Ministry of Economy, Trade and Industry

Japan's CCS policy

March. 2025

Carbon Management Division
Agency for Natural Resources and Energy, METI

History of Japanese CCS Projects

2000 — **2011** — **2016**

10k t-CO_2 (1.5years)

300k t-CO_2 (3 years)

Societal implementation

Fundamental Research (Nagaoka CCS PJ)

- Subsurface monitoring
- Numerical simulation

Practical research & developments (Tomakomai Demonstration PJ)

- Safety management tech. for large-scale CCS
- Effective injection into large-scale reservoirs
- Promotion of Public Acceptance

Fundamental Tech. Developments (Post –monitoring of Nagaoka CCS PJ)

- Core sample tests
- Migration modeling (faults, wells)
- Numerical simulations
- Eval. of the env. impact on offshore areas
- Fiber-optic monitoring
- Geological modeling technology

Liquefied CO2 Shipping Demonstration Project

A demonstration project for long-haul transportation from emission sources to places suitable for storage will be carried out to establish liquefied CO2 shipping techniques.

Photo by New Energy and Industrial Technology Development Organization (NEDO) / Sanyu Kisen

Liquefied CO2 Shipping Demonstration Project

In the hub and cluster plan for CCS, liquefied CO2 ship transportation is an important technology for transporting CO2 which is captured at distant emission sources.

Route examples

Osaki CoolGen (IGCC)

- Capture
- Carbon Recycling R&D base

Maizuru Power Station (Coal fired power plant)

- Capture
- Coal fired power plant

Tomakomai CCS demonstration

- Storage and monitoring
- Tomakomai CCS/CR hub

Demonstration transportation of CO2 started in 2024

Superiority of CCS Value Chain of Japan

Japan has competitive CO2 capture, transport, storage, and total engineering technologies for the CCS value chain. In addition, it is possible to construct an integrated CCS system from capture to storage. (already demonstrated in the Tomakomai Demonstration Project.)

Room for Growth

Capture

- Regarding solid absorbents and separation membranes, Japan's technology has **advantages in terms of energy consumption and selectivity and durability of separation membranes.**
- **MHI supplies 70% of the world market share** for separation and recovery plants using the amine absorption method.

MITSUBISHI HEAVY INDUSTRIES

Transport (Maritime, Pipeline)

- **The low-temperature, low-pressure LCO2 carrier tanks**, currently being by NEDO, will be **the world's first technology** of its field once it implemented, and will enable **it as large as LNG carriers**(approx. several ten thousands of tons), thereby **attract demands from home and abroad**.
- Japanese companies have traditionally had an advantage in the manufacture of marine tanks for LCO2 carriers and marine equipment such as safety valves for tanks.

MOL Mitsui O.S.K. Lines

"K" LINE KAWASAKI KISEN KAISHA, LTD.

NIPPON STEEL

Storage/ Total Engineering

- Accumulation of technologies for monitoring technologies related to storage in Nagaoka, Tomakomai, and international joint research, which are shared by JCCS, technical research associations, and member companies.
- It is also **expected to be implemented to overseas reservoir development and attracts oil-producing countries**.

JGC

CHIYODA CORPORATION

Japan's "CCS Long-Term Roadmap"

[Basic principles]

To implement CCS systematically and rationally to promote the sound development of CCS business in Japan with minimal social costs, thereby contributing to the development of Japan's economy and industry, securing a stable energy supply, and the achievement of carbon neutrality.

[Objectives]

A business environment for commencement shall be prepared by 2030, involving cost reduction, public understanding, overseas CCS promotion, and CCS Business Act legislation, **based on the rough estimation of enabling CO_2 storage of about 120 to 240 million tons as of 2050, and full-scale CCS business shall deploy after 2030**.

[Specific actions]

(1) Government support for CCS business
(2) Efforts for reducing CCS costs
(3) Promotion of public understanding of CCS business
(4) Promotion of overseas CCS business
(5) Examination for the development of the CCS Business Act
(6) Formulation and review of the CCS Action Plan

The 7th Strategic Energy Plan（February,2025）

6. Expansion of Decarbonized Power Sources and Grid Development

<Thermal power>

- While the current supply and demand of electricity remains unpredictable, we **will maintain and secure the generation capacity (kW) necessary for a stable supply of** thermal power as a whole, **while reducing the amount of electricity generated (kWh), mainly from inefficient coal-fired power**. Specifically, we will **secure LNG-fired power** as a means of **transition**, promote the **decarbonization of thermal power** by utilizing hydrogen, ammonia, CCUS, etc., and give ongoing consideration to measures such as a **Reserve Power Plants system**.

