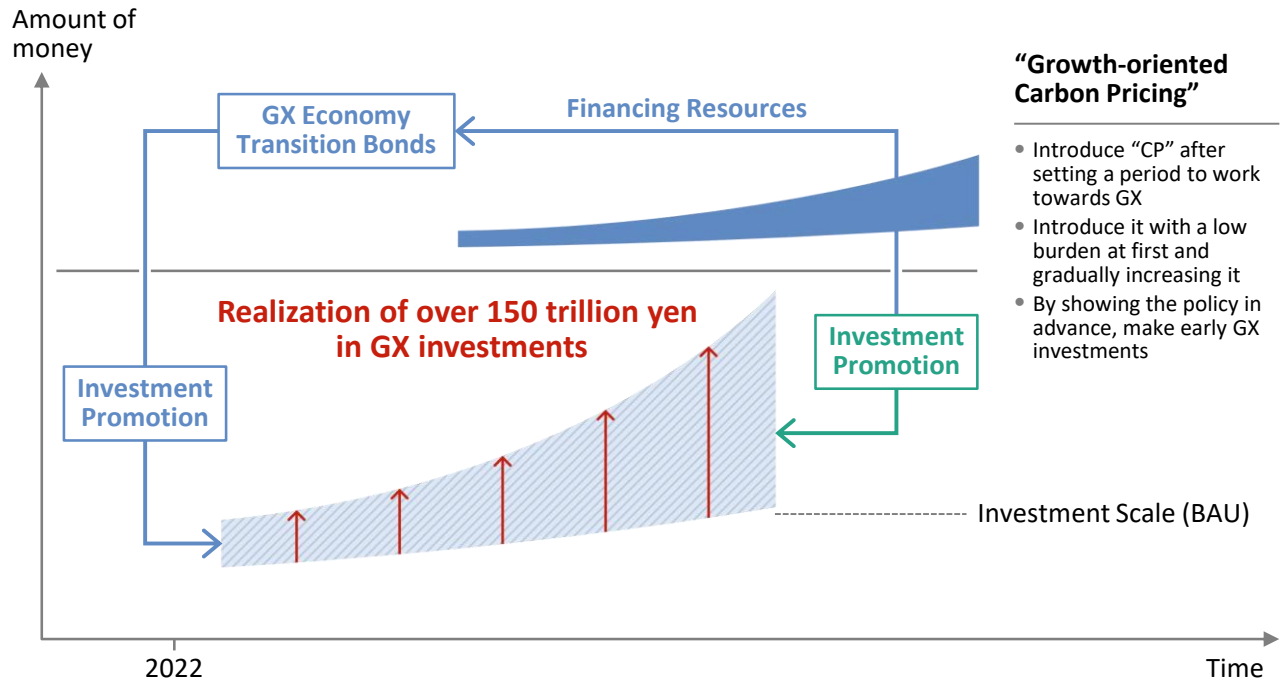
< Box: Mechanism of Carbon Pricing (CP) >

The Pro-Growth Carbon Pricing Concept aims to gradually develop an emissions trading system. The first phase, which started in FY 2023 under the GX League, is a voluntary framework based on the leadership of participating companies. By setting their own targets, companies are held accountable, which enhances their strong commitment and provides incentives for emissions reductions.

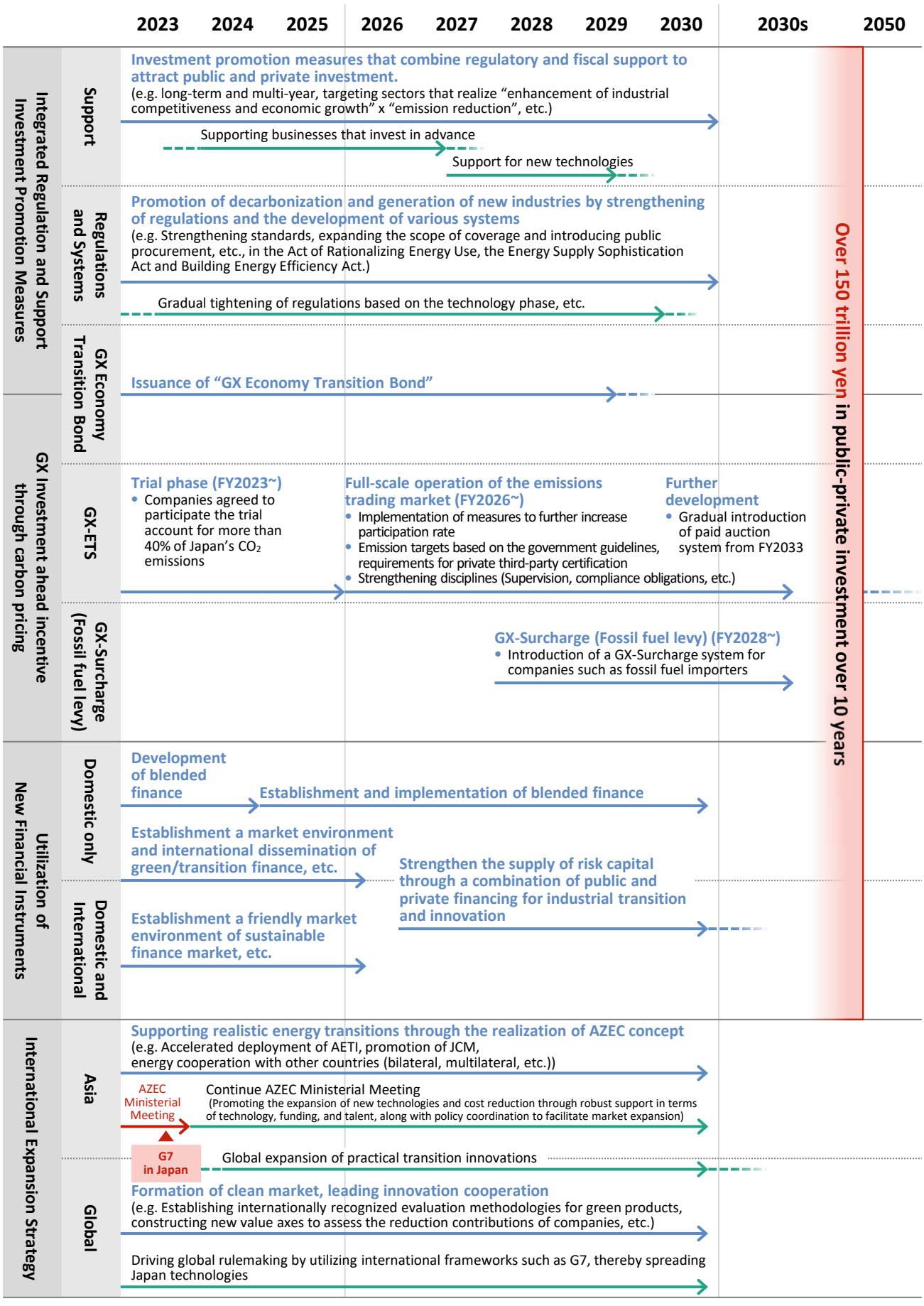
Building on the progress made in the GX League, efforts will be accelerated for companies' GX initiatives. The GX Promotion Act was revised to fully launch the emission trading system from FY 2026, incorporating flexibility to consider the characteristics of the industries of participating companies and pathways to decarbonization, while enhancing fairness and effectiveness related to the system. The policy includes mandatory participation for companies above a certain emissions level, the determination of required emissions reduction levels based on government guidelines, and measures to stabilize prices. Additionally, starting in FY 2033, a paid auction will be introduced for power generation companies.

Furthermore, a surcharge on fossil fuels will be introduced as a uniform carbon pricing mechanism starting in FY 2028, aimed at broadly motivating the transition to GX. In implementing this system, necessary exemptions will be stipulated to prevent adverse effects on the broader economy, along with amendments to ensure repayment.

The CT bonds will be repaid through the revenues from the fossil fuel surcharge and the paid auction. Administration related to the enforcement of this system will be handled by the GX Acceleration Agency.



Overview of the GX Policy Roadmap



Furthermore, reducing emissions in hard-to-abate sectors will be one focus in order to achieve GX. Specifically, in addition to the energy sector (such as power generation), measures to reduce emissions will be implemented in industrial sectors such as the steel industry and chemical industry, which account for a significant portion of post-electricity and heat distribution emissions, as well as sectors closely related to the lives of the population, such as households, transportation, and educational facilities. Priority will be given especially to measures that are highly effective in enhancing industrial competitiveness and economic growth, aiming for a balance between the environment and the economy.

(For ensuring Just Transition)
In promoting GX, Article 3 of the GX Promotion Act stipulates that, as a basic principle of the Act, close collaboration between the government and businesses will be established, taking into account the perspective of a just transition.

