INPEX, Osaka Gas to Commence Technical Development Business on CO2 Emissions Reduction and Practical Application of Effective CO2 Use Through One of World's Largest Methanation Operations

－ Toward the Practical Application of Technology Enabling Carbon Neutralization of City Gas -

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INPEX CORPORATION
Osaka Gas Co., Ltd.

INPEX CORPORATION (INPEX) and Osaka Gas Co., Ltd. (Osaka Gas) today announced they will jointly launch a technical development business targeting the practical application of a CO2-methanation system toward the carbon neutralization of gas. This initiative is based on a subsidized project commissioned to INPEX today by the New Energy and Industrial Technology Development Organization (NEDO). The joint technical development business is scheduled to be carried out at a newly built location connected to the Koshijihara Plant at INPEX's Nagaoka Field Office in Nagaoka City, Niigata Prefecture, Japan. INPEX and Osaka Gas will jointly take part in the business by entering an operating agreement.

Methanation is a method to produce methane (hereinafter "synthetic methane"), which is main component of city gas, by reacting CO2 with hydrogen through a catalyst. By manufacturing synthetic methane from green hydrogen produced with renewable energy (hereinafter "renewables") and CO2, it is possible to realize the carbon neutralization of city gas. Synthetic methane can use existing city gas infrastructure and facilities and be deployed to sectors where electrification is a challenge. The Green Growth Strategy announced by the Ministry of Economy, Trade and Industry (METI) in collaboration with other ministries and agencies lists the objective of feeding Japan's existing (pipeline) infrastructure with synthetic methane amounting to the equivalent of one percent of the country's entire natural gas supply by 2030. The basic technical elements behind CO2 methanation, which utilizes the Sabatier reaction, are already established. Going forward, the requirement lies in the technical development toward reducing the cost of synthetic methane production and the practical application of methanation through means such as scaling up facilities on a large scale.

The business is scheduled to consist of a demonstration test involving the production of synthetic methane using CO2 extracted from within INPEX's Nagaoka Field Office from the second half of fiscal year 2024 into fiscal year 2025, and introducing the produced synthetic methane into INPEX's city gas pipeline network. The synthetic methane production capacity of the CO2 methanation facility to be developed by this business is expected to reach

approximately 400 normal cubic meters per hour, which would make it one of the world's largest scale operations by current standards.

Since 2017, INPEX has been conducting basic technical development on CO2 methanation at its Nagaoka Field Office at a synthetic methane production capacity of 8 normal cubic meters per hour. INPEX will leverage this experience to oversee the entire business and undertake the operations of the facilities. Meanwhile, Osaka Gas will make use of its engineering capabilities including its design know-how concerning catalytic technology to produce synthetic methane while saving energy as well as scale ups, having nurtured these capabilities since the time it produced city gas and alternative natural gas from crude oil-based resources, to oversee the design of the CO2 methanation facilities as well as the optimization of the process.

Furthermore, in parallel with the demonstration test at the Nagaoka Field Office, the companies will conduct CO2 methanation in countries where the production of renewables-derived green hydrogen can be carried out at low cost, such as Australia, and study the commercial evaluation of importing carbon neutral methane to Japan and institutional policies toward the domestic transfer of environmental value generated by CO2 methanation outside of Japan, etc.

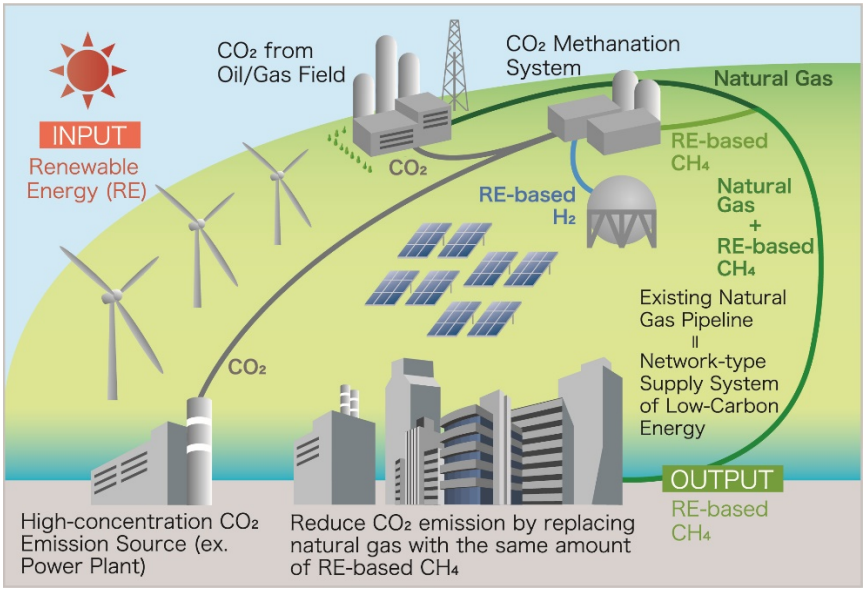
In future, the companies plan to conduct a demonstration business outside of Japan of commercial proportions (10,000 normal cubic meters per hour) and working with a view to commercializing an operation at a production scale of 60,000 normal cubic meters per hour. Through this business, INPEX and Osaka Gas will work toward the early-stage adoption of carbon neutralized city gas from CO2 methanation.

1. An overview of the methanation demonstration business

Parties and areas of responsibility	INPEX CORPORATION (scheduled subsidization from NEDO): evaluation of commercial scale applicability Osaka Gas (scheduled outsourcing from INPEX): development of reaction process technology Nagoya University (scheduled outsourcing from INPEX): development of simulation technology
Timeline	Second half of fiscal year 2021 until end of fiscal year 2025
Location	Newly built location connected to the Koshijihara Plant at INPEX's Nagaoka Field Office (scheduled)
Key components	1) Development of reaction simulation technology with the objective of understanding the reactive behavior of CO2 methanation against catalysts 2) Development of large-scale CO2 methanation reaction process

	technology with the objective of evaluating and establishing the basic process performance and the long-term durability of catalysts 3) Evaluation of applicability of reaction system with the objective of reviewing commercial scale expansion, applicability and economics, etc.

2. A graphic illustration of the business



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