

Japan

Clear policy shifting CCS closer to commercial reality

Clear policy, a new law, and business-led momentum are shifting Japan's CCS sector toward execution. With new legislation in place, government-backed projects progressing, and bilateral agreements with Malaysia and Singapore under discussion, Japan is establishing a solid foundation for the commercial deployment of CCS. However, challenges remain in ensuring long-term storage access, cost competitiveness, and public acceptance.

Momentum – The Japanese government has reaffirmed CCS as a central pillar of its 2050 net zero strategy, with nine Advanced CCS Projects selected and a national roadmap targeting up to 240 Mtpa of CO₂ storage by 2050.

Drivers – The CCS Business Act, enacted in May 2024, establishes a legal framework for licensing site exploration, storage, and pipeline operations, boosting investor confidence and providing regulatory clarity. With the planned introduction of a cap-and-trade emissions trading system into the carbon credit market in Japan (GX-ETS) in April 2026, an increasing number of companies appear to be seriously considering domestic CCS deployment.

Progress – With demand for Liquefied CO₂ (LCO₂) carriers from CCS projects that transport CO₂ collected in Japan to storage sites by sea expected to grow, the Japanese government has initiated:

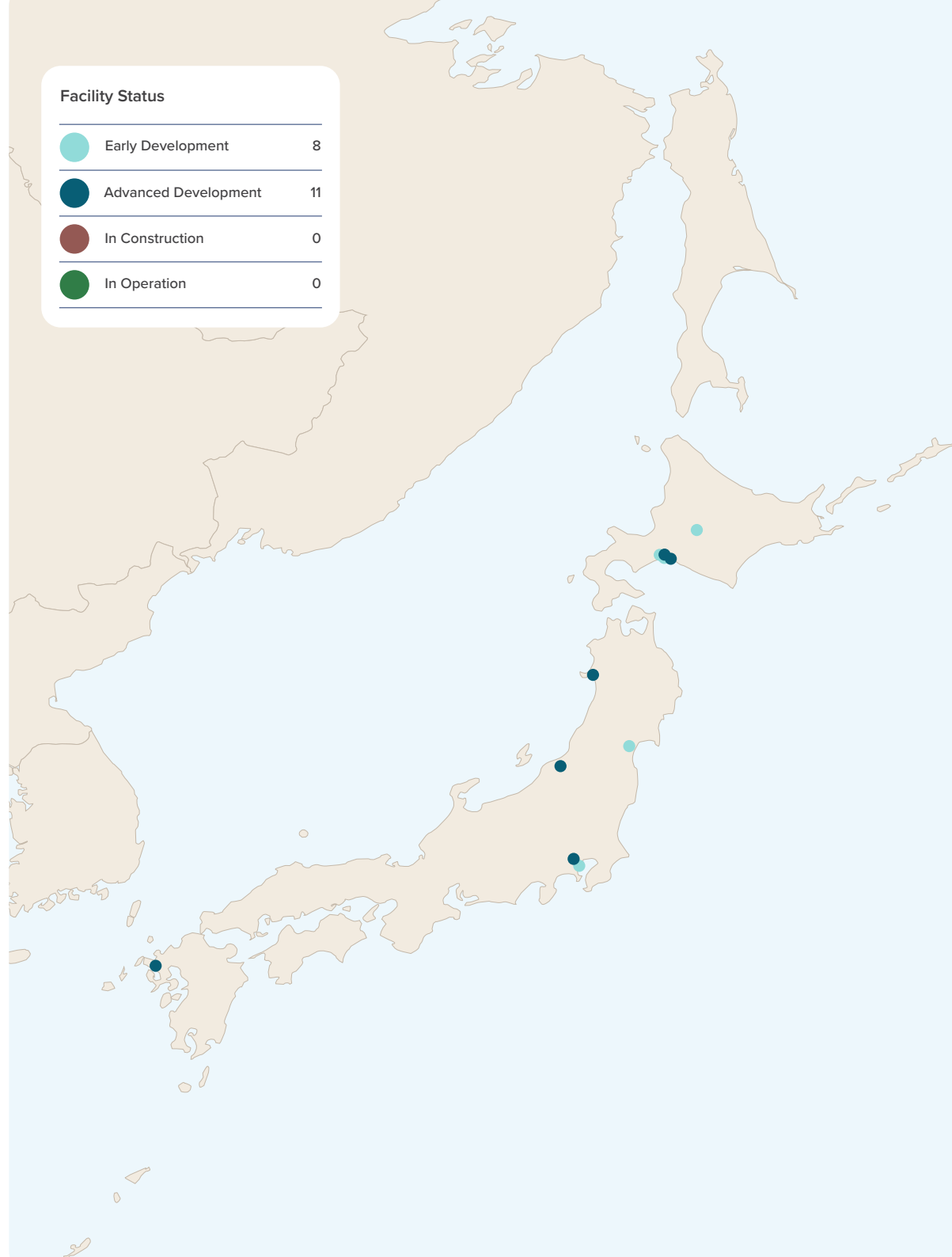
- ✓ R&D and Demonstration of CO₂ Ship Transportation, commissioned by NEDO (New Energy and Industrial Technology Development Organization)
- ✓ JOGMEC (Japan Organization for Metals and Energy Security) has established a council in collaboration with METI (Ministry of Economy, Trade and Industry) aimed at standardising specifications for CO₂ ship transport and reducing associated transportation costs.