In light of this, the GX2040 Vision emphasizes the importance of appropriately facilitating the workforce to newly emerging industries, including those in local regions, and advancing efforts to ensure that workers can continue to excel in an advanced supply chain through the transition to a GX industrial structure.

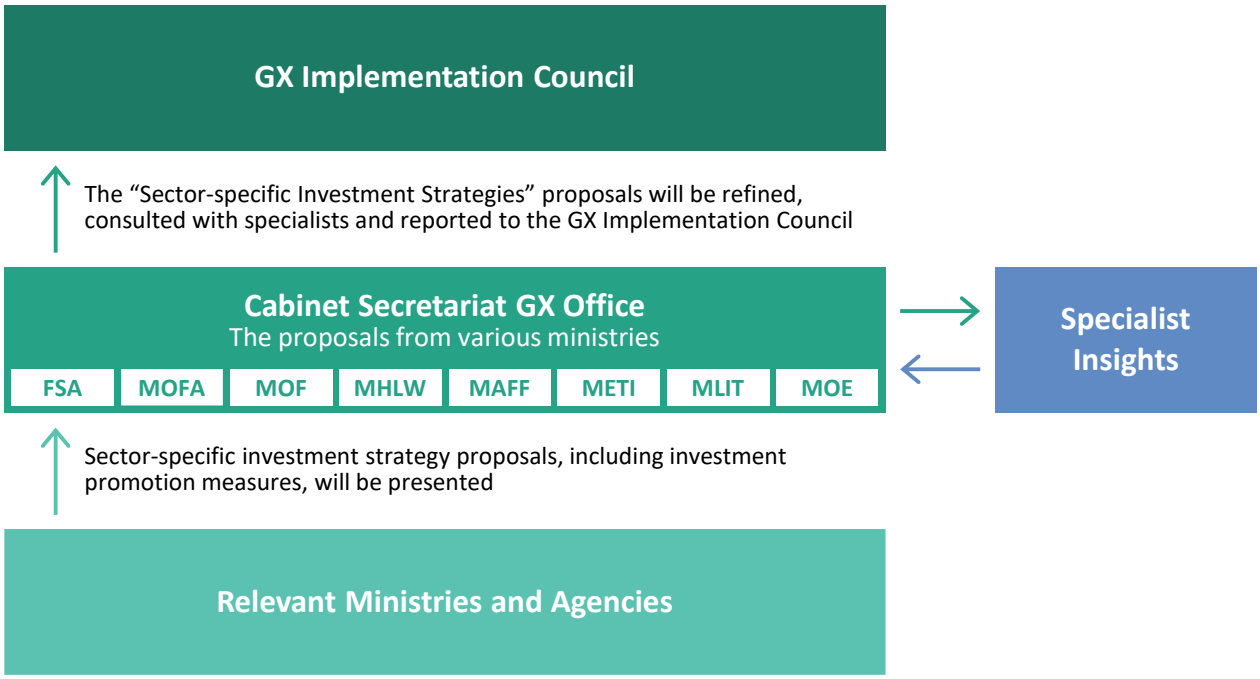
Specifically, in addition to investment support measures, relevant ministries will work together to promote the just transition by utilizing efforts (e.g. facilitation of labor transfer to growing industries such as matching support, support for reskilling and job changing for career advancement of the existing work force, and support for gaining new skills to adapt to advanced supply chains utilizing DX such as robotics and AI), understanding the various challenges that occur along the way, and respond thoroughly through efforts including those regarding safety nets.

2.1.5 Governance

The GX Implementation Council, chaired by the Prime Minister, has been held since July 2022 for the implementation of Japan's GX. In the council, the direction of the policy is determined through discussion among ministers from relevant ministries and experts. Discussions regarding "investment promotion measures" utilizing the GX Economy Transition Bonds are conducted and deepened in The Working Group of Experts for the Realization of GX. Furthermore, as stated in section 3.2, the Ministries and Agencies Liaison Conference has been established under the GX Implementation Council to share information and opinions, as well as to conduct necessary discussions regarding the GX Economy Transition Bonds.

Moreover, regarding the current status grasp and measures for GHG emissions and absorption in Japan, annual follow-ups are conducted in various fields such as energy transition, industry, transportation and household according to the Plan for Global Warming Countermeasures formulated based on the Act on Promotion of Global Warming Countermeasures. The result of follow-ups is approved by the Global Warming Prevention Headquarters, which involves all ministers.

As mentioned above, each strategy is appropriately and timely reviewed according to necessity and change of the circumstances.



FSA : Financial Services Agency
MOFA : Ministry of Foreign Affairs
MOF : Ministry of Finance
MHLW : Ministry of Health, Labour and Welfare
MAFF : Ministry of Agriculture, Forestry and Fisheries
METI : Ministry of Economy, Trade and Industry
MLIT : Ministry of Land, Infrastructure, Transport and Tourism
MOE : Ministry of the Environment

2.2 Business model environmental materiality

GX in Japan is to transform the structure of industry and society from being fossil fuel-centric, which it has been since the Industrial Revolution, to a clean energy-centric structure. This means a major transition in industrial and energy policies.

While there are a lot of research fields related to decarbonization technologies in which Japanese companies have technological strength, leveraging this expertise to accelerate GX can contribute not only to ensuring a stable energy supply but also to re-strengthening Japan's industrial competitiveness by creating new demand and markets in the decarbonization sector. This aspect is also mentioned in the “The Basic Policies for Realization of GX” set in February 2023, the “GX Promotion Strategy” approved by the Cabinet in July 2023, and the “GX2040 Vision” approved in February 2025.

Considering these perspectives, GX can be seen as an initiative that contributes to the transformation of core business activities in Japan, which are crucial for the environment, both now and in the future.

2.3 Climate transition strategy with science-based targets

In February 2023, as a reference document for the "Basic Policy for the Realization of GX" approved by the Cabinet, the government presented future milestones for 22 sectors to demonstrate its long-term and multi-year commitments, as well as to outline the prospects for regulatory and institutional measures. Following this, the future milestones were consolidated, and discussions were held in specialized working groups for each priority sector under the GX Implementation Council. The "Sector-Specific Investment Strategies," compiled in December 2023, were further revised in December 2024.

Regarding the "Investment Promotion Measures" utilizing GX Economy Transition Bonds, the basic principles and the commitments expected from businesses targeted for support in the direction of concretization are outlined, along with the fundamental principles for execution. Additionally, the document summarizes the future direction of investments across various related industries and sectors[16]. Moving forward, the specific strategies for GX investment will continue to be discussed in the "Working Group of Experts for the Realization of GX," utilizing objective indicators and expert knowledge.

These investment roadmaps are in alignment with the technology roadmaps developed by the METI and related ministries. These Technology Roadmaps cover so-called hard-to-abate sectors such as Iron and Steel, Chemical, Power, Gas, Oil, Pulp and Paper, Cement, and Automobile sectors. Each sector-specific roadmap presents a pathway for reducing CO_2 emissions with the introduction of low-carbon and decarbonization technologies, aiming to achieve carbon neutrality by 2050. The sector-specific roadmaps demonstrate the phased conversion, decommissioning, and discontinuation of technologies and facilities towards emission reduction, providing a clear plan and timeline. Implementation of upfront investments towards

[16] Sector-Specific Investment Strategies

these goals leads to the avoidance of lock-in during the transition.

