Osaka Gas and MHI Launch CO$_2$NNEX® Digital Platform for Management and Transfer of Clean Gas Certificates for e-Methane, for Use during Expo 2025

Tokyo, February 18, 2025 – Osaka Gas Co., Ltd. (Osaka Gas) and Mitsubishi Heavy Industries, Ltd. (MHI) today initiated operations for CO$_2$NNEX®, the city gas industry's first digital platform to enhance visibility in carbon dioxide (CO$_2$) trading and facilitate the transfer and management of Clean Gas Certificates, which certify the environmental value of e-methane,[1] allowing for use of the system during Expo 2025 Osaka, Kansai, Japan (the Expo).[2]

The CO$_2$NNEX platform will be used during the Expo to support Osaka Gas' e-methane production and utilization demonstration[3] by accumulating data and providing visibility on the amount of e-methane biogas produced, as well as its raw materials (CO$_2$ and H$_2$), and CO$_2$ emissions throughout the life cycle. It will also be utilized to manage utilization of the clean gas certificates generated by the demonstration. The clean gas certificates for the e-methane and biogas produced by Toho Gas Co., Ltd., Nihon Gas Co., Ltd., and Hokuriku Gas Co., Ltd. will be transferred through the platform and used for the natural gas supplied by Osaka Gas to the Expo site, contributing to the carbon neutrality of the Expo. The Gas Pavilion and Expo demonstration area presented by the Japan Gas Association will also feature videos for visitors introducing the forward-thinking initiatives by the city gas industry to systematize the transfer of clean gas certificates. (Fig. 1)

**Fig. 1: System for transfer of Clean Gas Certificate through CO$_2$NNEX**
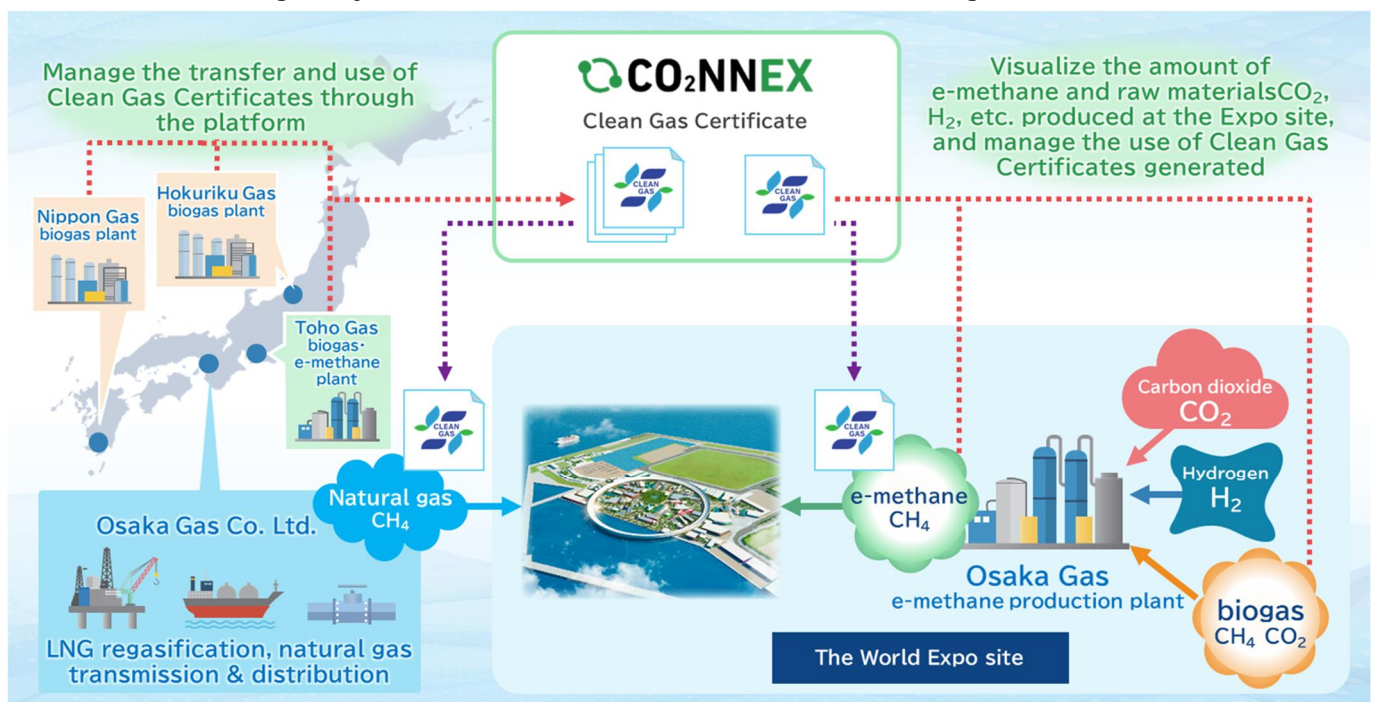
Expo site image courtesy of Japan Association for the 2025 World Exposition

