



Bio Friends DME fuel tanker
Hyundai Xcient diesel truck
DME fuel capacity: 15 tons

Bio Friends Leads DME, rDME & DME-H₂ Projects in Asia

10 January 2022 | Plans announced by South Korean DME manufacturer Bio Friends include leadership of a ₩39 billion (US \$30 million) national project for the production of low-carbon fuels using CO₂ captured from cement industry emissions, and a ₩4 billion (US \$3.3 million) project utilizing the company's DME-H₂ reformer for heating and power generation, both the first such projects in the region.



Bio Friends began producing DME in late 2020 at its 5,000 ton per year (TPY) facility at the Boeun Industrial Complex in North Chungcheong Province (photo right), and currently supplies DME to customers in South Korea for fuel, aerosol propellant, blowing agent and refrigerant applications. To date the plant has used fossil-derived methanol as a feedstock, but this year will begin producing rDME using renewable methanol for blending (33.3% wt) with (fossil) DME. A second DME production plant, with a capacity of 10,000 TPY, is currently under construction near the existing facility and scheduled to commence operation in early 2023.



Bio Friends 5,000 TPY DME plant
Boeun, South Korea

Production, Logistics and Applications Demonstrated

In addition to its core DME production business, Bio Friends has technology research and project development activities involving DME, rDME, LPG-DME blends and hydrogen, alone and in cooperation with partners including Engine Tech Win, Doowon Precision Industry, Korea Institute of Energy Research (KIER) and Korea Automotive Technology Institute (KATECH), across numerous application areas:

- **Sustainable mobility:** DME engine, and vehicle retrofitting for DME fuel use
- **Logistics:** DME transport, storage, distribution and dispensing
- **Power generation:** various capacity DME power generators
- **LPG-DME blends:** industrial heating and manufacturing processes
- **Hydrogen:** DME-to-hydrogen reforming process and fuel cell



Bio Friends DME refueling skid - 3 ton capacity

Bio Friends Leads DME, rDME & DME-H₂ Projects in Asia (continued)



DME-fueled engines developed by Bio Friends and Doowon Precision were demonstrated in three vehicles for a combined total of 40,000 km. The engines, based on a modified 3.9 liter Hyundai Kia diesel engine, can be used in vehicles and for power generation

CO₂ Capture, Renewable Methanol and rDME from Cement Industry Emissions

South Korea has announced plans to achieve carbon neutrality by 2050, including investment in technologies to reduce emissions in emission-intensive industry sectors such as steel, petrochemicals and cement. Bio Friends was selected to lead a project supported by the Ministry of Trade, Industry and Energy for the “Development of Low-Carbon Fuel Synthesis Using Captured CO₂ from the Cement Industry (CCU) Sector”. The project, with a budget of ₩39 billion (US \$30 million), involves demonstration of a 50 tpd CO₂ capture and 30 tpd methanol synthesis facility at the Sungshin Cement Company’s plant in Danyang. Sungshin has stated a goal of scaling up CO₂ capture to 400 tpd by 2027 and 2,000 tpd by 2030. Bio Friends plans to use this methanol to produce rDME at their facility. With almost half of all cement production plants in South Korea located in North Chungcheong Province, there is significant opportunity for other cement producers to leverage the technology developments being made in the region.

DME-to-Hydrogen Demonstration

Another national project announced last year and commencing this month involves demonstration of a DME-fueled hydrogen fuel cell in off-grid commercial agriculture, using the exhaust gas as a heat source in winter and with a heat pump for cooling in summer. The three-year project, “DME Fuel Cell Exhaust Heat Recirculation for Greenhouses and CO₂ Utilization”, is supported by the Ministry of Agriculture, Food and Rural Affairs and has a budget of ₩4 billion (US \$3.3 million). Bio Friends has performed numerous technology evaluations and demonstrations in the agriculture sector, including DME-fueled greenhouse power generation, boilers, heaters and CO₂ generators.

The company’s Chief Executive Officer, Dr. Wonjun Cho, previously led DME R&D at Korea Gas Corporation (KOGAS), and begins serving as chairman of the Korea DME Association (KDA) this year. He commented that “success in producing rDME from CO₂ captured from the cement industry could not only contribute to the reduction of greenhouse gas emissions, but could also create a monumental ripple effect on emission-intensive sectors closely related to the cement industry, such as steel and iron”.