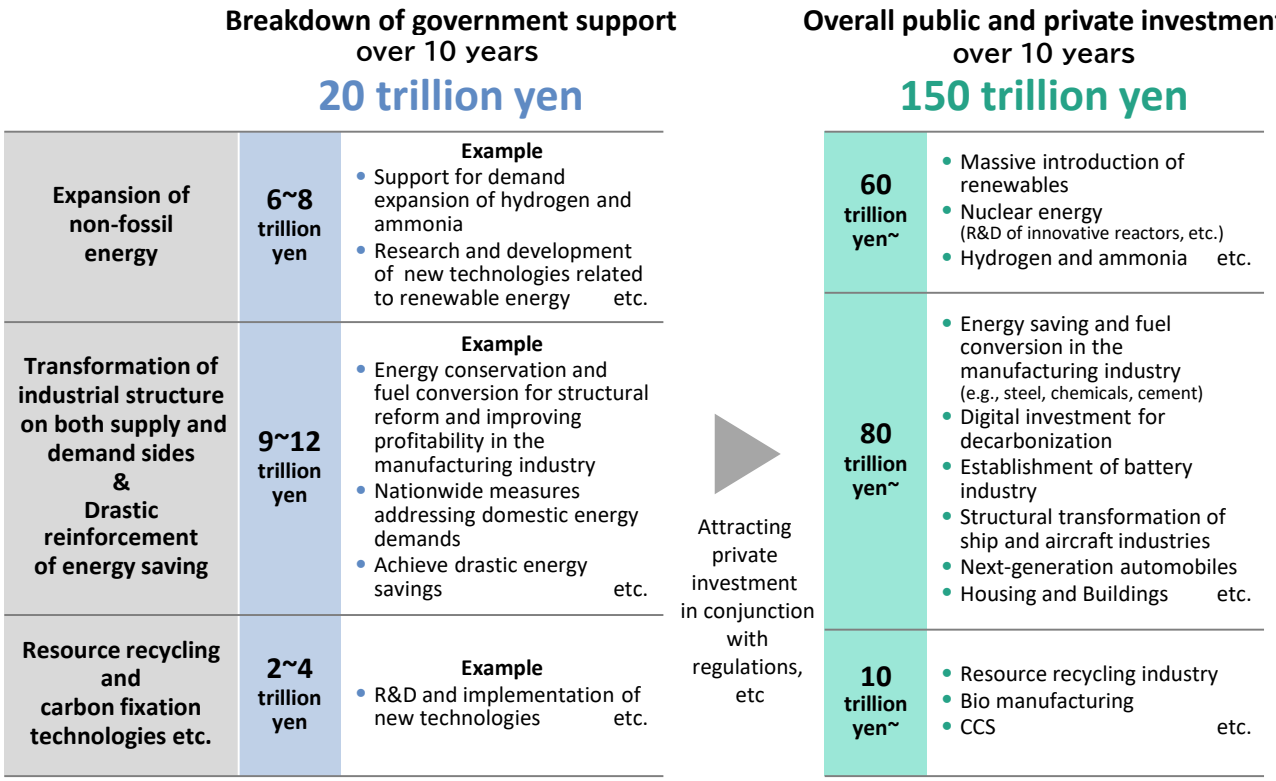
2.4 Implementation transparency

Japan aims to achieve over 150 trillion yen of public-private investments over 10 years via attracting private companies' investment by providing regulations and support in an appropriate manner according to business risks and business environment of each sector.

In the global competition for GX investments, Japan will provide government support of sufficient scale and term, taking into account the trends in investment support in other countries and past support achievements.

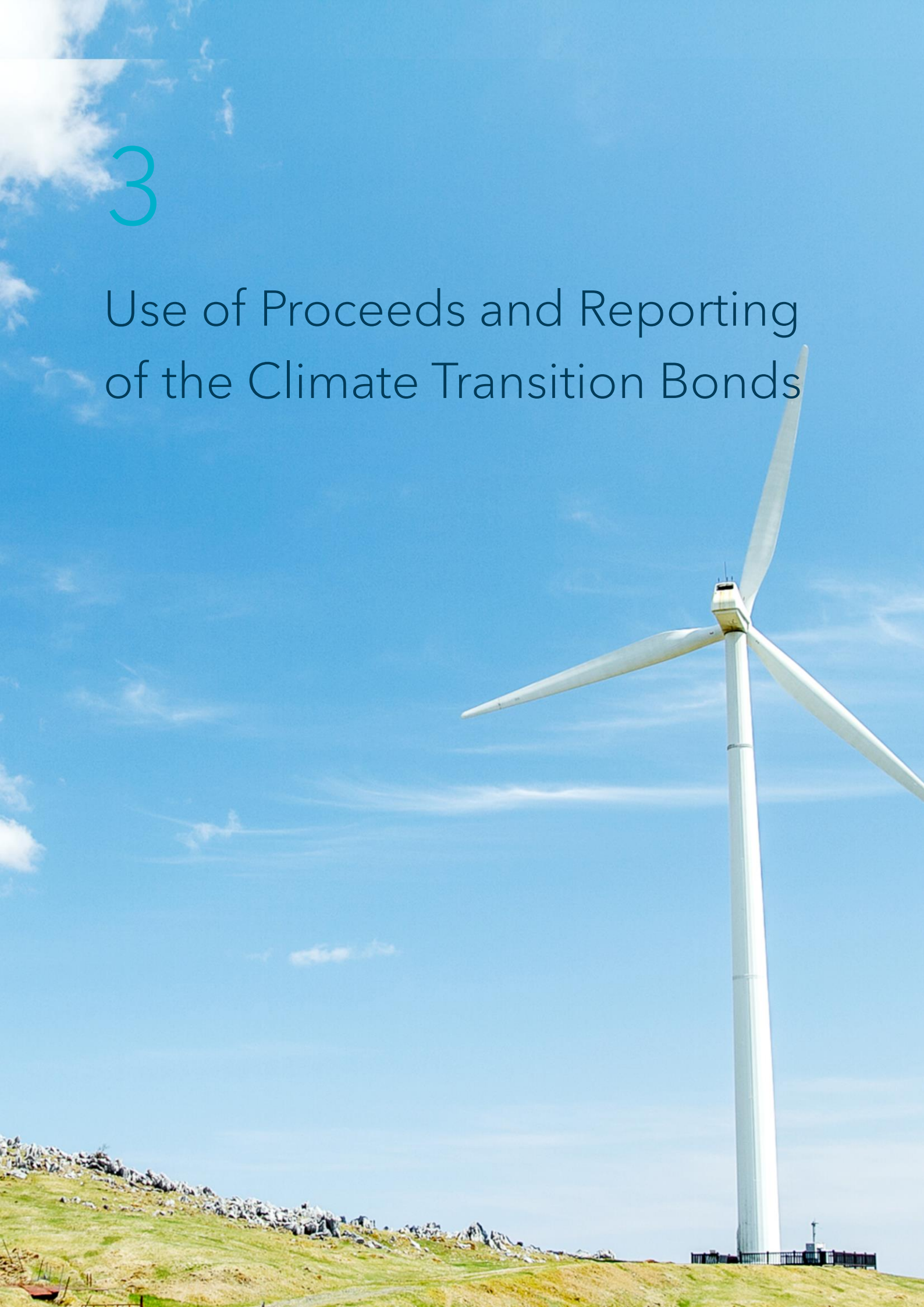
Starting from FY 2023, Japan has started upfront investment support to continue over 10 years amounting to roughly 20 trillion yen. The bonds to fund this support have already started issuance, with 1.6 trillion JPY issued in FY 2023 and 1.4 trillion JPY in FY 2024. The image of the government's support is as below. Based on the GX Promotion Strategy and the roadmaps outlined in 2.3, upfront investment support will be implemented for the transition to non-fossil energy sources, industrial structure shift of both demand and supply side especially in the manufacturing sector such as steel and chemicals, promotion of substantial energy conservation, and the investment in research and development of resource circulation, carbon capture, and other technologies.

Furthermore, based on the "GX Promotion Strategy", CP will be introduced as part of the Pro-Growth Carbon Pricing Concept. The CP will be initially implemented at a low burden, and will be gradually increased over time. By demonstrating this from the outset, it leads to encourage upfront GX investments from both the public and private sectors. As outlined in Section 2.1.4, these policies take a just transition into account and support the smooth transition of labor from fossil fuel-related industries to low-carbon industries.



3

Use of Proceeds and Reporting of the Climate Transition Bonds



3.1 Use of Proceeds

The proceeds will be allocated towards initiatives aligned with the "GX 2040 Vision" described in 2.1.4, aiming to achieve the internationally committed goal of carbon neutrality by FY 2050 in line with the Paris Agreement. The Government of Japan will allocate the proceeds to the projects described in the "GX 2040 Vision". Priority is given to investments in sectors that contribute to emission reduction, enhance industrial competitiveness and economic growth, and which are truly difficult for the private sector alone to make investment judgment on, taking into account the benefits and burdens associated with future CP (fossil fuel surcharge and paid auctioning in the power sector)[17] that will be the redemption source of the GX Budget[18]. The basic concept will be explained in 3.1.1.

The implementing entities of the projects primarily include companies in hard-to-abate sectors participating in the "GX-ETS"[19]. Furthermore, based on the concept of a regulation-and-support integrated investment promotion policy, The Government of Japan will consider integrating support measures to promote active engagement in emission reduction by companies in hard-to-abate sectors that join the GX League[20] through the GX Economy Transition Bonds during the gradual development of the GX League.

To realize GX investments through public-private collaboration, the Government of Japan will allocate the proceeds for subsidies, equity investments, debt guarantees[21], and tax reductions, considering business risks (such as technological and market risks) in each field and technology from research and development to social implementation to enhance the predictability of private businesses by long-term governmental support measures provided over multiple years. Financing may be provided for operation expenditures in addition to capital expenditures based on the nature of the project.

In the "GX Promotion Strategy", there are 14 "Future Actions" initiatives listed under the "Decarbonization initiatives towards GX based on the premise of ensuring a stable energy supply" for achieving decarbonization by both public and private. These initiatives are categorized as shown in Table 1. Going forward, these initiatives will be organized as eligible criteria for climate transition bonds.

