

Recommendations for Revising the Strategic Energy Plan

A Call for Establishing an Energy Policy to Support Economic Growth and the Lives of People

- Outline -

October 15, 2024

KEIDANREN (Japan Business Federation)

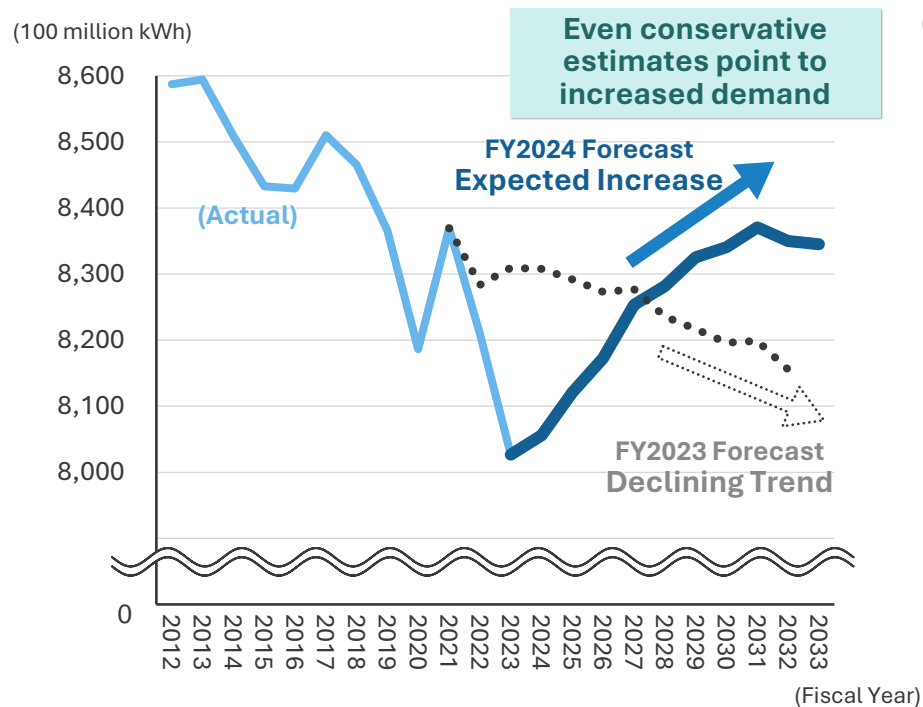
Introduction

- **Japan is facing its most severe energy crisis since the oil shocks.** Energy policy must address more challenges than ever before, including achieving carbon neutrality (CN), responding to global instability, and meeting increasing power demand from digital transformation (DX) and green transformation (GX).
 - **To achieve CN by 2050, it is essential to chart a course for expanding decarbonized power sources such as renewables and nuclear energy.** Without this, concerns about future electricity supply cannot be dispelled, potentially constraining domestic capital investment.
 - **It is crucial to strategically and appropriately combine energy policy, climate policy, and industrial policy to enhance Japan's global competitiveness and drive sustainable growth.**
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- In May 2022, Keidanren published its proposal “Towards Green Transformation (GX)” (hereafter, “GX Proposal”).
 - **Under the Kishida administration (2021-2024), the GX Implementation Council was established to lead GX policy efforts. Key initiatives have made steady progress, including clarifying the direction for maximizing the use of decarbonized power sources, issuing GX economic transition bonds, introducing pro-growth carbon pricing, and advancing the AZEC initiative. The focus has now shifted to implementation. Going forward, it is necessary to ensure policy continuity while further detailing and expanding these efforts.**
 - **The government plans to outline its energy and GX policies for 2040 within FY2024, including the GX 2040 Vision, the next Strategic Energy Plan, the next NDC, and the next Plan for Global Warming Countermeasures.**
 - In response to the government's deliberations, **Keidanren has compiled this proposal to outline the direction of energy policy that supports our country's economic growth and improves the quality of life for its people.** These recommendations reflect the results of the “Survey on Power Issues,” with responses from over 160 member companies.

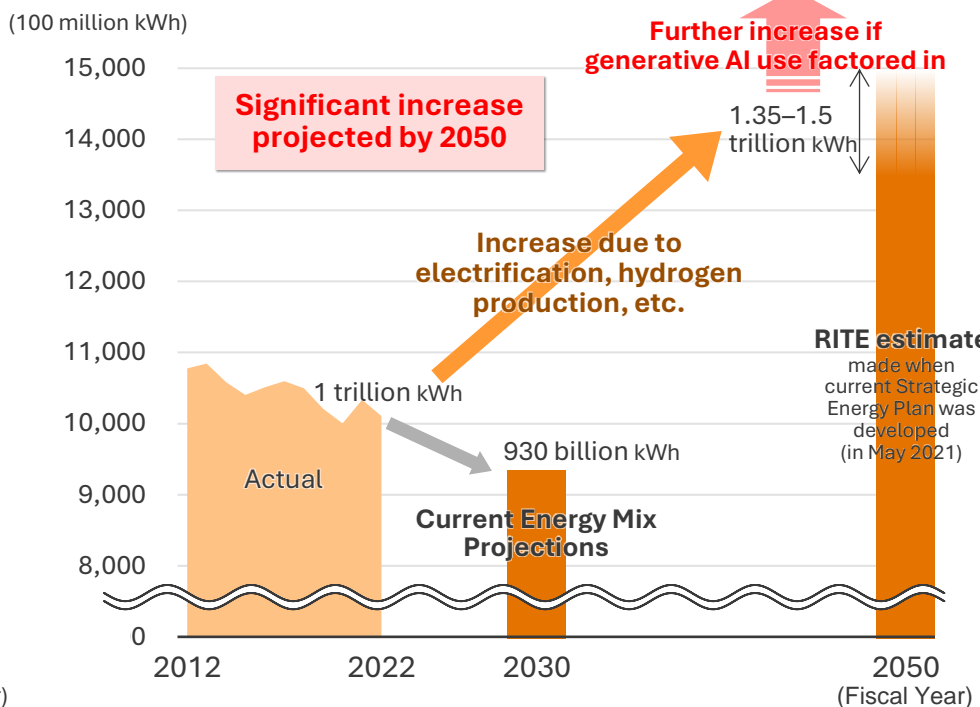
(1) Changes since the Current Strategic Energy Plan

- With increasing global instability, the importance of **energy security** has risen, and **countries are deploying industrial policies** under the banner of carbon neutrality (CN).
- Additionally, **with the advancement of DX and GX, future power demand forecasts have shifted towards significant expansion. Securing affordable and stable clean energy is essential** to meet growing demand. Without a clear outlook, **it becomes difficult to make domestic investment decisions** for energy-intensive facilities, **raising concerns about widespread deindustrialization**. In Germany, rising electricity prices have led to an increasing number of companies considering relocating production bases overseas.
- **The next Strategic Energy Plan needs to set forth policy directions considering these changing circumstances.** It is crucial to respond with a sense of crisis, recognizing that energy policy has the potential to make a difference to Japan's future.

Japan's Power Demand Forecast



Japan's Power Generation Forecast



Source: Prepared by Keidanren Secretariat based on "Nationwide and Supply Area Demand Forecasts" (FY2023, FY2024) by the OCCTO.

Source: Prepared by Keidanren Secretariat based on Comprehensive Energy Statistics, 6th Strategic Energy Plan, and materials submitted by RITE to the 43rd Basic Policy Subcommittee of the Advisory Committee for Natural Resources and Energy (May 2021).

Power Consumption Forecast for the Next 5–15 Years

- For power consumption forecast for the next 5 to 15 years, half (49%) of companies said consumption will “increase” (“increase significantly (by 50% or more)” or “increase”).
- 15% of companies responded that consumption will “decrease” (no companies responded that it will “decrease significantly (by 50% or more)”).

