

Provisional Translation

The Basic Policy for the Realization of GX
- A roadmap for the next 10 years -

February 2023

1. Foreword

Humanity is now facing a shared challenge of global climate change such as extreme weather and a rising number of massive natural disasters all over the world. As more countries and regions announce their net-zero greenhouse gas (GHG) emissions targets and the global momentum for decarbonization grows, Japan has made a global pledge for reducing GHG emissions by 46% in FY2030 and achieving net-zero GHG emissions by 2050, showing its strong national determination to combat climate change.

Meanwhile, Russia's military invasion of Ukraine in February 2022 has dramatically changed the world's energy situation. Every country has seen significant energy-related inflation. The situation in Japan is very tense as well. As electricity supply becomes stretched and energy prices soar, there is now a risk of the first full-scale energy crisis since the Oil Crisis of 1973. It goes without saying that ensuring stable energy supply is the foundation of citizens' lives and business activities. The current crisis has revealed the vulnerabilities of Japan's energy supply systems and their issues with regard to national energy security.

For Japan, a country that has experienced many critical moments in history with stable energy supply being disrupted, the idea of Green Transformation, or GX, means a thorough overhaul of its post-war industrial/energy policies, as GX will transform our entire industrial and social structures centering around fossil energy sources, long established since the Industrial Revolution, into ones based on clean energy.

As a result of Russia's invasion of Ukraine, European countries and the United States have further accelerated their existing decarbonization initiatives. They have launched national efforts to support investment leading to decarbonization in power generation, industry, and transportation sectors as well as residential sector for accelerated transition to a carbon-free society. The European Union has set a 140 trillion-yen target over 10 years for its joint public-private investment plan consisting of various support measures. Some European Union (EU) member countries have added extra measures worth several trillion yen. The U.S., in addition to the Bipartisan Infrastructure Law, introduced the Inflation Reduction Act in August 2022, with the aim of spending ¥50 trillion on energy and climate change over 10 years. These policies are examples of accelerated government-led efforts by European countries and the U.S. to support decarbonization investment and to establish new markets and rules. Successful GX decarbonization investment is now the decisive factor for each business and state that wishes to remain competitive.

As a country surrounded by sea and deprived of natural resources that can be extracted easily, Japan has traditionally focused on research and development in the field of decarbonization technologies, with Japanese corporations having technological strengths in many areas. Making the most of these technological advantages to accelerate GX will lead to the stable supply of energy as well as providing opportunities for putting Japan on track for a dramatic bounce-back to

economic growth. Japan's economy needs to grow by leveraging the expertise and insight accumulated in the country's private sector to support other countries' effort for achieving net-zero GHG emissions, as well as creating new demand and markets in decarbonization business which will ultimately lead to reinforcing Japan's industrial competitiveness.

GX introduction can lead the way to clearing Japan's global commitment of 46% reduction of GHG emissions in FY2030 and achieving net-zero GHG emissions by 2050. This initiative can also bring stable supply of inexpensive energy by reorganizing energy supply-demand structures, and furthermore, reforming Japan's industrial and social structures, and building a society in which all citizens, including future generations, can live an affluent life. With these goals in mind, the GX Implementation Council, based on the results of its past discussions, has created the following policies for the initiatives to be undertaken for 10 years.¹

Additionally, bills relevant to GX implementation will be submitted to the 211th session of the Diet.

¹ These policies are based on the Sixth Strategic Energy Plan, Plan for Global Warming Countermeasures, and Japan's Long-term Strategy under the Paris Agreement, all decided by the Cabinet in October 2021, and summarize Japan's global pledge for climate change actions (46% GHG reduction in FY2030 vs. FY2013 levels) as well as continuously trying to clear a higher goal of a 50% reduction in order to achieve net-zero GHG emissions by 2050) together with the country's initiatives for strengthening its industrial competitiveness and developing its economy, among other undertakings.

2. Decarbonization initiatives towards GX based on the premise of ensuring a stable energy supply

(1) Basic concept

In response to the dire energy situation after Russia's invasion of Ukraine, European and North American countries, including the G7, have taken actions to maintain stable supply of energy in line with each country's practical requirements. In addition to various measures that have been taken to address the issue of soaring energy retail prices, affected nations have been reaching out for an even wider introduction of renewable energy, as well as announcing policies for building more nuclear power plants, showing their enhanced moves towards ensuring stable energy supply.

On the other hand, the development of a business environment under the electricity deregulation scheme has not gone smoothly inside Japan, together with developing a grid network for introducing renewable energy and also restarting nuclear power stations. The power shortage within Tokyo Electric Power Company and other companies' service areas in March and June 2022, coupled with soaring energy prices, have led to an energy crisis situation not experienced since the 1973 Oil Crisis.

Stable supply of inexpensive energy is the very foundation of citizens' daily lives as well as social and economic activities. As such, it is Japan's top priority. Ensuring stable supply of energy is the fundamental prerequisite for both addressing climate change issues and facilitating GX over the coming years. At the same time, driving GX itself will lead to ensuring stable energy supply.

In order to ensure stable supply of energy into the future, simply focusing on the retail prices of gasoline, kerosene, electricity, and gas as temporary actions to mitigate the impact of price volatility is not enough. Transition to a resilient energy supply-demand that can withstand an energy crisis is needed.

To that end, promoting thorough energy efficiency improvement on the demand side and fuel switching within the manufacture will be facilitated to escape from excessive dependence on fossil energy sources. On the supply side, renewables, nuclear, and other power sources that contribute to national energy security and are highly effective for decarbonization will be used to their maximum potential, also in order to overcome the current crisis.

Based on the understanding that the reconstruction of Fukushima is the starting point for promoting any energy policies, no efforts will be spared until Fukushima is rebuilt and reborn. Initiatives to that end include the decommissioning of Fukushima Dai-ichi Nuclear Power Station, lifting of evacuation orders in Difficult-to-Return Zones, creating new businesses through the Fukushima Innovation Coast Framework, and revitalizing local businesses and livelihoods. Furthermore, the fundamental premise for utilizing nuclear power is that we will never forget the

lessons learned from the accident and give top priority to safety in nuclear power while being free of safety myths.

GX implementation has many requirements. The initiative will leverage Japanese companies' globally acclaimed technologies for decarbonization to help worldwide efforts aimed at achieving net-zero GHG emissions. Furthermore, by creating new markets and demands as well as strengthening Japan's industrial competitiveness, the country's economy can be put back on track for further growth, leading to future economic development and growth in jobs and income.

These basic concepts and discussions in the GX Implementation Council meetings form the foundation of the following initiatives.

(2) Next steps²

1) Promotion of thorough energy efficiency improvement and restructuring the manufacturing industry (through fuel and feedstocks transition)

Energy efficiency improvement not only contributes to a decarbonized society through reducing energy consumption but also building an energy supply-demand structure that is resilient to crises. As such, we will promote bold energy efficiency improvement through a combination of regulatory measures and support measures based on "the Act on the Rationalizing Energy Use and Shifting to Non-fossil Energy"

For companies, we will strengthen the support measures for SMEs by subsidies which are eligible for multiple-year investment plans. We will also strengthen the support measures for small business owners by increasing subsidies for energy efficiency diagnosis, which examines the use of energy and suggests how to improve energy efficiency.