Each initiative may fall under multiple categories of eligibility criteria[22], such as energy conservation promotion, and there are also policies that cross-cut multiple eligibility criteria, such as research and development projects, startup support, and promoting just transition.

17 Article 8 of the GX Promotion Act stipulates that the GX Economy Transition Bonds be redeemed by FY 2050, using the revenue from fossil fuel levies and specific business operator contributions (paid auctioning). Specifically, starting from FY 2028, the Minister of Economy, Trade and Industry will introduce a fossil fuel levy on importers of fossil fuels based on the amount of CO_2 derived from the imported fuels. Additionally, starting from FY 2033, power generation operators will be allocated a partially paid CO_2 emission quota and will be required to pay a specific business operator contribution based on the allocated quota.

18 The GX League consists of approximately 700 companies covering over 50% of Japan's total emissions and will be developed further. From FY 2026, an emissions trading system, "GX-ETS", will be fully implemented, leading to a gradual introduction of paid auctions in the future.

19 The emissions trading system is a mechanism that sets a cap on greenhouse gas emissions and allows business operators to buy and sell emission allowance.

20 Companies participating in the GX League are committed to efforts toward emissions reduction, such as actively practicing in a voluntary emissions trading system, towards achieving carbon neutrality by 2050 and the ambitious NDCs. Support measures through GX Economy Transition Bonds are designed to be integrated with the concept of "regulation and support integration".

21 Japan anticipates financial support such as debt guarantees and equity investments through the GX Acceleration Agency and Information-technology Promotion Agency（IPA） within eligible projects. Projects to be supported will be aligned with the framework at the time of financing.

22 In order to expand Japan's domestic market and contribute to emission reductions in the future, the government will provide policy support for research and development, as well as capital investment, for technologies that have high reduction impacts and are aimed at domestic market introduction in the medium to long term, but will securing overseas markets first, while taking into account international rules.

Table 1: The approach for classifying eligibility criteria based on energy supply and demand

Classification of energy supply and demand	Sector classification	Eligibility criteria	
Energy supply side	GX in energy transition	● Making renewable energy a major power source ● Utilization of nuclear power ● Facilitating introduction of hydrogen and ammonia	● Establish electricity and gas markets to achieve carbon neutrality ● Battery industry
Energy demand side	GX in daily life	● Promotion of thorough energy efficiency improvement and restructuring the manufacturing industry (through fuel and feedstocks transition) ● Battery industry	● GX in transport sector ● Digital investment aimed at decarbonization ● Houses and buildings ● Infrastructure
	GX in industry	● Promotion of thorough energy efficiency improvement and restructuring the manufacturing industry (through fuel and feedstocks transition) ● Facilitating introduction of hydrogen and ammonia ● Battery industry ● Resource circulation	● GX in transport sector ● Digital investment aimed at decarbonization ● Houses and buildings ● Infrastructure ● Carbon Recycling and CCS ● Food, agriculture, forestry, and fisheries industry

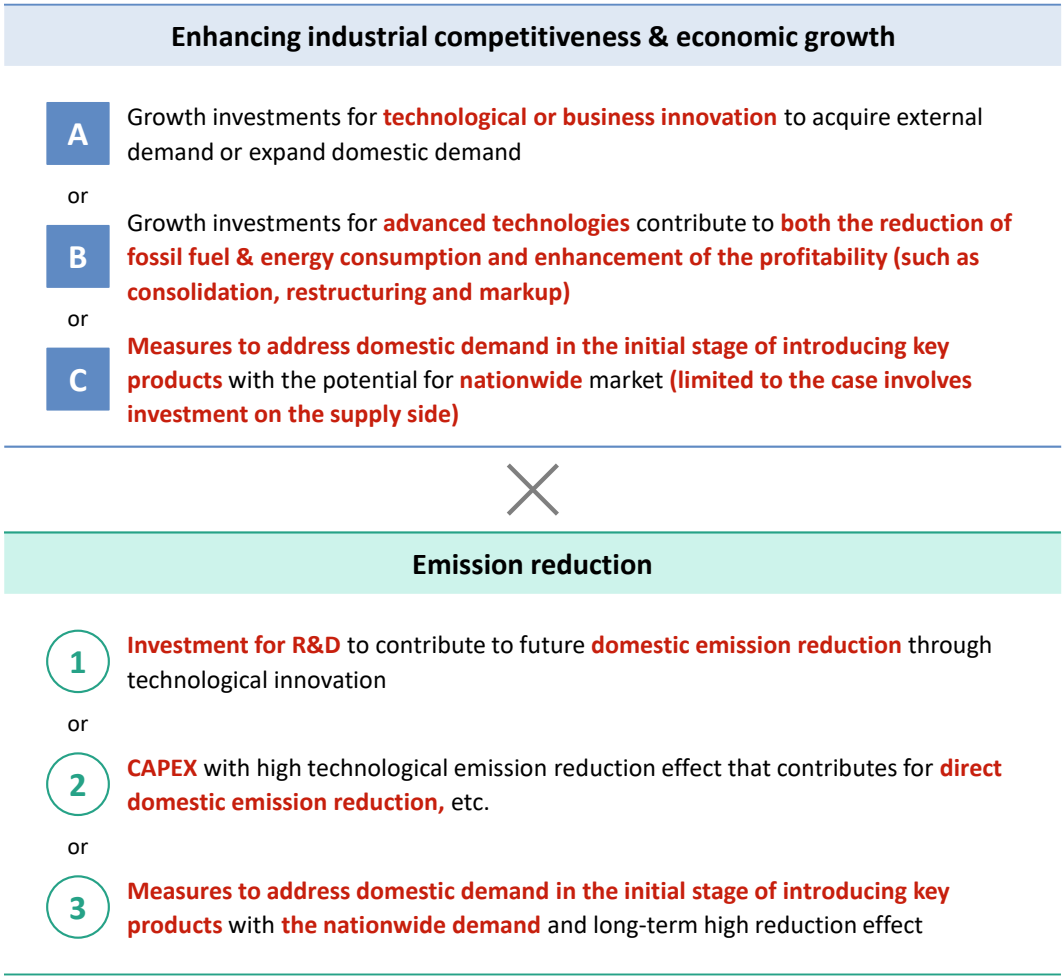
3.1.1 "Basic conditions" in the selection of the use of proceeds

Under the Framework, the selection of the use of proceeds will be made based on the "basic conditions" for investment promotion measures based on the basic concept of GX Economy Transition Bond's upfront investment, as indicated in Table 2, along with the eligible criteria shown in Table 1.

Table 2: GX Economy Transition Bond "basic conditions" in the selection of the use of proceeds (overview)

Basic conditions
I. Efforts that are truly difficult to make investment decisions solely by the private sector
II. Efforts that contribute to strengthening industrial competitiveness, economic growth and emission reduction, all of which are essential for achieving GX
III. Integration with regulatory regime and system that changes corporate investment and demand-side behavior
IV. Efforts that contribute to the expansion of domestic investment including support for human capital development

In addition to the above principles, prioritization will be conducted by identifying projects that meet one of the A-C requirements related to strengthening industrial competitiveness and economic growth, as well as one of the 1-3 requirements related to emission reduction.

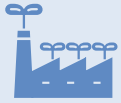


3.1.2 Climate Transition Bond: Classification of the use of proceeds (eligible projects)

Table 3 is the classification table of main eligible use of proceeds (eligible projects) that meet the “basic conditions”.

The use of proceeds is the key economic activities that are currently being organized through the government-led initiatives towards achieving Japan’s carbon neutrality goals. These activities are expected to be updated with the progress of GX-related initiatives, etc., in the future. The use of proceeds is broadly classified into six green categories and each category is further classified based on the eligibility criteria.