Power Supply Challenges

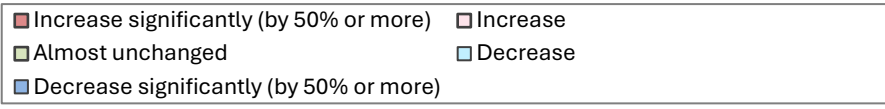
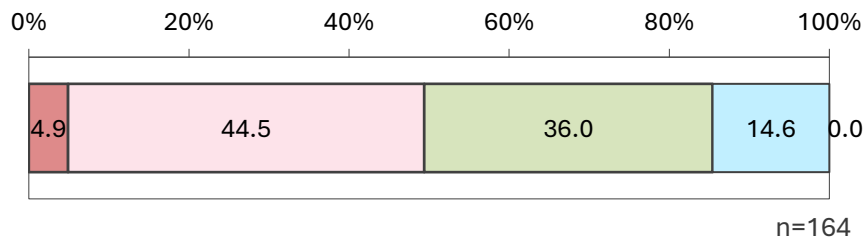
- About 90% of companies responded that they perceive challenges in Japan’s power supply

(“strongly perceive” 31%, “perceive” 48%, “somewhat perceive” 10%).

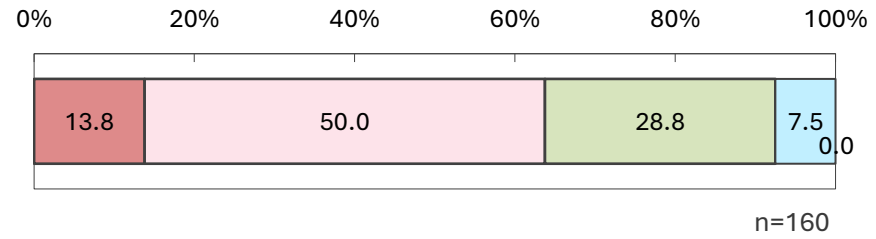
Impact of Power Costs on Domestic Business/Profits

- Currently, 64% of companies respond that the impact is “very significant/significant.”
- For the next 5 to 15 years, 71% of companies responded that the impact will be “very significant/significant,” indicating growing concerns about power costs in the future.

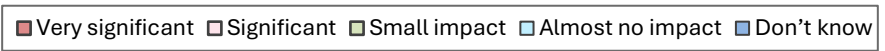
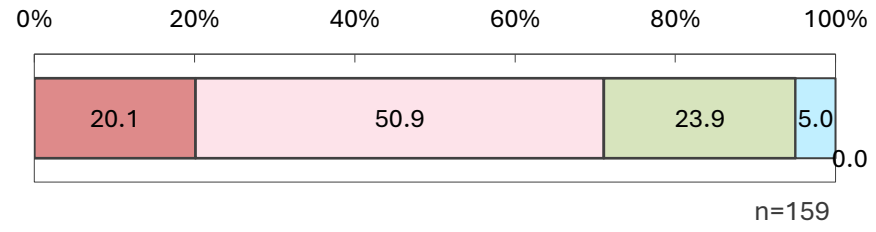
Outlook for Overall Power Consumption in the Next 5-15 Years



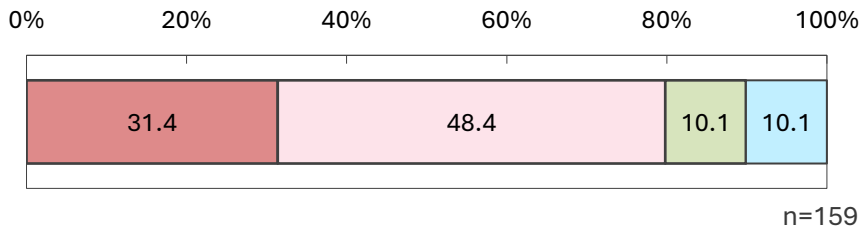
Impact of Power Costs on Domestic Business and Profits (Currently)



Impact of Power Costs on Domestic Business and Profits (In next 5-15 Years)

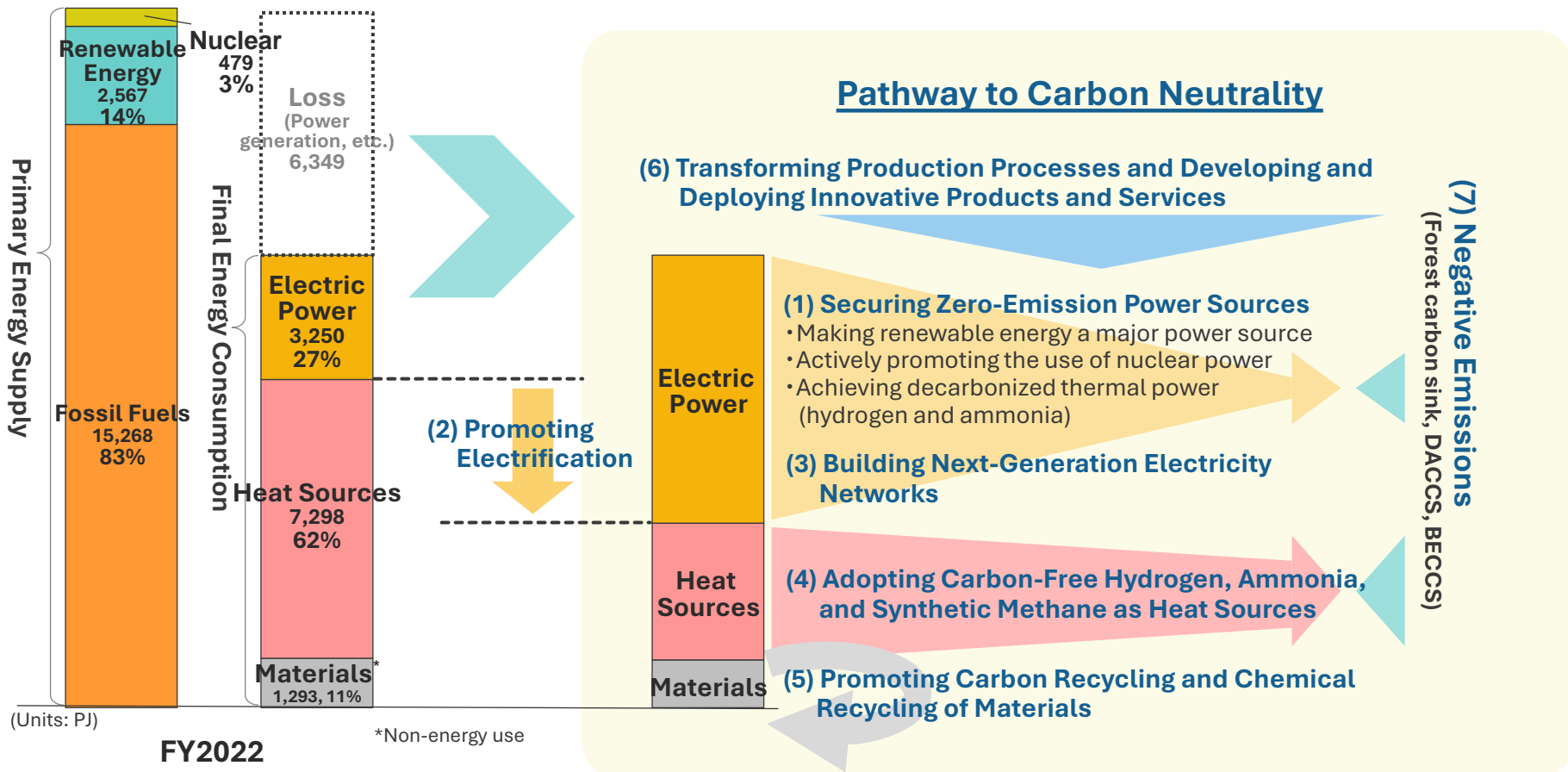


Do you perceive challenges in Japan’s power supply?



(2) S+3E as the Core Principle

- The core principle of energy policy is **S+3E** (safety as the foundation, with a balance of energy security, economic efficiency, and environment).
 - **Energy Security:** With expected increases in demand, it is necessary to **continuously secure the required energy supply**.
 - **Economic Efficiency:** To ensure industrial competitiveness, it is important to **achieve energy cost levels comparable to other countries**.
 - **Environment:** To achieve CN, it is vital to **address all “seven pathways”** outlined in the GX Proposal (shown below). GX should be promoted from four perspectives: (1) Innovation, (2) Transition, (3) Promotion of Public-Private Investment, and (4) Industrial Policy.



