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Developing Value Chain of Synthetic Methane for Net-zero Carbon City Gas Supply in Japan

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Abstract : About fifty years have passed since Japan's gas supply industry became the first in the world to switch from coal and oil to LNG as a city gas feedstock. Since the Japanese government target of net-zero carbon emission in 2050 was announced in October 2020, it has now entered a new era of challenges to commit to the requirement for decarbonization. This paper describes the situation that synthetic methane, produced from renewable energy-derived hydrogen and recycled carbon, is a promising national policy of transition toward net-zero society. In November 2020, the Japan Gas Association announced the 'Carbon Neutral Challenge 2050' as a vision to contribute to the decarbonization of society by converting the city gas supply to carbon neutral. The key technologies is methanation. This paper shows that methanation is a realistic solution to contribute to the decarbonization of the whole country at a lower social cost, utilizing the supply chain that already exists, from LNG plants to burner chips. The challenges during the transition period (2030-2050), as CO2 captured from exhaust of thermal power plants and industrial factories are expected to be used, it is proposed that a system of guarantee of origin (GO) for H2 and CO2 should be established and harmonize international rules for calculating and allocating greenhouse gas emissions in the supply chain, a platform is also needed to manage tracking information on certified environmental values.

Keywords : synthetic methane, recycled carbon fuels, methanation, transition period, environmental value transfer platform
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