

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

PRESS RELEASE

From carbon-negative diamonds to CO₂-based fuels for transport – Smart innovations replace fossil-based products

The CO₂-based Fuels and Chemicals Conference 2024 announces six nominees for the innovation award “Best CO₂-Utilisation 2024”.

Hürth, 14 March 2023: Carbon Capture and Utilisation (CCU) represents a large set of technologies aiming at creating a circular carbon economy. It involves capturing carbon from flue gas or directly from the air, converting it into renewable fuels, chemicals, and materials, and ultimately substituting fossil carbon. Recognised by the IPCC as a key contributor in climate mitigation for hard-to-abate sectors, CCU is an essential solution to reduce emissions where none or few alternatives exist.

According to a recent [expert vision scenario](#) on the contribution of CCU towards climate neutrality in Europe, the EU will be able to capture at least 320 MtCO₂ mainly from biogenic, atmospheric, and process emission sources by 2050, more than half of which will be used to substitute fossil resources. Of the 173 MtCO₂ utilised, 50 % will be used to produce CO₂-based fuels mainly for aviation and maritime transport, and 43 % for the production of chemicals.

The [CO₂-based Fuels and Chemicals Conference](#) (www.co2-chemistry.eu) has developed into a unique meeting and networking place for the entire CCU and Power-to-X industry and its customers. This year's edition will take place from 17-18 April, in Cologne, Germany as a hybrid event. Just like in previous years, this event will be showcasing the latest and most important developments in the fast-growing field of CCU with plenty of opportunities to network.

Smart innovations will be making a major contribution to the replacement of fossil-based products in the industry and transport sectors, playing a crucial role in defossilising Europe.

“Best CO₂-Utilisation 2024” Innovation Award

This year's nominees for the innovation award “Best CO₂-Utilisation 2024” prove that CO₂ innovations can be used to produce sustainable textile fibres and plastics, carbon-negative diamonds, as well as sustainable aviation fuels and building materials.

The award is one of the highlights of this year's conference and puts a spotlight on innovative products and technologies in the field of CCU. An expert jury and the conference advisory board and sponsors selected six promising nominees among the interesting submissions received. Those will have the chance to present their CO₂ innovation to a broad international expert audience at Maternushaus, Cologne (Germany), and online on the 17th of April.

Celebrating six pioneering CO₂-innovations – The nominees

D-CRBN – Plasma-based CO₂ Conversion – (BE)

D-CRBN is a three-year-old CCU spin-off from the University of Antwerp. The company has established a proprietary modular and scalable plasma technology capable of splitting the CO₂ molecule into CO, all in a fully electrified, gaseous phase, without solvents or catalysts. The CO is then turned into added-value chemicals, such as e-fuels, organic acids, polymers, etc. that are used as feedstocks for the chemical, petrochemical, maritime, and metallurgical industries among others.

<https://d-crbn.com>

Dioxycle – Ethylene Producing Electrolyser – (FR)

Dioxycle is pioneering a breakthrough carbon electrolysis technology that converts industrial emissions into sustainable ethylene using just renewable electricity and water. As a result, Dioxycle can produce carbon-neutral ethylene cost competitively with the fossil pathway, providing an economically attractive pathway to defossilise many industrial and commercial sectors. Ethylene is the world's most used organic chemical, finding application in key everyday products such as textile fibres, plastics, and construction materials.

<http://dioxycle.com>

GIG Karasek– ECO₂Cell – Pioneering Modular Syngas Production – (AT)

ECO₂Cell is a cutting-edge, modular plant for producing syngas through low-temperature electrochemical conversion of CO₂. This innovative technology platform efficiently converts CO₂ into valuable chemicals and fuels, promoting a circular economy. Its modular design ensures scalability and adaptability to various industrial applications, offering a sustainable and cost-effective solution for CO₂ emission challenges.