(3) Pursuing an Energy Mix Optimal for Japan

- Japan faces **severe energy supply constraints**, as a resource-poor island nation.
- Given these severe supply constraints, **pursuing the best mix of diverse energy sources is essential**.
A resilient energy supply system needs to be built by promoting the use of all energy types, while avoiding over-reliance on any specific sources of energy.
- **For the time being**, it is important to steadily reduce CO2 through **dedicated energy efficiency measures, promotion of low-carbon initiatives, and utilization of decarbonized power sources, while developing innovative technologies** aimed at gradual real-world implementation.
- **To secure the mineral resources** essential for achieving CN, public and private sectors should work together to strengthen international supply chains and build a resource recycling system, while avoiding excessive dependence on specific countries or regions.

Severe Supply Constraints

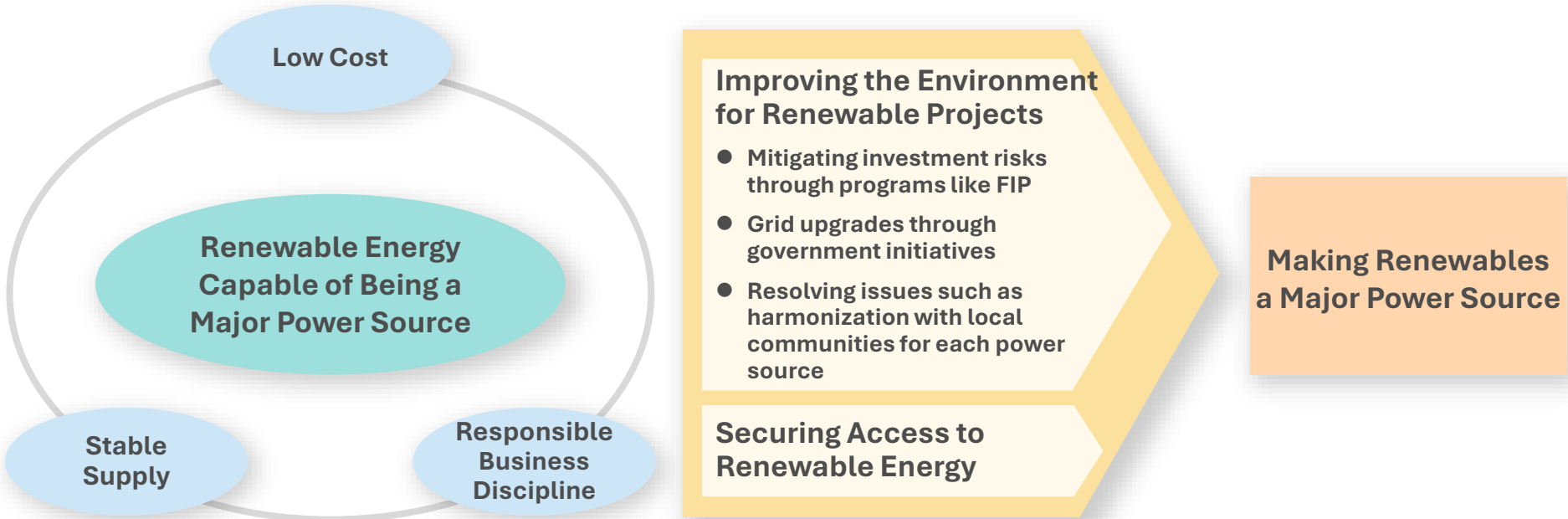
- Limited fossil fuel reserves
- Geographical conditions impose constraints on solar and wind power utilization
- Difficult to build cross-border power grid interconnection with neighboring countries
- Due to high population density and advanced industrialization, energy demand density is high, requiring high-quality power

Pursuing an Optimal Energy Mix

- Promote the development and spread of energy-saving, renewable energy, and energy storage technologies, and utilize them with maximum economic efficiency
- Break free from overreliance on imported fossil fuels and use them efficiently
- Utilize nuclear and fusion energy

(1) Making Renewables a Major Power Source

- Renewable energy is a crucial decarbonized power source that also contributes to energy self-sufficiency. **It is essential to increase adoption of renewables that meet three criteria of low cost, stable supply, and responsible business discipline.**
- For projects with potential for economic viability, **investment risks should be mitigated through measures such as the FIP system.*** It is also necessary to upgrade the power grid, including ensuring balancing capabilities. It is important to **evaluate the economic feasibility considering the increase in integration costs** as more renewables are introduced.
- Increased adoption **also requires steadily addressing issues such as harmonization with local communities**, which vary depending on the type of power source, etc.
- **Securing sufficient renewable energy access that supports industries is crucial** to maintain domestic production of key exports and essential goods, as business partners and others are increasingly demanding that manufacturers produce with renewable energy.



*Feed-in Premium (FIP) is a system that ensures the profitability of renewable energy projects by adding a certain premium to power producers' electricity sales revenue. It requires more independent business operations than the Feed-in Tariff (FIT) system which guarantees purchase, as power producers need to sell electricity in the market or engage in bilateral transactions themselves.

(2) Maximizing the Use of Nuclear Energy

- **Utilizing nuclear power is essential to achieving the NDC target, pursuing carbon neutrality (CN) by 2050, and maintaining industries that support Japan as a science and technology powerhouse.**
- Many companies have high expectations for nuclear power to contribute to both achieving carbon neutrality and ensuring stable electricity supply (see the next page for survey results).
- While sincerely reflecting on the Fukushima Daiichi nuclear disaster and **prioritizing safety assurance and local community acceptance as a premise**, it is necessary to reaffirm the need to promote nuclear power as a national policy. **The government needs to take the lead in this effort.**
- The next Strategic Energy Plan should **clearly state that “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,” as written in the Governments’ Basic Policy for the Realization of GX.**

Prerequisites for the Use of Nuclear Power

Cooperation with Host Regions

- **We, the business community, express our gratitude for the contributions of host regions** to our country’s energy supply and industrial development.
- **From the perspective of the energy consumer, the business community needs to play a role in revitalizing host regions**, including promoting industrial clusters that align well with the characteristics of decarbonized power sources.

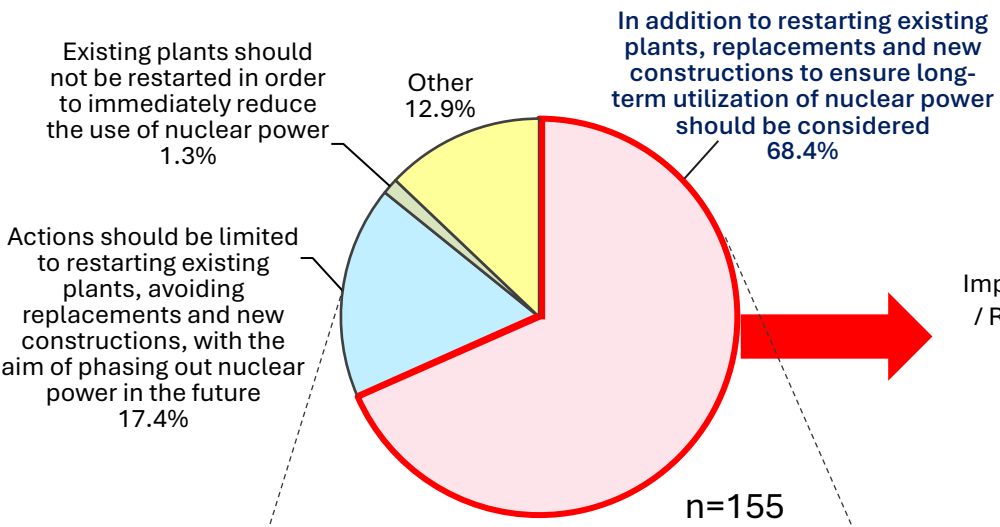
Resolving Back-End Issues

- For the continued use of nuclear power, **the government must take the lead and clearly outline the path forward.**
- **Establishing a nuclear fuel cycle: The reprocessing of spent fuel is essential.** This contributes to reducing the volume and toxicity of high-level radioactive waste and making effective use of uranium fuel. It is necessary to complete the Rokkasho Reprocessing Plant and promote the ‘Pluthermal’* project.
*The Pluthermal project is an initiative to use mixed oxide (MOX) fuel, produced from plutonium recovered through reprocessing combined with uranium, in light-water reactors.
- **Final disposal of high-level radioactive waste:** An issue that the current generation using nuclear power should address. Further efforts are needed to build public understanding.
- Smooth **decommissioning**, safe **interim storage**, and **development of evacuation plans** with sufficient hardware and software measures are also important issues. These should be addressed through collaboration between the national government, local governments, and operators.