² The Sixth Strategic Energy Plan decided by the Cabinet in October 2021 states that, based on the assumption that ensuring stable supply of inexpensive energy is vital not only for maintaining and strengthening Japan's vitality but also for a 46% GHG reduction in FY2030 and achieving net-zero GHG emissions by 2050, "Japan will address maximum introduction of renewable energy as major power sources as the top priority; societal implementation of hydrogen and Carbon dioxide Capture, Utilization and Storage (CCUS) will be promoted; and a necessary amount of nuclear power will be continuously utilized on the major premise of ensuring safety and public trust. Including these efforts, Japan will pursue all options to realize net-zero GHG emissions by 2050 by striving to maintain global competitiveness and to restrain the citizens' burden by securing a stable and cost-efficient energy supply."

The Sixth Strategic Energy Plan has made clear that Japan's fundamental energy strategy for clearing the ambitious goal of achieving net-zero GHG emissions by 2050 must be built by considering all possibilities and utilizing all available technologies. All the actions listed in this document for ensuring stable supply of energy are within the guidelines set by this Sixth Strategic Energy Plan, aiming to define all options based on these guidelines.

For the households, relevant ministries and agencies will work together to facilitate spontaneous cooperation and initiatives by citizens by, for example, establishing a single point of contact and strengthening one-stop support for the existing programs to support energy efficiency retrofitting in houses, such as replacing windows with thermal insulated models with higher energy efficiency performance. At the same time, relevant authorities will promote the understanding between consumers for energy efficiency improvement and changes in consumer behavior so that the effort take root as a comfortable lifestyles. Special Cash Payments for Resident Tax-Exempted Households, Etc. will be utilized to back up initiatives by municipalities, taking local needs into account, to support replacing appliances with energy efficient ones.

Based on "the Act on the Rationalizing Energy Use and Shifting to Non-fossil Energy", large-scale consumers are obliged to submit their medium- and long-term plans and periodic reports on the shift to non-fossil energy. We will encourage the shift to non-fossil fuel energy with newly proposed governmental guidelines for the five key industries (iron and steel, chemical, cement manufacturing, paper manufacturing, and automotive manufacturing) that use 40% of energy consumed by the entire industry sector³. In addition, by introducing a new system of voluntary disclosure of the periodic report information under the Act, we will encourage companies to disclose information about energy efficiency improvement and shift to non-fossil energy. Furthermore, targeted support will be given to, for example, development and introduction of innovative technologies such as hydrogen reduction for steelmaking, conversion of production systems from blast furnaces to electric furnaces, conversion to Carbon-Recycling production systems using ammonia-fueled naphtha cracker and other technologies, and fuel switching for coal-fired auto power generation.

We will promote the spread of energy-efficient appliance, such as heat pump water heaters, home-use fuel cells, as well as encouraging the introduction of energy-efficient equipment such as industrial heat pumps and co-generation, aiming for decarbonization of heat demand and the effective use of heat .

Demand response will be further expanded through support for introduction of suitable batteries and control systems, and establishment of a framework for evaluating demand response performance under "the Act on the Rationalizing Energy Use and Shifting to Non-fossil Energy".

2) Making renewable energy a major power source

To spread the usage of renewable energy, which is important as decarbonized electricity, while mitigating citizens' burdens and seeking coexistence with local communities, and being based on the key prerequisites of S+3Es (Safety, Energy security, Economic efficiency, and

³ Source: Act on Rationalizing Energy Use regular report (2021 report). Estimation provided by aggregating the energy used by all enterprises who, among others, declared themselves to be involved in any of the five key operations as their major business.

Environment), efforts will be made to maximize the deployment of renewable energy under the principle of giving it top priority as a major power source. Relevant ministries, agencies, and institutions will work closely to ensure the target level of 36-38% for renewable energy in the power generation mix by fiscal year 2030 is met.

To that end, as an immediate step, and in order to maximize the deployment of solar photovoltaic (PV) power generation to suitable locations, relevant ministries, agencies, and institutions will join forces to install more solar PV panels in places such as public facilities, residences, factories, warehouses, airports, and railways, as well as exploiting, for example, the provisions of the Act on Promotion of Global Warming Countermeasures⁴, in order to facilitate local-led initiatives for introducing renewable energy. Additionally, best inspection and maintenance practices for sustaining output will be shared.

As for feed in tariff (FIT) and feed in premium (FIP) programs, power generation costs can be reduced by further leveraging bidding systems and extending the introduction of the FIP programs. At the same time, models for solar PV deployment based on long-term contracts with consumers outside the FIT/FIP programs can be extended.

In order to stabilize the output from renewables power generation, power supplies based on actual supply-demand situations will be facilitated by installing batteries together with generators and facilitating the FIP program.

For a wider introduction of offshore wind power generation, a new public bidding process was started at the end of 2022, with revised rules for tendering offshore wind projects, such as giving additional incentives by favoring accelerated starting of commercial operation plans. A Japan-style centralized approach will also be established to accelerate formulation of projects based on developing local understanding and support. Furthermore, systemic approaches for extending Japan's exclusive economic zone will be studied. Additionally, further introduction of onshore wind, with the proviso that the facilities can coexist with local communities, will be facilitated through initiatives for streamlining relevant regulations and frameworks.

As medium- to long-term actions, development of power grids that can respond to fluctuating output, vital for wider introduction of renewable energy, will be accelerated. As for specific measures for power grid development, country-wide grid networks and submarine direct current (DC) transmission systems will be developed, based on the Master Plan for national power grid development with cost-benefit analysis, while seeking local communities' support and studying how infrastructures, such as road and rail networks, can be utilized. The development of inter-regional transmission networks will be accelerated for 10 years to grow more than eight times (larger than 10 GW) compared to the last 10 years (around 1.2 GW), while submarine DC

⁴Act on Promotion of Global Warming Countermeasures (Act No. 117 of 1998)

transmission from Hokkaido will be developed targeting FY2030. Furthermore, a mechanism for smoothly raising funds needed for these grid projects will be developed.

Expanding introduction of renewable energy with output fluctuations needs decarbonized balancing power to be in place. Regarding stationary batteries, we will formulate the prospects of introducing stationary batteries in 2030, and attract investment from private companies. To reduce the costs of stationary batteries and make these commercial quickly, we will promote support for their introduction, at the same time, establish a market which distributed energy resource can enter, including batteries for homes, and develop rules that can easily connect batteries to systems.

Maintenance and strengthening of pumped hydro power stations will be promoted leveraging Long-Term Decarbonization Power Resource Auction, while an environment that can effectively and efficiently control power fluctuations will be developed by, for example, scaling the demand response mechanism with support for introducing systems to control distributed energy resources, and by promoting research, development, and introduction of methods for storing excessive power in the form of hydrogen.

Targeting the early social implementation of next-generation (perovskite) solar cells that can help wider introduction of solar PVs and raise the self-sufficiency rate of technologies, research, development, and support for introduction together with demonstration projects in collaboration with users will be accelerated, while creation of demand and mass production schemes will be facilitated.

Goals for introducing floating offshore wind will be set. To achieve these goals, technological development and large-scale demonstration projects will be implemented, while a huge and robust supply chain covering wind turbines and their components, floating foundations, and other elements of offshore wind and relevant industries will be built.

As the disposal of solar PV panels, the provisioning program for disposal expenses launched in July 2022 will be steadily managed, and there will be planned actions to adequately cope with the mass disposal expected to peak in the second half of the 2030s.

In order to enable the wider introduction of renewables that can coexist with local communities, provided that appropriate business discipline is established, the acquisition of licenses and permits required for land development projects with potential to directly affect risks of disaster, such as impact of deforestation, shall be made a condition for approval under the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities⁵. Systemic measures will be defined, including a new procedure for temporary suspension of support provided to enterprises by the FIT/FIP programs with financial

⁵Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (Act No. 108 of 2011).

contributions of citizens when relevant legal obligations and other rules are violated. Other systemic measures will be taken for sustaining the amount of power supplied by renewable energy through maintenance, management, renovation, and addition of renewable energy facilities in order to facilitate additional investment for adding capacity to existing renewable energy and ensuring their long-term operation.