<https://www.gigkarasek.com/en/>

The Sky Mining Company – Skydiamond – (UK)

Skydiamond, the world's first carbon-negative diamond, is mined from the sky. The Sky Mining Company created an alternative to the destructive act of land mining. Skydiamonds are planet-positive, certified, and chemically identical to the timeless diamonds. This carbon-capture innovation is a patented and bespoke biological process operating out of the English countryside using only four ingredients; rainwater, solar and wind power and of course, atmospheric carbon, making these the most sustainable diamonds in the world.

<https://skydiamond.com>

Twelve – E-Jet® – (US)

E-Jet® fuel, Twelve's sustainable aviation fuel (SAF) made from CO₂, is produced with only three inputs – water, renewable electricity, and CO₂. E-Jet® fuel was tested and certified by the U.S. Air Force in 2021, drop-in ready for use in existing aircraft, made to ASTM D7566 specifications, the same performance standard as fossil-based jet fuel. All with up to 90 % lower lifecycle emissions and sulfur dioxide (SO₂), nitrogen oxides (NO_x), and other particulate emissions.

<https://www.twelve.co>

University of Bologna – RAPCOR – (IT)

The RAPCOR concept aims to convert flue gas carbon into renewable isopropyl alcohol (IPA), serving as a versatile fuel, energy carrier, hydrogen carrier, or commodity chemical. RAPCOR approach uses microbial mixed culture (MMC, consisting of anaerobic homoacetogens) supported on a peculiar char-based sparger reactor to reduce bicarbonate with renewable hydrogen, thus obtaining high concentration (>60 g/L) acetate, which is ketonised and hydrogenated to IPA. This process works at mild pressure and temperature and allows to overcome most of the limitations of existing Power-To-Fuel pathways.

<https://site.unibo.it/pyrolysis/en>

The full conference program is available here: <https://co2-chemistry.eu/program/>

nova-Institute would like to thank Yncoris for sponsoring the innovation award “Best CO₂-Utilisation 2024” and CO₂ Value Europe for co-organising the Innovation Award. GIG Karasek is supporting the event as a Bronze Sponsor.

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Responsible for the content under German press law (V. i. S. d. P.):

Dipl.-Phys. Michael Carus (Geschäftsführer)
nova-Institut für politische und ökologische Innovation GmbH

Leyboldstraße 16 Tel: +49 2233 460 14 00
50354 Hürth Fax +49 2233 460 14 01
Germany contact@nova-institut.de

nova-Institut GmbH has been working in the field of sustainability since the mid-1990s and focuses today primarily on the topic of renewable carbon cycles (recycling, bioeconomy and CO₂ utilization/CCU).

As an independent research institute, **nova** supports in particular customers in chemical, plastics and materials industries with the transformation from fossil to renewable carbon from biomass, direct CO₂ utilization and recycling.

Both in the accompanying research of international innovation projects and in individual, scientifically based management consulting, a multidisciplinary team of scientists at **nova** deals with the entire range of topics from renewable raw materials, technologies and markets, economics, political framework conditions, life cycle assessments and sustainability to communication, target groups and strategy development.

50 experts from various disciplines are working together on the defossilization of the industry and for a climate neutral future. More information at: nova-institute.eu – renewable-carbon.eu

Get the latest news from nova. Subscribe to <https://renewable-carbon.eu/newsletters>

CO₂ Value Europe (CVE) is an international non-profit association representing the Carbon Capture and Utilisation (CCU) community in Europe and beyond with a mission to promote the development of a circular carbon economy based on CO₂ to reduce greenhouse gas emissions and to move away from fossil. More information at <https://co2value.eu>.

The Association brings together over 90 organisations worldwide from diverse sectors (including industries, start-ups, universities, research and technology organisations, and regional clusters), and develops a large network of many more organisations and individuals who share the belief that CCU technologies are necessary to help the EU reach climate targets.

Responsible for the content in the rest of Europe:

CO₂ Value Europe
Antonio La Mantia
Communications & Events Director
Antonio.lamantia@co2value.eu
Phone: +393803281710

Lili Chatzikonstantinou
Communications & Events Manager
Lili.chatzikonstantinou@co2value.eu
Phone: +32477571803