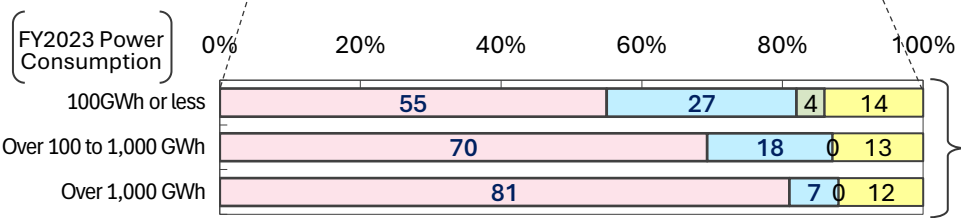
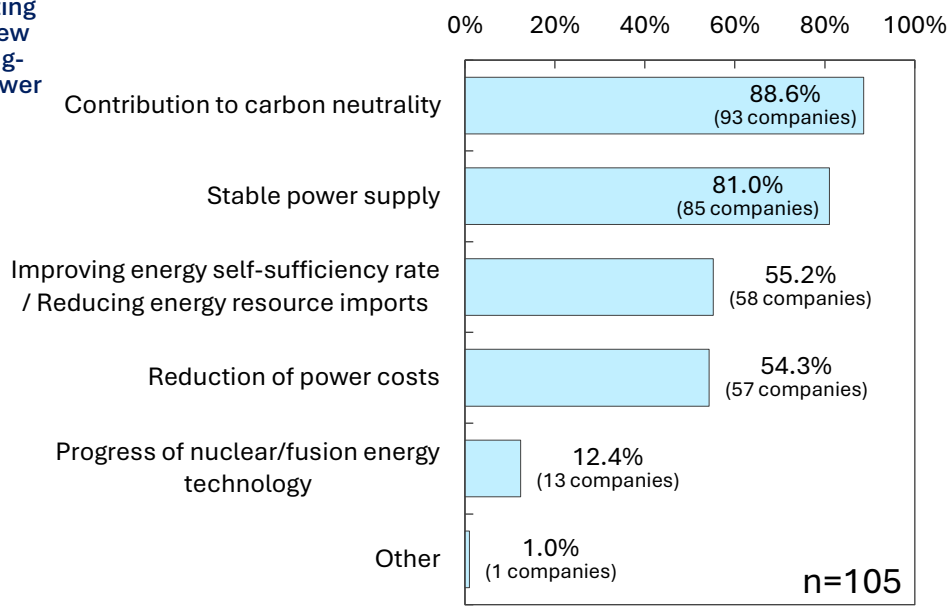
Survey Results: Direction of Nuclear Power Utilization

- 86% of companies recognize the need to restart existing nuclear power plants.
- 68% of companies recognize the need for replacement and new construction in addition to restarting.
- Companies with higher power consumption tend to recognize the need for replacement and new construction more (81% of companies using over 1,000 GWh per year. 55% of companies using 100 GWh or less also recognize the need).
- The top reasons cited for supporting replacement and new construction are “contribution to carbon neutrality” (89%) and “stable electricity supply” (81%).

Direction for Nuclear Power Utilization



Reasons for Supporting Restart/ New Construction & Replacement (Select up to 3)



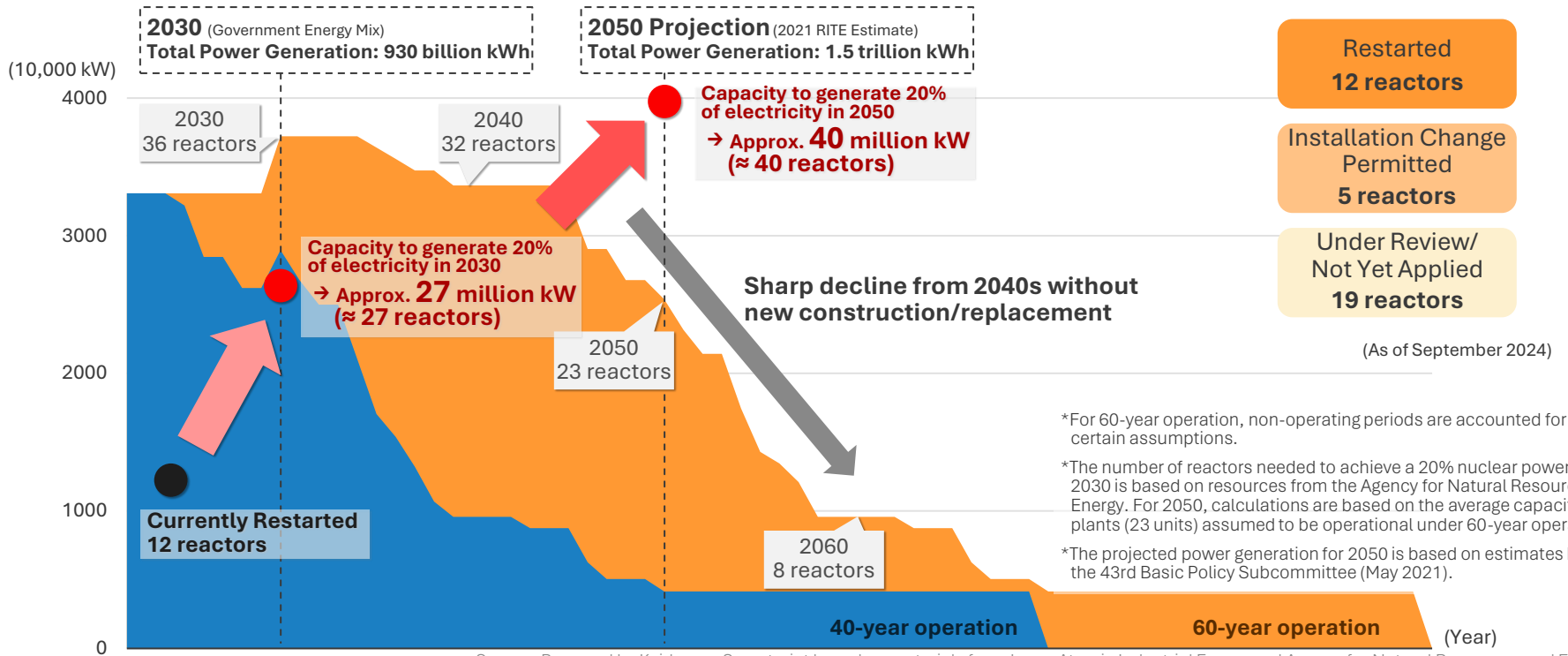
Main opinions in “Other”

- Nuclear power should be utilized alongside aggressive renewable energy adoption
- Comprehensive safety measures and careful dialogue with local communities and stakeholders are essential
- Replacement and new construction should proceed only with local consensus
- It is difficult to make judgements about replacement and new construction at this stage

(2) Maximizing the Use of Nuclear Energy: Utilizing Existing Facilities and Advancing Construction

- Existing facilities should be used to the fullest extent with verification of safety as an absolute priority. To accelerate the restart of existing reactors, efforts should be made to strengthen constructive communication between regulators and operators and streamline review processes.
- Without replacements or new constructions, nuclear power capacity is expected to sharply decline from the 2040s onward. Given that it takes 10-odd to 20 years to bring a new nuclear reactor online, the need for construction of innovative light-water reactors is urgent.
- Nuclear power projects involve significant risks due to massive initial investments and ultra-long operational periods. It is essential to establish a business environment that ensures predictable return on investment and improves overall project conditions. Effective institutional measures should be implemented while maintaining the transparency and accountability of support provided, referring to examples of measures in other countries.*

Nuclear Power Plant Capacity Outlook



Source: Prepared by Keidanren Secretariat based on materials from Japan Atomic Industrial Forum and Agency for Natural Resources and Energy.

*For instance, in the UK's Regulated Asset Base (RAB) model, investments approved by the regulatory authority can be recovered through regulated fees paid by consumers from the construction period through the operational period. The operating company receives revenue based on costs and profits approved by the regulatory authorities, with some coverage for ex-post construction cost fluctuations, etc.