In parallel, seven private companies are jointly studying how to establish standard specifications and designs for LCO₂ carriers.

Challenge – Japan's limited onshore storage options heighten its reliance on international partnerships, while public awareness remains an area that needs attention. To operate nine Advanced CCS Projects from 2030, each project proponent is required to make a final investment decision in 2026. The Japanese government is planning to support the cost of exploratory drilling required for the final investment decision.

Facility Status

● Early Development	8
● Advanced Development	11
● In Construction	0
● In Operation	0





Tomakomai CCS Demonstration Project, image courtesy JCCS.

Japan's policy ambition is backed by law, projects, and funding. As demonstration turns to deployment, success will hinge on timely permitting, international partnerships, and public support. Japan is not only scaling CCS at home but also shaping the regional ecosystem for decarbonisation.

Policy

Japan's CCS Business Act, passed in May 2024, provides a comprehensive legal foundation for CO₂ geological storage and transportation, setting a model for regulatory certainty and private-sector mobilisation.

The Act introduced a licensing regime (both onshore and offshore) for:

- Exploration rights for geological surveys.
- Storage rights for CO₂ injection and monitoring.
- CO₂ pipeline regulations under a notification system to expedite CO₂ pipeline development.

The Seventh Energy Strategy Plan produced by METI in February 2025 noted that "CCUS can achieve decarbonisation in areas that are difficult to decarbonise 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 decarbonisation."

Under the Designation of Specified Area in the CCS Business Act, METI designated an offshore location in Tomakomai City in Hokkaido Prefecture as a specified area in February 2025. The first granting of an exploration licence under the CCS Business Act was issued in September 2025.

Projects

Early projects laid Japan's CCS foundation:

- Tomakomai Demonstration Project: Full-chain pilot project by JCCS (2016–2019), storing 300,000+ tCO₂ offshore.
- Osaki CoolGen: Ongoing IGCC/IGFC demonstration near Hiroshima with capture-ready design.

In June 2024, JOGMEC announced nine CCS Advanced CCS Projects, focusing on feasibility studies to capture and store CO₂ emissions. These projects are strategically located across industrial regions, aiming to leverage existing infrastructure and suitable geological formations. Five are expected to store CO₂ domestically, and four to store CO₂ in Malaysia (three) and Oceania (one). The initiative aligns with Japan's carbon neutrality goals and its objectives around enhancing technological capability, and reflects a nationwide push for CCS adoption.

Japan recognises that cross-border CCS is essential to overcome its domestic storage constraints. As an example, it is negotiating CO₂ export frameworks with Malaysia.

Finance

Robust public support continues:

- Japan Climate Transition Bonds are a government-backed financing tool for CCS and other transition infrastructure. The proceeds from the Bonds have not yet been allocated to CCS projects, but may be in future. (Ministry of Finance et al., 2024)
- METI in January initiated discussion of a new CCS funding scheme that is expected to be consolidated by the end of 2025.

The scheme aims to provide support to address the uncertainty of the gap between the cost of CCS and the cost of unabated CO₂, which can include taxes, the cost of purchasing credit, profit/loss due to low environmental value, and other factors. The support will target not just capex to start the CCS project but also opex to sustain the project.

Advances

Japan is advancing CO₂ separation and capture technologies under the Green Innovation Fund, targeting low-concentration (below 10%) and low-pressure flue gas sources such as from natural gas power plants and industrial exhausts. The initiative aims to achieve a CO₂ capture cost of under Yen 2,000 per tonne by 2030, supporting both large-scale and mid-sized capture applications.

Seven major R&D projects are underway, covering a broad range of technologies: solid sorbents, membranes, cryogenic methods, electrochemical separation, and innovative absorbents. Notable participants include Chiyoda Corporation, JERA, DENSO, Resonac, Sumitomo Chemical, Air Water Inc., and Toho Gas, as well as universities and national research institutes.

These projects are designed not only for power and industrial decarbonisation, but also as enabling technologies for BECCS and DAC.

Standardised testing infrastructure for CO₂ separation materials is also being developed, led by AIST (National Institute of Advanced Industrial Science and Technology) and RITE (Research Institute of Innovative Technology for the Earth), to promote international alignment.

The program is supported by approximately Yen 38 billion in public funding from NEDO, covering all seven projects through to 2030.

This initiative is expected to contribute significantly to Japan's industrial decarbonisation strategy and strengthen its leadership in carbon capture technologies. The integration of capture systems with downstream CO₂ utilisation pathways is also being explored, including chemical production and e-fuel synthesis (NEDO, 2025).

