

Press release

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Hitchhiker's Guide to Carbon Capture Utilisation

What does “Carbon Capture Utilisation (CCU)” mean and what are the main benefits? nova-Institute’s newest paper provides deep insights into all aspects of the use of CO₂: Concept and vision, (semi)commercial implementations, political framework, sustainability and economy. The nova paper will be presented and discussed at the “7th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers”, 20–21 March 2019, Cologne (Germany)

For many, CCU is still a mystery and even experts often think that its implementation is for the distant future and will take 50 more years minimum. The nova paper explains the CCU concept comprehensibly and shows that even the use of fossil CO₂ emissions for CCU brings clear environmental advantages – although they are still greater for biogenic CO₂. It also showcases the first (semi)commercial plants that are in operation or under construction. The CCU revolution is already well underway! Additionally, the paper discusses the improved political framework conditions in REDII and the upcoming ETS, analyses the sustainability of the new technologies and describes the economic status of CCU: Where is it already worthwhile today and where will it be tomorrow? The Hitchhiker’s guide is your chance to understand one of the most exciting technologies of the future.

Carbon Capture and Utilisation (CCU) stands for the capture and utilisation of carbon dioxide (CO₂) as a carbon source to be used as a feedstock in the production of fuels, carbonates, chemicals and polymers. The energy needed for the transformation of CO₂ must stem from renewable resources to provide an environmental benefit compared to other sources of carbon. Nine out of the 17 Sustainable Development Goals of the United Nations are directly addressed through CO₂ utilisation in combination with renewable energies.

As one example for aviation and long-distance shipping, liquid fuels like kerosene and diesel are and will be indispensable in the long run. In both cases, CCU fuels are by far the best choice compared with conventional and also biofuels. The production process for CCU kerosene compared to bio-based kerosene shows significant advantages: a lower carbon footprint, based on the use of emitted CO₂ as a feedstock, much lower space requirements compared to cultivated biomass needed for bio-based kerosene and optimal production conditions in the desert, based on the high and cost-efficient supply of solar energy as the necessary renewable energy source.

Also, the chemical industry can only become sustainable if it completely abandons fossil feedstocks such as crude oil, coal and natural gas and strictly uses only renewable carbon as a raw material for organic chemistry. So CCU is crucial for a future sustainable chemistry.

About 70 research projects, start-ups and established companies are currently using or planning to use CO₂ or off-gases for the production of fuels, chemicals, polymers, proteins and gases for energy storage and chemicals. In the nova paper a selection of the 12 most advanced projects and companies at commercial scale is shown to underline the fact that CCU technologies are already successfully performed and not only a possible perspective for the future.

Under current conditions, renewable carbon from CCU is generally more expensive than fossil carbon from crude oil or natural gas. The most decisive factor for the price difference is the price at which renewable energy can be obtained for hydrogen production in the CCU process – the discrepancy will decrease in the future. The nova paper discusses different factors determining economic feasibility and how fast price parity can be reached.

Political frameworks are decisive for the make or break of infant technologies. The new renewable energy framework of the European Union, coming into force in 2020, includes support measures for transport fuels won from carbon capture and utilisation. It is the first time that such measures are part of a regulatory document on EU level. During the negotiations preceding the agreement on the revised Renewable Energy Directive (REDII), it became clear that many policy makers were previously not aware of the potential of the technology. Within a relatively short time, the topic grew roots in Brussels' discourses.

The EU Emissions Trading System (ETS) is the largest greenhouse gas emission trading scheme in the world and a cornerstone of the European Union's efforts against climate change. Where Carbon Capture and Sequestration (CCS) applications have a special position within the ETS, the same is not the case for CCU applications, meaning that companies have to purchase emission allowances for emissions they capture and utilise again for another process or product. However, also in this policy area, awareness is increasing and one company has already successfully challenged these regulations in court. Potential changes in the ETS are highlighted in the paper.

You can download the full nova paper #11 “Hitchhiker’s Guide to Carbon Capture Utilisation (CCU)” for free here: www.bio-based.eu/nova-papers

The nova paper will be presented and discussed at the “**7th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers**”, 20–21 March 2019, Cologne, Germany: www.co2-chemistry.eu

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nova-Institute is a private and independent research institute, founded in 1994; nova offers research and consultancy with a focus on bio-based and CO₂-based economy in the fields of food and feedstock, techno-economic evaluation, markets, sustainability, dissemination, B2B

communication and policy. Every year, nova organises several large conferences on these topics; nova-Institute has 30 employees and an annual turnover of more than 3 million €.

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