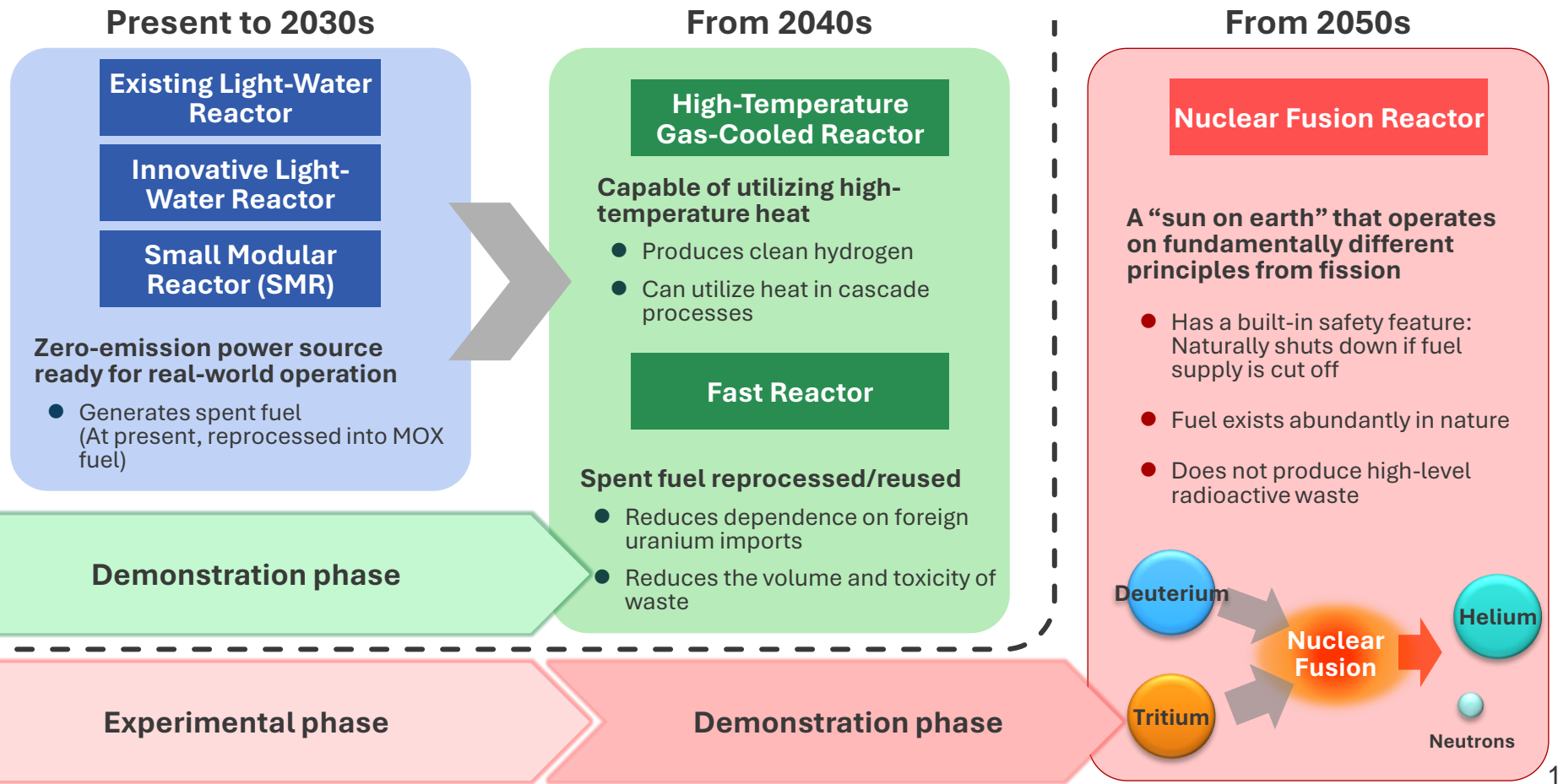
(2) Maximizing the Use of Nuclear Energy

Next-Generation Innovative Reactors, Nuclear Fusion

- **High-temperature gas-cooled reactors and fast reactors** play a major role in Japan's GX.
- To avoid lagging in global competitiveness, bold measures should be taken to **provide further support from a viewpoint to move up development schedules as much as possible.**

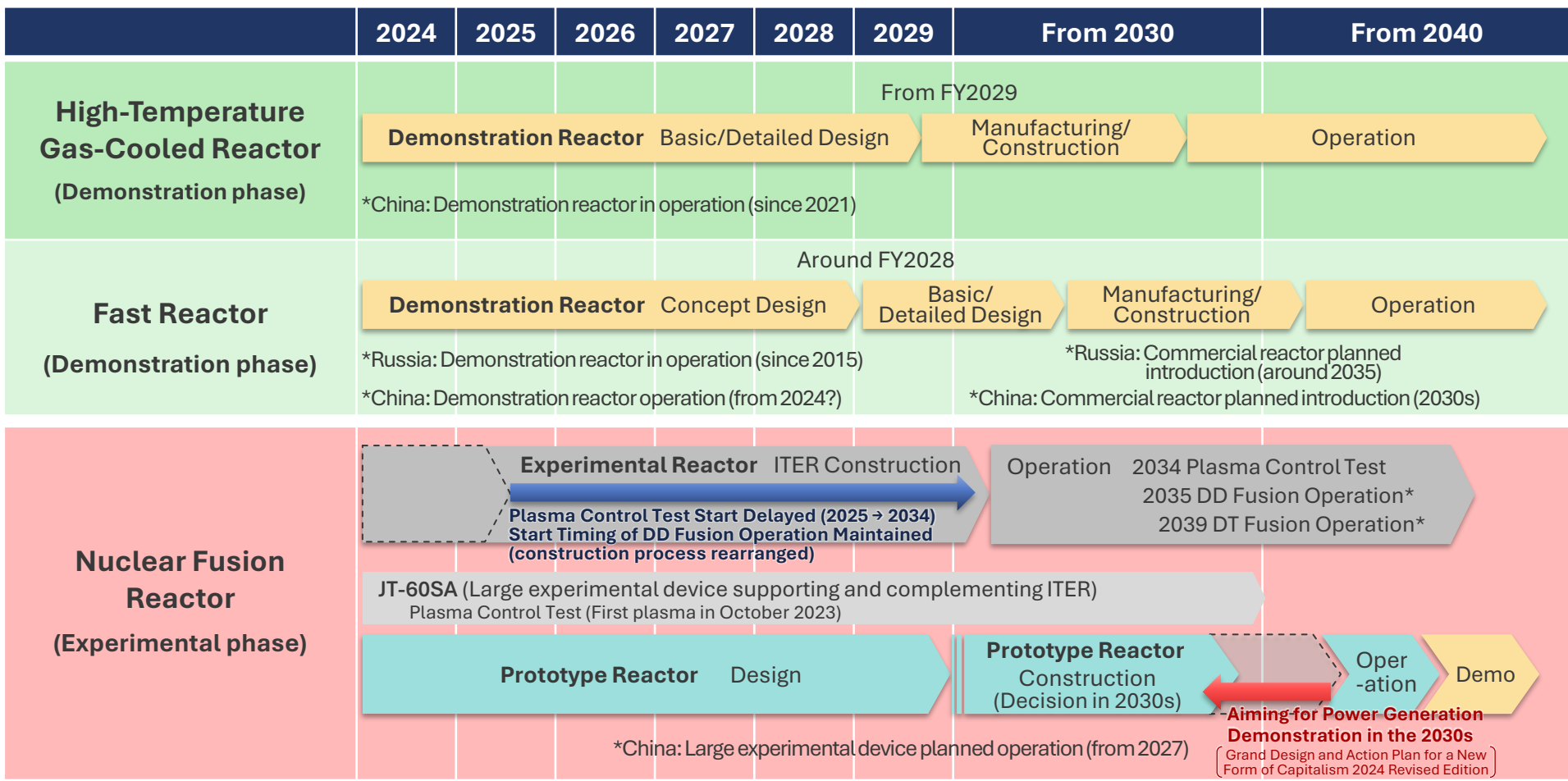
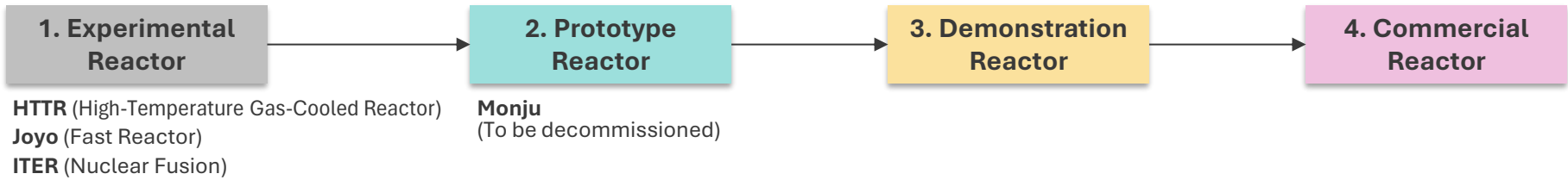
- The earliest possible real-world application of **nuclear fusion** should be pursued as a **national policy.**
- Given its potential as a future energy source for Japan, it **should be given greater prominence in the next Strategic Energy Plan.**
- While gaining knowledge through active involvement in projects like ITER, **a concrete strategy should be set forth to begin prototype reactor development as early as possible.**