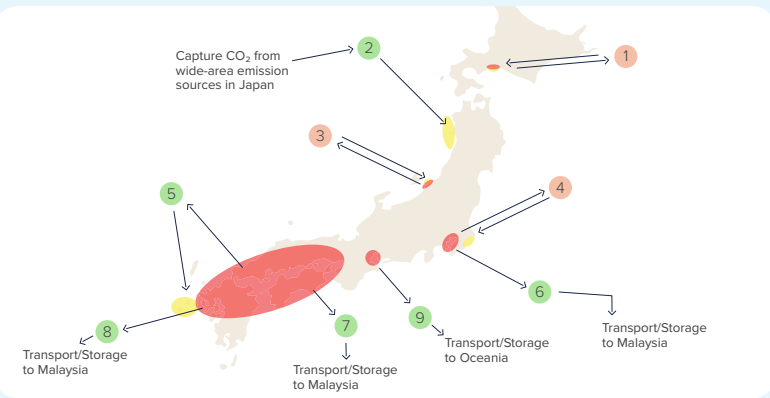


Japan is advancing CO₂ separation and capture technologies under the Green Innovation Fund, targeting low-concentration (below 10%) and low-pressure flue gas sources such as from natural gas power plants and industrial exhausts.

9 selected Japanese Advanced CCS Projects

Source: JOGMEC

- Potential Area of CO₂ Emission
- Potential Area of CO₂ Storage
- Project transporting CO₂ by Ship
- Early Development CO₂ by Pipeline



Project	Participants	Location
1 Tomakomai Area CCS	Japex Idemitsu Hepco	Hokkaido
2 Tohoku Region West Coast CCS	Itochu Nippon Steel Taiheiyō Cement Inpex Mitsubishi Heavy Industries Taisei	Tohoku
3 Higashi-Niigata Area CCS	Japex Mitsubishi Gas Chemical Hokuetsu Tohoku Electric Power Co. Inc.	Niigata
4 Metropolitan Area CCS	Inpex Nippon Steel Kanto Natural Gas Development	Tokyo Bay Area and Chiba
5 Offshore Western Kyushu	ENEOS ENEOS Xplora J-Power	Offshore Kyushu
6 Northern Offshore of Peninsula Malaysia CCS	Mitsubishi Corporation ENEOS ENEOS Xplora Nippon Shokubai JFE Cosmo Petronas	Tokyo Bay Area, for transport/storage to Malaysia
7 Offshore Sarawak CCS	Japex JGC "K" Line Petronas JFE Mitsubishi Gas Chemical EnerGia Mitsubishi Chemical Group Nippon Gas Line	Western Japan, for transport/storage to Malaysia
8 Southern Offshore of Peninsular Malaysia CCS	Mitsui & Co Kansai Electric Power Cosmo EnerGia J Power Kyushu Electric Power Co. Inc. Resonac Mitsubishi UBE Cement	Western Japan, for transport/storage to Malaysia
9 Oceania CCS	Mitsubishi Corporation Nippon Steel ExxonMobil Mitsubishi Chemical Group Mitsubishi Corporation Clean Energy	Chubu, for transport/storage to Oceania



EXCOOL transportation ship, image courtesy JCCS.

Standardisation of specifications for CO₂ ship transport

Public sector

JOGMEC has established a council in collaboration with METI to support the promotion and expansion of CCS projects. The council aims to standardise specifications for CO₂ ship transport and reduce associated transportation costs. The resulting guideline (first edition) for use as a reference for future CCS projects considering CO₂ ship transport was finalised in 2025 and is publicly available (JOGMEC, 2025).

Private sector

As the demand for LCO₂ carriers is expected to grow from various CCS projects that transport CO₂ collected in Japan by sea to storage sites, it is necessary to build and supply LCO₂ carriers in Japan to realise the CCS value chain and improve economic efficiency.

Seven companies have agreed to conduct a joint study to establish standard specifications and designs for LCO₂ carriers and to establish a construction supply chain – “K” LINE, MOL, NYK Line, Mitsubishi Shipbuilding, Imabari Shipbuilding, JMU, and Nihon Shipyard (“K” LINE et al., 2024).

R&D and demonstration

A consortium led by Japan CCS Co., Ltd., which included the Engineering Advancement Association of Japan, ITOCHU Corporation, Nippon Gas Line Co., Ltd. (from Nov. 2023), Nippon Steel Corporation (to March 2024), was jointly commissioned by NEDO in June 2021 to conduct the R&D and Demonstration of CO₂ Ship Transportation Project.

With a view to the implementation of CCUS around 2030, the project conducts technology development and demonstration of CO₂ ship transportation from emission sources to utilisation/storage points to advance the establishment of integrated liquefied CO₂ transportation technology.

The demonstration tests on the transport of liquefied CO₂ by ship at low temperatures and low pressure (-50°C, 0.7 MPa, etc.) are the first of their kind globally, and are expected to yield significant results in the safe and low-cost, long-distance mass transport of CO₂.

Since November 2024, the demonstration ship EXCOOL has been transporting CO₂ back and forth between the Maizuru and Tomakomai terminals, with liquefied CO₂ repeatedly unloaded, stored, and loaded at both terminals under various temperature and pressure conditions. Safety and design standards will be proposed after the collection and analysis of demonstration test data, contributing to the social implementation of CCUS. International rules required for the long-distance, mass transportation of liquefied CO₂ will also be proposed, along with a business model for CO₂ ship transportation.