

Biofriends, an Eco-Friendly Company Pursuing Carbon Neutrality

About the Company

Biofriends produces and offers clean fuels including dimethyl ether (DME) and hydrogen as part of the government's Green New Deal Project. Its business model centers on chemically converting carbon dioxide, a greenhouse gas, into carbon capture and utilization (CCU) products (methanol, r-DME, hydrogen, etc.).

Biofriends has a technology platform for carbon capture, utilization and storage (CCUS), a key technology for decarbonization that captures, utilizes and stores carbon dioxide (CO₂) causing climate change and extreme temperatures and threatening mankind. The company aims to grow into a sustainable and eco-friendly global leader by developing clean technologies, building clean fuel production plants and manufacturing and offering related products. It uses the CCUS technology to produce decarbonized and eco-friendly electrification fuel (e-Fuel), which is a kind of renewable fuel manufactured using captured carbon dioxide, together with hydrogen, methanol and DME, rather than fossil fuels.

Background

Biofriends is a clean fuel and dimethyl ether (DME) producer that was founded in 2016. It grew into the No. 1 DME producer and distributor in Korea by focusing on reducing the emission of environmentally harmful substances such as industrial greenhouse gases. Biofriends aims to contribute to Korea's effort to go carbon neutral by 2050 with DME and to improve the quality of life and protect the environment.

To fulfill its vision and goals, Biofriends has focused on developing technology since its establishment in 2016. It signed a technology transfer agreement (with the Korea Institute of Machinery and materials and Korea Gas Corporation) and memorandums of understanding with related companies to seek global business opportunities.

In 2020, Biofriends completed the establishment of

its DME plant (5,000 TPY) to become a DME manufacturer. The second plant (10,000 TPY) was completed in 2023 and went into operation. Biofriends obtained the BioDME certification (ISCC plus) in February 2024 and was recognized as an eco-friendly company.

About the Product

DME is currently sold primarily for aerosol applications and is exported in ISO containers.

Its properties similar to those of LPG enables it to be used as a fuel and replace diesel. In an effort to expand the fuel market, Biofriends is conducting demonstrations in smart farms, ships, and the LPG blending market.

DME is a colorless gas at normal temperatures and pressure and maintains a stable condition even when exposed to air for a long time. It is a colorless chemical that is inert, non-corrosive, non-carcinogenic, and non-narcotic, thereby causing no harm to the human body. In addition, it can be easily liquefied when pressurized above 6 atm at normal temperature and can be handled as a liquid for easy transportation. DME is currently being used in Europe and the U.S. as a fourth-generation alternative refrigerant in buildings and warehouses by mixing it with ammonia. It is widely used in the aerosol market as an eco-friendly blowing agent for foaming polystyrene exterior materials to reduce greenhouse gas emissions.

Biofriends has patents on the business model for producing e-Fuel, a clean fuel made from hydrogen and carbon dioxide and the plasma pyrolysis technology to produce hydrogen used as raw material, and a process that can produce e-Fuel. The company also holds a license for a DME plant that it has completed and is operating.

Based on these technologies, Biofriends aims to become a leader in the CCU and hydrocarbon businesses by implementing technology licensing projects and exporting technologies as well as products.

Competitive Edge and Business Strategy

Having started with a clean DME manufacturing and sales business, Biofriends has grown to command more than 70% of the domestic DME market and is gradually expanding its global sales network by entering the Chinese and Asian markets. Biofriends participated as the lead organization in a government project to produce clean methanol from captured carbon dioxide (government investment of KRW 25 billion and private investment of KRW 11 billion). It is also working on a project to produce 200,000 tons of clean methanol from domestic carbon dioxide sources by 2028 (targeting annual sales of KRW 140 billion).

Most notably, Biofriends has developed clean hydrogen, which is key to the CCUS technology platform, using its own technology to manufacture CO₂-free turquoise hydrogen and carbon black using the Plasma Carbon Neutral System (PCNS) to produce eMethanol and eDME from e-Fuel.

In addition, Biofriends has a sales network that offers CCUS products (DME, methanol, blue-green hydrogen, etc.) and aims to become a leader in the CCUS business by directly producing 1 million tons of decarbonized fuel in the next 10 years while seeking joint research and technology licensing based on its own technologies.

Biofriends is working toward the commercialization of hydrogen and DME technology and plans to widely introduce small-scale clean hydrogen facilities by verifying clean hydrogen in tests and using renewable DME in producing clean hydrogen. In case of the DME production technology, Biofriends is expected to enjoy stable service sales by building DME production plants with its plant engineering technologies and transferring (licensing) the DME technology for the supply of clean fuels. Biofriends expects additional sales from O&M contracts for DME production.

Future Plans

Biofriends was selected as the lead organization in the "Low-carbon Fuel and Technology Development Using the Carbon Dioxide Emitted from the Net Zero Cement Industry" project. It is the first project in Korea

aimed at building a R&D facility for demonstrating the feasibility of annually producing more than 10,000 tons of methanol with a net-zero technology. The technology involves Korea's first effort to capture carbon dioxide produced in the cement manufacturing process using the chemical conversion CCU technology. With the technology, fine dust and carbon dioxide emitted in the cement manufacturing process are captured together, refined and converted to a synthetic gas, which is ultimately converted to methanol widely used in the chemical industry.

Biofriends will lead the transition to a carbon-neutral society by producing environmentally friendly clean energy based on its DME extraction technology, DME hydrogen manufacturing and hydrogen refueling technology, and CCU technology to produce sustainable clean energy and reduce green gas emission by recycling carbon dioxide, while capturing carbon dioxide generated during the process and using it as an energy source for various future new industries.

The company has the technology to build a circular ecosystem centering on sustainable bioenergy as it can capture the carbon dioxide generated in the manufacturing process of other industries such as smart farms, cement, and steel and use it for DME extraction. The company plans to enter its target market with its technology.

In the future, Biofriends plans to also sell waste energy and its plant technology of recycling biogas and biomass from other fuel sources. The company expects to achieve annual sales of KRW 1.5 trillion by producing one million tons of DME at home and abroad with its own production facilities, and the company's third plant with a capacity of 30,000 tons is under construction

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BIOFRIENDS

** The opinions expressed in this article are the author's own and do not reflect the views of KOTRA.*