

August 4, 2026

Hitachi, Ltd.

Mitsui O.S.K. Lines, Ltd.

Japan Airlines Co., Ltd.

Hitachi, MOL, and JAL Sign MOU to Conduct Japan's First Pilot Test of Carbon Dioxide Removal Technology on Kume Island, Okinawa

Direct Ocean Capture (DOC): a technology for recovering CO₂ directly from the ocean



Installation Image and Location of the Pilot test site

Tokyo, August 4, 2026 Hitachi, Ltd. (TSE:6501, "Hitachi"), Mitsui O.S.K. Lines, Ltd. ("MOL"), and Japan Airlines Co., Ltd. ("JAL") have signed a Memorandum of Understanding (MOU) to conduct Japan's first^{*1} pilot test on Kume Island, Okinawa Prefecture, utilizing Direct Ocean Capture (hereinafter "DOC")—a technology that directly separates and captures CO₂ dissolved in seawater.

In this pilot test, the three companies aim to confirm the applicability of DOC technology using seawater from around Kume Island, and obtain foundational data on operational challenges and environmental impacts for deployment along Japan's coast. Specifically, the test will use containerized pilot equipment installed on land on Kume Island, taking in seawater to separate CO₂. In addition to this initiative, Kume Island hosts cutting-edge pilot projects that leverage its location, such as Ocean Thermal Energy Conversion (OTEC)^{*2}. With a concentration of expertise and talent in ocean research, the island offers an optimal environment for conducting Japan's first DOC pilot test.

Based on the knowledge gained from this project, the three companies will explore potential applications and expansion of DOC technology—including local utilization of captured CO₂, as

well as promotional and environmental education initiatives centered on this pilot test—to contribute to the creation of new ocean-based value (the Blue Economy^{*3}).

*1 Japan's first: As a DOC pilot test using pilot equipment connected to a seawater intake system, drawing in, processing, and discharging seawater from actual sea areas. As of July 2026, based on research by the three companies.

*2 Ocean Thermal Energy Conversion (OTEC): A renewable energy generation system that produces electricity by driving turbines using the temperature difference (approx. 20°C) between warm surface seawater and cold deep seawater.

*3 Blue Economy: An economic model that balances economic growth, improved livelihoods, and the health of ocean ecosystems through the sustainable use of ocean resources.

Background of the Pilot Test

In "hard-to-abate" sectors such as shipping and aviation, where electrification alone is difficult and emissions are hard to reduce, offsetting emissions has become a key challenge alongside corporate reduction efforts.

As demand continues to grow, expectations are rising for CO₂ removal technologies as a key means to address this, driving the need to establish technologies that directly remove CO₂ through engineered approaches. Establishing a domestic ecosystem is also becoming increasingly important from the perspective of curbing the future cost of procuring carbon credits^{*4} from overseas.

The three companies have invested in Captura Corp., a U.S.-based DOC technology developer, through their respective investment subsidiaries and other channels, and have been jointly exploring a domestic pilot test toward the deployment of Captura's technology in Japan by combining the expertise of each company. The companies position this pilot test as a first step toward building an island-based, domestically self-sufficient carbon economy in which the recovered CO₂ is ultimately utilized as a feedstock for synthetic fuels such as E-SAF^{*5}.

*4 Carbon credit: A mechanism that quantifies GHG emission reductions or removals/absorptions so they can be traded between companies.

*5 E-SAF: Next-generation synthetic aviation fuel with low environmental impact, produced by synthesizing captured CO₂ and renewable-energy-derived hydrogen.

About DOC Technology

DOC is a method for directly removing CO₂ from seawater. Seawater naturally absorbs carbon until it reaches equilibrium with CO₂ concentrations in the atmosphere. Artificially extracting and removing CO₂ from seawater disrupts this balance, prompting the ocean to absorb more CO₂ from the atmosphere to make up for the deficit. By repeating this cycle, atmospheric CO₂ concentrations can be effectively lowered via the ocean. The concentration of CO₂ in seawater is approximately 100 to 150 times higher than in the atmosphere. DOC is widely expected to be a promising climate change solution capable of capturing CO₂ at lower costs and with lower energy consumption.

