METI
Ministry of Economy, Trade and Industry

A way to steadily achieve carbon neutrality

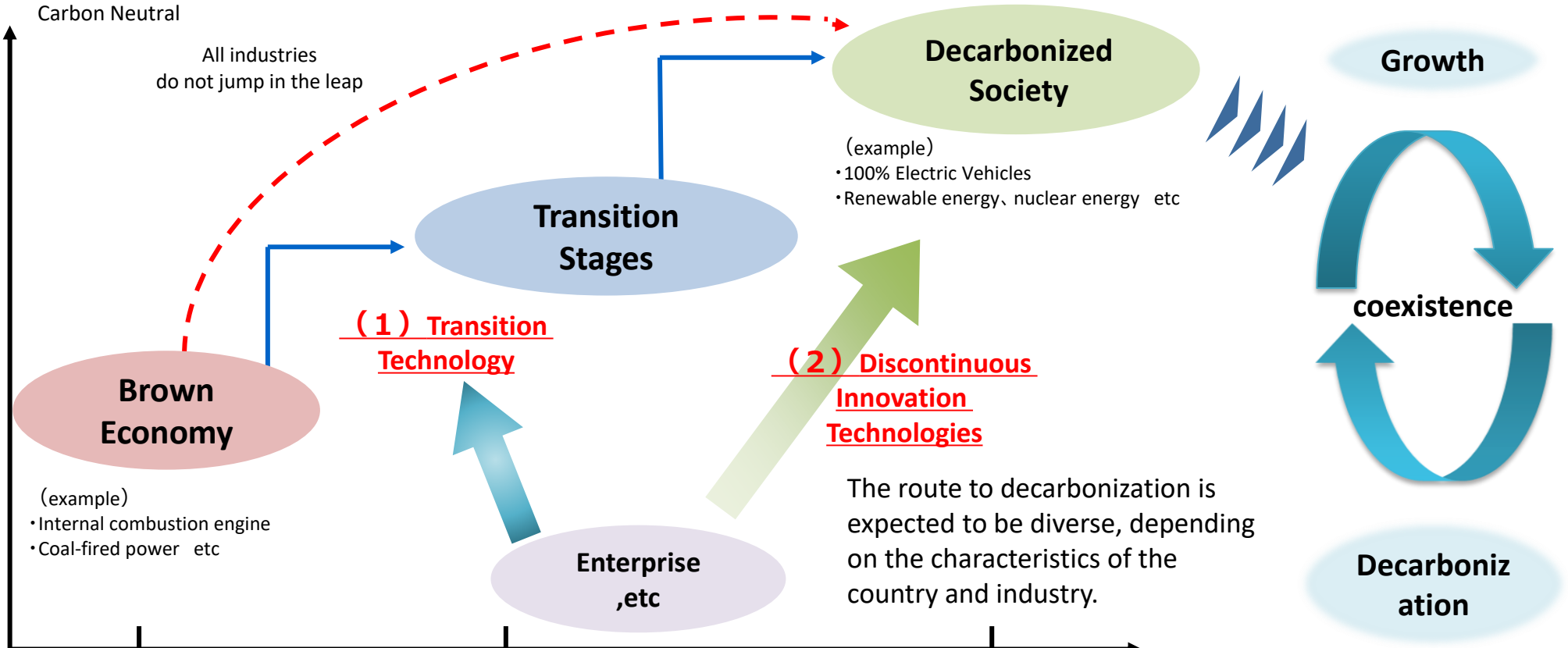
October 5, 2022

Industrial Science and Technology Policy and Environment Bureau

Why are transition and innovation finance beneficial?

- In order to realize a “decarbonized society,” it is necessary to provide a large amount of funds. Not all industries can achieve decarbonization in one step. Therefore, it is important to make efforts to make steady transitions, including energy conservation and fuel conversion, and discontinuous innovations toward decarbonization.

Long-term strategies for realizing a decarbonized society



Japan's 3-step-policy on Climate Transition Finance

- Although green projects have been attracting investment, more investments need to support transition to net zero.
- To encourage private finance flow for transition, Japanese government take 3-step-policy. (1)**Basic Guidelines** in line with ICMA transition handbook, (2) **Sector Roadmaps** which show technology options for carbon neutrality and (3) **Model Projects** to secure a good quality of practices without washing.
- As required by Basic Guidelines, companies are expected to show their transition strategy. They can account for their plan by referring to the technologies and pathway of the roadmap.

1. Basic Guidelines

■ Financial Services Agency, Ministry of Environment and METI formulated the Guidelines to establish transition finance in line with the ICMA transition handbook.