Roadmap for Utilizing Next-Generation Innovative Reactors



2. Securing Power Sources for Stable Supply

(Reference)
Development Schedule for Next-Generation Innovative Reactors

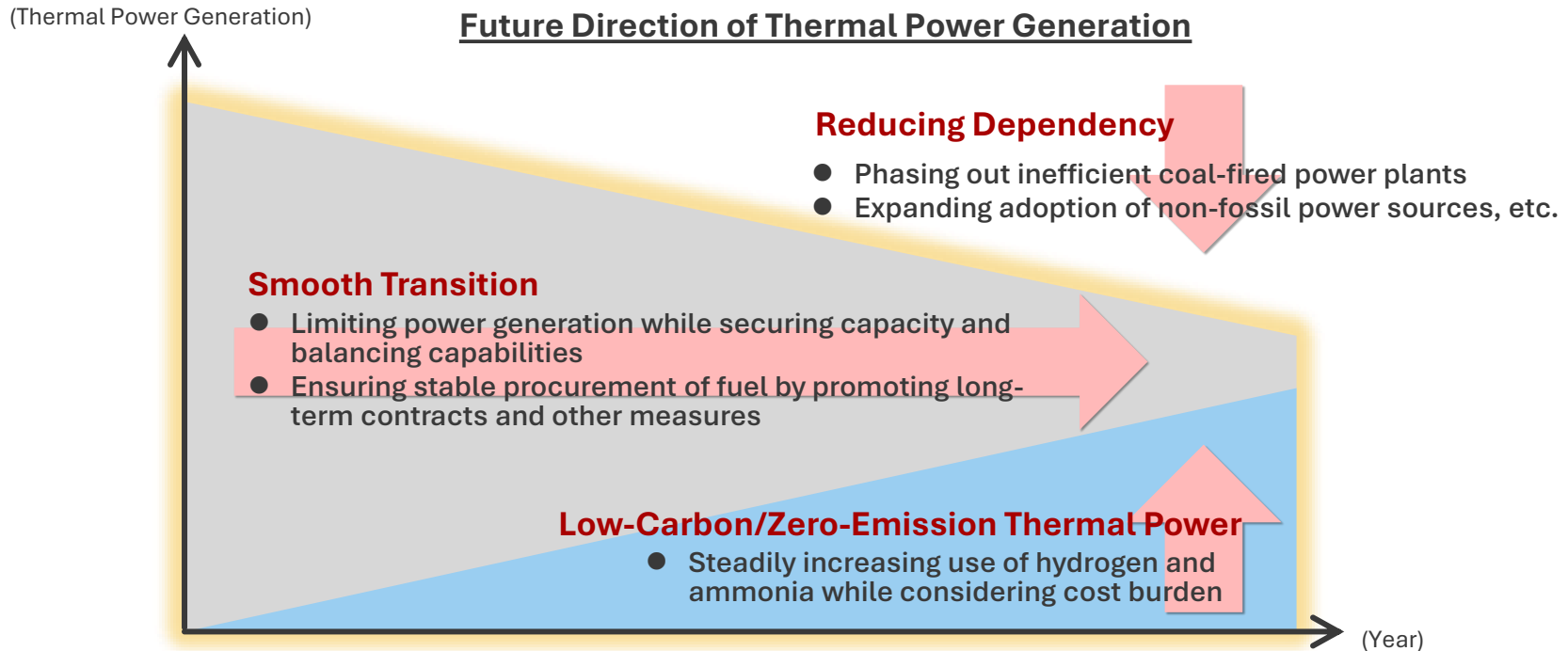


*ITER aims to first increase technological maturity with DD fusion (deuterium-deuterium fusion reaction), where the energy of generated neutrons is small and less likely to cause durability issues in equipment, before proceeding to realize DT fusion (deuterium-tritium fusion reaction).

Source: Prepared based on materials submitted by ANRE to the 7th Innovative Reactor Working Group (December 2023), 22nd Fast Reactor Development Conference Strategic Working Group (June 2024); materials submitted by MEXT to the Joint Meeting of 38th Fusion Science and Technology Committee and 35th Prototype Reactor Development Comprehensive Strategy Task Force (July 2024); "Integrated Innovation Strategy" (June 2024); and other materials.

(3) Using Thermal Power in the Transition Period

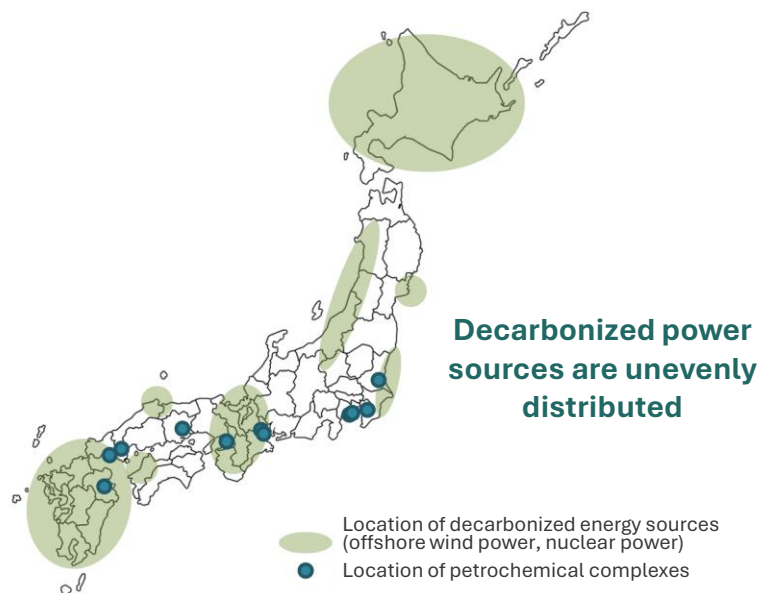
- **Thermal power remains an important power source for providing reserve and balancing capabilities.** However, to achieve carbon neutrality (CN) and ensure stable supply in terms of both quantity and price, **it is crucial to reduce dependency on fossil fuels**—which are almost entirely imported—as well as **thermal power. A smooth transition** that does not compromise supply stability **is essential.**
- **Limiting power generation** at unabated thermal plants (plants without emission reduction measures)—such as by phasing out inefficient coal-fired plants—**while securing the necessary capacity and balancing capabilities** is fundamental. It is necessary to drive the transition in a deliberate and strategic manner, including through utilizing the mechanisms to maintain inactive power facilities in case of supply shortages.
- **Ensuring stable supply of thermal power fuels is also critical.** In particular, measures are needed to secure long-term LNG contracts.
- Decarbonizing thermal power through substitution (**co-firing and single-firing**) of **hydrogen and ammonia**, as well as using CCS (carbon capture and storage), is also important. These efforts should be steadily advanced, while being mindful of cost burden.



3. Establishing Next-Generation Electricity Networks

- **Investment in transmission and distribution infrastructure is crucial** for: (1) maintaining and upgrading aging facilities, (2) modernizing to accommodate renewable energy and digital technologies, (3) expanding capacity to meet projected increases in electricity demand.
- **Deliberate and strategic grid development** based on a long-term policy for a cross-regional electric network (the Master Plan) is essential. Mechanisms to support large-scale investments that account for project risks should also be considered. It is also necessary to address utilization of distributed energy resources.
- **When deciding on grid reinforcement, cost-benefit analysis** should be conducted, discipline ensuring cost efficiency maintained, and **fairness in distribution of financial burdens** considered.
- For an efficient and effective network, **strategic placement of power sources and demand-side facilities is critical**.
- **Greater utilization of power storage technologies** is crucial for ensuring grid stability and effectively using surplus renewable energy.