9．CCUS/CDR

- CCUS can **achieve decarbonization in areas that are difficult to decarbonize through electrification and a shift to non-fossil sources using hydrogen and its derivatives**. Therefore, CCUS is indispensable for simultaneously achieving energy security, economic growth, and decarbonization. We will **consider support systems to encourage investment** in CCS projects, **develop technologies to reduce costs**, **develop suitable sites**, etc.
- CDR is necessary as a means to offset residual emissions.We will work to improve the environment, create markets, and accelerate technology development.

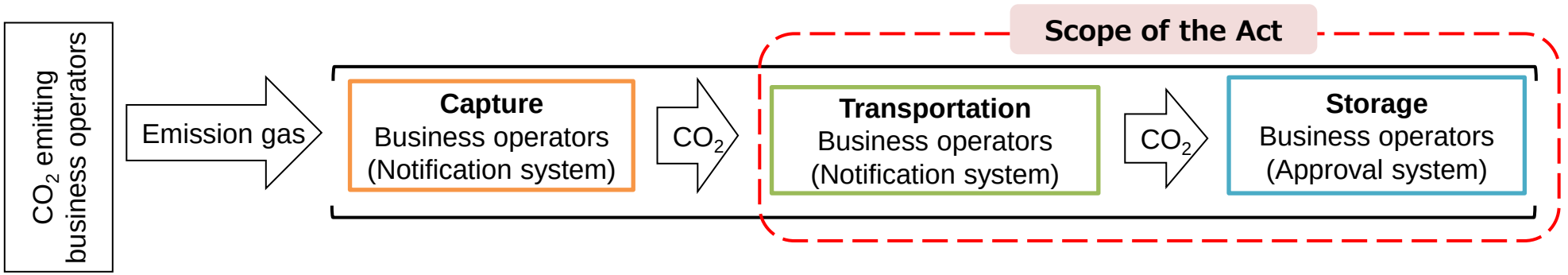
CCS Business Act (accepted on 24th May, 2024)

Purpose

◆Ensuring adequate business environment and public safety for CCS business in Japan

Scope

◆**Regulations for** business operators of **pipeline transportation** and **storage**
*Including **not only safety regulation** but **also economic regulation**
*Regulations for Carbon capture will be considered in the future



London Protocol

◆**Japan is the contracting parties to the London Protocol 1996**.

◆Together with CCS business Act, **acceptance of the amendment of London Protocol was approved** by the National Diet on this May which **enable Japan to export CO2.**

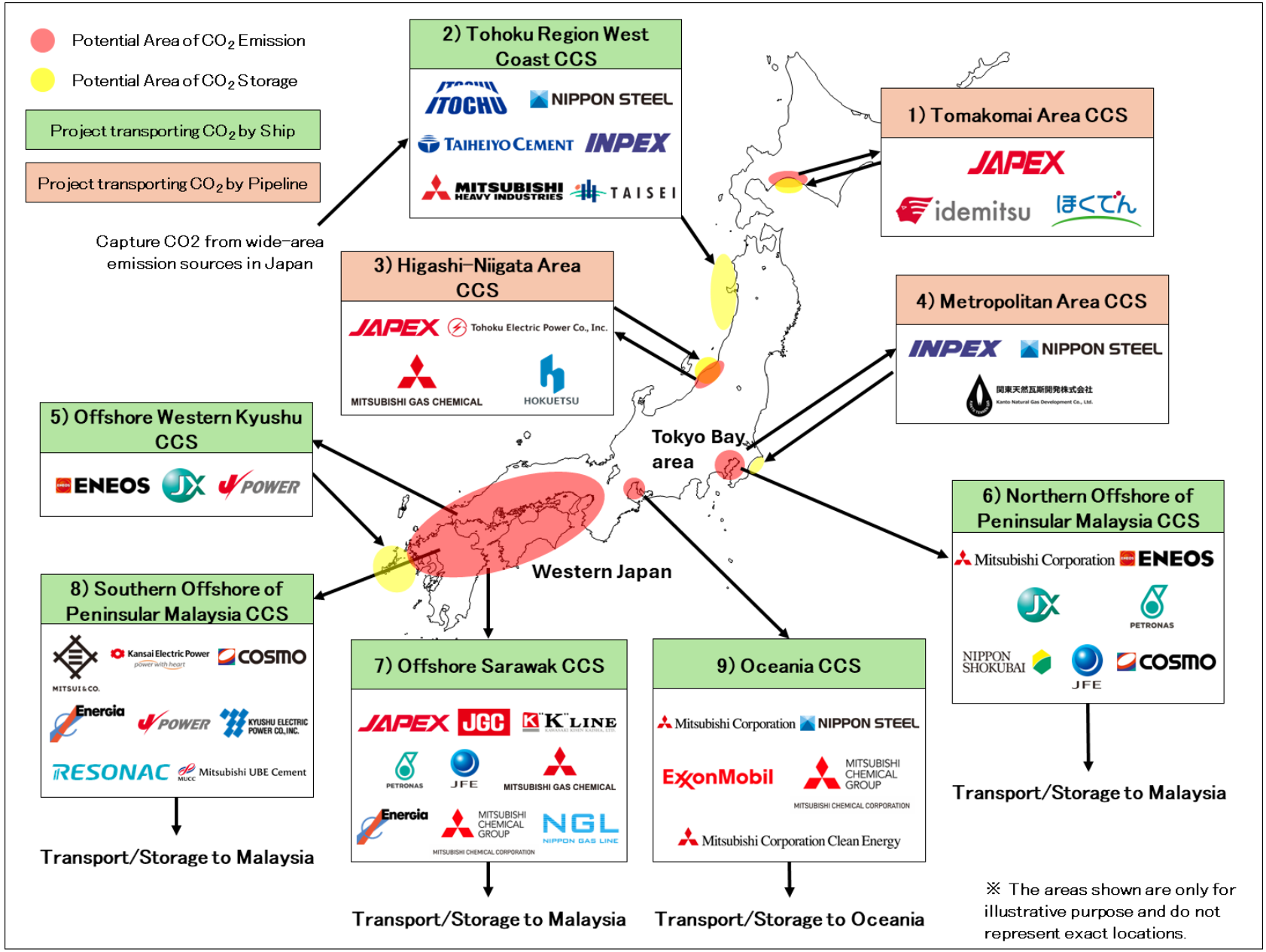
Purpose of “Advanced CCS Program”

