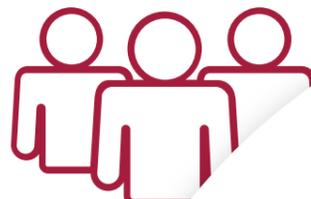


The new carbon fuels in the Renewable Energy Directive



RENEWABLE LIQUID AND GASEOUS TRANSPORT FUELS OF NON-BIOLOGICAL ORIGIN

Liquid or gaseous fuels which are used in transport other than biofuels whose energy content comes from renewable energy sources other than biomass,

where any carbon feedstock is captured from the ambient air;
Article 2, paragraph 2, point s,

CARBON CAPTURE AND UTILISATION (CCU) FUELS

Low carbon fossil fuels, which are generated from gases effluents produced as an unavoidable and not intentional consequence of the manufacturing or production of products that is intended for commercial use and/or for sale

Annex IX, Part A, point q a (new) and Article 25, paragraph 1, subparagraph 4, point b, subparagraph 1

BIOMASS

the biodegradable fraction of products, waste and residues from biological origin from agriculture – including bacteria, vegetal and animal substances, forestry and related industries including fisheries and aquaculture but excluding peat and material embedded in geological formations and/or transformed to fossil, – as well as the biodegradable fraction of waste, including industrial, commercial and municipal waste of biological origin, and bacteria;

Article 2 – paragraph 2

BIOFUELS

Liquid or gaseous fuel for transport produced from biomass or by biomass*;

Article 2 – paragraph 2 – point g

* includes bacteria

* excludes bacteria



RECYCLED CARBON FUELS

Fuels produced from unavoidable gaseous waste streams of non-renewable origin, including waste processing gases and exhaust gases, with substantial greenhouse gas savings over their entire lifecycle; the proportion of gaseous waste used for the production of these recycled carbon fuels, cannot be credited under other emissions reduction schemes, such as the EU Emission Trading System;

Article 2, paragraph 2, point ff

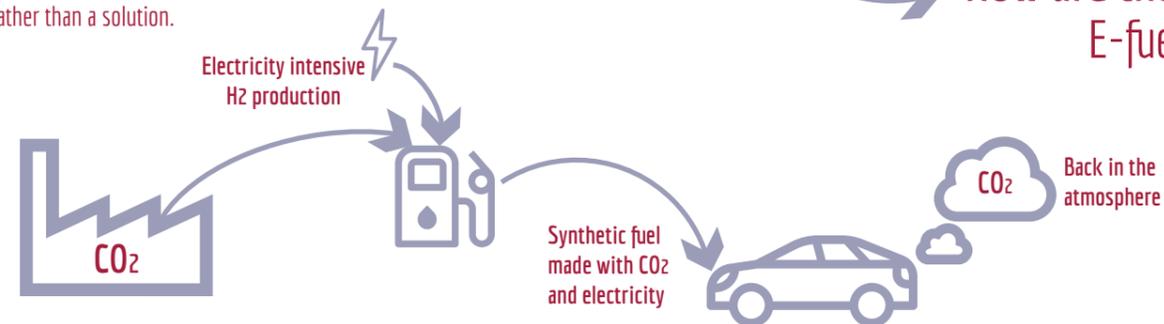
BACTERIA BASED FUELS

Liquid fuels produced through bacterial growth using the carbon oxides within gaseous waste and residue streams which are generated as an unavoidable and not intentional consequence of the manufacturing of products and are not credited under other emissions reduction schemes;

Article 2, paragraph 2, point u u a (new)

The European Parliament and the Council are currently deciding on the future of the key legislation affecting the use of renewable energy in the European union. Among the target for the use of advanced biofuels is a provision for synthetic fuels, also known as renewable liquid and gaseous transport fuels of non-biological origin. Without proper environmental safeguards, the fuels could prove to be more of a threat for climate change mitigation, rather than a solution.

How are they made? E-fuels



Why are these fuels a potential risk?