Table 3: Climate Transition Bond: Classification of the use of proceeds

	Main Category (Green category)	Sub-category Eligibility criteria	Typical use of proceeds (eligible projects)
1	**Energy efficiency** 	Promotion of thorough energy efficiency improvement	● Promotion of energy-efficient appliances
		Housing and buildings	● Support for building new houses and buildings with high energy efficiency and retrofitting to improve energy efficiency
		Digital investment aimed at decarbonization	● Facilitating the development of and investment in energy efficient semiconductors, photonics electronics convergence technologies
		Battery industry	● Investments in plants manufacturing batteries together with their material and components
2	**Renewable energy** 	Making renewable energy a major power source	● Floating offshore wind ● Next-generation solar cells (perovskite)
		Infrastructure	● Development of cities and communities contributing to decarbonization
3	**Low-carbon and decarbonized energy** 	Utilization of nuclear power	● Next-generation advanced reactors with built-in new safety mechanisms
		Establishing electricity and gas markets to achieve carbon neutrality	● Promoting zero-emission thermal power ● Development of submarine DC transmission systems
4	**Clean transportation** 	GX in transport sector	● Support for the introduction of next-generation vehicles ● Developing demonstration aircraft by 2030s and spreading the use of zero-emissions ships
		Infrastructure (repost)	● Development of cities and communities contributing to decarbonization
5	**Circular economy adapted products, production technologies and processes** 	Restructuring the manufacturing industry (fuel and feedstocks transition)	● Development and introduction of innovative technologies such as hydrogen reduction steelmaking ● Conversion to Carbon-Recycling production systems
		Facilitating introduction of hydrogen and ammonia	● Building supply chain both domestically and internationally ● Research and development as well as the introduction support of production and usage of hydrogen derived from excess renewable energy sources
		Carbon Recycling and CCS	● Support for research and development of Carbon Recycling fuel
6	**Environmentally sustainable management of living natural resources and land use, Circular economy** 	Food, agriculture, forestry, and fisheries industry	● Decarbonization of agriculture, forestry and fisheries
		Resource circulation	● Investment to accelerate resource circulation including plastics, metals, sustainable aviation fuel (SAF)

3.1.3 Climate Transition Bond: eligible criteria and examples of the use of proceeds (eligible projects)

In Tables 4.1 to 4.6, the overview of eligibility criteria described in Table 3 and typical examples of use of proceeds (eligible projects) included in eligibility criteria are provided.

The net proceeds (of each Climate Transition Bond) will be allocated to projects whose eligibility has been verified (eligible projects) as confirmed in Tables 4.1 to 4.6, as well as research and development, capital investment and initial demand creation, etc., of the eligible projects that meet the basic criteria as will be confirmed in future evaluations and discussions.

In assessing the eligibility of each project, reference will also be made to the areas and efforts deemed to be necessary at the Working Group of Experts for the Realization of GX, outlined in Section 2.3 “Climate transition strategy with science-based targets”.

1) Green category: Energy efficiency

Table 4.1: Energy efficiency "Promotion of thorough energy efficiency improvement" "Houses and buildings" "Digital investment aimed at decarbonization" "Battery industry"

Green category: Energy efficiency
No.1.1 Promotion of thorough energy efficiency improvement
Support will be provided for the necessary environmental improvements (related measures, development of related facilities and systems) to achieve a 62 million kl energy efficiency improvement by FY 2030 compared to FY 2013 levels.
< Related key sector-specific investment roadmaps, technology roadmaps > **Sector-Specific Investment Roadmaps:** Life-related Industry, Steel, Chemicals, Cement, Paper and Pulp **Technology roadmaps:** Steel sector, Chemical sector, Paper and Pulp sector, Cement sector
< Examples of initiatives (overview, etc.) > ● Support program for promoting energy efficiency in the household sector through the introduction of high-efficiency water heaters Support for the installation of facilities related to efforts to promote the adoption of high-efficiency water heaters by consumers and others **Criteria example:** The heat pump water heater exceeds the 2025 target (energy consumption efficiency: 3.5 or higher, etc.) set by the Top Runner Program under the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy, etc. ● Support program for promoting energy-efficiency investments and transitioning demand structures Support for energy-efficiency investments such as upgrading to advanced energy-saving facilities with high technical capabilities and energy efficiency, which have the potential for future expansion of adoption **Criteria example:** In the case of upgrading to advanced facilities and systems, one of the following criteria should be met as a whole of factory and business premises Energy efficiency rate + increase rate of non-fossil fuel proportion: 30% or higher, Energy saving volume + non-fossil fuel usage volume: 1,000 kl or higher, Improvement rate of energy consumption per unit: 15% or higher, etc. In the case of upgrading in a customized manner to fit the usage purposes of the business entity, one of the following criteria should be met as a whole of factory and business premise Energy efficiency rate + increase rate of non-fossil fuel proportion: 10% or higher, Energy saving volume + non-fossil fuel usage volume: 700 kl or higher, Improvement rate of energy consumption per unit: 7% or higher, etc. ● Support program for installing CO2-saving facilities to reduce Scope 3 emissions through collaboration among companies Support for installation of CO2-saving facilities to large companies and companies in their value chain (mainly small and medium-sized enterprises), taking into account the importance of reducing CO2 emissions from the value chain (Scope 3) is increasing mainly in large companies

No.1.2 Housing and buildings

To achieve the fundamental energy efficiency improvement of housing and buildings (e.g., ensuring energy-saving performance at the ZEH[23] and ZEB[24] level for new housing and buildings by 2030), the expansion and strengthening of regulations through the Building Energy Efficiency Act, and other measures such as energy-saving renovations of existing housing and buildings will be implemented over years.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Life-related Industry

< Examples of initiatives (overview, etc.) >

- Support program for accelerating energy efficiency and CO2 reduction in the household sector through retrofitting to insulated windows, etc.

  Support for retrofitting to insulated windows to enhance the thermal performance of existing residential buildings immediately and effectively

  Criteria example:

  Heat transfer coefficient (Uw value) of 1.9 or lower, surpassing the 2030 target level of the Top Runner Programme for building materials, etc.

No.1.3 Digital investment aimed at decarbonization

To drive growth in the semiconductor industry, continuous investment in semiconductors and related supply chains towards achieving GX will be implemented throughout the 2030s. This includes advancing the societal implementation of future technologies such as next-generation semiconductors and optoelectronic fusion. Furthermore, as the acceleration of DX (digital transformation) utilizing AI can maximize the impact of GX, carbon neutrality of data centers will be promoted by leveraging these technologies to develop the necessary domestic data centers.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Batteries, Semiconductors

< Examples of initiatives (overview, etc.) >

- Support programs for strengthening the semiconductor supply chain to achieve GX through improved power performance

  Achieving overall improvement in competitiveness of Japan's power semiconductors and solving societal challenges such as decarbonization through strengthening the semiconductor supply chain that contributes to energy efficiency enhancement

  Criteria Example:

  The investment should be of a substantial scale (in principle, exceeding 200 billion yen) with a focus on SiC power semiconductors. The performance of equipment and devices to be introduced should be advanced
- Research and development projects for future technologies that are essential for achieving GX, such as optoelectronic fusion

  Pursuing the development of important technologies to realize a high-performance and energy-efficient computing infrastructure with high-speed and low-loss

  Criteria Example:

  The performance indicator of semiconductor devices with optoelectronic fusion devices implemented in the package, expressed as bandwidth density/power (Gbps/mm)/(pJ/bit), should be 800 times or more compared to the products currently available at the start of the research and development
- Research and Development of AI foundation models and advanced semiconductor technologies and related projects

  R&D support for information networks and their parts (calculation resources, AI foundation models, etc.)
- Research and Development Program for Next-generation Edge AI Semiconductor

  R&D support for academic research to be bridged to industries speedily, for technologies regarding existing industries or those backcasted from new industries needed after the mid-2030s, regarding the design, manufacturing, and materials of innovative next-generation edge semiconductors with extremely low power usage

23 The abbreviation for Net Zero Energy House.

24 The abbreviation for Net Zero Energy Building.

No.1.4 Battery industry

To achieve the goal of establishing a domestic manufacturing infrastructure for batteries with a capacity of 150 GWh by 2030, intensive investments and support for research and development for technologies in battery production facilities will be implemented over 5 years while creating demand by approaching demand side through the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy over the next decade.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Batteries

< Examples of initiatives (overview, etc.) >

- Supporting initiatives for strengthening the manufacturing supply chain of batteries which are essential for a green society

  To ensure the prompt and stable supply of batteries that are essential for maintaining the infrastructure of electrification and digitalization society, enhancement of the domestic manufacturing infrastructure will be implemented by supporting capital investment and technology development in batteries and component materials

  Criteria example:

  Expansion of production capacity should be as follows

  At least 3 GWh per year (for automotive batteries)

  At least 300 MWh per year (for stationary batteries)

Representative SDGs classifications

2) Green category: Renewable energy

Table 4.2: Renewable energy "Making renewable energy a major power source" "Infrastructure"

Green category: Renewable energy

No.2.1 Making renewable energy a major power source

Toward the maximum introduction of renewable energy, Japan aims to achieve the social implementation of next-generation renewable energy technologies such as the establishment of a domestic mass production system for next-generation solar power and the formation of large-scale offshore wind power projects including floating offshore wind over 10 years.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Next-Generation Renewable Energy, Life-related Industry

Technology roadmaps: Power sector

< Examples of initiatives (overview, etc.) >

- Development and demonstration projects for cost reduction in offshore wind power generation

  Development of element technologies for wind turbines and floating platforms tailored to the weather and sea conditions in Asia. Involvement of users (power generation companies) in the integrated design and demonstration of wind turbines, floating platforms, cables, etc.

