Press release

nova-Institut GmbH (www.nova-institute.eu)

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Soap, proteins and highly complex molecules from CO_2 – these are the winners of the "Best CO_2 Utilisation 2022" innovation award

Large scale investments in CO_2-based ethanol, methanol and aviation fuel are just around the corner – supporting climate protection and independence from fossil fuels. Participants of the "Conference on CO_2-based Fuels & Chemicals 2022" elected the three innovation award winners. The award was organised by nova-Institute and CO_2 Value Europe, and sponsored by YNCORIS.

Finally, networking in person again: Participants used every minute of the conference to generate new or intensify existing contacts. After two long years of online-events, participants could finally enjoy the benefits of real in-person networking and got reminded how much better it is on site. The perfect spring weather did the rest. A total of 200 participants attended this year`s edition of the established "Conference on CO_2-based Fuels & Chemicals 2022", 100 on site in the heart of Cologne (Germany) and 100 online. A generous conference sponsoring was provided by Covestro (DE) and Evonik (DE). Thanks to the excellent IT, the event achieved a seamless integration of on-site and online presentations. The participants showed active involvement in the presented topics and asked about 500 questions, which were discussed extensively in each of the seven panel discussions following the respective sessions. Dr Martin Lindmeyer of YNCORIS (DE) pointed out that "this international conference is unique in Germany with its variety of academic and industrial participants. It's an excellent platform to present and get informed about the latest news and state-of-the-art technologies".

The conference offered a comprehensive overview of where Carbon, Capture & Utilisation (CCU) stands today and what developments are be expected in the coming years. This indeed is something to be proud of. Concrete projects covering an estimate of several 100,000 t of CO_2-based products are just around the corner.

A recent focus was identified in the commercial implementation of CO_2-based ethanol, methanol and kerosene. While Ethanol and methanol are fuels and form important building-blocks for the chemical industry. Methanol can be used directly to fuel container ships in particular, which so far usually run on heavy fuel oil.

At this point, LanzaTech (US) in China already produces 60,000 t/y of CO_2-based ethanol using emissions from the steel industry (CO, CO_2 and H_2) – and aiming to increase the volume soon to 200,000 t/y. A first European plant is planned to be built in Belgium at Arcelor Mittal Steelworks in Ghent (64,000 t/y). The generated ethanol will be marketed directly or refined into ethylene or aviation fuel.

Other industrial actors like the waste incinerator EEW (DE) and other companies too are planning to build large methanol plants in the Netherlands (two times 200,000 t/y) and Germany (300,000 t/y) that use CO_2 from waste incineration or industrial point sources by 2030. In addition, the company BSE Methanol (DE) is planning on erecting corresponding plants based on large-scale solar thermal power plants in Tunisia with major partners (150,000 t/y by 2025).

Further, various plants for the products of aviation fuel are about to start construction. Engie (FR) will install in Dunkerque (France) production facilities for 20 million litres of kerosene plus naphtha, diesel, methane and heat. Nordic Electrofuel (NO) will invest €175 million in southern Norway near Oslo in 2024 to then produce 10 million litres of aviation fuel per year from CO_2.

What was still a vision in the last ten years is now becoming reality. The production of e-kerosene is mainly stimulated by a coming quota: According to the ReFuel Aviation EU proposal, by 2030, 5% of kerosene demand in the European Union would have to be met by sustainable aviation fuels (SAF), of which a minimum share of 0.7% of synthetic aviation fuels. By 2035, the mandate is supposed to increase to 20% SAF with a sub-quota of 5% minimum of synthetic fuels.

And it could develop much faster: The participants identified neither costs nor technology as the main barriers, but above all unfavourable regulations in Europe and worldwide. With the right political and economic framework conditions, CCU technologies could for example meet the demands of large production quantities of methane from CO_2 and green hydrogen. In addition to support climate protection, these approaches could gradually replace Russian natural gas imports and offer gas customers in Europe more security of supply.

In addition to large scale commodity production, the conference also featured a variety of projects and investments in complex molecules for fine chemicals and polymers using new chemical catalysts, electrochemistry and biotechnology. The CCU industrial association CO_2 Value Europe (CVE) presented a database project, collecting information about all CCUprojects in the world: in operation, under construction and planned.

CCU has the potential to fundamentally transform the entire chemical industry and replace fossil carbon with renewable carbon.

As Professor Dr Andreas Pinkwart, Minister of Economic Affairs, Innovation, Digitalization and Energy of the State of North Rhine-Westphalia, and patron of the conference pointed out:

"On the path to a climate-neutral and strong, internationally competitive future in the long term, CO_2-based fuels and chemicals have a key role to play. [...]96 % of production in the EU depends on chemical precursors."

Best CO_2-Utilisation 2022 – three innovative winners

It became particularly exciting for the audience when every participant was asked to vote for the best presentation out of six nominees. The "Best CO_2 Utilisation" award is granted for the fourth time to innovative and trend-setting CO_2-based products and technologies. This year`s innovation awards 2022 went to the companies CleanO_2, Avecom and Fraunhofer IGB. The Canadian company CleanO2 Carbon Capture Technology converts waste-CO_2 into potassium carbonate in order to produce soap. Avecom from Belgium produces single-cell proteins made by micro-organismen also generated from CO_2. The German Fraunhofer Institute IGB developed a process for the selective incorporation of CO_2 into highly complex molecules.

Here are the three winners of the award 2022 in detail:

1st winner: CleanO_2 Carbon Capture Technologies (CA) – CleanO_2 Soap

CleanO_2® makes a revolutionary soap the old-fashioned way. Using 5,000-year-old know-how, the company makes premium natural cold-processed soap that contains captured carbon. In the form of potassium carbonate, this captured carbon gives the soap a luxurious silky lather. They convert the waste CO_2 into potassium carbonate, before the carbon enters the atmosphere, using a patented process. And even after the soap is used, the carbon remains sequestered. Further information: www.cleano2.ca

2nd winner: Avecom (BE) – Power to Protein

Power to Protein covers the sustainable production of protein-rich ingredients for human consumption. Avecom makes use of single cell micro-organisms or bacteria that naturally consume hydrogen and oxygen gas, both derived from green electricity by means of electrolysis, and carbon dioxide to produce a biomass rich in protein and vitamin B12. Further drying of the biomass will produce a powder that can be further applied as food ingredient. The Power to Protein process uses its additional resources like nitrogen without any loss to the environment, therefore is not an emitter but a net consumer of carbon dioxide. Further information: www.avecom.be

3rd winner: Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB (DE) – eBioCO_2n Technology

The eBioCO_2n technology developed among Fraunhofer IGB, MPI Marburg and TUM Campus Straubing powers for the first time the selective incorporation of CO_2 into highly complex molecules using green electricity. Its potential relies on the replacement of petrochemical-based processes to directly build molecules using electrolysers for CO_2 reduction. eBioCO_2n is a step towards achieving an energy and resource efficient circular carbon economy. Further information: www.igb.fraunhofer.de

Patronage, sponsors and partners

The nova-Institute would like to thank Professor Dr Andreas Pinkwart, Minister of Economic Affairs, Innovation, Digitalization and Energy of the State of North Rhine-Westphalia (Germany) for taking on the patronage of the conference.

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Many thanks go also to all partners www.co2-chemistry.eu/partners and media partners www.co2-chemistry.eu/media_partners for their support of the conference.

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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 the transition of the chemical and material industry to renewable carbon: How to substitute fossil carbon with biomass, direct CO_2 utilisation and recycling. We offer our unique understanding to support the transition of your business into a climate neutral future. nova-Institute has more than 40 employees.

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