Greenwashing fossil



Due to a significant price difference, it is certain that fuel producers will use low-cost fossil CO₂, unless mandated otherwise. This undermines the climate rationale for the technology.

Energy intensive



To power Europe's transport with synthetic fuels, one would require up to 8 459 TWh by 2050 only to produce them – an equivalent of three times the total current European electricity production (3400 TWh), both fossil and renewable³.

Expensive



With a price tag of 3,000 € per tonne of electro-diesel (or electrojet or electropetrol)⁴, the fuels are around 6 times the price of a tonne of conventional diesel/petrol.

Limited climate benefit



Retains CO₂ and air pollution in transport while using 5 times more energy than electric cars and at a higher cost; The GHG performance also depends on grid electricity mix; emissions increase by 3.5 when using the German average grid mix

To ensure that the CO₂ used in the production of the fuels is not of fossil origin, even the car and fuel producers marketed it as CO₂ from ambient air:

"In addition to producing hydrogen with the aid of wind and solar energy, Sunfire's technology is also able to recycle atmospheric CO₂." Sunfire

"Synthetic fuels are climate neutral, they take as much CO₂ out of the atmosphere as they emit." President of the German Association of the Automotive Industry (VDA), Matthias Wissmann

".../ atmospheric CO₂ supplied by Climeworks enables the production of low-carbon synthetic fuels. With these synthetic fuels, the CO₂ emissions can be reduced by up to 85% if atmospheric rather than fossil CO₂ is used as a feedstock for the Power-to-Liquids process." Nordic Blue Crude

"A facility of the Audi cooperation partner Climeworks filters CO₂ from the ambient air and feeds it into the conversion reactor" Audi

Fuel type	Resource Inputs		Category		CO ₂ and air pollution
	Carbon	Energy	Biofuel	Advanced biofuel	
Renewable liquid and gaseous transport fuels of non-biological origin or direct air capture (ENVI)	CO ₂ captured from low carbon sources (coal, steel, cement) or direct air capture (ENVI)	Electricity from RES in principle; without safeguards, a largely fossil grid mix		✓	✓
Carbon capture and utilisation (CCU) fuels Recycled carbon fuels	Carbon monoxide gas and CO ₂ from industrial production	Fossil energy from industrial processes		✓	✓
Bacteria based fuels	Carbon monoxide gas, typically from steel production	Fossil energy from industrial processes	✓*	✓*	✓

If the definition of biomass includes bacteria, then a bacteria based fuel could theoretically qualify as either a biofuel or advanced biofuel

How to avoid buyer's remorse?

INCLUDING A FULL LIFE CYCLE ASSESSMENT AND ENSURING A GREENHOUSE GAS SAVING OF AT LEAST 70%

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USING ATMOSPHERIC CO₂ FOR THE PRODUCTION OF RENEWABLE FUELS OF NON-BIOLOGICAL ORIGIN

Amendment of the definition
Article 2, Paragraph 2, point s

This amendment safeguards the European consumers and ensures that the producers keep their word.

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ELIMINATING BACTERIA BASED FUELS AND CCU FUELS, MINIMISING DUPLICATION AND REDUNDANCY IS NEEDED TO AVOID UNCONTROLLABLE COMPLEXITY

3

¹ European Commission. 2017. Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast). Retrieved from: http://eur-lex.europa.eu/resource.html?uri=cellar:3eb9ae57-faa6-11e6-8a35-01aa75ed71a1.0007.02/DOC_16format+PDF

² Carbon Brief. 2017. The Swiss company hoping to capture 1% of global CO₂ emissions by 2025. Retrieved from: <https://www.carbonbrief.org/swiss-company-hoping-capture-1-global-co2-emissions-2025>

³ Ludwig Boelkow Systemtechnik and DENA. 2017. «E-FUELS» STUDY: The potential of electricity based fuels for low-emission transport in the EU.

⁴ Malins, Chris. 2017. What role is there for electrofuel technologies in European transport's low carbon future? Retrieved from: https://www.transportenvironment.org/sites/te/files/publications/2017_11_Cerology_study_What_role_electrofuels_final_0.pdf