  Criteria example:

  Projected level of 8-9 yen/kWh for the electricity generation cost of bottom-mounted offshore wind turbine under specific conditions (such as wind conditions) by 2030, etc.

- Development and demonstration projects for next-generation solar cells

  Development of next-generation solar cells (perovskite solar cells, etc.) that can be installed on building walls and other surfaces

  Criteria example:

  Projected electricity generation cost of 14 yen/kWh or lower under specific conditions (such as sunlight conditions) by the FY 2030

No.2.2 Infrastructure

Promotion of the formation of Carbon Neutral Ports (CNPs) and decarbonization in construction work to achieve decarbonization and enhance competitiveness in industries and ports. Promotion of renewable energy introduction and thorough energy consumption reduction by utilizing various infrastructure such as airports, roads, dams and sewage systems. Advancing the development of cities and regions that contribute to decarbonization.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Life-related Industry

< Examples of initiatives (overview, etc.) >

- Support program for the construction of local government- and private-owned microgrids

  Supporting the installation of key decarbonization products and technologies (renewable energy, energy efficiency, energy storage), etc., with high GHG emission reduction effects into local government- and private-owned microgrids in specific regions where private businesses benefit from those microgrids

  Criteria example:

  In the areas with local government- and private-owned microgrids, to establish a plan to achieve net-zero emissions from the household and business sectors by FY 2030

Representative SDGs classifications

3) Green category: Low-carbon and decarbonized energy

Table 4.3: Low-carbon and decarbonized energy "Utilization of nuclear power" "Establishing electricity and gas markets to achieve carbon neutrality"

Green category: Low carbon and decarbonized energy
No.3.1 Utilization of nuclear power
Developing and constructing next-generation innovative reactors that incorporate new safety mechanisms, with the utmost priority on ensuring safety. **< Related key sector-specific investment roadmaps, technology roadmaps >** **Sector-specific investment roadmaps:** Nuclear Power **Technology roadmaps:** Power sector **< Examples of initiatives (overview, etc.) >** ● Support for R&D and Building Supply Chains for the Development and Construction of Next-Generation Reactors Support for R&D of next-generation reactors, and maintaining/strengthening domestic industry basis ● Project for the development of fast reactor demonstration Based on the revised "Strategic Roadmap" for fast reactor development, which was updated on December 23rd 2022, the specifications for the reactor concept and the core companies to be selected for the conceptual design from FY 2024 onwards ● Project for the development of high-temperature gas reactor demonstration Feasibility study of carbon free hydrogen production methods using high temperature above 800°C. Establishment of connection technologies and evaluation methods to achieve high safety using decarbonized high-temperature heat source above 800°C and hydrogen production technology through commercialized methane steam reforming method **Criteria example:** Aim to supply a large amount of hydrogen stably at approximately 12 yen/Nm3 by 2050 using decarbonized high-temperature heat above 800°C and carbon-free hydrogen production methods. Efforts will be made for industrial applications such as iron and steel production and chemical industries
No.3.2 Establishing electricity and gas markets to achieve carbon neutrality
Towards the expansion of decarbonized power such as renewable energy and nuclear power, and low-carbon and decarbonized energy such as hydrogen and ammonia, the necessary environment will be further developed through measures such as research and development, establishment of domestic advanced research hubs, enhancement of grid infrastructure, securing flexibility, alongside support for long-term and large scale continued investment by power utilities for decarbonized power sources. **< Related key sector-specific investment roadmaps, technology roadmaps >** **Sector-specific investment roadmaps:** Next-generation renewable Energy, Hydrogen and its derivatives, Nuclear Power **Technology roadmaps:** Power sector, Gas sector, Oil sector **< Examples of initiatives (overview, etc.) >** ● Support program for the establishment of large-scale hydrogen supply chains Creating a positive cycle of large-scale hydrogen demand production and supply cost reduction through technology development such as scaling up transportation infrastructure and large-scale hydrogen transportation verification for multiple hydrogen carriers (liquefied hydrogen, MCH[25]), and demonstration of hydrogen combustion stability in actual hydrogen power generation systems **Criteria example:** Supply cost: below 30 yen/Nm3 by 2030 and below 20 yen/Nm3 by 2050 (CIF cost. Aim to reduce costs to a level comparable to fossil fuels)
Representative SDGs classifications


25 Abbreviation for Methylcyclohexane.

4) Green category: Clean transportation

Table 4.4: Clean transportation "GX in transport sector" "Infrastructure" (repost)

Green category: Clean transportation
No 4.1 GX in transport sector
In the transportation sector, which accounts for approximately 20% of our country's CO_2 emissions, to improve energy efficiency in each transportation mode such as railways and logistics and passenger flow, and transformation of demand structure towards the expansion of utilization of non-fossil fuel, Japan will systematically and strategically promote initiatives for the transition to clean energy over 10 years, taking into account the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy, etc. Japan will also aim to expand private investment and create a market for related industries such as transportation businesses.
< Related key sector-specific investment roadmaps, technology roadmaps > **Sector-specific investment roadmaps:** Automobiles, Aircraft, SAF, Ships, Life-related Industry **Technology roadmaps:** Automobile sector, Oil sector, International Shipping sector, Domestic Shipping sector, Aircraft sector
< Examples of initiatives (overview, etc.) > ● Support Project for Sustainable Aviation Fuel (SAF) Production and Supply Chain Development Support for capital investment towards entities conducting large-scale domestic SAF production projects contributing to GX, to build an environment where SAF can be supplied stably at a globally-competitive price ● Promotion of the construction of zero-emission ships etc. In order to make a supply foundation needed for the deployment of zero-emission ships etc. using hydrogen/ammonia as fuels, which are necessary for achieving carbon neutrality in 2050, support will be provided for capital investment for building and expanding production of capacity engines, fuel tanks, fuel supply systems and other facilities necessary for construction and their instalment ● Support program for promoting the introduction of clean energy vehicles Support for the purchase cost of electric vehicles, fuel cell vehicles and plug-in hybrid vehicles, etc., in the early stages of adoption **Criteria example:** Being eligible vehicles for the FY 2030 fuel efficiency standards under the Top Runner Program of the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy ● Support program for promoting the electrification of commercial vehicles Support for adoption acceleration of the electrification of commercial vehicles (trucks, taxis, buses, etc.) **Criteria example:** Setting up plans for the introduction of non-fossil fuel vehicles in accordance with the goals set by the government (e.g., replacing 5% of small trucks under 8 tons with non-fossil fuel vehicles by FY 2030), etc. ● Development and demonstration projects for next-generation aircraft Technology development of core technologies for hydrogen-powered aircraft **Criteria example:** Engine combustor: 54% reduction in NOx[26] emissions compared to CAEP/8 Hydrogen fuel storage tank: Achieving a weight of less than twice of stored hydrogen fuel Aircraft design: Confirmation of the conceptual design of a hydrogen-powered aircraft with a range of 2,000-3,000km through wind tunnel testing

26 Abbreviation for nitrogen oxides.

No 4.2 Infrastructure (repost)

Promotion of the formation of Carbon Neutral Ports (CNPs) and decarbonization in construction work to achieve decarbonization and enhance competitiveness in industries and ports. Promotion of renewable energy introduction and thorough energy consumption reduction by utilizing various infrastructures such as airports, roads, dams and sewage systems, etc. Advancing the development of cities and regions that contribute to decarbonization.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Life-related Industry

Representative SDGs classifications

5) Green category: Circular economy adapted products, production technologies and processes

Table 4.5: Circular economy adapted products, production technologies and processes
"Restructuring the manufacturing industry (fuel and feedstocks transition)"
"Facilitating introduction of hydrogen and ammonia" "Carbon Recycling and CCS"

Green category: Circular economy adapted products, production technologies and processes
No 5.1 Restructuring the manufacturing industry (fuel and feedstocks transition)
To address the GX market growing worldwide, in the manufacturing industry which accounts for a significant portion of CO_2 emissions after electricity and heat distribution, Japan will swiftly establish a GX supply chain through research and development as well as capital investment support, and engage in market creation etc., in new GX fields.
< Related key sector-specific investment roadmaps, technology roadmaps > **Sector-specific investment roadmaps:** Steel, Chemicals, Cement, Paper and Pulp **Technology roadmaps:** Steel sector, Chemical sector, Paper and Pulp sector, Cement sector
< Examples of initiatives (overview, etc.) > ● Support for energy/manufacturing process conversion for hard-to-abate industries Support for capital investment leading to swifter deployment of facilities leading to emissions reduction and increased competitiveness in hard-to-abate industries ● Development and demonstration projects for the utilization of hydrogen in the iron and steel production process Research and development towards the establishment and societal implementation of decarbonization technologies, including hydrogen reduction steelmaking, in anticipation of a future where cost-effective and abundant hydrogen supply infrastructure is established **Criteria example:** Establishment of hydrogen reduction technology in blast furnaces to achieve over 50% reduction of CO_2 emissions. Establishment of direct hydrogen reduction technology to achieve over 50% reduction of CO_2 emissions ● Development and demonstration projects for decarbonization of thermal processes in the manufacturing Utilization of zero-emission fuels and development and demonstration of efficient thermal processes to address decarbonization of industrial furnaces **Criteria example:** Establishment of industrial furnaces with 50% co-firing capability of existing fuels such as natural gas and hydrogen and ammonia by FY 2031. Establishment of technologies to reduce peak power consumption, etc., by 30% or more by FY 2031