For further introduction of renewable energy, with regard to geothermal, hydro, and biomass that can be expected to generate electricity stably, the business environment for them will be developed further by initiatives including the continuous review of requisite regulations and programs. Support that addresses specific requirements of different sources will be offered, such as business feasibility studies, resource surveys, technology development, and support for introducing artificial intelligence (AI) and Internet of things (IoT).

3) Utilization of nuclear power

The fundamental premise for utilizing nuclear power is that the national government and operators never forget the lessons learned from the accident at Tokyo Electric Power Company's Fukushima Dai-ichi Nuclear Power Station, continuously asking whether they are free of safety myths. The national government will lead efforts to make self-motivated safety improvements beyond satisfying regulation, reform management and organization of utilities, coexist with host communities through supporting for municipalities and continuous improvement of disaster mitigation and control methods, including construction and maintenance of evacuation routes based on unique local situations as well as deepening and extending communication with different groups of Japan's population.

On that premise, nuclear power, which is characterized as a carbon free energy source and having stable output and high autonomy, will be utilized to achieve both the stable energy supply and net-zero GHG emissions. In order to make sure to achieve the target of approximately 20-22% nuclear power of the total power generation mix in 2030 defined by the Strategic Energy Plan, giving top priority to safety, we will facilitate the restart of the nuclear reactors that have passed safety reviews by the Nuclear Regulation Authority and have gained local understanding.

Nuclear power will be utilized in line with the Strategic Energy Plan by aiming to improve nuclear safety through the development and construction of next-generation advanced reactors with built-in new safety mechanisms. On the basic premise of gaining local understanding, plans for building next-generation advanced reactors within the sites of existing nuclear power plants that have determined to be decommissioned will be materialized, taking developments in back-end such as the completion of Rokkasho Reprocessing Plant into account. Other development and construction projects will be considered based on the future situation, including the status of reactors operating in each region and how local understanding has progressed. Additionally, the business environment required for safety improvement and other initiatives will be developed,

while offering stronger support for research and development, training, and supply chain maintenance and enhancement. Steps will also be taken to promote research and development through international collaborations with partner countries, to build a resilient supply chain, and to ensure nuclear safety and security.

In order to utilize existing nuclear power plants maximally, the operation period, limited to 40 years with a possibility of extensions for 20 years in the same way as current regulations, will be approved to be additionally extended for a certain length of outage periods on the premise of the Nuclear Regulation Authority conducting rigorous safety reviews.

We will promote the development of a framework that promotes the nuclear fuel cycle, including achieving the completion of construction goals of the Rokkasho Reprocessing Plant, sharing knowledge to ensure the steady and efficient decommissioning of reactors, and securing funds; to encourage country-led understanding by citizens to realize final disposal and drastically strengthen proactive work for local municipalities, we will also promote measures to create a support system as a nation for municipalities to accept literature survey, to strengthen the system of the implementing entity, the Nuclear Waste Management Organization of Japan (NUMO), to establish a conference for discussion between the national government and the relevant municipalities, and to suggest from various levels of the government to local stakeholders.

4) Facilitating introduction of hydrogen and ammonia

Hydrogen and ammonia are expected to play important roles in various fields including power generation, transportation, and industry. These energy sources can also improve the self-sufficiency rates of energy and help managing renewable energy's fluctuating output, making them one of key energy sources for achieving net-zero GHG emissions while helping with stable energy supply as well. Hydrogen and ammonia can be co-fired with fossil fuel, so they can support the transition towards a net-zero GHG emissions by reducing CO₂ emissions from thermal power generation while ensuring stable supply of electricity. At the same time, policy measures and infrastructures will be developed strategically so that large-scale introduction of hydrogen and ammonia can positively impact Japan's economy by strengthening industries and creating jobs, among other effects.

A large-scale and resilient supply chain will be built inside and outside Japan under a national strategy in order to induce the transition to clean hydrogen and ammonia, and also by accelerating the introduction of a comprehensive program packaging regulations and support schemes, such as support for improving investment predictability while paying attention to price differences against existing fuels, and support for developing clusters that will induce larger demand and industry concentration. Also, development of technologies for co-firing and single-firing as well as measures aiming at extended introduction of hydrogen and ammonia for commercial purposes in the mobility field will be accelerated.

From the perspective of national energy security, support will also be offered for building a supply chain for producing and distributing hydrogen and ammonia inside Japan. Research and development as well as the introduction support of both production and usage of hydrogen derived from excess renewable energy sources will be accelerated so that large-scale production and distribution of green hydrogen supply chain inside Japan in particular can be realized as soon as possible with medium- to long-term perspectives in mind. When importing hydrogen and ammonia from abroad, sufficient attention must be paid to the global consensus on GHG emissions during their production. At the same time, stronger relationships with hydrogen producing and exporting countries should be built with an eye to acquiring upstream interests.

With a view to fostering sufficient social acceptance in introducing hydrogen and ammonia to the society, demonstrations and other activities at the Expo 2025 Osaka, Kansai, Japan should be promoted. Also a hydrogen safety strategy covering regulatory rationalization and optimization should be developed and a global standardization sought, by learning from examples outside Japan and ensuring safety as a primary concern.

5) Establish electricity and gas markets to achieve net-zero GHG emissions

With regard to electricity system reforms, while there have been achievements such as consumers given more choices and formulation of cross-regional power supply systems, there are some challenges left in terms of program designs. One example is supply-shortages caused by suspensions and shutdowns of thermal power stations, delays in restarting nuclear power stations, and various other reasons. Another example is stronger discipline within electricity retail business for protecting consumers.

Therefore, to secure a stable supply capacity, we will steadily run a capacity market, to be launched in FY2024, as well as support the realization of a stable supply through Reserve Power Plants with a view to utilizing the inactive power plants in emergencies, and through Long-term Decarbonized Power Resource Auction; we will also support systematic investment in decarbonized electric power.

Decarbonized balancing power will be developed by fade-out of inefficient coal-fired power plants and switching to cleaner natural gas. There will also be other approaches such as improving power generation system efficiency, co-firing and single-fuel firing of hydrogen and ammonia, maintaining and enhancing pumped hydro, facilitating introduction of batteries, and developing carbon dioxide capture and storage (CCS) and Carbon Recycling technologies. Also, countrywide grid networks and submarine DC transmission systems will be developed, based on the Master Plan and with cost-benefit analysis, while seeking local communities' support and studying how infrastructures, such as road and rail networks, can be utilized. The development of inter-regional transmission networks will be accelerated for 10 years to grow them more than eight times compared to the last 10 years, while submarine DC transmission from Hokkaido will be developed

targeting FY2030. Furthermore, a mechanism for smoothly raising funds needed for these grid projects will be developed. Remote islands and other locations that have constraints on power sources and grid scales will be subject to necessary initiatives taking specific local requirements into account.

In order to ensure procurement of fuel, enhanced government involvement in fuel procurement and other approaches will be sought, such as building a framework to enable reviews of procurement business structures and fuel reallocations, as well as a 'strategic buffer liquefied natural gas (LNG)' mechanism to secure surplus LNG for emergency use in normal times.

Risks of city gas supply shortages will be mitigated through city gas supply-demand management, such as capping city gas usage using financial incentives and other measures, exploiting alternative energy and other potential sources, and supply-demand controls as last resorts as mandated by the revised Gas Business Act.⁶

For consumer protection, steps will be taken to improve electricity retailers' self-discipline through operation monitoring and other measures. At the same time, in order to energize competition between electricity retailers, measures will be taken aimed at strengthening access to sustainable and consistent power sources. Actions required to ensure the neutrality and transparency of power transmission business will also be taken.