Bio Friends DME-fueled 40kW, 60hz generator developed with Engine Tech Win

More information: en.bfi.co.kr

Report: rDME a “Clear Option” for Decarbonising LPG in New Zealand

18 January 2022 | A report prepared by international energy and engineering consultancy Worley published this month finds that renewable DME provides “a clear option for decarbonising” the LPG sector in New Zealand, according to the LPG Association of New Zealand (LPGA). The report, **Exploring Short Term Renewable LPG/DME Production for NZ** ([link here](#)), is the second in a two-stage research project by Worley commissioned by the LPGA and Gas NZ. The first report, **Pathway to 70/100% renewable LPG** ([link here](#)), released in March last year, looked at the overall approach to decarbonising the New Zealand LPG sector, with early research showing that achieving significant decarbonisation of the LPG sector was credible and within reach. “We had initially expected to find a clearer pathway for renewable LPG itself, however the technology for producing rDME is significantly more developed than the process for rLPG and accordingly has more immediate potential in New Zealand”, says Gas NZ Chief Executive Janet Carson.



More information: www.gasnz.org.nz



Photo courtesy BPMI Setpres

Construction Begins on Major Indonesian DME Project

24 January 2022 | Indonesian President Joko Widodo presided over the groundbreaking ceremony of a US \$2.1 billion (Rp. 30 trillion) project for the production of DME in Tanjung Enim, South Sumatra. The project, a collaborative venture between Pertamina, Air Products and Chemicals and Bukit Asam, is one of six new major energy investments designated a “national strategic project” by presidential decree for the period 2020 – 2024.

Following the announcement by the parties in 2019 of a joint venture to cooperate on development of a major coal gasification project producing DME for domestic consumption, detailed engineering design was performed in 2020. Air Products is supplying the gasification technology, Bukit Asam the infrastructure preparation, permits and feedstock, and Pertamina product offtake. Construction is expected to take 30 months to complete, with commercial production beginning by 2025. Gasification of low-calorie coal will provide syngas from which 1.4 million tons per year (TPY) of DME will be produced, in addition to 300,000 TPY of methanol and 250,000 TPY of methanol ethylene glycol (MEG).

Indonesia has been investigating the potential for DME production from domestic feedstocks, and fuel applications including LPG blends and substitution, for more than a decade, with early research into DME and LPG-DME fuel applications carried out by the Indonesian R&D Center for Oil & Gas Technology (LEMIGAS). In 2017 Pertamina commissioned a study evaluating the potential to substitute LPG with DME for domestic and commercial cooking applications, which included an implementation roadmap, evaluation of technical, operational, and financial feasibility, and a market trial in Jakarta involving hundreds of LPG consumers using 20%, 50% and 100% DME. In 2019 the Ministry of Energy and Mineral Resources’ (ESDM) Research and Development Agency completed a market trial of 100% DME with customers in Palembang and Muara Enim.

Indonesia is one of the four largest LPG importers in Asia (with China, India and Japan), and rapidly increasing consumption of LPG combined with subsidies for the product and diminishing production has moved the government in Southeast Asia’s largest economy to encourage investment in technology enabling the conversion of abundant quantities of domestic low-grade coal to methanol and DME in an effort to reduce LPG imports.

Also in attendance at the groundbreaking ceremony were Minister of Energy and Mineral Resources Arifin Tasrif, Minister of State-Owned Enterprises Erick Thohir, Minister of Investment Bahlil Lahadalia, the Governor of South Sumatra Herman Deru, President Director of PT Bukit Asam Arsal Ismail, President Director of Pertamina Nicke Widyawati, and Air Products Indonesia Chief Executive Officer Duddy Christian.

DME Event Calendar

DME Briefing Series
10 & 24 February 2022
Online

Gas Energy Australia National Forum
26 – 27 May 2022
Gold Coast, Queensland, Australia

9th International DME Conference (DME 9)
15 – 17 June 2022
Empa-Akademie
Dübendorf, Switzerland