March 21, 2025
Cosmo Energy Holdings Co., Ltd.
Utilization of Carbon Dioxide Institute Co., Ltd.

Cosmo and UCDI Initiate Basic Study on CO_2-Derived, Next-Generation Ethanol Production to Meet Future Ethanol Demand

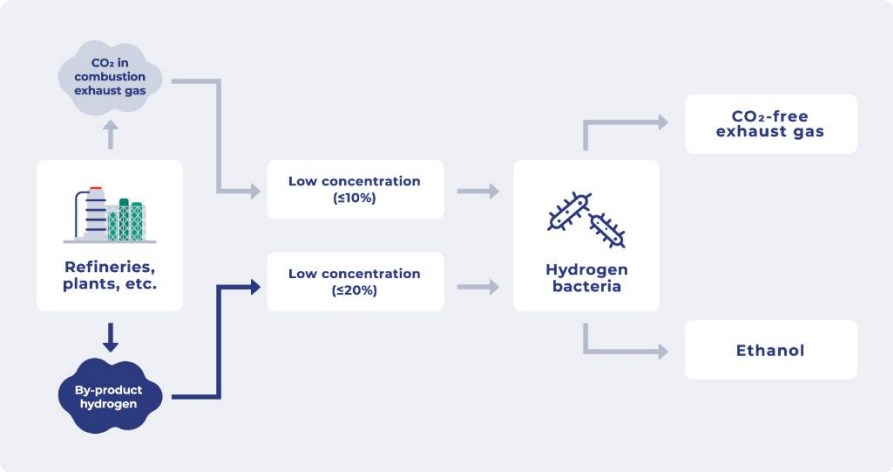
Cosmo Energy Holdings Co., Ltd. and Utilization of Carbon Dioxide Institute Co., Ltd. (hereafter “UCDI”) have signed an agreement for a joint study aimed at realizing Carbon dioxide Capture and Utilization (CCU) to convert carbon dioxide (CO_2) into ethanol using “UCDI ® Hydrogen Bacteria.[1]”

Ethanol is a versatile substance with various applications, including as an alternative fuel to gasoline, a raw material for biojet fuel, synthetic fuel, and other energy sources, and a feedstock for petrochemical products. While it is gaining attention for its contribution to carbon neutrality, ethanol derived from food crops—produced using food, plants, and other biomass feedstocks—faces challenges such as competition with food supply, limitations in production efficiency, and land use issues. With demand expected to increase, concerns are growing over the ability to ensure a stable supply in the future.

UCDI has developed the proprietary, highly proliferative hydrogen bacteria "UCDI® Hydrogen Bacteria" and possesses the technology and patents to produce ethanol from CO_2 and hydrogen. This technology enables mass production of ethanol without relying on food-based feedstocks, offering the potential to produce biofuels while reducing CO_2 emissions.

Conventional CCU technologies require removing impurities that inhibit CO_2 conversion from exhaust gases and raising CO_2 and hydrogen concentrations, both of which involve significant costs and energy.

In this joint study, the two companies aim to reduce production costs by developing technology that directly utilizes CO_2 and hydrogen containing impurities, enabling the cost-efficient production and supply of ethanol.



Through this collaboration, the Cosmo Energy Group and UCDI seek to produce sustainable products derived from CO_2 emissions from the Cosmo Energy Group's refineries and other facilities. Both parties are committed to exploring the potential for next-generation ethanol supply and advancing technological development toward the realization of sustainable fuels and chemicals.

1. "UCDI® Hydrogen Bacteria" use hydrogen as an energy source and absorb CO_2 as they grow. This process can be easily understood by comparing it to photosynthesis in plants. Furthermore, "UCDI® Hydrogen Bacteria" also boast the world's fastest growth rate among the hydrogen bacteria discovered to date.

Company Profiles

● Cosmo Energy Group

The Cosmo Energy Group announced its *2050 Carbon Net Zero Declaration* and is accelerating decarbonization-related initiatives under *Vision 2030* and the *Seventh Consolidated Medium-Term Management Plan Oil & New ~Next Stage~.* This collaboration is one of a number of concrete measures that the Group is taking to "strengthen competitiveness of the *Oil* Business and pursue low carbonization" as set forth in Vision 2030. It is being carried out with the goal of solving societal challenges and achieving sustainable corporate development toward the realization of the Group Management Vision of achieving "harmony with humanity, society, and our planet."

● Utilization of Carbon Dioxide Institute Co., Ltd. (UCDI)

In line with its slogan, "Turn CO_2 into Happiness," the Utilization of Carbon Dioxide Institute develops technologies to produce various products—such as fuels, chemicals, and food—utilizing CO_2, by applying its proprietary "UCDI® Hydrogen Bacteria."

By leveraging innovative biotechnology, UCDI aims to convert CO_2 into valuable resources, using hydrogen as an energy source. To help address food security issues and combat global warming, the organization is committed to further evolving its technology and doing its utmost to build a sustainable future.

(End)