No 5.2 Facilitating introduction of hydrogen and ammonia

In order to achieve the domestic introduction targets of 3 million tons of hydrogen and 3 million tons (ammonia equivalent) of ammonia by 2030, and 20 million tons of hydrogen and 30 million tons (ammonia equivalent) of ammonia by 2050, efforts will be made over 10 years to establish a large-scale and robust supply chain (production, transportation, utilization) such as through the support system for supply chain development and the support system for hub development.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: Hydrogen and its derivatives

Technology roadmaps: Power sector, Gas sector, Oil sector

< Examples of initiatives (overview, etc.) >

- Support focusing on the price gap to build supply chains for hydrogen and its derivatives

  Support focusing on the price gap between low-carbon hydrogen and its derivatives compared to existing materials/fuels that they substitute

- Hydrogen Hub Development Program

  Support for shared facilities that merit a variety of entities leading to wide-scale expanded use of low-carbon hydrogen and its derivatives, aiming for building an independent pilot supply chain around FY 2030

- Development and demonstration projects for the establishment of a large-scale hydrogen supply chain

  Creating a positive cycle of large-scale hydrogen demand creation and supply cost reduction through technology development such as scaling up transportation infrastructure and large-scale hydrogen transportation verification for multiple hydrogen carriers (liquefied hydrogen, MCH), and demonstration of hydrogen combustion stability in actual hydrogen power generation systems

  Criteria example:

  Supply cost: 30 yen/Nm3 by 2030 and below 20 yen/Nm3 by 2050 (CIF cost. Aim to reduce costs to a level comparable to fossil fuels)

No 5.3 Carbon Recycling and CCS

Research and development, demonstration, and capital investment will be implemented over 10 years to promote the use of fuels and materials that contribute to decarbonization, such as SAF (Sustainable Aviation Fuel), synthetic fuels and synthetic methane. Additionally, there will be efforts for the establishment of regulations and frameworks, and coordination towards international rules establishment, and building supply chains.

Additionally, a supply chain for bio-manufacturing through support for technology development aimed at social implementation will be built. Furthermore, regarding Carbon Capture and Utilization (CCU), the construction of a CO2 supply chain will be promoted. For Carbon Capture and Storage (CCS), necessary improvement of the environment will be conducted through measures such as CCS cost difference measures for operations to begin in the early 2030s.

< Related key sector-specific investment roadmaps, technology roadmaps >

Sector-specific investment roadmaps: SAF, CCS, Resource Circulation

Technology roadmaps: Power sector, Gas sector, Oil sector

< Examples of initiatives (overview, etc.) >

- Development and demonstration projects for control technologies to address feedstock variations in synthetic fuel production

  Development of control technologies for temperature, catalyst quantity, and other parameters to address feedstock variations in synthetic fuel production

Representative SDGs classifications

6) Green category: Environmentally sustainable management of living natural resources and land use, Circular economy

Table 4.6: Environmentally sustainable management of living natural resources and land use, Circular economy "Food, agriculture, forestry, and fisheries industry" "Resource circulation"

Green category: Environmentally sustainable management of living natural resources and land use, Circular economy
No 6.1 Food, agriculture, forestry, and fisheries industry
Based on the "Green Food System Strategy" (formulated in May 2021) and the "Act to Promote Environmental Burden Reduction Activities for Establishment of Environmentally Harmonized Food System" (enacted in April 2022, implemented in July 2022), efforts will be made to promote transformation in the food, agriculture, forestry, and fisheries industry towards decarbonization and reducing environmental impacts. Forests, farmland, algae fields, etc., which serve as production areas for the agriculture, forestry, and fisheries industry, play an essential role as carbon sinks in achieving carbon neutrality by 2050. From the viewpoint of attracting private investment, efforts will be made to strengthen these functions including behavioral changes among stakeholders.
< Related key sector-specific investment roadmaps, technology roadmaps > **Sector-specific investment roadmaps:** Life-related Industry
No 6.2 Resource circulation
To promote resource circulation through the collaboration between production side and recycle side, and achieve autonomic and robust resource circulation systems, efforts will be made over 10 years to establish information distribution platforms utilizing digital technologies. Additionally, resource circulation market will be created through revision of regulatory frameworks towards the acceleration of the collaboration between production side and recycle side, and GX investment support based on the premise of structural reforms.
< Related key sector-specific investment roadmaps, technology roadmaps > **Sector-specific investment roadmaps:** Resource Circulation **< Examples of initiatives (overview, etc.) >** ● Development and demonstration projects aimed at achieving carbon neutrality in the waste and resource circulation sector Development of technologies, etc., related to alternative treatment methods to conventional waste disposal systems, such as incineration, that release CO_2 into the atmosphere, etc. **Criteria example:** By 2030, establishing technologies that realize the waste incineration facilities based on CO_2 separation and recovery, which ensures a stable carbon recovery rate of 90% or higher from waste under specific conditions
Representative SDGs classifications 

< Exclusionary Criteria >

The Government of Japan commits not to allocate the net proceeds procured based on the Framework to finance projects related to the following.

- Projects involved in manufacturing, sales or distribution of mass destruction weapons such as nuclear weapons, chemical weapons, biological weapons, and inhumane weapons such as anti-personnel landmines and projects involved in manufacturing and providing services of products that support the manufacturing or sale of mass destruction weapons such as nuclear weapons, chemical weapons, biological weapons, and inhumane weapons such as anti-personnel landmines
- Projects involved in mining, refining and transportation of coal
- Projects involved in the ownership or operation of gambling facilities or businesses
- Projects involved in forced labor
- Projects involved in unfair trade practices, bribery, corruption, extortion, embezzlement and other inappropriate relationships that do not comply with the laws of the country where they are located
- Projects involved in transactions that may cause human rights, environmental, or other social issues

3.2 Process for Project Evaluation and Selection

The compliance status regarding the adherence to eligible projects stipulated in "3.1 Use of Proceeds" for the allocated projects is confirmed within each relevant ministry or agency, followed by discussions in the Working Group of Experts for the Realization of GX, then included in the government's budget plan. In addition, an independent external reviewer confirms the planned allocation projects' alignment. Upon this, if needed, discussions between relevant agencies are conducted, and the projects are reported to the "Government-Related Ministries and Agencies Liaison Conference on GX Economy Transition Bond Issuance" (Liaison Conference), which consists of director-general level officials, and the GX Implementation Council. Additionally, each project is determined through the approval by the National Diet as part of the government budget annually.

Members of the Liaison Conference are as follows.

- Cabinet Secretariat
- Financial Services Agency
- Ministry of Finance
- Ministry of Economy, Trade and Industry
- Ministry of the Environment

Furthermore, the aforementioned Liaison Conference also discusses the allocation reporting and impact reporting mentioned in 3.4 and conducts the confirmation and evaluation of the allocation status. As necessary, the results are reported to the "GX Implementation Council".

< Identification of Environmental and Social Negative Impacts and Implementation of Mitigation Measures >

Through the aforementioned evaluation process, the presence of negative impacts caused by the allocated projects and their mitigation measures are verified. Additionally, when individual businesses implement the allocated projects, they will ensure that mitigation measures are being taken through identifying negative effects on the environment and society based on laws and regulations such as environmental impact assessments.

3.3 Management of Proceeds

The Government of Japan will allocate the net proceeds to eligible projects. The eligible projects to be allocated are those that have started operations or have been executed in the fiscal year[27] including the implementation date of funding based on the Framework, as well as projects that have started operations or executed in subsequent FYs and the previous FY.

The allocated projects are managed within the Special Account for Energy Measures, separate from other accounts. METI will track and monitor the amount of the net proceeds to match the actual expenses on an annual basis using an internal management system**.**

Until full allocation of the net proceeds, the unallocated proceeds will be managed in cash.