Four Key Elements

1. **Strategy and Governance**
2. **Environmental Materiality**
3. **Science-based Strategies Targets & Pathways**
4. **Transparency**

2. Sector Roadmaps

■ An Annex to the Basic Guidelines to show a pathway of technologies to achieve CN by 2050

■ In 7 sectors: **iron & steel, chemical, electricity, gas, oil, cement and paper & pulp.** (Automobiles to be released in 2022)

■ The roadmaps can be referred by companies to formulate their strategies and pathways and by financial entities to evaluate those of clients

3. Model Projects

■ 12 model projects from shipping, steel, aviation, chemical, energy and heavy industry sectors, total **USD 2.5 billion**

Shipping
NYK LINE
MOL
K LINE

Iron&Steel
JFE Holdings, Inc.

Chemical
SUMITOMO CHEMICAL

Aviation
JAPAN AIRLINES

Energy
TOKYO GAS
JERA
OSAKA GAS
idemitsu

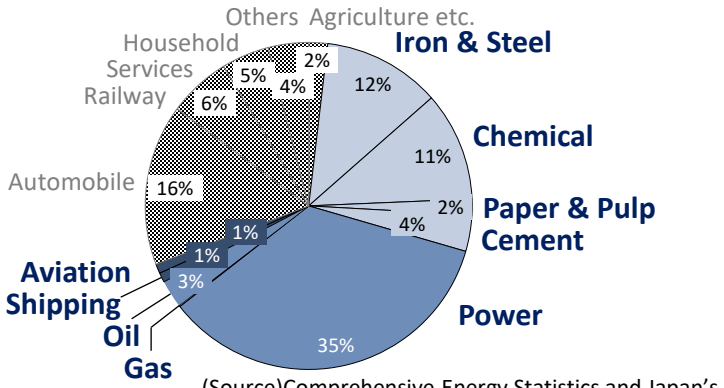
Heavy industry
IHI
MITSUBISHI HEAVY INDUSTRIES

Transition Finance: Summary of “Sector Roadmap”

- The technology roadmap realizes carbon neutrality with credibility in three aspects.

1 Comprehensive — Covering approx. 70% of CO2 emissions in Japan

Breakdown of Japan’s CO2 emissions



(Source)Comprehensive Energy Statistics and Japan’s National Greenhouse Gas Emissions

Sectors of the Roadmaps

			Emission Ratio
Energy	Power	Gas	38%
	Oil		
Material	Iron & Steel	Cement	28%
	Chemical	Paper & Pulp	
Transport	Shipping	Aviation	2%

※Roadmaps for Shipping and Aviation are formulated by Ministry of Land, Infrastructure, Transport and Tourism

2 Ambitious — Carbon neutrality by 2050

1. Targeting Net-Zero

Roadmap aims to realize carbon neutrality by 2050

2. Science based/alignment with the Paris Agreement

Deliberation by experts of technologies and environment and representatives from finance sector