6) Enhancing government involvement, including resource diplomacy to ensure access to natural resources

Russia's invasion of Ukraine has further decreased the global LNG supply capacity. The world's resource and energy situation seems even more complex and uncertain. Under these circumstances, the government of Japan must be at the forefront of diplomatic efforts to ensure access to natural resources so that fossil fuels, mineral resources, and other material can be continuously supplied, since the country depends on imports for the majority of the resources it needs.

For the purpose of ensuring stable supplies of oil, natural gas, and metal resources, in order to support the acquisition and procurement of upstream and middle-stream interests outside Japan where private businesses are involved in development and production activities, initiatives will be facilitated to engage in active resource diplomacy and provide stronger government support for acquiring LNG through government arms such as the Japan Organization for Metals and Energy Security (JOGMEC) and the Japan Bank for International Cooperation (JBIC).

In addition, in light of the increasingly uncertain LNG market trends, and given the nature of LNG, which is difficult to reserve for the long term, all possible policy measures will be mobilized

⁶Gas Business Act (Act No. 51 of 1954).

to ensure stable supplies, including the establishment of strategic buffer LNG by leveraging the private sector's procurement capabilities.

Interests in Sakhalin 1 and 2, Arctic LNG 2, and other international projects will be preserved for the time being, as they are important for energy security. The public and private sectors will continue to do their utmost to ensure stable supplies while working together with international society including the G7 countries.

In order to realize an energy security framework encompassing all of Asia, Japan will invest in upstream development in partnership with Asian countries and build a mutual cooperation system for acquiring LNG in times of emergency and supply shortages. Also, Japan will facilitate the practical transition towards stabilized energy supply and net-zero GHG emission in all of Asia through close communication with resource producing countries to increase their LNG production and other approaches.

In terms of securing indigenous resource that can be supplied without disruption and are not prone to geopolitical risks, support for technological and other development projects in the field of resource exploration in Japan, especially for methane hydrate, as well as submarine hydrothermal deposit, will continue to be facilitated so that positive outcomes can be gained as soon as possible.

7) Battery industry

For establishing a domestic annual manufacturing base of 150 GWh of batteries and materials by 2030, support will be offered for investments in plants manufacturing batteries together with their material and components, and to programs that will establish and enhance advanced manufacturing technologies using digital transformation (DX) and GX. These approaches and introduction of a mechanism to visualize production CO2 emissions will drive the decarbonization of battery production and strengthen Japan's competitiveness in this field. Also, support will be given to efforts aimed at winning a certain share in next-generation battery markets, for example, by accelerating all-solid-state battery research and development with the goal of making the product available around 2030.

8) Resource circulation

To establish Growth-Oriented, Resource-Autonomous Circular Economy, a mechanism to accelerate resource circulation by collaboration between manufactures and recyclers, among other actors and supporting medium- to long-term creation of a resilient resource circulation market will be introduced. Resource circulation throughout the entire life cycles can be accelerated by promoting circularity-friendly designs, supporting introduction of facilities that contributes to resource circularity such as plastics, metals, and sustainable aviation fuel (SAF) etc., measuring

circularity and CO2 emissions by leveraging information distribution platforms based on digital technologies and advocating disclosure, among other initiatives.

9) GX in transport sector

a. Next-generation vehicle

The ambitious FY2030 target for fuel and power efficiency, based on the Top Runner program introduced by the Act on Rationalizing Energy Use and Shifting to Non-fossil Energy, and stronger enforcement of those new rules will be the tool for facilitating the development of electrified vehicles and improving their performance as well as for supporting their introduction and also assisting the roll-out of recharging stations and creating methods of charging from vehicles. As medium- to long-term plans in line with the non-fossil energy switching target will be made mandatory for transportation businesses and shippers under the revised Act on Rationalizing Energy Use, businesses that have set ambitious goals for introducing fuel cell vehicles (FCVs), battery electric vehicles (BEVs), or any other relevant equipment will be eligible for focused financial support when purchasing them or on some other occasions involving such equipment.

b. Next-generation aircraft

Efforts will be made with a target date of the 2030s to develop demonstration aircraft, develop and demonstrate SAF production methods, introduce fuel-efficient aircraft, and improve flight operation, among other activities. Japan will continue to lead efforts to establish international rules and discussions on specific measures including a framework for mandatory CO₂ reduction in line with the 2050 net-zero emissions target agreed by United Nations organizations, and will promote SAF utilization as well as create demand inside and outside Japan for aircraft embedded with new technologies by developing basic policy for promotion of decarbonization in aviation sector in line with the revised Civil Aeronautics Act.⁷ and so on.

c. Zero-emission ship

In order to achieve net-zero GHG emissions for international shipping by 2050, clear the goals of the Plan for Global Warming Countermeasures, and other relevant purposes, requisite support programs will be introduced to spread the use of zero-emissions ships, and so on, in domestic and international shipping. Japan will lead international rule-making and other initiatives for achieving net-zero GHG emissions using both economic and technical measures and facilitate wider use of zero-emission ships and so on that can make maritime industries more competitive.

d. Railway

Introduction of renewable energy by, for example, utilizing railway assets will be facilitated together with initiatives to promote railway transportation. At the same time, introduction of

⁷Civil Aeronautics Act (Act No. 231 of 1952).

energy efficient and CO₂-saving railway vehicles, and fuel cell railway vehicles will be facilitated, as well as demonstrations of the integrated hydrogen stations that will become hydrogen supply points.

e. Logistics and human transportation

In order to shift demand structures towards using less energy and more non-fossil fuel in freight and passenger transportation, actions such as promoting wider use of trucks, buses, or taxis, and other types of next-generation vehicles in business and facilitation of green logistics by, for example, supporting introduction of comprehensive renewable energy-related facilities, modal shift towards railway and vessels, and implementation of drone delivery, and encouraging the use of public transport through mobility-as-a-service (MaaS) implementation will be planned.

10) Digital investment aimed at decarbonization

Support aimed at facilitating the development of and investment in energy efficient semiconductors, photonics electronics convergence technologies, or any other approaches that are indispensable for digitalization, electrification, and certain other purposes will be considered.

Data centers are the platforms for processing information. Going forward, extension of the coverage of benchmarking frameworks under the Act on Rationalizing Energy Use and other measures will be used to further develop an energy efficient information processing environment.

As for semiconductors, investment for growth targeting GX will be realized by making businesses commit to continuous production activities and social implementation of their research outcomes.

11) Houses and buildings

Compliance with energy efficiency standards will be made mandatory by FY2025. To ensure the energy efficiency performance of houses and buildings newly constructed after FY2030 to meet the level of the ZEH (Net Zero Energy House) and ZEB(Net Zero Energy Building) standard as well as improve the performance levels of stock of all of the existing houses and buildings, the government will strengthen support for building new houses and buildings with high energy efficiency performance and retrofitting existing houses and buildings to improve energy efficiency. At the same time, we aim to update the building material Top Runner program based on "the Act on the Rationalizing Energy Use and Shifting to Non-fossil Energy" earlier than FY2030 and extend its coverage. In addition, we promote the usage of wooden materials by rationalizing building standards and support.

12) Infrastructure

Introduction of renewable energy by leveraging airports, roads, dams, sewers, and other components of infrastructure, a thorough reduction of energy consumption, and development of

cities and communities that will help decarbonization, among other projects, will be facilitated. To decarbonize industries and ports while enhancing their competitiveness, development of Carbon Neutral Ports (CNPs) and decarbonization of their construction processes will be promoted.