Strategic Facility Placement for Efficient and Effective Grid Development



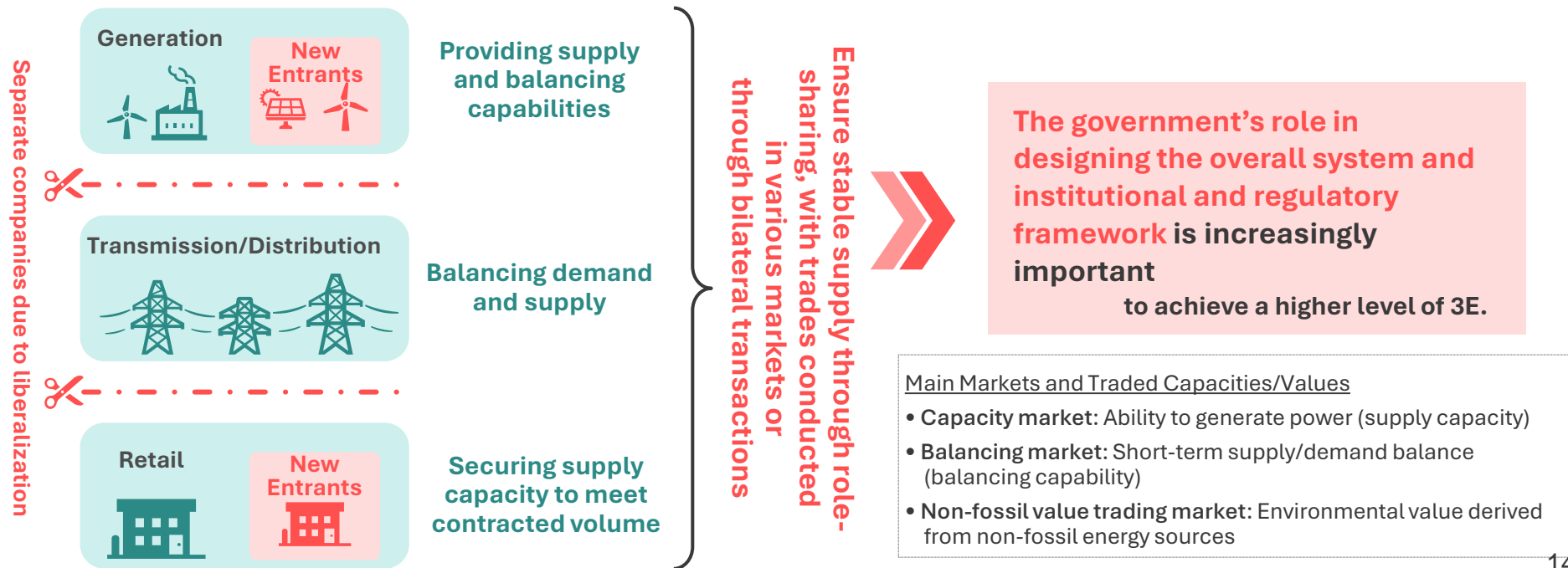
Promoting the strategic placement of energy sources as well as demand-side facilities, taking into account network conditions.

- Encouraging to concentrate the location of demand-side facilities in areas with decarbonized power sources
- Promoting “watt-bit linkage”*

*Watt-bit linkage refers to the integrated development of next-generation power grids (watts) and communication networks (bits), such as locating data centers near power sources.

4. Designing the Power Market for the Next 10 Years

- Since 2013, the government has carried out electricity system reforms with three main goals: (1) securing the stable supply, (2) maximally restraining electricity prices, and (3) expanding customers' options and chances for business operators.
- Government councils are currently **reviewing the electricity system reforms** of the past 10 years. Reflecting the results in the next Strategic Energy Plan and other strategies **as guidance for the next 10 years is crucial**.
- With liberalization, the comprehensive power supply obligation of former general electric utilities was abolished, transitioning to a system where power generation companies, transmission/distribution system operators, and retail electricity suppliers each bear their own obligations. The government's role in designing the institutional and regulatory framework is extremely important. **Continuous analysis and appropriate revision of system design** from a 3E perspective **are necessary**.
- Liberalization has led to many new entrants. Ensuring **accountability and quality** of businesses is essential for stable supply.
- The power system has become more complex due to multiple markets and institutional measures, such as the capacity market, the balancing market, and the non-fossil value trading market. Efforts should be made to develop a more efficient system, while carefully examining the impact on market participants.



5. Securing Stable Fuel Supply and Transitioning Heat Sources

- Three-quarters of Japan's final energy consumption is based on the use of heat and fuel, mainly from fossil fuels. Promoting the transition to carbon neutrality (CN) for heat and fuel is a crucial pillar of green transformation (GX).

(1) Reducing Dependency on Fossil Fuels and Ensuring Stable Procurement

- **Reducing dependence** on fossil fuels is a must. During the **transition period**, it is important to **secure stable supply** of relatively low CO₂-emitting fuels such as LNG.
- Promoting the securing of interests and resource diplomacy. Opposing calls for divestment that could lead to excessive supply reduction.
- Utilizing frameworks like AZEC (Asia Zero Emission Community) and **fostering understanding within the international community about the importance of a realistic transition**.

(2) Utilization of Carbon Neutral Fuels

- To achieve carbon neutrality, addressing clean heat demand is essential. **The demonstration of large-scale and low-cost production technologies must be accelerated.**
- **Continuing to promote investment** in projects with potential economic viability. Working to secure interests with a view to overseas CN fuel production.
- Promoting the streamlining and optimization of systems, including regulatory reforms.

(3) Sector-Specific Initiatives toward Carbon Neutrality

Industrial and Residential Sectors

- At the present, focus on promoting energy efficiency, electrification, fuel conversion, and the transition to ZEB/ZEH (net-zero energy buildings/homes).
- In the mid to long term, working to develop user-side technologies for hydrogen and utilize CCUS (carbon capture, utilization, and storage).

Transport Sector

- Developing and spreading technologies for using most suitable CN energy sources (electricity, hydrogen, synthetic fuels, etc.) for each mode of transport.
- Conducting demonstrations aimed at building CN fuel supply chains, while monitoring market formation.

6. Securing Financial Support for the Energy System

- **The development of large-scale decarbonized power sources and next-generation grids** requires long-term, substantial investment. **It is necessary to strengthen the private financial sector's ability to take risks** through blended finance, debt guarantees, and bond acquisitions.
- Innovation and cost reduction are essential to decarbonize thermal power and increase the use of renewables and nuclear power, but there is uncertainty and risk involved. **Greater understanding of transition finance is needed** to support the expansion of decarbonized power sources.
- **While financed emissions (emissions from clients and investees of financial institutions)** make comparing financial institutions easier, focusing only on immediate figures **may hinder investment and financing that contribute to mid- to long-term reduction measures**, including those for high-emission industries. **Ongoing public-private discussions are needed to address and reflect these outcomes in international debates.**

Promoting Wider Adoption of Transition Finance



The Japanese government's **Basic Guidelines on Climate Transition Finance**, and sector-specific Technology Roadmaps (which outline technologies and directions for the transition and help assess the reliability of corporate efforts), **should be actively communicated both domestically and internationally while being revised as needed to ensure the credibility of transition finance.**

While there is a **common goal of carbon neutrality by 2050**, the **pathways and methods to achieve it (transition strategies and efforts) are diverse.**

Concept of the Basic Guidelines on Climate Transition Finance (May 2021):

Rather than focusing only on the use of the funds, **a company's transition strategy for decarbonization and the credibility and transparency of implementing that strategy should be comprehensively assessed.**

