Direct CO2-to-Fuels without syngas. Proven.

SYNTHETIC FUELS

A cost-effective way to deliver sustainable methanol for marine or dimethyl ether (DME) for road transportation. With further product upgrade production of other fuels is possible (e.g. sustainable aviation fuel, e-gasoline).

INDUSTRY DECARBONIZATION

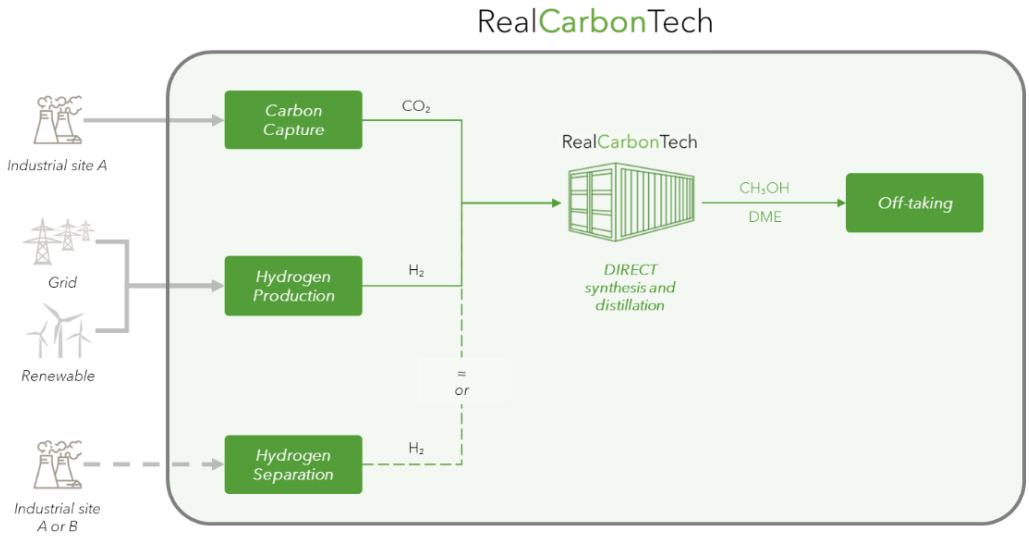
Low-footprint conversion of CO_2 emissions into marketable products in addition to carbon tax avoidance.

LONG-TERM ENERGY STORAGE

Non-battery solution to store and transport energy using already existing infrastructure. With long history of safe handling methanol addresses challenges of green energy generation volatility and export restrictions.

INTRODUCTION

Continuous hydrogenation of CO_2 in unique innovative process conditions is the only route to achieve breakthrough efficiencies in methanol synthesis without compromising scalability potential. CO_2 conversion, methanol yield and selectivity in our method are close to 100% in single pass, which is unrivalled by commercially available or emerging technologies. At the same time energy consumption is reduced by smart process design and can be optimized even further with a heat recovery solution.



ADDED VALUE

- **Modular design** for low footprint, reduced capex, optimized opex and suitability for scales from small to large.
- Higher pressure makes the process **less sensitive** to feed-stock purity grade and represents a high **electricity co-generation** potential.
- Made of commercially available parts and components the technology boasts **easy scalability** and minimized risk profile.
- **Catalyst efficiency** is increased from 1:1 to 1:7.5 (for commercial) and 1:15 (for own) catalysts.

MORE END-TO-END SYSTEM BENEFITS

- **Reduced costs** of feed-stock purification due to lower carbon dioxide and hydrogen quality allowed.
- Hydrogen **waste gases** from industrial processes can be used as a feed-stock.
- Flexible business model as either **methanol or DME** can be synthesized depending on project needs.
- A missing **breakthrough component** for any CO2-to-Methanol projects (DAC, PtX, CCU).

RealCarbonTech

www.realcarbontech.com

Direct CO2-to-Fuels without syngas. Proven.

30% LESS ENERGY REQUIRED

Our process design optimizes energy consumption and achieves efficiencies vs state-of-the-art.

70% MORE CO_2 ELIMINATION

By skipping the syngas stage, we replace reverse water-gas-shift (rWGS) and Fischer-Tropsch (FT) reactions with single conversion step without any gas emissions.

20-30% LESS CAPEX

With less production steps and no gas recycling, process flow is optimized for single compact converter and absence of gas recirculation equipment.

PARTNERS

TU Delft – Delft University of Technology

ICIQ – Institute of Chemical Research of Catalonia

Warsaw University of Technology

Łukasiewicz – Sieć Badawcza

TECHNOLOGY DEMONSTRATION

Antoni Migdal, CTO of RealCarbonTech at the demo facility in Warsaw, Poland

Launch date:	September 2022
Capacity:	Contenerised installation starting from 200 TPA to any capacity required
Feedstock:	Both carbon dioxide and hydrogen feedstock comefrom market supply
Set-up:	Phase 1 - Vertical across 3 floors Phase 2 – Horizontal in container
Footprint:	Equivalent to 40” sea container in total for capacity up to 4 000 TPA (500 kg/hr)
Catalyst:	Solid, commercial.

PROCESS SCOPE

- Hydrogen compression
- CO2 compression
- Pre-mixing unit
- Catalytic converter
- Gas-liquid separator
- Back pressure regulator (liquid).

PROCESS PARAMETERS*

- Standardised pressure and temperature
- CO2 conversion per pass: >95%
- Overall process efficiency: 100%
- By-product: H_2O.

** Patent protected*

NEXT STEPS

Industrial pilot project of scale 200–10000 TPA methanol capacity per one modul.
Possible scope of supply includes methanol / DME synthesis part separately,
or as an element of an integrated end-to-end CCU system as follows:

1) Methanol synthesis as per the scope above, catalyst, process control and automation in container, crude distillation module, product storage.

2) Flue gas treatment module (post-combustion carbon capture) from one of the predefined 3rd party providers.

3) Hydrogen separation / water plant and electrolysis module from one of the predefined 3rd party providers.

REQUIRED

CO_2 emission point/CO_2 source – 275 – 5500 TPA (35 – 700 kg/hr),
H_2 source – 38 – 750 TPA (5 – 95 kg/hr), electricity, utilities.

TOTAL INVESTMENT

Methanol synthesis - EUR 2 million – 7.2 million, EPC Lump Sum Turn Key.

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