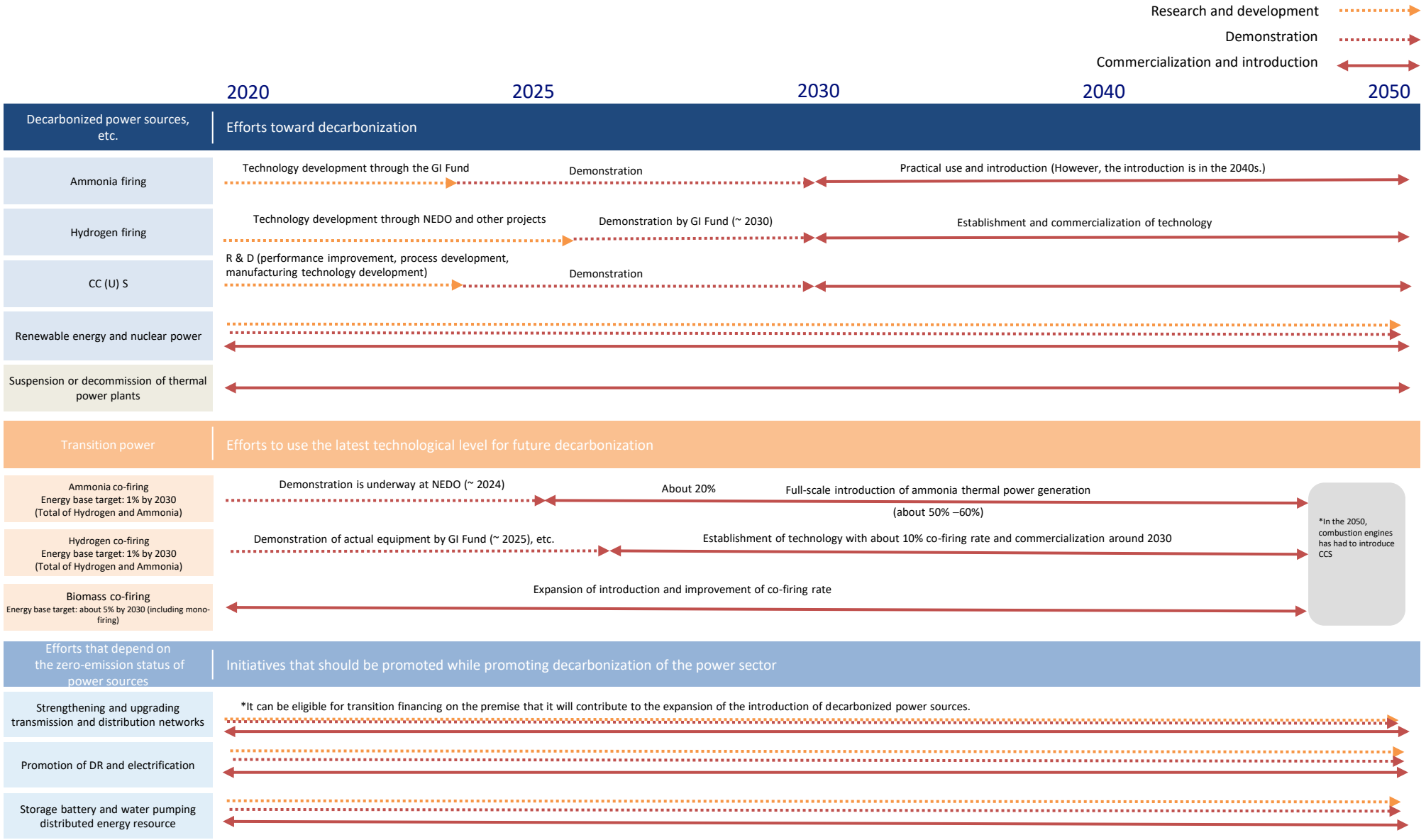
3. Living document

To be updated by technological progress

3 Feasible — Transition is realized by the implementation of the policies

Feasibility is ensured by supporting various policies such as NDC (46%-reduction by 2030), Long-term Strategy, Green Growth Strategy, Basic Energy Plan, and R&D and social implementation plans in the Green Innovation Fund. Moreover, these policies are also intended to enhance international competitiveness of Japanese companies.

[Reference] Transition Roadmap for Decarbonization of the Power Sector



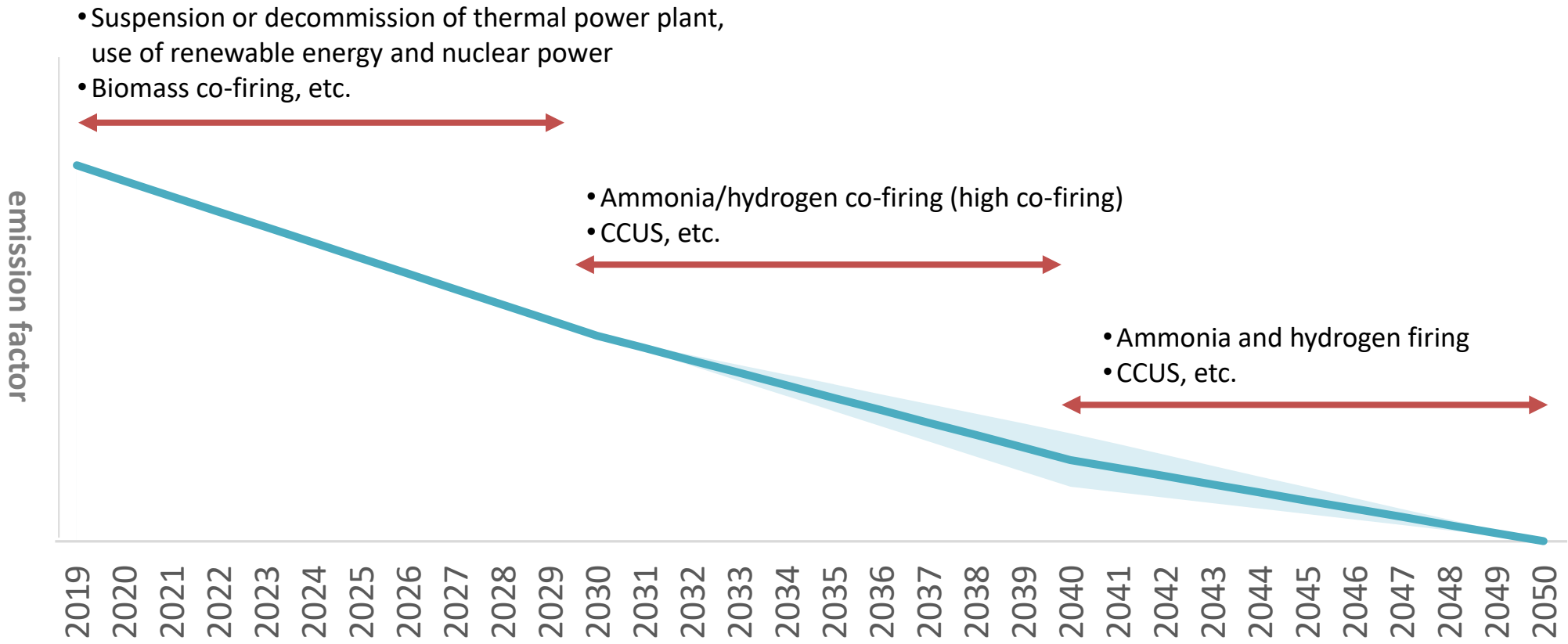
*Efficiency improvement and conversion from coal to natural gas of thermal power sources can be subject to transition financing on the premise of decarbonizing power sources by 2050, with an eye toward the introduction of mixed combustion and exclusive combustion of ammonia and hydrogen and CC (U) S in the future.