To ensure efficient operation of the platform, Osaka Gas and MHI solicited advice from the Japan Gas Association, and held discussions with Toho Gas, Nihon Gas, and Hokuriku Gas, the companies that will use CO₂NNEX for exchange of clean gas certificates for the Expo, as well as with INPEX CORPORATION, which acted as advisor during the proof of concept stage for the system.[4] The aim of these measures was to enhance user convenience and reliability in the transfer and management of clean gas certificates.

Along with the reuse of CO_2 (CCU[5]), such as for e-methane and recycled carbon fuels (e-fuel, SAF, Green LPG), practical applications for CO_2 storage (CCS[6]) technology are expected to emerge in the future. Osaka Gas and MHI are also considering implementing the CO₂NNEX digital platform for CO_2 distribution management in the CCS demonstration project currently being developed, with the aim of utilizing it as a management system for the establishment of the CO_2 value chain. (Fig. 2)

Fig. 2: Conceptual image of the CO2 value chain
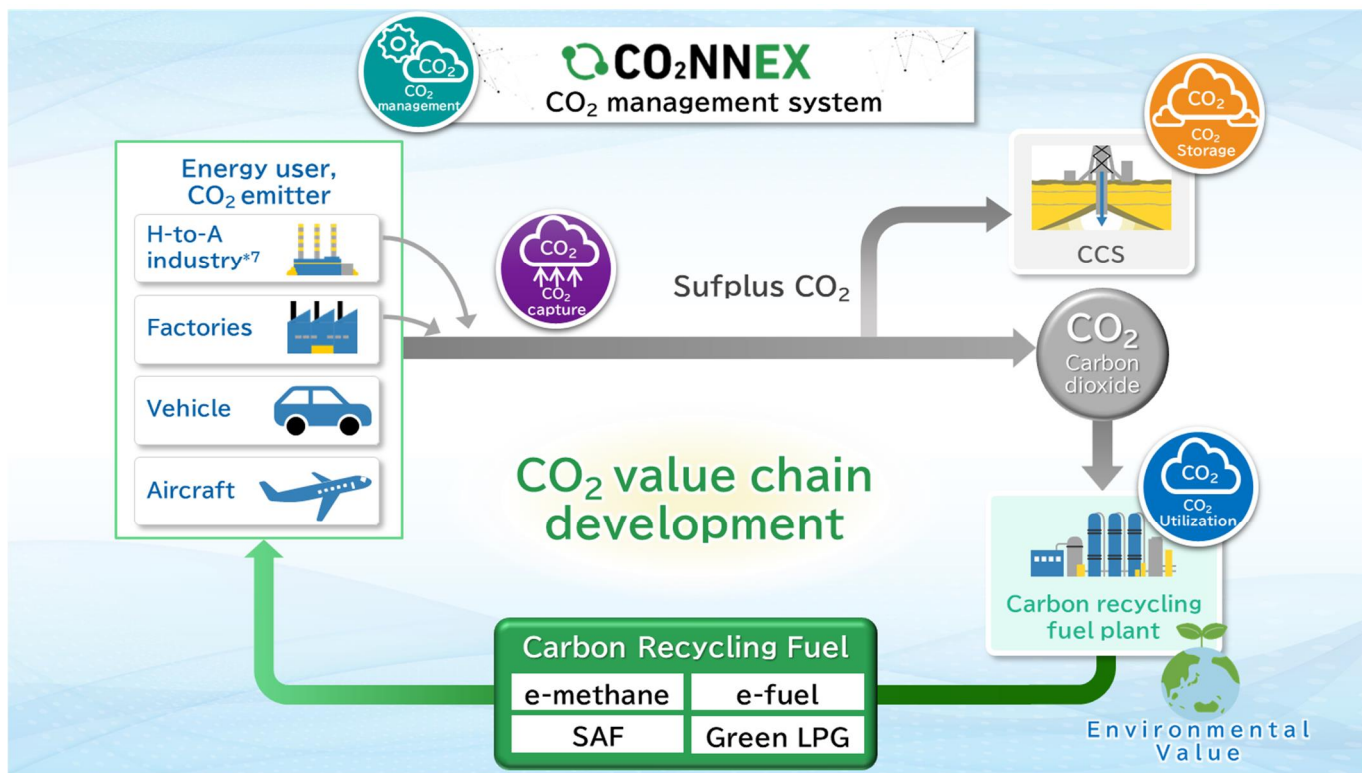
Private sector utilization of Clean Gas Certificates came into effect on April 1, 2024, and efforts to convert the environmental value of e-methane and biogas produced in Japan into Clean Gas Certificates are gaining momentum. Since the volume of transactions, such as those for the Expo demonstration, is expected to increase further in the future, a system for the transfer and management of clean gas certificates is required. Osaka Gas and MHI will utilize the results from CO₂NNEX at the Expo to support the practical application of e-methane technology across society, and contribute to the realization of a carbon-neutral world by 2030.

