

# NEWS RELEASE

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## Initiation of Joint Feasibility Study of Ammonia Value Chain between eastern Siberia and Japan for future low-carbon ammonia introduction

Japan Oil, Gas and Metals National Corporation (hereinafter “JOGMEC” Headquarter: Minato-ku, Tokyo; Chairman & CEO: Tetsuhiro Hosono), Irkutsk Oil Company hereinafter (“IOC”), Toyo Engineering Corporation (hereinafter “TOYO”) and Itochu Corporation (hereinafter “ITOCHU”) agree on the joint feasibility study of low-carbon ammonia value chain between eastern Siberia and Japan.

The project aims to establish a future low-carbon ammonia (Note1) value chain at a commercial scale. Ammonia does not emit CO<sub>2</sub> through combustion, and is expected as a next-generation carbon-free fuel for power plants and marine engines which require huge amount of energy. The parties are willing to prepare a new option for energy security between Russia and Japan by establishing a new value chain which transports ammonia produced in Russia to be utilized as fuel in Japan.

On July 1, 2020, JOGMEC issued its new “Technical Business Strategy for a Low-Carbon Society”. In order to proactively respond to changes in the environment surrounding oil and natural gas development, JOGMEC defined three central pillars of a new technical business strategy as follows;

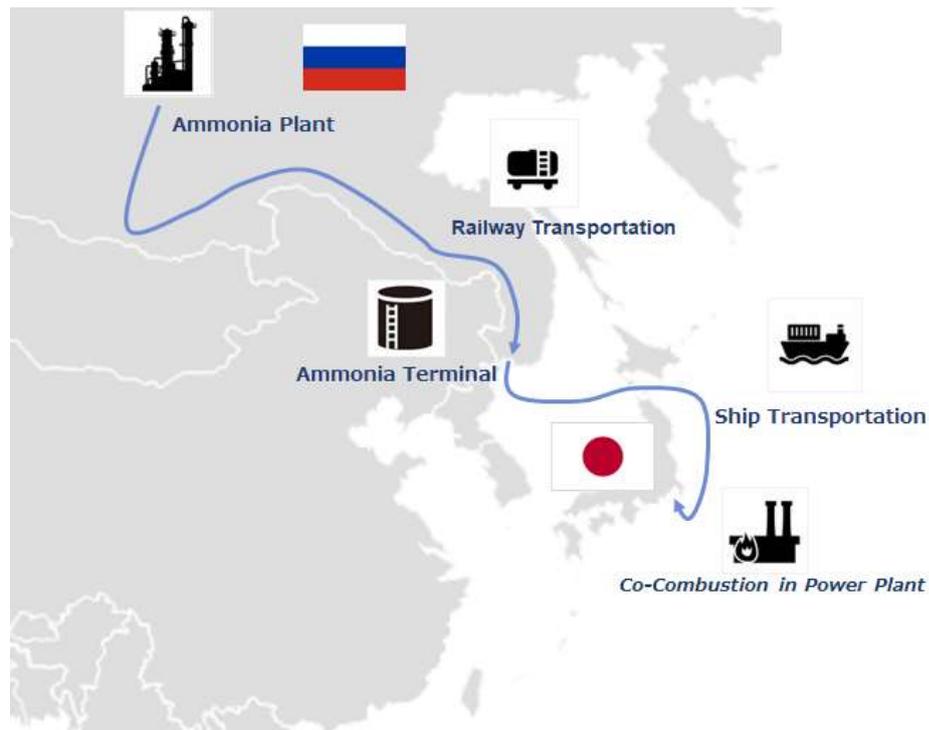
- Contribute to the realization of a low-carbon society
- Pursue new possibilities in oil and gas field development
- Strengthen foundational technologies for technical evaluation of exploration and development projects

Based on the above strategy, JOGMEC initiated the feasibility study of a supply chain to transport ammonia converted from hydrogen produced by IOC from eastern Siberia, Russia to Japan by entrusting TOYO and ITOCHU.

As the next step, IOC and JOGMEC plan to conduct a study on low-carbon ammonia production system that combines conventional ammonia production from natural gas and CO<sub>2</sub> capture technology, whereas the captured CO<sub>2</sub> will be utilized for CO<sub>2</sub>-EOR(Note2). By realizing the low-carbon ammonia production system and value chain, mass-produced low-carbon ammonia can be stably supplied to Japan and used as fuel for power plants.

IOC, JOGMEC, TOYO and ITOCHU will contribute to establish low-carbon ammonia value chain between eastern Siberia and Japan through close collaboration among the parties by utilizing the

technologies and knowledge owned and promoting initiatives to reduce GHGs(Note3) by introducing low-carbon ammonia as fuel.



Low-carbon ammonia value chain flow diagram (Concept)

(Note1) Ammonia is liquefied under relatively mild conditions, i.e.  $-33$  deg.C in ambient pressure or 8.5 atm in ambient temperature. Since this condition is similar to that of Liquefied Petroleum Gas (LPG) liquefaction, ammonia can be stored and transported with a similar infrastructure for LPG storage and transportation.

(Note2) CO<sub>2</sub>-EOR (Enhanced Oil Recovery): A process to inject CO<sub>2</sub> in the oil reservoir with the aim of enhancing the production of oil, and increasing the overall recovery rate of oil from the reservoir.

(Note3) GHGs: Green House Gases