*"Electrification" includes indirect electrification (utilization of hydrogen produced by water electrolysis using electric power derived from renewable energy, etc.).

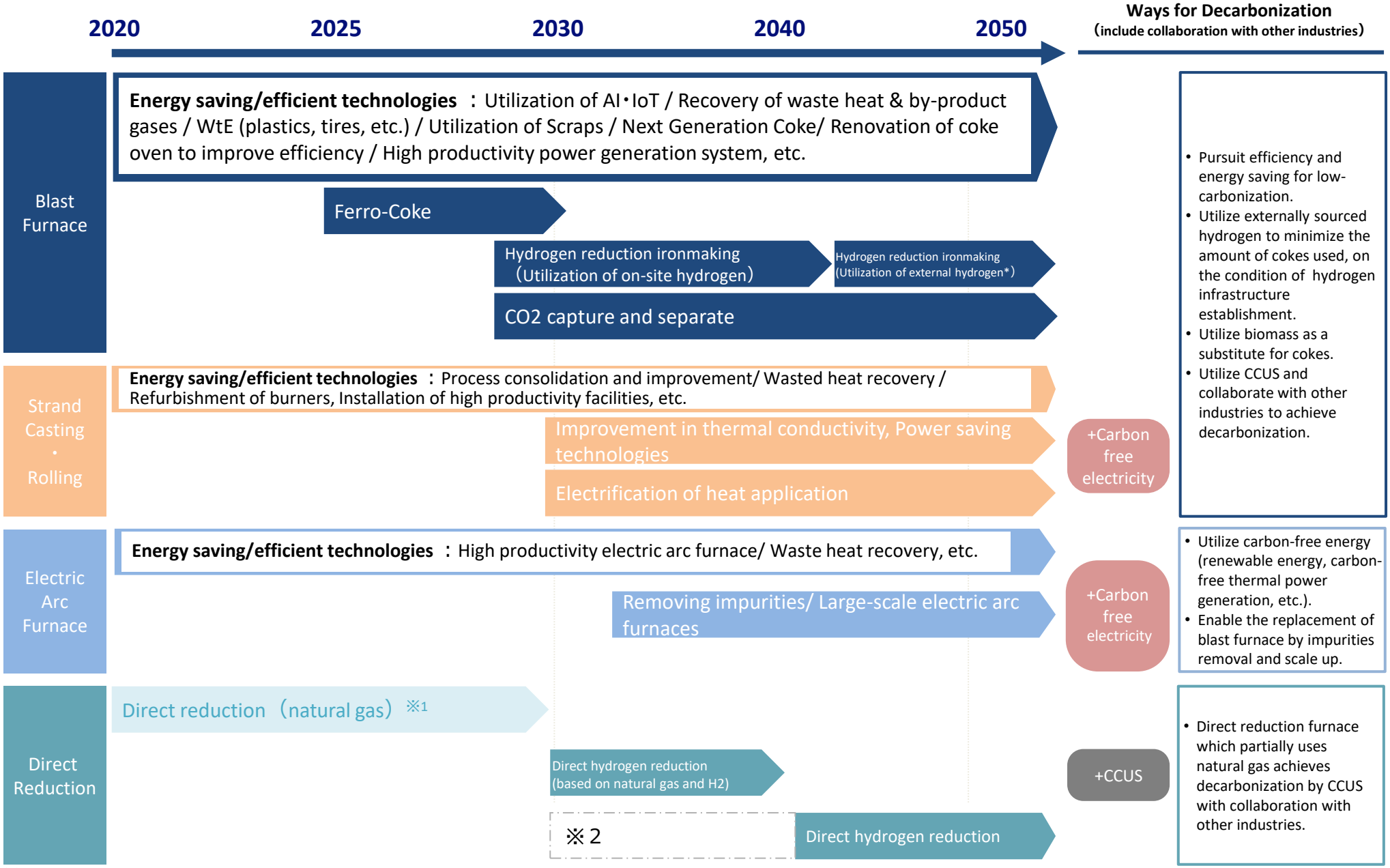
*The mixing ratio is based on heat quantity.

