



7th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers

20–21 March 2019, Cologne, Germany

Title of the presentation

CO₂ Capture from Air: A Breakthrough Sustainable Carbon Source for Synthetic Fuels

Teaser

Synthetic fuels produced from CO₂ are considered a key component of the mobility energy mix of the future and to reduce climate gases (Ref. Agora, BDI, IEA).

In its IPCC Special Report on Global Warming to 1.5C by the UNFCCC a process called **direct air capture** (DAC) was considered a key measure in order to keep global warming to below 1.5C.

In order for CO₂ based synthetic fuels to be truly climate neutral, sourcing CO₂ as highly concentrated, high purity CO₂ captured *directly* from the atmosphere through DAC is needed.

The concept of closing the carbon cycle through combining synthetic fuels production and direct air capture of CO₂ is illustrated in Figure 1 below.

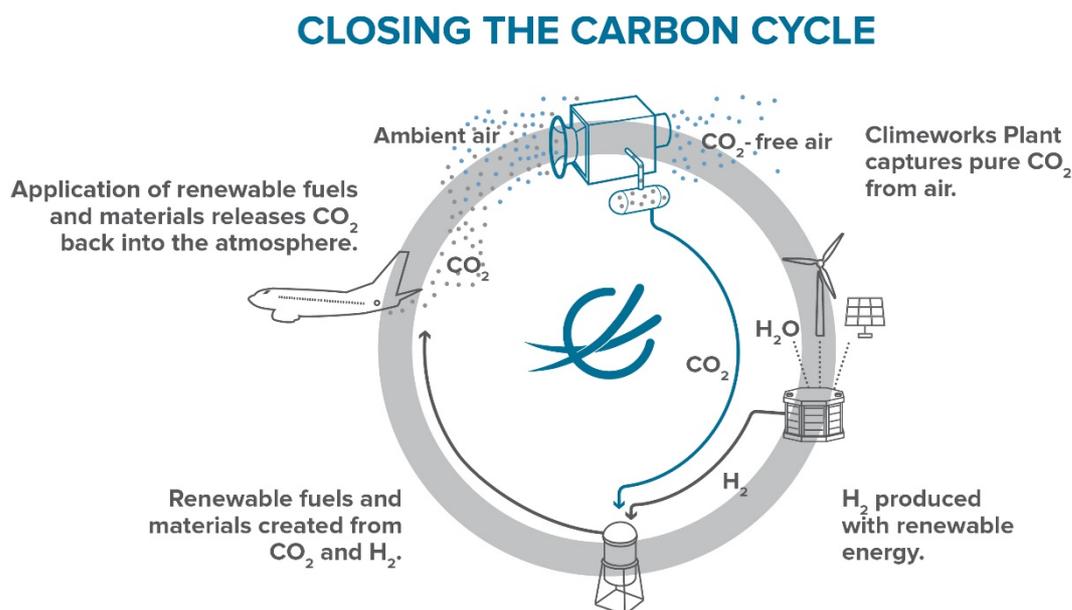


Figure 1: Closing the carbon cycle through direct air capture and synthetic renewable fuels.

Just a handful of companies are working on direct air capture of CO₂ worldwide. Amongst them, Climeworks is the first company with an industrial-scale, commercial plant in operation. In 2018 Washington Post hailed Climeworks the trendsetter in the field <https://www.washingtonpost.com/news/theworldpost/wp/2018/01/08/carbon-emissions>



Abstract

Climeworks already has a strong track record in supplying CO₂ for the synthesis of hydrocarbon fuels and materials. **Audi** has been a customer since 2013 and has to date bought two CO₂ capture plants from Climeworks. Audi incorporates Climeworks' products in its strategy for the production of renewable fuels from atmospheric CO₂.

Since 2015 Climeworks direct air capture plants have also been used for the production of synthetic methane by the **University of Applied Science, Rapperswil**. In December 2017, Climeworks delivered a demonstration plant to **ETH Zürich** for the experimental production of synthetic fuels through direct use of solar heat.

Kopernikus is amongst the largest German R&D programs within the framework of the German "energy revolution" and Climeworks is involved in the energy storage projects on Power-to-Fuel technologies through its German subsidiary Climeworks Deutschland LLC. This entails integrating a Climeworks demonstration plant with Sunfire's electrolysis technology and INERATEC's modular microchannel Fischer-Tropsch reactors for the production of renewable liquid fuels.

Store&Go is another large R&D project within the framework of Europe's Horizon 2020 program, where Power-to-Gas energy storage technologies are being developed at three different sites. For one of those sites, Climeworks contributes a DAC-3 plant for the synthesis of renewable methane. **Celbicon** is a further R&D project, also within the Horizon 2020 program, that produces chemicals from CO₂. All CO₂ originates from two Climeworks demonstration plants.

In July 2017 **Nordic Blue Crude** announced the construction of a commercial synthetic fuels plant with an annual capacity of 10 million tons of synthetic crude oil. Some of the CO₂ required for production will be generated on-site by a Climeworks plant.

To date, Climeworks has a total of 14 projects that have either been realized or are currently under construction.

At the 7th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers, Head of Climeworks Germany Dr. Dirk Nuber will shed further light on Climeworks' success stories and plans in the providing air-captured CO₂ as feedstock for fuels.