13) Carbon Recycling and CCS

a. Carbon Recycling fuel

Carbon Recycling fuel can be used for existing infrastructure, facilities, and internal combustion engines. This type of fuel can keep decarbonization investment costs low, while having a positive effect for stable supply of energy by ensuring diversity in energy sources other than electricity.

As for methanation, discussions on how to establish domestic and international rules for regulating CO₂ emissions when combusted will be coordinated. Together with fossil fuel-free liquefied petroleum gas, the Green Innovation Fund will be exploited to support and promote research and development projects, while exploring different ways to support introduction of these technologies while reducing their costs.

In the field of SAF and e-fuel, Public-Private Council meetings will focus on how to solve technological, economic, and systemic challenges. Projects for developing technologies to make various production methods available will be facilitated, while support will be offered to invest in production facilities aimed at demonstrating and implementing these fuels.

b. Bio-manufacturing

To create initial demand, measures such as increasing the percentage of bio-based products in public procurement or involving agriculture and other businesses will be taken to build up the market.

Usage of bio-based products can be incentivized by creating certification and credit programs for CO₂ and other raw materials to justify their costs added to the prices as well as establishing schemes for reuse and collection, among other approaches.

c. CO₂ reduction concrete

In order to develop the market, support for projects such as building production facilities for CO₂ reduction concrete and products using calcium carbonate will be offered, while formulating measures for stimulating demand.

Methods to evaluate CO₂ levels inside concrete during production will be established. Technologies ready for application in construction sites throughout Japan will be tested in national government-run projects and elsewhere to have their results incorporated into technological standards and other rules so they can be fully implemented in construction work.

d. CCS

To develop a business environment for starting CCS by 2030, development and operation of advanced projects that can be models for other projects will be supported. Business risks and safety issues for geologic CO₂ storage will be fully addressed, and current discussions on developing relevant legal frameworks will be accelerated to have systemic measures in place.

14) Food, agriculture, forestry, and fisheries

The Strategy for Sustainable Food Systems, MIDORI⁸, MIDORI Act⁹ and other frameworks promote investments on decarbonization of agriculture, forestry, and fisheries, enhancement of carbon sinks, and developing innovations utilizing forest-sourced material, which will contribute to realizing both decarbonization and economic growth.

3. Realizing and implementing Pro-Growth Carbon Pricing Concept

(1) Basic concept

Investment in different fields is needed to fulfill Japan's global commitments while enhancing its industrial competitiveness and growing its economy at the same time. According to one estimate, this will require more than 150 trillion yen for 10 years. To bring in this enormous GX investment through public-private partnerships, a Pro-Growth Carbon Pricing Concept will be swiftly realized and implemented. The following three methods will be applied:

- Bold initial investment leveraging instruments such as GX Economy Transition Bonds (including Government support integrated with regulation for GX investment),
- Incentives for upfront GX investment through carbon pricing, and
- Leverage new financial instruments.

In order to realize GX investment and other enormous decarbonization investment, better predictability for private businesses is needed. To that end, the government must show its long-term commitment spanning multiple years, and also publish outlooks for regulatory and structural measures. Accordingly, the government will introduce a comprehensive strategy aimed at strengthening industrial competitiveness and economic growth at the same time. In key areas where GX investment can be expected, the government will announce its targets for bringing in new products in each area and defining new regulations and frameworks, to be presented as a combined roadmap. These undertakings will have their progress assessed, analyzed, and reviewed

⁸ Launched by Ministry of Agriculture, Forestry and Fisheries, May 12th, 2021.

⁹ Law Concerning Promotion of Low Environment Impact Business Activities to Establish a Food System in Harmony with the Environment(Law No.37 of 2022).

as required, inviting industrial and expert insights as well. Additionally, in order to drive the realization and implementation of Pro-Growth Carbon Pricing Concept and other GX initiatives, actions needed to foster understanding between citizens and industries will be taken.

Furthermore, to accelerate the establishment of Pro-Growth Carbon Pricing Concept and its implementation, bills addressing legal requirements will be submitted to the 211th session of the Diet. For some of the relevant schemes that will be introduced in the future, detailed rules required for their implementation will be established within two years, after requisite discussions and considerations.

(2) Support for bold initial investment leveraging GX Economy Transition Bonds (Government support integrated with regulation for GX investment)

1) Basic concept

In order to invest more than ¥150 trillion in GX for 10 years through public-private partnerships, the government must offer long-term multi-year support programs to provide predictability for private businesses. To this end, new GX Economy Transition Bonds program will be launched. These bonds can be leveraged to offer bold support for advance investment amounting to ¥20 trillion. This program for promoting investment will be implemented together with regulatory and structural initiatives to have a positive impact on the creation of new markets and demands.

First, based on the current investment and business projections, support at a level of ¥20 trillion will be offered by the government for investment in switching to renewables, nuclear, and other non-fossil energy, structural transformation and fundamental promotion of energy efficiency improvement from both demand and supply sides in industries including iron and steel, chemical, and other manufacturing sectors, and research and development on resource-recycling, carbon storage, or other technologies, and other relevant projects, regardless of enterprises' scale.

This support will be offered in combination with appropriate subsidies, investment, or loan guarantees, based on individual project's level of realization, business risks, and even their market and product characteristics, in line with different instruments available for financing enterprises.

It should be noted that while the government must first show its willingness to strategically design this support portfolio, this portfolio must also be reviewed flexibly based on impact surveys and assessment of support programs.

Therefore, when setting priorities for different support areas, deciding who can get support, or making other choices, technology and market projections, program impacts, and other elements will be considered. Checks will also be in place to assess the progress of supported programs and to assess them, in order to determine, for example, if those programs still need to be supported. Projects eligible for support will be reviewed flexibly through these provisions.

2) GX Economy Transition Bonds

The government, in order to promote long-term multi-year investment, will issue GX Economy Transition Bonds worth ¥20 trillion for 10 years, with annual caps to be decided by the Diet. The bonds will be financed by future revenues coming from the introduction of a carbon pricing mechanism.

Plans for issuing the GX Economy Transition Bonds will not be limited to offering them as financial instruments identical to existing government bonds (including Construction, Special Deficit-Financing, and Reconstruction Bonds), but will include a new approach in line with international standards. This requires solutions to difficult challenges such as a. ensuring a certain level of market liquidity, b. technical readiness in private and other sectors to accept the bonds, and c. controlling how bond revenues are spent (by following up on the expenditures, compiling reports, among other actions). An international accreditation is needed for issuing these bonds with the new approach. A body for considering these issues by members from ministries and agencies will be established at an early stage.

Revenues from the GX Economy Transition Bonds will have to be expressly spent for promoting GX investment. To this end, the fund will be managed by the Special Account for Energy Measures, together with the provisional budget set by the government as part of the GX investment under this Basic Policy. The bonds will be designed so they will be redeemed by FY2050, the target year for achieving net-zero GHG emissions.

3) Principles of government actions for promoting investment

As for the principles of government actions for promoting investment, in addition to combining these actions with regulatory and systemic methods so as to promote GX investment effectively, matching benefits with the cost burden will be considered when choosing the target areas for investment, which will be projects that are too difficult for private businesses to make their own investment decisions by themselves, and at the same time will help reinforce Japan's industrial competitiveness, grow its economy, and reduce GHG emissions at the same time. These principles are different from traditional approaches which were solely aimed at curbing energy consumption or reducing emissions.

Government support will be offered based on these principles and to projects fulfilling the following requirements.