[Reference] Assumed CO2 Reduction Pathway for the Power Sector

- This Roadmap is aligned with the Paris Agreement, referring to various Japanese policies and international scenarios aimed to achieve carbon neutrality in 2050.



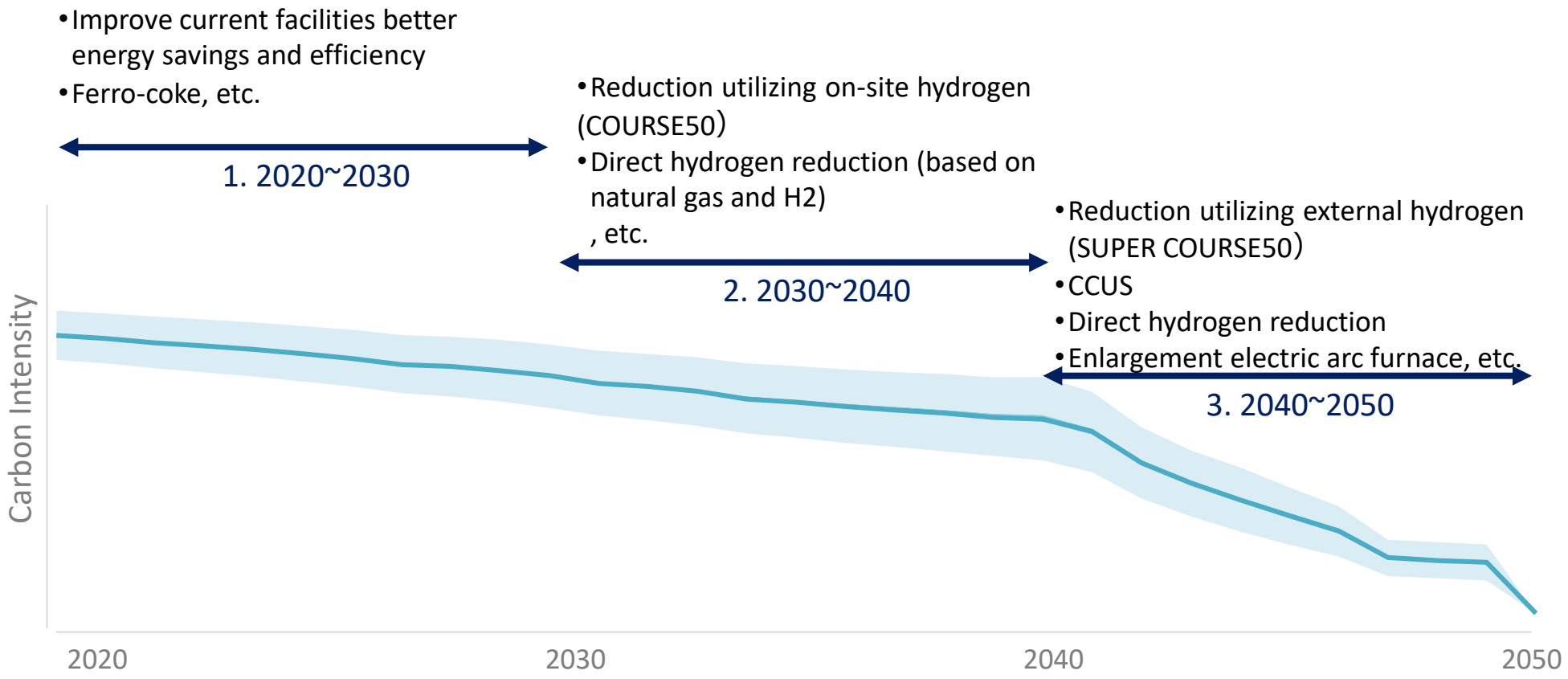
[Reference] Transition Roadmap for Decarbonization of the Iron & Steel



※1 Has not been implemented domestically due to several conditions (production scale & quality, cost, etc.) unmet.
※2 IEA estimates the technology be available by 2030, however the Technology Roadmap determine the implementation year in consideration with the establishment of hydrogen infrastructure.
※3 Products contributes to decarbonization (Eco-products, noted in P8) are not listed in the Technology Roadmap, though can still be the use of proceeds for transition finance.