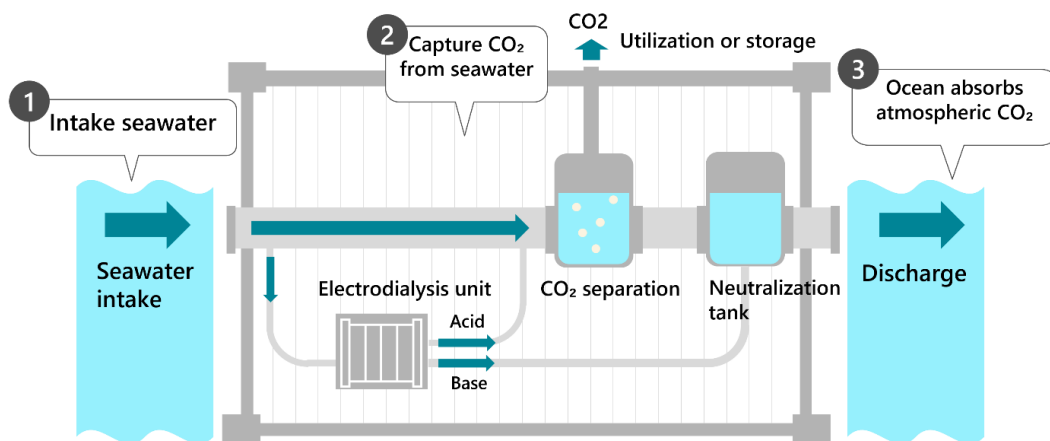


Image of DOC

Roles of the Three Companies

Hitachi: Under its management plan, "Inspire 2027," the Hitachi Group has established its sustainability strategy, PLEDGES^{*6}, and is leading this initiative. Utilizing advanced analytical instruments and characterization methods from Hitachi High-Tech Corporation, Hitachi will measure and record operating status and water quality/environmental data (e.g., Dissolved Inorganic Carbon (DIC) and pH in seawater). By analyzing this data and implementing Physical AI that directly feeds insights back into actual plant operations, Hitachi aims to identify and control operating conditions that deliver high energy efficiency. Furthermore, by recording and verifying data on the amount of CO₂ captured and the electricity consumed, it will contribute to building an MRV^{*7} data platform for generating highly trustworthy carbon credits. Hitachi Industrial Products, Ltd. will advance studies toward proposing and supplying the core equipment required for commercial plants. Through One Hitachi, the Hitachi Group aims to establish an intelligent DOC model originating in Japan.

MOL: The MOL Group positions its environmental strategy as a key initiative under its group management plan "BLUE ACTION 2035," advancing decarbonization initiatives as an ocean-based social infrastructure company. In this pilot test, MOL will leverage the local foundation established through a comprehensive partnership agreement^{*8} with Kumejima Town, Okinawa Prefecture, to build cooperative relationships with local stakeholders and prepare the pilot environment. Based on the insights gained, MOL aims to contribute both to expanding the use of DOC technology and to creating new local businesses and regional initiatives on Kume Island.

JAL: As part of its Green Transformation (GX) strategy under the "JAL Group Management Vision 2035," the JAL Group has identified carbon dioxide removal (CDR) technologies as a key initiative. In this pilot test, together with Japan Transocean Air Co., Ltd. and Ryukyu Air Commuter Co., Ltd., both of which operate flights to Kumejima, the JAL Group will leverage regional partnerships to lead promotional activities and raise awareness of DOC technology

both within and outside the industry. Furthermore, JAL will evaluate the utility of DOC technology with a view toward future procurement of E-SAF manufactured from captured CO₂.

*6 PLEDGES: Sustainability strategy formulated in the Hitachi Group's management plan "Inspire 2027," consisting of seven pillars including decarbonization and resource circulation.

*7 MRV: Stands for Measurement/Monitoring, Reporting, and Verification. A series of processes and frameworks to accurately measure, report, and third-party verify greenhouse gas (GHG) emissions and reductions.

*8 For details, please refer to the press release : <https://www.mol.co.jp/en/pr/2025/25083.html>

About Hitachi, Ltd.

Through its Social Innovation Business (SIB) that brings together IT, OT(Operational Technology) and products, Hitachi aims to be a global leader in continuously transforming social infrastructure through digital, contributing to a harmonized society where the environment, wellbeing, and economic growth are in balance.

Hitachi operates worldwide across four sectors – Digital Systems & Services, Energy, Mobility, and Connective Industries – as well as a Strategic SIB Business Unit focused on new growth areas. With Lumada at its core, Hitachi creates value by combining data, technology and domain knowledge to solve customer and social challenges. Revenues for FY2025 (ended March 31, 2026) totaled 10,586.7 billion yen, with 606 consolidated subsidiaries and approximately 290,000 employees worldwide. Visit us at www.hitachi.com.

About MOL

Headquartered in Japan, Mitsui O.S.K. Lines, Ltd. (MOL) is one of the world's leading shipping companies, operating more than 900 vessels around the world. To respond to the ever-changing needs of society—including environmental conservation—MOL is developing a wide range of social infrastructure businesses and related technologies and services, with shipping at their core. MOL's fleet includes dry bulk carriers, LNG carriers, car carriers, and tankers. Alongside its traditional shipping business, MOL operates social infrastructure businesses such as terminals, logistics, and offshore wind power, as well as wellbeing lifestyle businesses including real estate, cruises, and ferries. With one of the world's largest fleets and over 140 years of history, experience, and technology, MOL is evolving into a global social infrastructure company that supports people's daily lives from the blue seas, opens up a prosperous future, and delivers new value to all its stakeholders.

Website: <https://www.mol.co.jp/en/>

About JAL

Japan Airlines (JAL) was founded in 1951 and, as a member of the oneworld® alliance, operated a fleet of 234 aircraft as of March 2026 and, together with its codeshare partners, provides a network covering 413 airports in 71 countries.(*). Certified as a Skytrax "5-Star Airline" and as "World Class" by APEX, a North America-based airline non-profit, JAL is one of the world's leading airline groups and is taking new steps toward the realization of "JAL Vision 2035" with safety as its foundation. Under the brand slogan "Soaring Together," the group aspires to be an airline group in which customers can enjoy, across all scenes of life including their everyday moments, "authentic experiences that stimulate the five senses, encouragement to take a new step, and connections that enrich life." For more information, please visit

<https://www.jal.com/en/>.

(*) The network figure includes services operated by group airlines.

Business Contact

Hitachi, Ltd.

[Inquiry Form : Industry : Hitachi](#)