Renewable and low carbon fuels for the off-grid energy sector

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Dimeta: accelerating the energy transition in off-grid areas

We are advancing the production and use of renewable and recycled carbon Dimethyl Ether ("rDME"), a low-carbon sustainable liquid gas, to support the de-fossilization of the LPG Industry at global scale.

Dimeta is a joint-venture between SHV Energy and UGI International, leading global distributors of off-grid energy.
LPG: Energy for off-grid areas

LPG (propane) is a liquid gas that allows the off-grid areas to have access to a clean and affordable form of energy.

- >200M tons/year LPG used globally for energy
- + 25% over past 10 years

Renewable LPG is already available, but in limited quantities. rDME can accelerate and scale-up the use of renewable fuel in off-grid areas.
rDME: energy ready to use

**Easy to handle**

DME is chemically similar to propane and butane, a gas at room temperature and pressure. Like LPG, it is easily transported as a liquid in pressurised cylinders and tanks.

**A simple product**

Dimethyl-ether is a molecule (CH₃OCH₃) that can be produced from a wide range of local renewable feedstocks.

**Safe, clean and green**

rDME can reduce GHG emissions by up to 85% compared to diesel and heating oil and emits no harmful particulates.

**Versatile Fuel**

DME has been used for over 50 years in the chemicals sector as an aerosol propellant. It can be used as a fuel, providing today a viable alternative to off-grid users.
A drop-in solution for the Propane Industry

- rDME can be used as a clean fuel for many applications: heating, cooking, industrial applications, but also transportation
- Blends up to 20% rDME could represent a drop-in solution, displacing volumes of fossil LPG.
- Appliances and equipment can, with small changes, also use 100% rDME: HDVs and Industry are the most promising sectors.
- DME is also an Hydrogen Carrier, easily reformable at low temperatures, making it a future solution for H2 applications
rDME is strongly supported by the LPG industry, and increasingly recognised in policy.
Dimeta works across the whole value chain...

**R&D**
Supporting novel routes to commercial production of rDME with targeted R&D activities.

**PROJECT DEVELOPMENT**
Developing opportunities, setting up collaborations and facilitating investment in rDME production and infrastructure.

**COMMERCIAL SUPPLY**
Sourcing rDME for onwards sale to LPG distributors, for both demonstration and commercial use.

**SAFETY & OPERATIONS**
Provide expertise on rDME operational acceptance and reliability. Demonstrating cost effective distribution of rDME use in a range of applications.

**ADVOCACY & COMMUNICATIONS**
Promoting the use of rDME as a solution in the energy transition, in both blended and pure form. Supporting the development of regulations and standards for safe and efficient use.
Targeting 300,000 tons/year of rDME by 2027

In order to reach this goal, Dimeta is:

Identifying partners and establishing the right collaboration framework for developing production plants

Supporting partners from pre-feasibility to project development activities

Partnering in investments

Providing a long-term stable offtake contract for the total production, backed by international LPG distribution companies

Supporting plants through all stages of development, in order to secure rDME offtake
We are investigating all routes to produce rDME

With first commercial plants expected to use gasification
We are investigating all routes to produce rDME

Gasification of waste and biomass to make rDME:

• Syngas purity requirements similar to other catalytic processes
• Conventional DME synthesis proceeds via methanol; more novel processes can go directly from syngas to DME in a single reactor
• High efficiency conversion of syngas to DME
• With a high specificity for DME as a product
• No further upgrading requirements, only purification to meet fuel DME specification (ISO 16861 / ASTM D7901)
Our first Plant: Circular Fuels Ltd

Circular Fuels Ltd (CFL) is the first partnership established by Dimeta to scale up the supply of rDME. CFL is a Joint Venture between Dimeta and KEW Technology. It is a specialised project development company, which develops construction-ready waste-to-rDME plants using KEW’s proprietary technology.

**Single – module demonstrator**
- Birmingham, UK
- 5 t/day production capacity
- Syngas production since 2019, rDME production from Q1 2023

**First commercial scale plant**
- 50kt/year production capacity
- 220kt/year non-recyclable waste feedstock
- Site secured: Teesside, UK
- International EPC engaged, detailed engineering complete, target start-up 2024

**Subsequent plants**
- Europe and USA
- Under development
- Potential for pipeline investment opportunity

About KEW: a UK based sustainable energy solutions company, that has developed an advanced gasification process, a form of Advanced Conversion Technology, which converts all types of non-recyclable resources and low-grade biomass into a wide-range of sustainable energy vectors, such as hydrogen, power, heat and advanced fuels.
Also working together with: Enerkem

In October 2022 we have entered into a collaboration with Enerkem, the first company in the world to produce renewable methanol and ethanol from non-recyclable, non-compostable municipal solid waste at full commercial scale.

- Exploring the development of rDME plants
- North America, Europe as targets
- Large scale rDME >150,000 ton/year
- Use of non-recyclable waste
- Strong focus on maximising CO₂ recycling
Some lessons learnt after 9 months of navigation...

Fair winds…

• Investors and Technology players are looking at rDME
• The LPG Industry has a genuine interest for rDME
• We now have a strong strategy to scale-up supply
• Collaboration can make the journey easier!

....and things to watch out for…

• Time : development, construction, global supply chains
• Inflation – the uninvited guest!
• Regulatory framework is in development, a lot of work!
Collaboration is key!

We are actively looking for collaborations on:

- rDME supply opportunities
- R&D and innovative technologies for rDME production
- Integration of rDME into the LPG value chain
- Financing and investments of rDME infrastructures
- Sustainable feedstock

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