

INPEX, Osaka Gas Commence Demonstration Operations at World's Largest-Class Methanation Test Facility

INPEX CORPORATION (INPEX) and Osaka Gas Co., Ltd. (Osaka Gas) commenced demonstration operations of a methanation test facility for a joint technology development project aimed at the practical implementation of a CO₂ methanation system to achieve carbon neutrality for city gas. This follows the completion of construction and trial operations of the test facility.

The project was initiated by INPEX in 2021 after it was selected for a subsidy program by the New Energy and Industrial Technology Development Organization (NEDO). Construction of the test facility—the world's largest-class*¹ with a capacity of 400 Nm³-CO₂/h (an annual production capacity equivalent to the gas consumption of approximately 10,000 households)—began in 2023. Synthetic methane (e-methane*²) produced at the facility was successfully injected into a natural gas pipeline on February 20.

The test facility consists of equipment for raw material supply, methanation and utilities. Using CO₂ separated and recovered from the Koshijihara Plant within INPEX JAPAN Corporation's (INPEX JAPAN) Nagaoka Field Office (located in Nagaoka City, Niigata Prefecture) as raw material, it is designed to produce e-methane. Through trial operations at the test facility, the technical development goal of producing synthetic methane with a methane concentration of 96% was successfully achieved. Going forward, a portion of the synthetic methane produced will be injected into INPEX JAPAN's natural gas pipeline via the Koshijihara Plant. In addition, the demonstration operations at the test facility will prioritize safety and environmental considerations.

In this project, INPEX oversees the overall management of the project and the operation of the test facility. Concurrently, INPEX will accumulate expertise in CO₂-methanation technology and operational experience with the equipment, scale up the reaction system, and study its applicability for deployment in promising regions. Osaka Gas is responsible for the reaction process technology development of the CO₂-methanation facility. It will leverage energy-efficient catalytic technology for synthetic methane production and design know-how related to scale-up, among other expertise, to advance the design of equipment and processes for further optimization.

Furthermore, this test facility has received certification as a clean gas production facility under the "Clean Gas Certificate System*³," which is supported by the Japan Gas Association. This certification was granted as of January 27, 2026. The environmental value of the synthetic methane produced can now be provided in the form of certificates after undergoing "Clean Gas Equivalent Certification."

INPEX announced its INPEX Vision 2035 on February 13, 2025, stating its commitment to achieving "responsible energy transition." As part of this vision, INPEX aims to advance low-carbon solutions centered around CCS (carbon capture and storage) and hydrogen by 2035 as one of its growth pillars.

The Daigas Group (Osaka Gas Group), under its initiative "Energy Transition 2050" announced in February 2025, is working on the development of technologies and services that contribute to a

decarbonized society, aiming to address social challenges such as climate change. The group seeks to establish itself as a corporate group that supports the evolution of everyday life and business.

Through this project, INPEX and Osaka Gas are committed to accelerating the early societal implementation of carbon-neutral city gas using CO₂ methanation.

*1 Based on the production capacity of the facility, according to research by the e-NG Coalition.

*2 As defined and announced by the Japan Gas Association: "A term used for synthetic methane produced using green hydrogen and other non-fossil energy sources as raw materials" (<https://www.gas.or.jp/en/gastainable/e-methane/>).

*3 An initiative whereby certificates are issued for clean gas (synthetic methane or biogas) that carries environmental value (considered not to increase atmospheric CO₂ even when burned). This system separates environmental value from energy value to allow for their transfer independently (<https://www.clean-gas-certificate.com/>).



Aerial photo of the test facility (as of June 2025)

[Reference]

Overview of the Methanation Demonstration Project

NEDO Subsidy Project Name	Development of practical technology for pipeline injection using a large-scale CO ₂ methanation system
Structure	INPEX CORPORATION (Subsidized by NEDO): Feasibility study for commercial-scale application Osaka Gas Co., Ltd. (Contracted by INPEX): Development of reactive process technology Nagoya University, Tokai National Higher Education and Research System (Contracted by INPEX): Development of simulation technology INPEX JAPAN Corporation (Contracted by INPEX): Construction and demonstration operations of the test facility
Period	Second half of fiscal year 2021 to the end of fiscal year 2026
Location	Connected to the Koshijihara Plant at INPEX JAPAN's Nagaoka Field Office, where the test facility is constructed
Overview	(1) Feasibility study for scaling up and evaluating applicability and economic viability for commercial-scale reaction systems (2) Development and establishment of large-scale CO ₂ methanation reaction process technologies with a focus on evaluating base performance of processes and long-term durability of catalysts (3) Development of reaction simulation technology for understanding catalyst-driven CO ₂ methanation reactions (4) Construction, Demonstration Operation, and Evaluation of the Test Facility

■Media inquiries

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