(1) Energy Mix

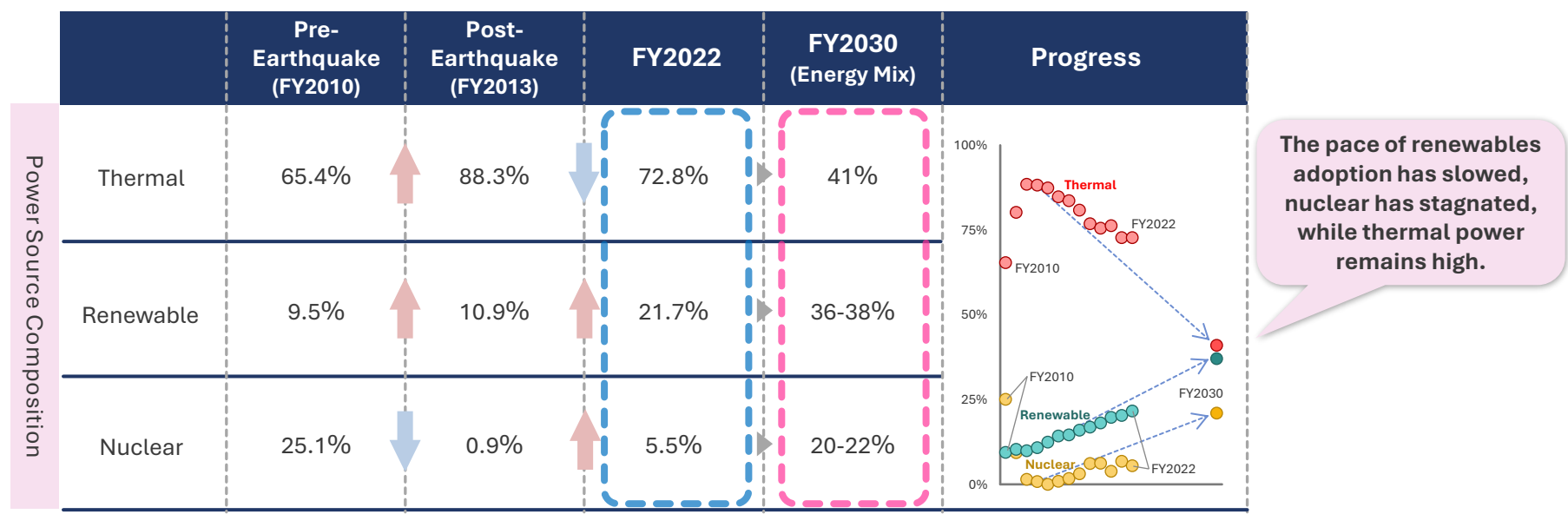
For FY2030

- The current energy mix for FY2030 assumes highly ambitious energy efficiency improvement and decarbonization of power sources. To achieve this, over the next five years, Japan must make the utmost efforts, including further introducing renewable energy and accelerating the restart of nuclear power plants.
- **The current energy mix should be kept as an ambitious assumption**, while strengthening related policies.

For FY2040

- The next Strategic Energy Plan should **present the energy mix for FY2040** to facilitate corporate investment decisions.
- Considering the increasing uncertainty about international trends, demand, and innovation, **multiple scenarios (possible future outcomes) should be presented**, rather than a single future vision.

Status of the Power Source Composition for the FY2030 Energy Mix



Source: Created by Keidanren Secretariat based on Comprehensive Energy Statistics and other sources.

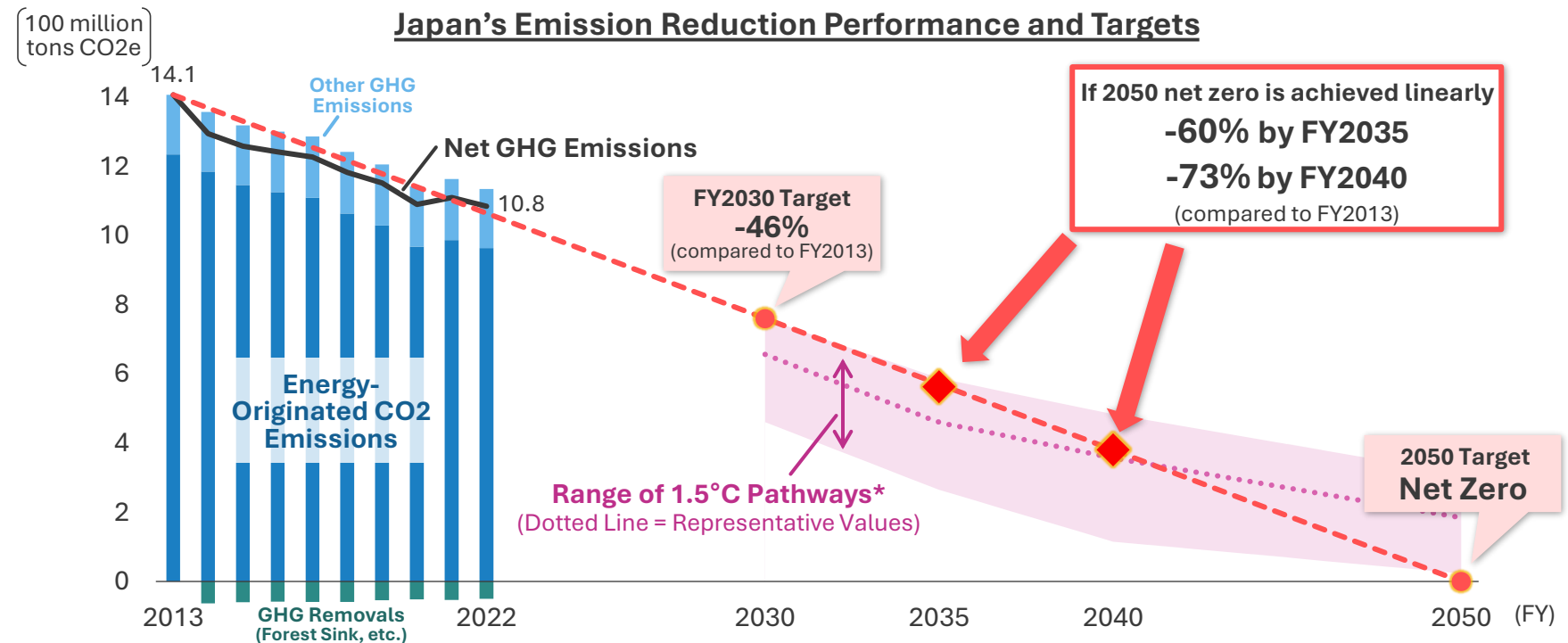
(2) Nationally Determined Contribution (NDC)

For FY2030

- **The current NDC reduction target of 46% (compared to FY2013)** corresponds to the pace required to achieve carbon neutrality linearly by 2050. Assuming the maintenance and expansion of economic activity, **this target is already extremely ambitious, and efforts should continue to achieve it.**

For FY2035 Onward

- While a “convex upward” path of reduction with rapid cuts in the future driven by innovation might be reasonable, **it is preferable to set a target of linearly achieving carbon neutrality by 2050** to align with G7 commitments and demonstrate Japan’s ambitions.
- To pursue ambitious targets amid uncertainty, the traditional accumulation-based follow-up should be replaced by a **flexible implementation of measures based on regular assessments of overall progress and the adoption of new technologies**, while taking into account the situation in other countries.



*The 1.5°C pathway is a simple application to Japan of the IPCC's global emission reduction ratio toward the global 1.5°C target.

Conclusion

- Climate change countermeasures and energy policy are two sides of the same coin. **To achieve carbon neutrality by 2050, it is essential to immediately address energy policy challenges**, such as thorough energy efficiency improvement, maximizing the use of decarbonized power sources like renewable energy and nuclear power, and developing and implementing innovative technologies in society.
- At the same time, Japan must aim for growth through addressing social issues. Without growth, the resources needed to tackle social problems cannot be secured. **Achieving a virtuous cycle between economy and environment is essential** in addressing climate change and energy issues.
- **Innovation must be pursued by combining the wisdom of industry, government, and academia, while promoting green transformation (GX) through collaboration among various stakeholders, as it involves the transformation of the entire economic and social structure.**
- **Currently, Japan is in a critical situation where the nation's future could be limited by energy constraints. A national vision for sustainable growth as a science and technology powerhouse is necessary, with a strong energy policy being one of its essential elements.**
Hopefully this proposal will serve as a guide for implementing such policies and help raise public awareness that Japan's energy is at a crossroads.
- Keidanren will continue to promote Challenge Zero and the Carbon Neutrality Action Plan while actively participating in policy discussions. Keidanren will also compile "Future Design 2040" based on the direction of energy policy outlined in this proposal, presenting the business community's vision of the future of the nation.