[Reference] Assumed CO2 Reduction Pathway for the Iron & Steel

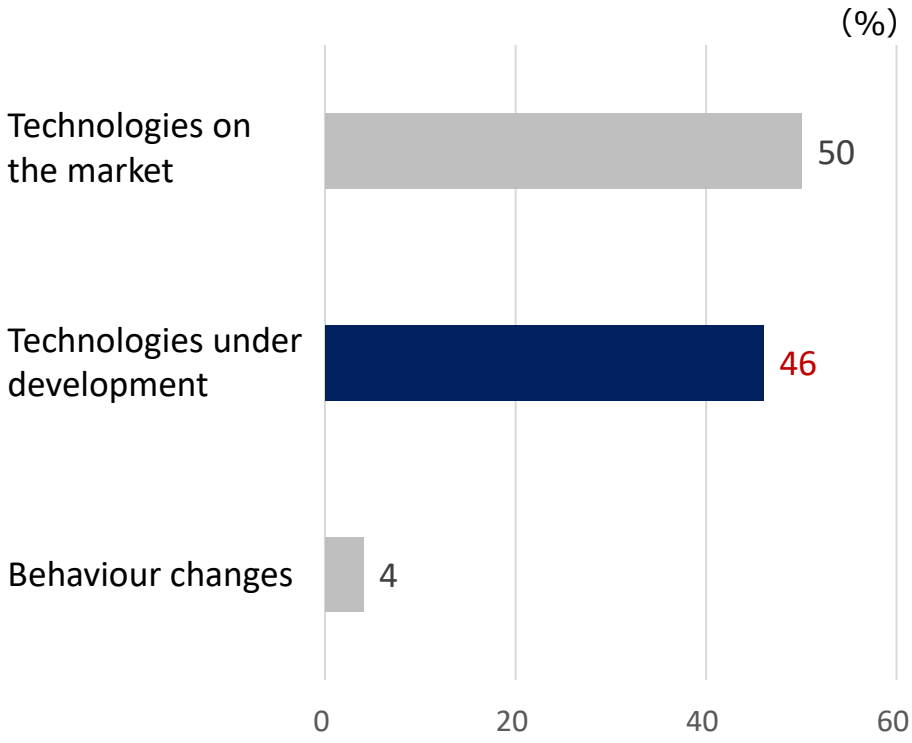
- This Roadmap is aligned with the Paris Agreement, referring to various Japanese policies and international scenarios aimed to achieve carbon neutrality in 2050.



The importance of innovations for achieving GX

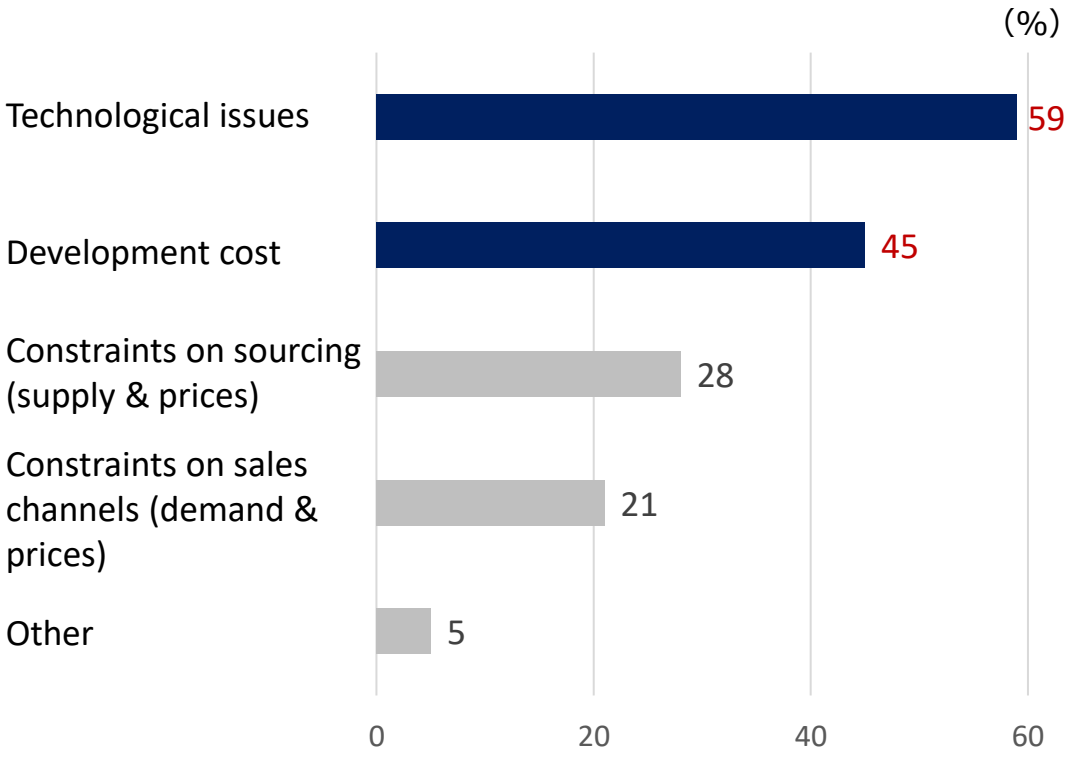
- It is estimated that half of the reductions in 2050 will come from technologies under development.
- For Japanese companies, technological issues and development costs are the major impediments to decarbonization. Therefore, it is important to promote technology development by expanding innovation finance.