Notes

1: Environmental value: Since CO_2 emitted into the atmosphere (or CO_2 in the atmosphere) is captured and carbon recycled as raw material for e-methane, even when e-methane is used (burned), the amount of CO_2 in the atmosphere does not increase in real terms, so CO_2 emissions are effectively zero.

*2: For details on the implementation of CO$_2$NNEX at Expo 2025, see the following press release: "Osaka Gas and MHI to Implement the CO$_2$NNEX$^®$ Digital Platform for Managing and Transferring the Environmental Value of e-Methane at Expo 2025 Osaka, Kansai, Japan" (September 25, 2024) https://www.osakagas.co.jp/en/whatsnew/__icsFiles/afieldfile/2024/09/24/240925.pdf https://www.mhi.com/news/24092501.html

*3: Osaka Gas' e-methane production and utilization demonstration is a project to build and demonstrate a hydrogen supply chain in urban areas based on methanation using hydrogen derived from renewable energy, and biogas derived from food waste. The project was selected by Japan's Ministry of the Environment for its "Demonstration Project to Build a Model for Lowering the Cost of Hydrogen Supply Using Existing Infrastructure."

*4: CO$_2$NNEX Proof of Concept is a project conducted in 2022 that demonstrated the feasibility of a system to enable the transfer and management of clean gas certificates from the standpoint of CO$_2$ emissions in the e-methane supply chain.

*5: CCU: Carbon dioxide Capture and Utilization

*6: CCS: Carbon dioxide Capture and Storage

*7: H-to-A industry: Hard-to-abate industry

About Osaka Gas

Osaka Gas aims to achieve net-zero emissions across its group under the Carbon Neutral Vision the company announced in 2021. Osaka Gas is developing technologies and services that drive the decarbonization of society. As a company serving customers for their life and business advancement, Osaka Gas is actively addressing climate change and other social challenges.

About MHI

MHI Group is actively involved in programs targeting the realization of a carbon neutral society. Building a CO$_2$ ecosystem is central to its energy transition initiatives. As a global leader in CCUS, the company aims to accelerate this ecosystem development by seeking widespread adoption of related hardware as well as the CO$_2$NNEX$^®$ digital platform.
For more information, see the CO$_2$NNEX website.