Basic requirements

I. Candidate projects must be, due to their innovative technological approaches or by the nature of their enterprise, very difficult to make investment decisions for by private businesses alone. As a starting point, each candidate business

must fully commit to innovating corporate management, including methods for raising funds.

II. They must help bring stronger industrial competitiveness, economic growth, and emissions reductions all at once. The government will set priorities for the candidate projects based on their market size, reduction scale, necessity of domestic supplies indispensable for clearing GX goals, and other factors, all of which will be considered comprehensively. Projects will then be supported in the order of their priorities.

III. Support must be offered in combination with regulatory and structural approaches that will induce mechanisms for changing corporate investment and demand-side behaviors.

IV. The scope of support will be limited to projects that will increase investment in human and physical resources inside Japan (including investment in resource circulation, domestic-only markets, and other areas that will help value circulation within Japan's domestic economy). Capital investment that are completed outside Japan or any other projects that do not help emissions reduction inside Japan, as well as projects such as credits of which effect is limited to only help clear targets, will not be eligible for support.

In addition to the principles above, candidate projects must fulfill one of the requirements from A to C for industrial competitiveness enhancement and economic growth, and also fulfill one of the requirements from 1) to 3) for emissions reductions, and will be given priorities accordingly.

Industrial competitiveness enhancement and economic growth

- A. Growth investment that has technological or business innovativeness, and is aimed at capturing foreign demand or expanding domestic demand
- B. Growth investment with advanced technology that helps both reducing fossil feedstocks/fuels and energy as well as improving profitability (such as integration, reorganization, or mark-up)
- C. Measures to address domestic demand in the initial stage of introduction of key goods for which a nationwide market is expected (accompanied by supply-side investment)

Emissions reduction

- 1) Investment in research and development that can help future reduction inside Japan through technological innovation
- 2) Capital investment that can directly help reduction inside Japan with a highly effective reduction technology
- 3) Measures to induce initial stage demand for introducing new key products with long-lasting reduction effect and have nationwide demand

(3) Carbon pricing that will give incentives for early GX investment

1) Basic concept

Carbon pricing is a scheme for adding value to GX products and businesses by setting prices for carbon emissions. At the same time, if this scheme were introduced without considering availability of alternative technologies or impact on international competition, Japan risks hurting its economy and triggering an exodus of production facilities (carbon leakage). Therefore, this approach will not be introduced immediately and deferred until after a period for focusing on GX.

Also, announcing in advance the policy to set low initial prices and gradually raising them can attract more early-stage GX investment. A structure for giving business incentives to start investing in GX at an early stage can be created by using these carbon pricing features effectively.

These methods, combined with early-stage investment of ¥20 trillion by the government and utilization of new financial instruments, will target over ¥150 trillion of GX investment through public-private partnerships.

With regard to designing concrete carbon pricing schemes, ambitious reduction goals set by individual companies based on their different business situations and with focus on industries with large emissions will form the basis for an emissions trading system that can be introduced to strengthen industrial competitiveness and also reduce emissions efficiently and effectively. Also, for incentivizing general GX approaches not limited to industries with large emissions, GX-Surcharge will be also introduced as a way of applying the carbon pricing scheme to all carbon emissions equally.

The principle for introducing these carbon pricing schemes is that it will be synchronized with medium- to long-term reductions in total energy costs. To be specific, their introduction will be planned to align with the expected decrease in petroleum and coal tax as a result of GX evolution and the decrease in total renewable energy surcharge revenues¹⁰ after it has peaked as a result of falling renewable energy purchasing prices.

2) Next steps

a. Full-scale launch of the emissions trading system

The emissions trading system to be experimentally launched in FY2023 and steered by the GX League is a voluntary scheme based on member companies' leadership. Businesses that set their own voluntary goals will be held accountable and strongly incentivized to commit to reduction. With that expectation, setting reduction targets and clearing them will be left to their voluntary efforts.

¹⁰ Renewable Energy Power Promotion Surcharge

Even as member companies' voluntary efforts are emphasized, in order to further improve the system's fairness and effectiveness, methods to expand the system's membership, independent non-government certificates for reduction targets based on government guidelines, stronger discipline for achieving targets (including instructions, guidance, and mandatory compliance), and other measures will be considered after the emissions trading system is launched full-scale in FY2026, while its further development will be discussed in line with the system's evolution and international developments.

There is still a concern over the emissions trading system that, while it can reduce emissions efficiently and effectively by leveraging the market mechanism, the low predictability of trading prices due to market price changes may be an issue. To address this concern, the programs will be designed by taking examples from outside Japan and to increase trading pricing predictability and promote corporate investments by incorporating a gradual and medium- to long-term carbon price increase, appropriately combining lower and higher price limits, and also disclosing these price ranges in advance.

These price ranges will be set after FY2026 when the carbon trading market will be launched full-scale, and incorporate behavior-changing effects in favor of GX, trading prices in the carbon credit market due to be launched in FY2023, international carbon prices, and other factors. The price ranges can also be reviewed to a certain level to increase their predictability, with a projected price increase over around five years and based on changing economic situations, among other considerations.

With these future developments in scope, the government and GX League member companies will collaborate to gather required data, accumulate insights and expertise, and discuss government guidelines, among other things from FY2023.

Also, with focus on emissions trading system member companies with large emissions, and based on the idea of Government support integrated with regulation for GX investment, a synchronized assistance program leveraging GX Economy Transition Bonds will be considered.

b. Gradual introduction of auctioning for power generation utility

For giving stronger incentives to reduce emissions and achieve net-zero GHG emissions, electrification coupled with decarbonized electricity will be important. Accordingly, based on examples in the EU and other countries outside Japan where auctioning are used in the power generation sector and targeting the power generation sector with renewable or any other alternative sources, an auction scheme will be gradually introduced for power generation utility (the power generation utility defined in Article 2, Paragraph (1), item (xv) of the Electricity Business Act¹¹) with large emissions.

¹¹ Electricity Business Act (Act 170 of 1964).

Specifically, the emissions quota proportional to the volume of emissions that must be acquired for the power generation business will be auctioned. This emissions quota will initially be allotted for free and gradually decreased (in other words, its charged proportion raised), based on emissions volume projection, power generation efficiency (benchmarks), and other factors and also in line with relevant information such as the company's GX transition status.

The timing to start the gradual introduction will be set at FY2033. The approach is the same as GX-Surcharge, since the auctioning auction system will also be introduced while medium- to long-term total energy costs will decrease and total revenues from renewable energy surcharges will have peaked out by then. At the same time, this program will be harmonized with the existing Sophisticated Methods Act¹² and other legal provisions to make different policy measures more effective.

c. Introduction of GX-Surcharge

For incentivizing general GX approaches not limited to industries with large emissions, GX-Surcharge^a will be introduced as a way of applying the carbon pricing scheme to all carbon emissions equally. Specifically, if this scheme were introduced without considering the availability of alternative technologies or the impact on international competition, Japan risks hurting its economy and triggering an exodus of production facilities (carbon leakage). Therefore, this approach will not be introduced immediately and deferred until FY2028 after a period of five years for focusing on GX. More early-stage GX investment by private companies can be promoted by setting a policy for fossil fuel importers and other businesses that sets low initial prices and gradually raise them, with this approach announced in advance.

Also, with regard to the scope of this scheme, considerations will be given to exemptions and other requisite measures that will be in place for a certain period of time based on classifications and other mechanisms used by similar, existing structures, while for the paid auction and GX-Surcharge under the emissions trading system, considerations will be given to introducing requisite adjustment measures such as preventing dual payment for the same carbon emissions.