CO2 emissions savings in the net zero pathway



Source: IEA “Net Zero by 2050 A Roadmap for the Global Energy Sector”

Japanese companies’ challenges to continued efforts for achieving carbon neutrality



Source: Development Bank of Japan “Survey on Planned Capital Spending for FY 2020, 2021and 2022 (Conducted in June 2021)”

14 sectors that are expected to grow toward 2050

- In order to achieve carbon neutrality by 2050, we need to realize “innovation” and “social implementation” of innovative technologies.
- We will leverage all of our policies and do our best to encourage companies to take on positive challenges toward innovation.

Growth areas will expand from the current situation to 2030 and 2050.

Energy related industries

1.Offshore wind pwr.
Solar ,heat energy

2.Hydrogen
Fuel Ammonia

3.Next-generation
heat energy

4.Nuclear power

Transportation/manufacturing-related industries

5.Automobile,
Storage batteries

6.Semiconductors
Info/Communication

7.Shipping

8.Logistics,
people flow,
Civil engineering

9.Food, Agri.
fishery, forestry

10.Aircraft

11.Carbon Recycling,
Materials

Home/Office related industries

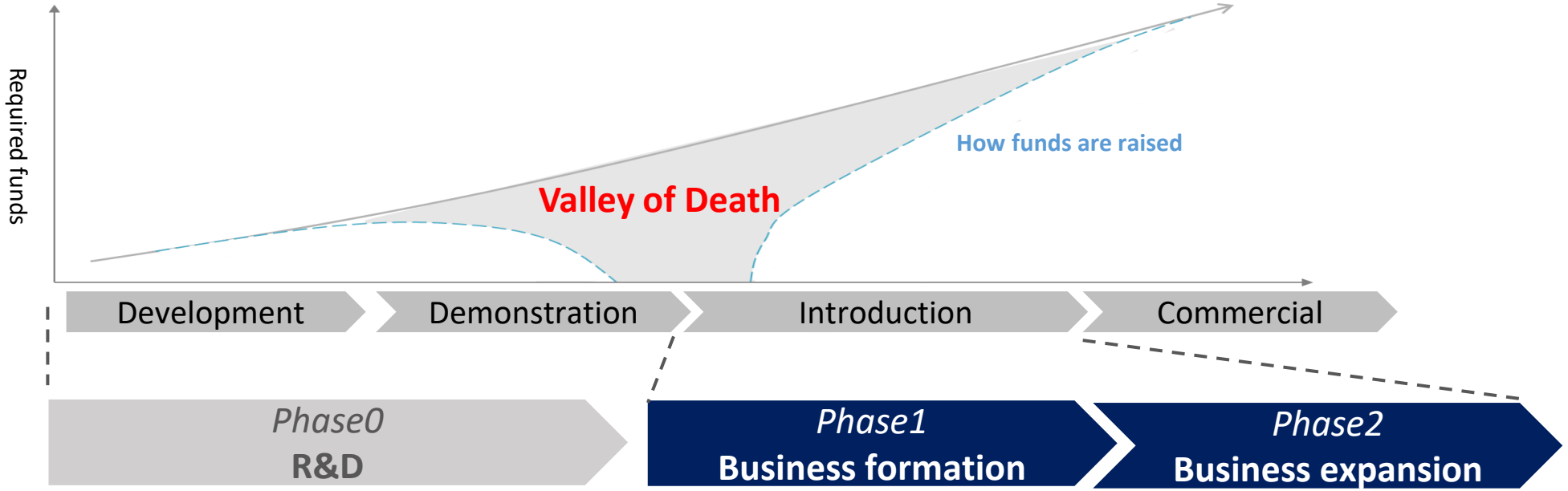
12.Housing/Building
Next gen. electric
power management

13.Resource
circulation

14.Lifestyle related

Challenges in the implementation of innovative technologies

- In the stage from R&D to commercialization, there is a “Valley of Death” where the supply and demand of funds diverge.
- In the R&D phase, Japanese government have started to provide a subsidy mechanism on a long-term basis through the Green Innovation Fund Program which is a subsidy scheme of 2 trillion yen. However, it is important to combine private and public financing (blended finance) to commercialize the innovations at large scale in the implementation phase.
- Furthermore, in order to overcome the “Valley of Death,” it is important to consider measures to encourage business formation and business expansion.