- To secure annual storage of 120-240 million tons of CO2 by 2050, A business model for CCS that can cross-sectoral should be established at an early stage. Thus, Japanese government selected “Advanced CCS projects” led by operators and will actively support them.
- This supporting program will establish various CCS business models by supporting projects with different combinations of CO2 source, transportation methods and CO2 storage areas. Furthermore, it aims to secure 6-12 million tons of CO2 storage per year by 2030.
- This year, this program will provide support for the analysis of this geologic data and feasibility study.

Possible types of CO2 source, transport methods, and CO2 storage areas

CO2 sources	Transport methods	CO2 storage areas
Thermal power plant Steel plant Chemical plant Cement plant Paper plant Hydrogen plant etc.	Pipeline Ship	Onshore Near shore Offshore

Advanced Efforts for Commercialization of CCS
- JOGMEC selects Nine projects as Japanese Advanced CCS Projects -



Study to establish a support system for CCS

<Key Topics>

- ✓ Examination of support systems and financing schemes in leading overseas CCS cases
- ✓ CCS Cost reduction for business self-sustainability
- ✓ Coordination with the study and the discussion on GX-ETS and electricity decarbonization
- ✓ Coordination with the study on industrial site location for CN
- ✓ Earlier development of CO2 storage sites

<Schedule>

December, 2024	Release of Outline draft of the support system for CCS
Beginning of 2025	Detailed discussions based on Outline draft of the support system for CCS
Summer of 2025	Interim report of the support system

Support System for CCS (Outline draft)

1. Basic Concept

- **Ensure Japanese companies' competitiveness and business stability in the CCS market**
- Contribute to **the competitiveness of the hard-to-abate sector**, **the decarbonization of the energy sector**, and **the growth of CCS-related businesses**
- Consider progress of other decarbonization measures development

- Focus on the following risks in the CCS business;

➢ **Support focusing on the cost difference between CCS cost and CO2 cost***

➢ **Support both for CAPEX to start a CCS project and for OPEX until the project becomes self-sustaining**, addressing cost difference with uncertain timelines for resolution

➢ **Policy measures** to address **CO2 supply disruption risk, CO2 leakage risk, and post-injection discontinuation measures**.