Additionally, with the basic understanding that this scheme will be introduced as medium- to long-term total energy costs go down, the scheme will be designed to allow GX-Surcharge levels and other parameters to be decided based on factors such as that trading prices in the emissions trading system will ultimately be decided by the market.

d. Establish the GX Promotion Organization for implementing carbon pricing and other systems

The GX Promotion Organization will be established as an institution that manages the emissions trading system and carries out operations such as collecting contributions and GX-

¹² Act on the Promotion of Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Materials by Energy Suppliers (Act 72 of 2009).

Surcharge (including part of early stage investment support). In order to introduce a hybrid carbon pricing scheme using the emissions trading and carbon surcharge systems, the Organization will comprehensively manage coordination, control, and collection activities for both systems.

Also, with regard to the full-scale launch of the emissions trading system in FY2026, in order to smoothly operate various processes in this scheme and for stable operation of this system in a way which achieves both medium- to long-term industrial competitiveness and efficient and effective emissions reduction, the Organization will carry out activities such as the management of emissions reduction and trading results, paid auctioning ~~auctions~~, and monitoring operations aimed at stabilizing trading prices.

(4) Leverage new financial instruments

1) Basic concept

In order to invest over ¥150 trillion in GX for 10 years through public-private partnerships for achieving net-zero GHG emissions by 2050, active financial services from private financial institutions and corporate investors are needed, together with government support in the form of GX Economy Transition Bonds.

To achieve the target of net-zero GHG emissions by 2050, funds provided by investors and financial institutions to transition initiatives undertaken by hard-to-abate industries are absolutely necessary, along with expanding green finance. As such, initiatives to build international support for transitional finance will be strengthened.

At the same time, in some GX areas there exist cases that require extensive funding for a long period of time, but private financial institutions cannot take these risks by themselves because of high levels of uncertainties in technologies and demand. Therefore it is important to establish financing approaches combining public and private funds, or blended finance.

Additionally, Japan has the largest number of entities supporting the Task Force on Climate-related Financial Disclosures (TCFD), and the industrial and financial sectors have engaged in dialogues through active corporate information disclosures. From now on, based on discussions at the International Sustainability Standards Board (ISSB) and other bodies, an enabling environment will be developed to promote sustainable finance as a whole, including disclosures of climate-related information.

2) Next steps

a. Calling private sector fund into GX areas

(Green Finance)

The government will create the enabling environment for the development of the green finance market in Japan by, for example, enhancing the list of green projects to further clarify the criteria for green eligibility in the Green Bond Guidelines, and establishing a new platform targeting issuers to increase green bond issuance with the cooperation of market participants. (Transition Finance)

For enhancing initiatives to build international support for transition finance, actions must be taken to ensure its eligibility and credibility. Transition finance also needs to extend its financing outreach by improving sector-specific technology roadmaps and taking other steps to attract investors to relevant projects.

Especially, signatories of coalitions under the Glasgow Financial Alliance for Net Zero (GFANZ) are required to achieve net-zero emissions by 2050, including their financed emissions. They might hesitate to finance hard-to-abate industries that will increase their own financed emissions depending on disclosure methods. As such, a framework for having transition finance positively evaluated will be discussed, taking into account global calculation and disclosure methods. Relevant ministries and the industry will jointly continue to consider competition policy measures that will encourage collaboration among multiple companies.

- b. Develop and establish a financial method combining public and private funds (blended finance)

Appropriate actions for different risks are important for promoting GX investment by businesses and fund-raising through private finance. In addition to promote private investment by announcing medium- to long-term government policy road maps to improve predictability of the future, it is important to skillfully combine public and private funds (i.e., blended finance) to accelerate the overall social implementation of decarbonizing technologies.

In the United States and Europe, public and private entities are developing measures to facilitate GX investment by offering financial assistance such as subsidies, funding, or loan guarantees depending on the risks of each project to overcome uncertainties never experienced before. Japan also needs to understand GX investment as a new asset class to develop and set up new financing methods, with an eye to boosting its own industry's global competitiveness.

As of today, there are not enough people with expertise in GX-related technologies, finance, climate change policies, etc. To address this issue, a system will be built in which members of public and private entities can work together sharing their insight and expertise to develop and implement the new financing methods.

Specifically, the GX Promotion Organization, a public institution formed on the basis of public interest, fairness, and neutrality, will consider and implement risk mitigation measures

(such as loan guarantees) using financial methods for GX technologies' social implementation stages, by, as required, gathering project stakeholders (including businesses, public and private financial institutions, national research and development agencies that support technological developments, institutional investors, lawyers, accountants, and other relevant experts), interviewing different parties to understand and analyze the risks they can accept, in order to identify the risks private banks or any other players cannot take (including periods longer than standard investments and loans, as well as the large scale of funds required). During the process, the GX Promotion Organization will work together with private financial institutions as well as Japan Finance Corporation, Development Bank of Japan, Japan Investment Corporation, Japan Green Investment Corp. for Carbon Neutrality, and other public financial institutions to expand private investment.

c. Facilitate sustainable finance

Following the revision of the Tokyo Stock Exchange Corporate Governance Code in June 2021, companies listed on the Prime Market are required to make disclosures based on TCFD recommendations, along with other information. Such efforts have resulted in Japan having the largest number of TCFD-supporters. However, there is room for improvement in the contents of disclosure, and it is important to enhance disclosures based on each company's business strategy. To this end, assistance for further disclosures will be offered through human resource development programs provided by the TCFD Consortium, among other support.

Disclosure of non-financial information, especially those related to sustainability including decarbonization, has been gaining attention and becoming more important than ever in parallel with the progress of the ISSB's discussion internationally. A new section is to be created for disclosure of sustainability-related information in the Annual Securities Reports, and necessary procedures, including the revision of the Cabinet Office Ordinance, will be taken accordingly.

Additionally, initiatives to promote sustainable finance, such as those listed below, will be taken to further mobilize capital to GX areas.

(Leverage market functionalities to expand ESG markets)

To ensure the objectivity of green finance and transition finance, among other targets, adherence to the Code of Conduct for ESG Evaluation and Data Providers, created in December 2022, will be promoted, and guidelines for overseeing ESG investment trusts that have green-washing concerns will be developed by the end of FY2022.

(Leverage financial institutions' functionalities)

In addition to the Supervisory Guidance on Climate-Related Risk Management and Client Engagement released in July 2022, other guidelines for facilitating dialogues between financial institutions and businesses will be developed by June 2023, with the purpose of advocating support for decarbonization by financial institutions to businesses, with reference to how to design engagement between financial institutions and businesses aimed at giving financial assistance for transition.

(Multi-area initiatives)

With regard to impact investments for solving social problems, ways to fund innovations for decarbonization and other approaches will be considered, with the aim of formulating basic guidelines for impact investing by June 2023.

4. Strategy for global actions

(1) Basic concept

Combating climate change is a common challenge we face, and we must work together and take actions to achieve net-zero GHG emissions. Today, each country is taking steps toward decarbonization in accordance with national circumstances. By leading the formation of a clean market and collaborations for innovation, Japan will contribute to the realization of global GX.

Considering the fact that Asia accounts for more than half of global emissions, Japan will also contribute to GX in the region. We will make efforts to materialize the Asia Zero Emission Community (AZEC) initiative, as a regional platform, to provide various supports, coordinate policies, pushing further energy transition with Asian countries, and promote efforts for decarbonization in various and practical ways while also ensuring energy security.

Japan will contribute to global GX by taking initiatives both globally and regionally.

(2) Next steps

In order to contribute to global decarbonization, efforts will be advanced to form a global clean market by leveraging technologies of Japanese businesses, and actions required will be taken, such as providing financial support, to finance the growing energy investment in Asia.

