

December 20, 2024

Tokyo Gas Co., Ltd. Signs Memorandum of Understanding with PETRONAS to Jointly Explore Carbon Neutral Technologies

**– Advancing Collaboration for Cost Reduction in Hydrogen
Production and CCS –**

Tokyo Gas Co., Ltd.

Tokyo Gas Co., Ltd. (hereinafter "Tokyo Gas") signed a Memorandum of Understanding (hereinafter "the MoU") with Petroliaam Nasional Berhad (hereinafter "PETRONAS"), a global energy company, to jointly explore carbon neutral related technologies.

This MoU is signed with the aim of strengthening the relationship between the two companies while complementing each other's technologies and expanding collaboration in a wide range of areas related to carbon-neutral related technologies. Specifically, the companies anticipate conducting joint studies on hydrogen production technology and carbon capture and storage (CCS) technology, while promoting efforts towards achieving carbon neutrality.



(From Left: YM Tan Sri Tengku Muhammad Taufik, President & Group Chief Executive Officer, PETRONAS; Ir. Mohd Yusri Mohamed Yusof, Senior Vice President, Project Delivery & Technology, PETRONAS; YAKABE Hisataka, General Manager of Hydrogen & Carbon Management Technology Strategy Dept., Green Transformation Company; and SASAYAMA Shinichi, Director, Representative Corporate Executive Officer, President and CEO, Tokyo Gas Co., Ltd.)

Specific Areas of Exploration

■ Hydrogen Production Technologies

Tokyo Gas is working on the development of core components for water electrolysis systems used in hydrogen production, aiming to reduce the cost of hydrogen production. Specifically, the company has established a high-speed production technology for catalyst-coated membranes (CCMs), which are crucial components that influence the performance, cost, and durability of cell stacks for water electrolysis.^{*1} PETRONAS, on the other hand, possesses high-efficiency cell stack technology for water electrolysis. By applying Tokyo Gas's CCMs to that technology, the companies aim to further reduce the cost of hydrogen production. Using the water electrolysis system from this initiative, the companies aim to improve e-methane production energy and performance efficiency and reduce future costs.

■ CCS Technologies

Tokyo Gas is working on the development and commercialization of microbubble technology^{*2}, which aims to enhance the efficiency of Carbon Capture and Storage (CCS) through CO₂ bubbles at micron size, thereby allowing for the underground storage of a larger amount of CO₂. Petronas is actively exploring CCS projects and aims to further reduce CCS costs by potentially applying microbubble technology.

Comment from KIMOTO Kentaro, Tokyo Gas Representative Corporate Executive Officer, Vice President, CTO, and Chief Executive of Green Transformation Company

PETRONAS and our company have built a strong relationship of trust over more than 40 years of LNG transactions. Based on this trust, both companies are taking steps towards conducting joint studies on the construction of an e-methane supply chain^{*3} towards the common goal of achieving carbon neutrality. We are very pleased that with the signing of this MoU, our collaboration will expand into the field of carbon-neutral technology development, further strengthening our relationship. By leveraging the strengths of both companies, we strongly expect that carbon-neutral technologies will be realized at an early stage, contributing to the achievement of carbon neutrality in Malaysia, Japan, and the world, as well as to the growth of both companies.

Comment from Senior Vice President of Project Delivery & Technology, PETRONAS, Ir. Mohd Yusri Mohamed Yusof

Our enduring partnership with Tokyo Gas, built on over four decades of trust and collaboration in LNG, is now entering an exciting new chapter. This MoU signifies our mutual commitment to achieving carbon neutrality and net zero carbon aspirations. By integrating our technological strengths and expertise in hydrogen production and CCS, we will not only unlock a more affordable and accessible energy source but also accelerating decarbonization efforts for a more sustainable future for Malaysia, Japan and the world.

Tokyo Gas is advancing efforts to achieve Net-Zero CO₂ as outlined in its group management vision "Compass 2030" by combining measures such as renewable energy, hydrogen, methanation, and

CCUS, and collaborating with various domestic and international partners. Through the initiatives outlined in this MoU, the companies aim to contribute to the Japanese government's goal of achieving carbon neutrality by 2050.

- *1: Establishment of Mass Production Technology for Catalyst-coated Membranes (CCMs) for Water Electrolysis toward Low-cost Green Hydrogen Production (announced on March 15, 2023)
- *2: Joint development with the Research Institute of Innovative Technology for the Earth (RITE)
- *3: Joint Feasibility Study in Malaysia to establish Supply Chain of Carbon Neutral Methane (announced on November 25, 2021)