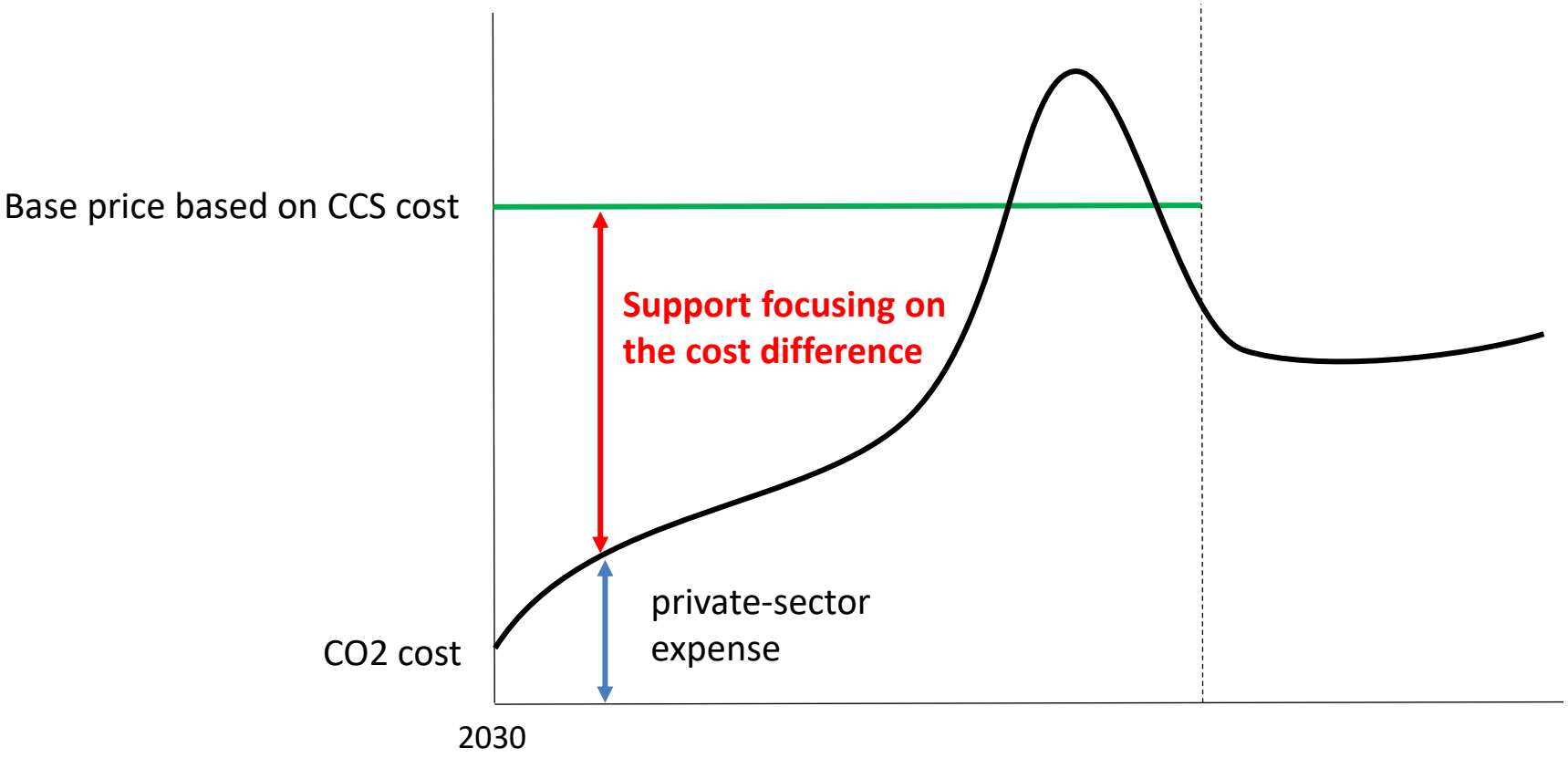
*cost burden to emitters derived from non-abatement

2. Mid-to-Long Term Support

- **Provide Mid-to-Long term support for CCS business projects starting after 2030 until CCS costs and CO2 costs are reversed.**

Image of Support System for CCS

- It is difficult to foresee when CCS cost and CO2 cost will be reversed. Therefore, support both for CAPEX to start a CCS project and for OPEX until the project becomes self-sustaining is necessary.
- This support should focus on the cost difference between CCS cost and CO2 cost.



Support System for CCS (Outline draft)

3. CCS Business Self-Sustainability

- To achieve self-sustainability of CCS business, **accelerate technological and market development and cost reduction through competition among businesses**.

4. Coordination with Other Policies Mechanism

- **Consider the different situations between the power and non-power sectors**, including GX-ETS auction-based emission allowances purchase scheme for power producers starting in 2033.
- **Coordinate with possible future support for CCS equipped thermal power in the Long-Term Decarbonized Power Source Auction** to avoid over/under-support.
- Coordinate with CCU regulations including those for synthetic fuels and methanation

5. Issues to Consider in Overseas Storage

- In addition to domestic storage, consider additional unique factors for overseas storage including **the business environment in storage countries** and **specifications for large-scale transport by LCO2 vessels**.