3.4 Reporting

3.4.1 Overview of Reporting

After the fundraising based on the framework, the Government of Japan will provide allocation and impact reporting as follows. The reporting aims to go beyond disclosing the progress of eligible projects financed by the Framework and provide information that can be used as a reference for future allocation decisions by conducting appropriate project reviews similar to the verification of regular budget projects and taking into account the progress of the projects, their environmental improvement impacts, etc. Furthermore, disclosure of the midterm strategy and anticipated impacts of eligible projects will be made to the extent possible, strengthening companies' commitment and enabling market evaluation not only of the current financial performance but also of the content of upfront investments.

3.4.2 Allocation Reporting

Until the proceeds are fully allocated to eligible projects, the Government of Japan will report the allocation of net proceeds annually on its website, within the scope of confidentiality obligations and to the extent reasonably practicable, regarding any or all of the following items.

Should a significant change occur after the allocation of the proceeds, such change will be disclosed in a timely manner.

< Reporting items >

- The amount of net proceeds allocated to the eligible projects
- The amount of unallocated proceeds
- The estimated amount of the proceeds allocated to the projects in the FY that ends before the issuance date

27 In the GX Promotion Act, it is stated that "the issuance of GX Economy Transition Bonds can be carried out until June 30th of the following year for each FY. In this case, the revenue related to GX Economy Transition Bonds issued after April 1st of the following FY shall be attributed to the revenue of the respective FY". Therefore, for example, funds raised from April 1st to June 30th in FY X may be attributed to the revenue of FY X-1. In this case, the FY X-1 becomes the "relevant FY" in this provision. With regard to tax measures, the FY in which the tax reduction amount is determined will be considered the "relevant FY."

3.4.3 Impact Reporting

The Government of Japan will report the environmental impacts for each eligible criterion annually on its website, within the scope of confidentiality obligations and to the extent reasonably practicable, regarding any or all of the following items.

The initial report for each issuance will be conducted within two fiscal years of issuance, and subsequent progress reports will be conducted at least until the completion of the individual project period.

< Reporting items >

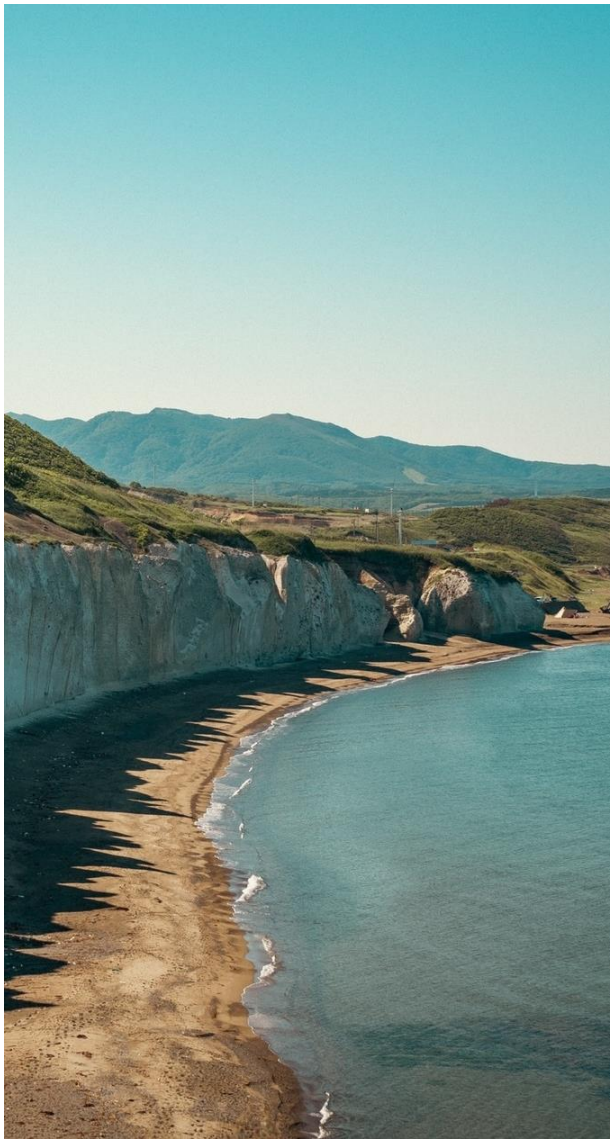
- Environmental improvement effects such as reduction in CO_2 emissions (expected reduction effects for research and development)
- Overview of main projects, allocated amount, number of projects adopted, case studies of project implementation, progress updates on research and development and capital investment, etc.

* Additionally, other indicators and criteria related to the project may be disclosed as needed.

3.5 Review of the Framework

In the future, a review of the Framework will be considered by FY 2030 at the latest, depending on the progress of Japan's GX Promotion Strategy and the progress of eligible projects. The Liaison Conference will formulate a revision draft of the Framework, taking into account evaluations and opinions from private sector insights, including those from capital market participants and experts, and report to the GX Implementation Council.

Furthermore, except for minor revisions, when reviewing the Framework, the Government of Japan will engage independent external reviewers to provide second party opinions on the alignment with appropriate principles and guidelines such as ICMA Green Bond Principles.



4

External Review

4.1 Second Party Opinion

The Government of Japan has engaged DNV Business Assurance Japan K.K. and Japan Credit Rating Agency, Ltd. as independent external reviewers to provide Second Party Opinion (“SPO”) on the alignment with the Green Bond Principles (ICMA, 2021), the Green Bond Guidelines (MOE, 2024), the Climate Transition Finance Handbook (ICMA, 2023) and the Basic Guidelines on Climate Transition Finance (FSA, METI, and MOE, 2025).

4.2 Post-issuance External Verification

The Government of Japan will engage independent external reviewers to provide annual external verifications on the allocation of the net proceeds financed based on the Framework to the eligible projects and assessment of their environmental impacts until full allocation of the proceeds.

Disclaimer

The Framework does not constitute, or form part of, a prospectus or other offering document. The Framework is not, and should not be construed as, an invitation or offer for sale or subscription of, or a solicitation of any offer to buy or subscribe for, any securities of the Government of Japan in any jurisdiction or an inducement to enter into investment activity.

The information and opinions contained in the Framework are provided as at the date of the Framework and are subject to change without notice. None of the Government of Japan or any of its affiliates assume any responsibility or obligation to update or revise such statements, regardless of whether those statements are affected by the results of new information, future events or otherwise. The Framework represents current policy and intent of the Government of Japan, is subject to change and is not intended to, nor can it be relied on to create legal relations, rights or obligations. The Framework is intended to provide non-aa, general information. The Framework may contain or incorporate by reference public information not separately reviewed, approved or endorsed by the Government of Japan and accordingly, no representation, warranty or undertaking, express or implied, is made and no responsibility or liability is accepted by the Government of Japan as to the fairness, accuracy, reasonableness or completeness of such information. The Framework may contain statements about future events and expectations that are forward-looking. None of the future projections, expectations, estimates or prospects in this document should be taken as forecasts or promises, nor should they be taken as implying any indication, assurance or guarantee that the assumptions on which such future projections, expectations, estimates or prospects have been prepared are correct or exhaustive, or, in the case of assumptions, fully stated in the Framework.

No representation is made as to the suitability of any of the Climate Transition Bonds to fulfil the environmental, social or sustainability criteria required by prospective investors. Each potential purchaser of bonds should determine for itself the relevance of the information contained or referred to in the Framework or the relevant bond documentation for such Climate Transition Bonds regarding the use of proceeds, and its purchase of the Climate Transition Bonds should be based upon such investigation as it deems necessary.

The Government of Japan has set out its intended policy and actions in the Framework in respect of the use of proceeds, project evaluation and selection, management of proceeds and reporting, in connection with the Climate Transition Bonds. However, it will not be an event of default or breach of contractual obligations under the terms and conditions of any such Climate Transition Bonds if the Government of Japan fails to adhere to the Framework, whether by failing to fund or complete eligible projects or by failing to ensure that proceeds do not contribute directly or indirectly to the financing of the activities that meet one or more of the exclusionary criteria specified in the Framework, or by failing (due to a lack of reliable information and/or data or otherwise) to provide investors with reports on use of proceeds and environmental or social impacts as anticipated by the Framework, or otherwise. In addition, it should be noted that all of the expected benefits of the eligible projects as described in the Framework may not be achieved.

Factors including (but not limited to) market, political and economic conditions, changes in government policy (whether with a continuity of the government or on a change in the composition of the government), changes in laws, rules or regulations, the lack of available eligible projects being initiated, failure to complete or implement projects and other challenges, could limit the ability to achieve some or all of the expected benefits of these initiatives, including the funding and completion of eligible projects. Each environmentally or socially focused potential investor should be aware that eligible projects may not deliver the environmental, social or sustainability benefits anticipated, and may result in adverse impacts.


2050 CARBON NEUTRAL