1)Global

Creation of markets where the values of green steel, green plastics, energy efficient products, and other goods are appropriately evaluated will be promoted by establishing global evaluation methods for the diffusion of green products.

In addition, the development of a new way to evaluate the contribution of companies to the reduction of GHG emissions throughout the society (including “avoided emissions”) will be

promoted so that such evaluation will be recognized as value and become an additional perspective to mobilize financial resources.

2)Asia

In Asia, we will back up enormous future energy investment by accelerating the formulation of clean energy projects, including renewable sources. As part of this effort, work is underway within the Asia Energy Transition Initiative (AETI) framework to support the formulation of a roadmap towards achieving net-zero GHG emissions, back up financing activities for transition technologies and projects based on the Asia Transition Finance Guidelines and other relevant schemes, support programs to develop decarbonization technology experts and other talents, for example. These undertakings will be in line with each Asian country's unique requirements and take sustainable economic growth, national and regional energy security, and measures against climate change into consideration.

We will also utilize JBIC, Nippon Export and Investment Insurance, JOGMEC, Japan International Cooperation Agency (JICA), and other government arms to offer public financing assistance. Furthermore, we will promote further utilization of the Joint Crediting Mechanism (JCM) by expanding the number of JCM partner countries, enhancing its implementation structure, and also envision implementing large-scale projects including CCS. In addition, we will promote ASEAN-Japan Climate Change Action Agenda 2.0 initiative.

5. Promoting GX for entire society

(1) Just Transition

1)Basic concept

Just Transition is a concept proposed by the International Trade Union Confederation (ITUC) at the COP15 meeting in 2009. From this Just Transition perspective, shifting the workforce appropriately to emerging industries becomes important when promoting GX in Japan. Supporting smooth workforce transition from fossil fuel industries to low-carbon industries can ensure the livelihoods and jobs for citizens, and also help Japan's economic growth. Therefore, the government will offer required support to talent development programs in universities and other initiatives, based on each industry's unique situation.

2)Next steps

The original investment policy package of ¥400 billion over three years has been extended to ¥1 trillion and five years, by taking in, among other developments, the comprehensive economic measures decided by the Cabinet in October 2022 to overcome inflation and rebuild the economy. Just Transition will be backed up by acquisition of new skills and smooth transition of the labor market to green and other emerging industries using measures such as offering support for smooth transition of the labor market to emerging and other industries as well as support for workers upgrading their careers by changing jobs or employers, among other initiatives.

(2) Promoting demand-side GX

1)GX amongst communities and daily life

Decarbonization in communities and daily life will be achieved through collaboration with financial institutions, businesses, and other players within each community, and leveraging creativity of each municipality according to its characteristics to transform social and industrial structures and generate widespread demand for products contributing decarbonization.

To this end, based on the Plan for Global Warming Countermeasures and targeting net-zero GHG emissions by 2050, the government is to designate at least 100 Decarbonization Leading Areas by FY2025 and also leverage support programs offered by ministries and agencies to encourage social implementation of GX. Also, in order to implement priority measures for regional decarbonization and accelerate the progress, municipalities will leverage financial assistance from the government to accelerate business- and resident-driven initiatives and to take the lead in implementing priority measures that form the basis of regional decarbonization (e.g., introduce renewable energy that can benefit and coexist with local communities, ZEB into public facilities, and electrified vehicles into public fleets) in all administrative work and projects, including municipality-owned corporations. The National Movement for New and Prosperous Lifestyles toward Decarbonization and other initiatives will be used to induce behavioral changes and life-style transformation for citizens and consumers, stimulating demand.

2) Visualizing carbon footprints and other actions to generate new demand

Generating demand to develop the market for green products and promote innovation holds the key to a successful GX. With regard to low-carbon products already available in the market to a certain degree, their procurement by public and private entities will be expanded by further leveraging carbon footprints, environmental labels, and other tools, as well as reviewing and discussing criteria, calculation rules, other requirements for products that should be procured under the Act on Promoting Green Procurement¹³ and other legal provisions. Also, to generate demand for innovative technologies and products, appropriate actions for developing demand

¹³ Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Act No. 100 of 2000).

based on various characteristics including purchasers and the level of innovativeness of technologies and products, e.g., incentivizing innovative products and technologies as well as their procurement, will be studied.

Furthermore, in order to reduce emissions from the entire supply chain together with each player's own emissions and indirect emissions e.g., buying electricity, as well as developing relevant products' and industries' competitiveness, a guideline for carbon footprint calculations will be developed by around FY2022 to drive public and private procurement of green products as defined by the results of calculations based on these guidelines.

(3) Driving GX in small and medium-sized enterprises

1) Basic concept

Supply chain is one of Japanese industries' strength in industrial competitiveness. Achieving net-zero GHG emissions while maintaining and enhancing competitiveness will not be possible without GX covering the entire supply chain including small and middle-sized businesses (SMEs) as well as large corporations.

As SMEs employ almost 70% of Japan's workforce and generate some 20% of the country's total GHG emissions, they will play a very important role in achieving net-zero GHG emissions by 2050.

Therefore, SMEs will be never left behind when driving initiatives aimed at GX for the entire society. To be specific, different supports for different levels of initiatives -from learning actions required for net-zero GHG emissions to understanding (measuring) own emissions to reducing those emissions - and promoting supply chain decarbonization will be important for SME decarbonization. In addition, talent development and a stronger support framework for organizations supporting SME initiatives, more support for supply chain collaboration initiatives and message dissemination, green product market generation, and more actions will be promoted.

2) Next steps

The launching of an online inquiry portal, creation of documents showing examples of decarbonization in business management, and other actions by the Organization for Small & Medium Enterprises and Regional Innovation, Japan will be leveraged to promote support for learning about net-zero GHG emissions actions, visualizing (measuring) emissions volumes and other data to enhance programs for evaluating an energy efficiency improvement and providing SMEs with easy ways to calculate their emissions volumes by updating national electronic reporting systems and other tools, and reducing emissions and others by assisting capital expenditures that will improve energy efficiency and further reduce CO₂. Also, efforts to develop products helping green transition and promote them in green areas will be supported.

Also, in order to build a structure to provide push-type assistance from SME support organizations and local financial institutions to SME initiatives, talent development for supporting organizations and other players will be supported by, e.g., organizing training courses for the supporting organizations and establishing a certification program for experts supporting decarbonization. Additionally, support organizations will be strengthened through measures such as providing information on net-zero GHG emissions-related actions to them and building a support structure covering entire communities.

Furthermore, the decarbonization of the entire supply chain including SMEs will be promoted by having added provisions for initiatives relevant to subcontractor decarbonization to the promotion criteria of the Act on the Promotion of Subcontracting Small and Medium-sized Enterprises¹⁴ and further expansion of the “Declaration of Partnership Building”.

Additionally, taking into account the goals for the Startup Development Five-year Plan created in November 2022, support for research, development, and social implementation programs by startup businesses in GX areas will be fundamentally strengthened.

6. Evaluating and reviewing the status of progress in the implementation of new policy initiatives for realizing GX

Having established the insurance of stable energy supply as a primary prerequisite, as Pro-Growth Carbon Pricing Concept and other new policy initiatives for realizing GX are implemented, the GX Implementation Council and other bodies will regularly evaluate their progress and, based on the result, effectively review them as required, taking into consideration aspects such as the progress of public and private GX investment, global development and its impact on the economy, and trends in technological development. These ideas will be explicitly stated in the bill for smooth transition to a decarbonized growth-oriented economic structure submitted to the 211th session of the Diet, then steadily implemented.

¹⁴Act on the Promotion of Subcontracting Small and Medium-sized Enterprises (Act No. 145 of 1970).