To ensure technological feasibility, seed money, such as government subsidies, is required.

To ensure market feasibility, business model demonstration is required through business planning, company establishment, etc.

Large-scale financing by project financing, etc. is required.

Summary of the Green Innovation Fund Program's basic policies

1 Purpose & Outline

To achieve carbon neutrality by 2050, **METI has established a 2 trillion-yen fund as part of NEDO** and provides **continuous support for R&D projects, demonstrations, and social implementation projects for 10 years to companies that commit to ambitious goals.**

2 Program Target

(Per project)
Ambitious 2030 Target
(Performance, Cost, etc.)

Cross-sectoral monitoring of fund projects based on the following:
・International Competitiveness
・Commercialization (TRL, etc.)
・Potential for attracting private investment

- **CO_2 Reduction Effect**
- **Economic Effect**

3 Support Target

METI's support will focus on **priority fields for which implementation plans have been formulated within the Green Growth Strategy, where policy effects are significant, and long-term continuous support is required to realize public implementation.**

- ✓ Average size of conventional R&D projects (20 billion yen) or more.
- ✓ Projects for which short-term government support programs are sufficient are not eligible.
- ✓ Main implementers should be companies or other profit-making businesses capable of carrying out the entire process of public implementation (participation of small and medium-sized venture companies is encouraged; participation of universities and research institutions is also expected).
- ✓ The project must include innovative and fundamental R&D elements that are worthy of being commissioned by the government.

4 Strategy for Maximizing Results

To ensure that research and development results are steadily implemented publicly, METI seeks **the commitment of the managers of companies and other organizations to strive for these goals as long-term business issues.**

(Efforts required of company managers)
・Submission of the vision and the long-term business strategy at the time of application
・The management attends and reports to the WG.
・Submission of a management sheet showing the status of initiatives

(Implementation of a system to enhance commitment)
1) If the status of the project is inadequate, the project will be canceled, and a portion of the consignment fee will be returned.
2) Introduction of a system (an incentive measure) that allows the government to pay more depending on the degree of achievement of targets.

List of projects（As of September, 2022）

(unit : billion yen)

①Cost Reductions for Offshore Wind Power Generation	1,195
②Next-Generation Solar Cell Development	498
③Large-scale Hydrogen Supply Chain Establishment	3,000
④Hydrogen Production through Water Electrolysis Using Power from Renewables	700
⑤Hydrogen Use in Steelmaking Processes	1,935
⑥Fuel Ammonia Supply Chain Establishment	688
⑦Development of Technology for Producing Raw Materials for Plastics Using CO2 and Other Sources	1,262
⑧Development of fuel production technology using CO_2 and Other Sources	1152.8
⑨Development of Technology for Producing Concrete and Cement Using CO_2	567.8
⑩Development of technology to separate/capture CO_2	382.3
⑪Realization of carbon neutrality in the field of waste treatment and resource circulation	Pending
⑫Development of next-generation batteries/next-generation motors	1,510
⑬Development of in-vehicle computing and simulation technology for energy saving such as electric vehicles	420
⑭Establishment of a smart mobility society	1,130
⑮Establishment of next-generation digital infrastructure	1,410
【Addition】Establishment of a platform for IoT sensing	Pending
⑯Development of next-generation aircraft	210.8
【Addition】Development of electric aircraft	Pending
⑰Development of next-generation ships	350
⑱Development of CO_2 reduction and absorption technology for food/agriculture, forestry, and fisheries industries	159.2
⑲Promotion of carbon recycling using CO2 as a direct raw material through bio-manufacturing technology	1767 (Pending)

Direction of the policy for social implementation of innovations

- It is important to maximize leverage by blended finance combining the strengths of public and private finance on the mechanism of technology and market information sharing and on promotion to create new business entities using innovations.
- The direction of the policy response should be to provide these functions in a single integrated manner: ①Sharing technology and financial information, ②Encouraging the formation of new business entities, ③Complementing private finance in implementation phase.

Issues hearing from financial institutions

① Access to market and technical information of innovations

② Building new business entities as a users of innovations which are often different from developers.

③ Risk sharing for large-scale and long-term funds between public and private financial institutions

EU/US government's support

① Access to the technical expertise of public institutions

② Hands-on support, including equity investment etc.

③ Debt Guarantee Program

Direction of Japanese government's policy

Provide these functions in one integrated package.

1 **Sharing technology and financial information**
- Considering a mechanism to share technology and market information on innovation between public institutions and private financial institutions.

2 **Encouraging the formation of new business entities**
- Considering a mechanism to promote the formation of new business entities and provide hands-on support in terms of increasing the speed of implementation of innovations.

3 **Complementing private finance in implementation phase**
- Considering a mechanism to support for commercializing the innovative projects financially through a sort of public credit enhancement mechanism.